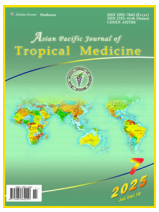

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Willingness to pay for hand, foot, and mouth disease vaccination in Ho Chi Minh City, Vietnam: A cross-sectional analysis

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ABSTRACT

Objective: To estimate the willingness to pay (WTP) of Ho Chi Minh City residents for the hand, foot, and mouth disease (HFMD) vaccine and its associated factors using the contingent valuation method.

Methods: This cross-sectional study was conducted in 2024, involved face-to-face interviews with 423 participants in Ho Chi Minh City. The participants were divided into two groups: parents of children under six and individuals without young children. WTP for the HFMD vaccine was assessed using the Krinsky and Robb procedure and the double-bound dichotomous choice technique. A probit regression model was used to analyze factors influencing WTP.

Results: The participants had a mean age of (34.0±10.3) years, and the majority of them were female, resided in urban areas, and held a university degree. 54.6% had children under six years of age, and 63.8% had never heard of the EV71 vaccine. The mean WTP for two doses of the HFMD vaccine was VND 1 240 000 (USD 51.66). Parents of children under six years old had a mean WTP of USD 49.16, while individuals without young children had a mean WTP of USD 56.25. Significant factors that were positively associated with WTP included vaccine price, younger age, higher income, and greater knowledge about vaccines.

Conclusions: The study indicates a relatively high willingness to pay for HFMD vaccination in Ho Chi Minh City, suggesting strong potential for vaccine implementation. It is recommended that the government disseminate vaccine-related information to enhance public awareness and understanding.

KEYWORDS: Contingent valuation method; Hand, foot, and mouth disease; Vaccination; Vietnam; Willingness to pay

Summary

Question: What is the estimated willingness to pay (WTP) for the hand, foot, and mouth disease (HFMD) vaccine, and what are its associated determinants among adults in Ho Chi Minh City?

Findings: This cross-sectional study, conducted among 423 adults in Ho Chi Minh City, estimated the mean WTP for two doses of the HFMD vaccine at VND 1 240 000 (approximately USD 51.66). Factors significantly associated with higher WTP included lower vaccine price, younger age, higher income levels, and prior awareness of the vaccine.

Meaning: The substantial WTP observed indicates a high level of public acceptance of the HFMD vaccine. These findings underscore the potential for successful implementation of HFMD immunization programs in Vietnam and may inform similar vaccine policy and pricing strategies in comparable international contexts.

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1. Introduction

Hand, foot, and mouth disease (HFMD) is a prevalent infectious illness affecting children, particularly in the Asia-Pacific region, where enterovirus 71 (EV71) is the primary causative agent of the disease[1,2]. This virus can cause severe complications in the central nervous system and a high risk of mortality[3]. The occurrence of HFMD is increased by environmental factors, such as high temperatures and humidity, making it a prominent health concern in countries with tropical monsoon climates, such as Vietnam[4,5].

Vietnam experiences HFMD year-round, with two epidemic peaks occurring from March to May and September to December. Its southern region is the hardest hit, accounting for over 60% of cases[6]. In 2023, the country reported more than 170 200 HFMD cases and 31 deaths[7]. As of May 12, 2024, the Ho Chi Minh City Center for Disease Control reported a cumulative number of 3 858 HFMD cases[8]. Although Vietnam's situation reflects broader global HFMD trends, it also highlights specific local challenges. For instance, HFMD imposes a substantial economic burden on endemic countries. From 2016 to 2017, the estimated average cost per case in Vietnam was around USD 400.80, half of which was paid out of pocket[9].

No specific treatment for HFMD is currently available. Its management revolves mainly around symptomatic care, disease surveillance, and public education[10]. The high incidence and economic burden of HFMD underscore the urgent need for vaccination as a crucial preventative measure to protect children and reduce the disease's impact[11]. In response to the escalating epidemic, Vietnam's Ministry of Health is considering approving HFMD vaccination for children under six years old[12]. This can significantly reduce the effects of the disease, mirroring the positive outcomes observed in other countries where the vaccine has been administered[9].

Clinical trials have demonstrated the safety and high efficacy of five monovalent inactivated EV71 vaccines developed in China and Taiwan region, as well as in Singapore[13,14]. Although these vaccines are currently approved only in China and Indonesia, their benefits suggest their likely adoption in other countries, including Vietnam[9]. However, introducing a new vaccine program requires extensive tasks, such as cost and budget estimation, vaccination strategy planning, the establishment of monitoring systems, and vaccine safety assurance. Therefore, understanding community acceptance and willingness to pay (WTP) for vaccination, as well as assessing knowledge, attitudes, and behaviors, is crucial for developing an effective vaccine delivery program with appropriate pricing.

Previous WTP studies in similar economic and epidemiological settings have offered valuable insights. The use of highly effective, safe, and affordable vaccines are generally associated with considerable parental WTP and low vaccine hesitancy[15-18]. Several studies conducted in Southeast Asia on the WTP for dengue and human papillomavirus (HPV) vaccines highlighted key factors such as socioeconomic status and vaccine efficacy, safety, and cost as influencing parental WTP[15,16,18]. Since low socioeconomic status is associated with reduced WTP, an imperative is to offer subsidized or free immunizations to attain higher vaccine coverage[15,16].

In similar contexts, knowledge and positive attitudes toward vaccination are positively associated with high WTP[15,16]. Parental WTP for vaccination for themselves is a strong predictor of WTP for vaccination for their children. Parental WTP for themselves is influenced by factors such as vaccine hesitancy and vaccine knowledge, which in turn affect parental WTP for their children[18]. Despite the importance of these issues, however, no studies have estimated WTP for HFMD vaccines in Vietnam or assessed the factors affecting it. Ensuring that such vaccines are both accessible and affordable, especially for vulnerable populations, is important. Given the cruciality of developing effective pricing strategies and ensuring broad community acceptance, the present research estimated the WTP for HFMD vaccines in Vietnam and examined the potential factors influencing it. The findings are expected to support the Ministry of Health's decisions regarding an HFMD vaccination program and its implementation. They can also help policymakers design informed and effective HFMD vaccination strategies in Vietnam, ultimately improving public health outcomes and potentially serving as a model for other countries.

2. Methods

2.1. Study design

A cross-sectional study was conducted in Ho Chi Minh City in mid-April 2024 using the contingent valuation method (CVM) with the double-bounded dichotomous choice (DBDC) technique.

2.2. Study population

Convenience sampling was employed to approach individuals for participation in interviews due to its convenience, ease of implementation, and time and resource efficiency[19,20]. The inclusion criteria were as follows: (1) at least 18 years old and residing in Ho Chi Minh City, (2) had not been diagnosed with or were not exhibiting symptoms of HFMD, and (3) of Vietnamese nationality and fluent in communication. Participants were excluded

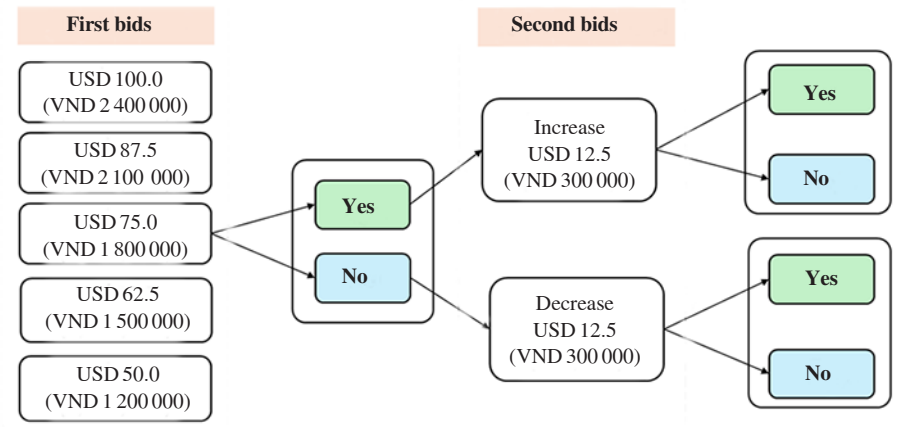

Figure 1. Double-bounded dichotomous choice technique for exploring the willingness to pay for the hand, foot, and mouth disease vaccine.

based on the discontinuation or incompleteness of answers.

Two groups of WTP scenarios were designed, involving the same vaccine but administered twice: parents without children under six years old (Group 1) and parents with children under six years old (Group 2). The sample size was calculated according to Cochran's (1977) method[21]:

$$n_0=Z^2_{1-\alpha/2}\times\frac{pq}{d^2}$$

where $Z^2_{1-\alpha/2}=1.96$ (the z-score value of standard normal distribution at a 95% confidence interval), p=0.5, q=1-p=0.5, d=0.05. To accommodate potential exclusions, the sample size was increased by 10%, resulting in a required sample of 423 individuals.

2.3. Data collection

Surveys were conducted through face-to-face interviews in densely populated areas, such as schools and clinics, as well as with acquaintances of the survey team. Trained interviewers, who were senior medical and pharmacy students, conducted the interviews, which lasted 5 to 10 minutes. The questionnaire comprised three sections. Section 1 contained the voluntary consent form, providing a comprehensive explanation prior to the participants' engagement in the research. Section 2 encompassed inquiries regarding the participants' demographic details, including sex, age, location of residence, educational level, marital status, and income, as well as their sources of information on HFMD and their comprehension of the EV71 vaccine. Section 3 presented a hypothetical scenario involving the HFMD vaccine intended for children above six months old and potentially extendable to adults. This was aimed at assessing WTP. In this scenario, the vaccine is anticipated to exhibit long-term efficacy spanning five years, with an efficacy of 95% for the first two years and safety despite common side effects, such as fever, redness, and pain at the injection site. It is administered in two doses spaced one month apart, effectively preventing the transmission of HFMD and EV71-related illnesses among those previously uninfected, albeit offering no benefits to individuals with a history of HFMD.

2.4. WTP measurement

CVM is a commonly used approach to eliciting preferences and assessing WTP[22]. Among the questioning techniques in CVM, the DBDC approach enables higher accuracy than that derived from other techniques. The DBDC valuation method is also statistically more efficient and provides more reliable estimates of WTP compared with the single-bounded dichotomous choice technique[23].

The vaccine price was referenced from a Chinese vaccine in 2016, which was priced at 1.2 million VND for a scheme of two doses. After adjusting for the consumer price index in 2024, the price is approximate 1.8 million VND. Combined with the DBDC technique, this results in five starting price levels (Figure 1). The participants were instructed to make a payment for the hypothetical HFMD vaccine, with the bid being randomly assigned by the researchers. The randomization process, executed through software, ensured that the distribution of bids occurred with approximately

equal frequency. The survey begins with the question "Would you be willing to pay this price for vaccinating your child?". The interviewers adjusted the price based on the participants' responses, with subsequent questions featuring a modified price accordingly. When a participant answered affirmatively ("yes" or "agree"), the question was repeated with VND 300 000 (or 12.5 USD based on the February 2024 exchange rate) added to the initial price. When a participant responded negatively ("no" or "disagree"), the question was repeated with VND 300 000 (or 12.5 USD) deducted from the initial cost. Upon repetition of the question, regardless of a participant's answer, the interviewer concluded the inquiry. The highest WTP was determined based on a participant's consecutive responses.

Combining the DBDC technique enabled us to obtain the mean and confidence interval using an appropriate model, that is, a parameter estimation method from a probit regression model combined with the Krinsky and Robb procedure[24–26]. Under this approach, G1 was the first bid, and G2 was the second bid. WTP was limited as follows: Yes-Yes WTP≥G2, G1≤Yes-No WTP<G2, G1>No-Yes WTP≥G2, No-No WTP<G2. WTP is represented by interval variable in the model.

2.5. Data analysis

Descriptive statistics were used to represent variables related to the sample's characteristics. The probit regression model was used to analyze the factors associated with the WTP for the HFMD vaccine. The mean WTP for the vaccine was determined using the Krinsky and Robb procedure, with a default of 5 000 replications[26]. In the context of Krinsky and Robb procedure, *P*-value (also known as achieved significance level) is used to interpret the hypothesis test, where H_0: WTP≤0 *vs*. H_1: WTP>0. The $P<0.05$ indicates that the WTP is significantly different from zero, in other words, there is evidence that the true WTP is greater than zero. All the data were managed using Microsoft Excel 365, and statistical analysis was carried out using STATA (version 13.0).

2.6. Ethical considerations

The study protocol was reviewed and approved by the Research Ethics Committee of Pham Ngoc Thach University of Medicine (No. 1084/TĐHYKPNT-HĐĐĐ, dated on 3 April, 2024). All the participants volunteered to take part in the research and were clearly informed about the purpose, procedures, and content of the study. Personal information was kept confidential, encrypted, and used solely for research purposes.

3. Results

3.1. Sample characteristics

A total of 423 participants provided complete responses (Table 1). The participants were aged 18 to 72 years, with a mean age of (34.0±10.3) years. Among them, 248 (58.6%) were female, 298 (70.4%) resided in urban areas, and 303 (71.6%) had university-level education. A total of 195 (46.1%) participants reported a monthly income of two GDP units (approximately 500 USD) or more. Regarding family status, 283 (66.9%) were married, and 231 (54.6%) had children under 6 years of age. Additionally, 270 (63.8%) reported that they had never heard of or learned about the EV71 vaccine.

Table 1. Demographic characteristics of the participants (*n*=423).

Variables	*n* (%)
Age group	
Mean±SD[#], years	34.0±10.3
18-30	172 (40.7)
31-40	149 (35.2)
41-50	75 (17.7)
≥51	27 (6.4)
Sex	
Male	175 (41.4)
Female	248 (58.6)
Location[a]	
Urban districts	298 (70.4)
Suburban districts	101 (23.9)
Suburbs	24 (5.7)
Education	
General	84 (19.9)
University	303 (71.6)
Postgraduate	36 (8.5)
Marital status	
Single (Not married/widow/divorce)	140 (33.1)
Married	283 (66.9)
Income (GDP)[b]	
<1	94 (22.2)
1-<2	109 (25.8)
≥2	195 (46.1)
NA	25 (5.9)
Have children under 6 years old	231 (54.6)
Level of information about EV71 vaccine	
Haven't heard	270 (63.8)
Just heard	114 (27.0)
Learned	39 (9.2)

[#]Data were expressed as mean±SD. GDP: Gross domestic product. [a]Decision No. 29/2014/29/2014/QĐ-UBND promulgating regulations on management of general planning and architecture in Ho Chi Minh City. [b]Monthly average income per capita in Ho Chi Minh City 2022 was 6 392 000 VND according to the Statistical Yearbook of 2022-General Statistics Office of Vietnam. NA: Not available (unknown/not want to answer). 1 USD=24 002 VND (Source: The State Bank of Vietnam-exchange rate for foreign currencies in February 2024).

Table 2 shows the distribution of the double-bound dichotomous responses concerning the first bid for the HFMD vaccine. In general, as the first bid increased, the percentage of "yes-yes" responses decreased, whereas the percentage of "no-no" responses increased. More specifically, at the first bid of 1.5 million VND (62.50 USD), the "yes-yes" response rate was 69.8%, but at 2.4 million VND (100.00 USD), it decreased to 48.9%. Conversely, the percentage of "no-no" responses increased from 16.7% at a bid of 1.2 million VND (50.00 USD) to 37.2% at a bid of 2.4 million VND (100.00 USD). Overall, 10.6% of the participants refused to pay more under a price increase, and 5.9% accepted a reduced vaccine price. The assignment of bid groups is random among participants. Table 2 summarizes the overview of response rates and offers preliminary insights. To gain a clearer understanding of whether these rates result from differences in respondent characteristics or price sensitivity, it is essential to incorporate a regression model.

3.2. Sources of HFMD information and factors that influence vaccine acceptance

Figure 2 illustrates the various sources from which the participants obtained HFMD information and the factors that influenced vaccine acceptance. The majority of the respondents relied on Internet/social networks (76.4%) in updating their knowledge of HFMD. However, 0.7% of them reported that they had never derived updated information on the disease. Other popular sources of information were television/radio/loudspeaker announcements (64.1%), family/relatives/friends (64.1%), and medical facilities/medical staff (52.2%). The factors that influenced vaccine acceptance included concerns about adverse effects (93.7%), vaccine effectiveness and safety (92.1%), and the time required for vaccination (19.0%). Equally significant considerations were the reliability and source of vaccine supply (87.3%), with many of the respondents suggesting government sponsorship for this vaccine (69.8%).

3.3. Mean WTP for the hypothetical HFMD vaccine

The CVM with the DBDC technique was used to estimate the WTP for the hypothetical HFMD vaccine (Table 3). Among 423 respondents, the mean WTP was estimated at 36.66 USD under the single-bounded format and 51.66 USD under the double-bounded format. The *P*-values ($P<0.001$) in all rows indicate that the mean WTPs are statistically significantly greater than zero at the 5% level, meaning that respondents were, on average, willing to pay a positive amount for the vaccine. Subgroup analysis showed that parents with children under six years old had a slightly lower mean WTP (49.16 USD) compared to those without young children (56.25 USD) in the double-bounded format. Despite this difference, both groups showed highly significant positive WTP values ($P<0.001$), confirming the demand for the vaccine across populations.

3.4. Factors associated with WTP

The probit regression results presented in Table 4 confirm the appropriateness of the models for both single- and double-bounded formats, as indicated by significant Wald test statistics ($P<0.001$) and acceptable multicollinearity levels (mean VIF=1.42). Several factors were significantly associated with willingness to pay (WTP), including age, income level, prior knowledge about the vaccine, and bid amount. Specifically, a one-unit increase in the bid amount significantly reduced the probability of a "yes" response, consistent with economic theory and findings in Table 2.

Notably, age had a negative association with WTP, indicating that older individuals were less likely to express willingness to pay for the vaccine. Since age was entered as a continuous variable in the model, this relationship reflects a general trend rather than differences between discrete age groups. In contrast, higher income and prior awareness of the vaccine were positively associated with WTP, suggesting that individuals with more financial resources

Table 2. Distribution of the dichotomous responses [*n* (%)].

First bid (USD)	Yes-Yes	Yes-No	No-Yes	No-No	Observation
50.00	55 (65.5)	10 (11.9)	5 (5.9)	14 (16.7)	84
62.50	60 (69.8)	4 (4.6)	3 (3.5)	19 (22.1)	86
75.00	48 (57.8)	14 (16.9)	8 (9.6)	13 (15.7)	83
87.50	48 (57.2)	7 (8.3)	7 (8.3)	22 (26.2)	84
100.00	42 (48.9)	10 (11.6)	2 (2.3)	32 (37.2)	86
Total	253 (59.8)	45 (10.6)	25 (5.9)	100 (23.7)	423

1 USD=24 002 VND (Source: The State Bank of Vietnam-exchange rate for foreign currencies in February 2024).

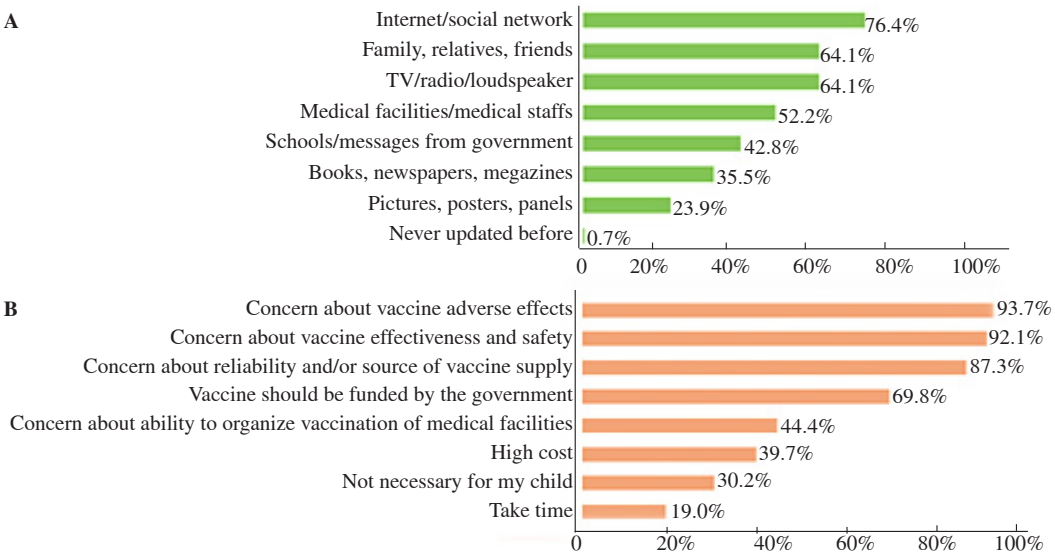

Figure 2. (A) Sources of hand, foot, and mouth disease information and (B) factors that influenced vaccine acceptance.

Table 3. Estimated willingness to pay for the hand, foot, and mouth disease vaccine (USD).

	Mean (USD)	95% Confidence interval		*P*-value
		Lower bound	Upper bound	
Total (*n*=423)				
Single-bounded	36.66	29.58	42.91	<0.001*
Double-bounded	51.66	45.41	57.08	<0.001*
Have children under 6 years old (*n*=231)				
Single-bounded	37.91	28.75	45.83	<0.001*
Double-bounded	49.16	40.00	57.08	<0.001*
No children under 6 years old (*n*=192)				
Single-bounded	37.91	25.00	47.08	<0.001*
Double-bounded	56.25	46.25	64.16	<0.001*

*Statistically significant at 5% indicates that the true willingness to pay (WTP) is greater than zero. Each *P*-value corresponds to a one-sample significance test assessing whether the estimated mean WTP is significantly different from zero. *P*-value=ASL (achieved significance level) used in the context of Krinsky and Robb procedure for testing H_0: WTP$\leqslant$0 *vs*. H_1: WTP>0. The two *P*-values for each subgroup represent separate tests: One for the single-bounded WTP estimate, and one for the double-bounded WTP estimate. All estimates were statistically significant at the 5% level (ASL<0.05), indicating that participants had a positive WTP for the vaccine across all subgroups. 1 USD=24 002 VND (Source: The State Bank of Vietnam-exchange rate for foreign currencies in February 2024).

and better knowledge were more inclined to invest in disease prevention. Overall, those who had previously heard about the vaccine demonstrated significantly greater WTP, highlighting the importance of public health communication.

4. Discussion

The HFMD vaccine is considered an important intervention, representing the most effective and fundamental measure for protecting children against the risk of infection and minimizing the burden associated with the disease[11]. This study is a pioneering work in Vietnam, aimed at estimating the WTP for the HFMD vaccine and determining the factors associated with such willingness. The average WTP for two doses stood at 51.66 USD, with the parents of children under six years old indicating a WTP of 49.16 USD and the participants without such children reporting a WTP of 56.25 USD. The average WTP for this vaccine was relatively high, equivalent to nearly one-fifth of the average monthly income per capita in Ho Chi Minh City. This points to a strong

Table 4. Probit analysis of factors associated with willingness to pay.

Variables	Single-bounded			Double-bounded		
	Coeff.	Robust Std. error	*P*-value	Coeff.	Robust Std. error	*P*-value
Follow bid (ref: first bid)	0.989	0.093	<0.001*	0.992	0.096	<0.001*
Age	-0.036	0.010	<0.001*	-0.037	0.010	<0.001*
Male (ref: female)	0.049	0.155	0.754	-0.134	0.152	0.378
Suburban and suburbs (ref: urban)	0.077	0.128	0.546	0.252	0.136	0.065
University and higher (ref: general education)	-0.302	0.158	0.056	-0.156	0.138	0.257
Married (ref: single)	-0.261	0.244	0.285	0.172	0.236	0.465
Income lower than GDP (ref: equal or higher)	0.254	0.089	0.004*	0.186	0.093	0.045*
Heard about vaccine (ref: never heard)	0.509	0.131	<0.001*	0.387	0.128	0.002*
Have child (ref: no child)	0.061	0.191	0.749	0.070	0.182	0.700
Constant	-0.411	0.457	0.368	-1.131	0.470	0.016

Notes: first bid, follow bid, age: continuous variables; *statistically significant at 5%. For the Single-bounded model: Log likelihood=-184.345, Wald χ^2 (9)=163.02, *P*<0.001, mean VIF=1.42; For the double-bounded model: Log likelihood=-193.355, Wald χ^2 (9)=130.00, *P*<0.001, mean VIF=1.42.

willingness among Vietnamese individuals to invest in disease prevention for their children despite their low level of awareness about this vaccine (with only 9.2% having sought information and 27% having heard of the HFMD vaccine at the time of the survey)[27].

In the CVM combined with the DBDC technique, two common and closely related biases are the starting point bias and the yea-saying bias[28,29]. Under the former, participants tend to respond closer to an initial bid, narrowing the allocation range around the mean value. Under the latter, many individuals agree to lower prices. Hence, we distributed responses across initial bids with approximately equal frequencies. This could be one of the explanations for the differences in WTP obtained in various studies. For instance, the WTP for two doses of the HFMD vaccine in Vietnam is 1.8 times higher than that in China (28 USD) but 1.7 times lower than that in Malaysia (87.47 USD)[30,31]. These differences may also arise from income levels, epidemiological profiles, residents' experiences with the disease, or national policies.

Furthermore, the average WTP for the HFMD vaccine with a two-dose regimen in this study significantly surpassed that for other vaccines in Vietnam, such as the tetanus vaccine (at 22 USD per regimen, three doses) and the hepatitis B vaccine (at 10.3 USD per dose with a three-dose course)[32,33]. However, compared with the WTP for vaccination schedules for the HPV infection, COVID-19, and dengue fever, the price for the HFMD vaccine is lower. Specifically, the WTP for a two-dose scheme of HPV vaccination is 137.5 USD, the WTP for two injections of the COVID-19 vaccine is 85.92 USD, and the WTP for a three-dose series of dengue fever vaccination is 130.34 USD (type 1) and 217.39 USD (type 2)[34–36]. Discrepancies in these figures may be attributed to the aforementioned bias factors as well as variations in data collection methodologies and statistical analyses.

The study found a notably high willingness to vaccinate, indicative of a positive outlook toward vaccination for children, reaching 85.1%, which is similar to the rates observed in China in 2020 and 2024 (87.8% and 87.7%, respectively) and surpasses the rate in Malaysia (71.5%)[30,31,37]. Primary deterrents to vaccination included concerns regarding vaccine side effects, efficacy, and safety, alongside an inadequate understanding of the disease and the HFMD vaccine. These findings align with the overarching trend analysis of future vaccination patterns and the global vaccine hesitancy data analysis by the World Health Organization/United Nations International Children's Emergency Fund[38,39].

This study uncovered a correlation between demographic factors and the WTP for the HFMD vaccine, offering practical insights into implementing vaccination programs in Vietnam amid escalating and complicated epidemic situations. The key influencing factors for WTP included age, income, and awareness of the HFMD vaccine, consistent with the findings from previous studies. Regarding vaccine pricing, as the tender price of the vaccine increased, the participants' WTP also rose, which differs from the findings of Rajamoorthy *et al*[30]. Additionally, the current study's results indicated that older individuals and those earning low incomes tended to exhibit lower WTP than that shown by younger individuals with higher incomes. Some studies have suggested that individuals with high education levels are more receptive to vaccines, but the current research found that heightened health consciousness and knowledge about vaccines significantly elevated the acceptance of vaccination fees. This trend mirrors findings from three studies

conducted in the cities of Jiangsu, Chongqing, and Guangzhou in China[37,40,41].

The combination of the abovementioned factors, along with the high WTP for the HFMD vaccine, is a favorable precedent for its introduction into the healthcare market in Vietnam. However, because the health insurance system of the country currently lacks policies to support vaccination, establishing affordable pricing to reach the general population under various economic conditions is imperative. The survey also underscored the paramount role of media as a convenient and highly effective avenue for disseminating information in the digital era. Therefore, the government needs to provide accurate, updated information to parents or guardians, educational institutions, and healthcare facilities to alleviate concerns. Alongside such efforts, Vietnam can counteract vaccine hesitancy and anti-vaccine sentiments to facilitate the deployment of the HFMD vaccine and foster public health resilience.

As with any other research, this study has some limitations. First, we employed the CVM, which affords researchers clarity, flexibility, and economy in time and resources, but it still suffers from certain drawbacks[42]. For example, the hypothetical nature of the vaccine scenario (in terms of effectiveness, duration of immunity, price, *etc*.) may have constrained the validity of the results[43]. Second, the respondents were recruited via convenience sampling, which is subject to sampling bias, thereby potentially diminishing representation of the entire Vietnamese population. To assess the representativeness of a study sample, researchers can adopt population-based probability sampling when feasible[20].

The current research is a reliable reference for future cost-effectiveness, or cost-utility studies related to the HFMD vaccine. It can also serve as a basis for expanding comparative research to regions within Vietnam with different economic characteristics, tracking changes in WTP over time through longitudinal data exploration or with vaccines for other pediatric illnesses.

The average WTP for two doses of the HFMD vaccine was 1 240 000 VND (51.66 USD). The factors significantly associated with WTP included younger age, high income, and previous awareness about vaccines. Initial and subsequent bids emerged as important determinants of decisions regarding payment for this kind of vaccine.

Conflict of interest statement

No potential conflict of interest relevant to this article was reported.

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Authors´ contributions

Vo TQ, Marzo RR and Vo BV conceived and designed the study. La TB, Vo TQ and Tran QV collected the data. La TB and Tran QV analyzed the data and contributed to the interpretation of the results. Marzo RR, Rajamoorthy Y, Chen HWJ provided methodological support, assisted in statistical analysis, and reviewed the manuscript. All authors contribute to the final version of the manuscript. Vo BV supervised the project and critically revised the manuscript.

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