Attitudes and Willingness to Pay Dengue Vaccine: A Survey Data Set Towards Public's Acceptance in Peninsular Malaysia

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Abstract

The paper analyses data concerning trust in key players, attitudes towards technology, religiosity, perceived benefits and barriers, perceived risks and severity, self-efficacy, cues to action towards attitudes, and the willingness to pay for the dengue vaccine among stakeholders in Peninsular Malaysia. The validated questionnaire was conducted using an online survey platform on the public in Malaysia starting from March to June 2024. The survey data were collected from 580 adults over the age of 18. The participants were 339 females and 241 males. Among the respondents, 281 were willing to pay between 0 and 49 Malaysian Ringgit for the immunization, while the rest were willing to pay more than MYR 50. Generally, the public in Peninsular Malaysia shows a positive attitude towards dengue vaccine and is willing to pay for it. They consider this dengue vaccine as beneficial and a high level of cues to action, translating into high acceptance. However, they also acknowledged concerns about the medium-level dengue vaccine's risks, perceived barriers, and severity. The extensive findings give several possibilities for evaluating the public's reception of the dengue vaccine, supporting the formulation of policies and action plans, and promoting more studies by other researchers interested in the methodology and data presented.

Keywords: *Attitudes, Willingness to Pay, Dengue Vaccine, Public's Acceptance, Peninsular Malaysia*

INTRODUCTION

Dengue fever is the most significant danger to the country's health and economy [1]. A dengue vaccine was developed due to the growing number of infections. Currently, two dengue vaccines have been introduced: Dengvasia, available in several countries [2], and Qdenga, which has been approved by the European Medicines Agency (EMA) for individuals > 4 years of age and use according to national recommendations [3]. However, these dengue vaccines have not been produced in Malaysia. Therefore, stakeholders' attitudes and willingness to pay must be assessed before distributing the dengue vaccination to Malaysians. Thus, this study builds on the previous framework from Arham et al. (2022) and adds the Health Belief Model (HBM) components. This study develops and improves Malaysian attitudes and tests dengue vaccination willingness to pay to find significant additional elements. The discovered major variables might assist the government, public health professionals, companies, and policymakers design vaccination uptake strategies to minimize dengue incidence and fatalities. This research on Malaysian opinion may also inform pandemic education and awareness efforts by healthcare staff. This study supports SDG17's goals of excellent health, well-being, and sustainable cities and communities. Refer to table 1 which displays the specifications data relevant to this study.

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Table 1. Specifications of the Data.

Subject	Infectious Diseases; Environmental Health; Vaccine
Specific subject area	Stakeholder's Acceptance; Attitudes: Willingness to Pay; Trust in Key Players; Attitude in Technology; Religiosity; Perceived Benefits; Perceived Barriers; Perceived Risks; Perceived Severity: Self-Efficacy and Cues to Action
Type of data	Table, figure
How data were acquired	Survey through a structured questionnaire
Data format	The data is in its original, unprocessed format and has been thoroughly examined using descriptive and statistical methods. The data file has been successfully submitted and processed.
Parameters for data collection	The respondents consisted of stakeholders located in Peninsular Malaysia. The sample was randomly selected from 11 states and 2 federal territories, specifically Kuala Lumpur and Putrajaya.
Description of data collection	The respondents among stakeholders consisted of people aged 18 and older, as they had the necessary maturity to make informed decisions on the dengue vaccine. They are actively engaged, both directly and indirectly, in controlling and preventing dengue disease. Respondents might also serve as a representative sample of the people residing in Peninsular Malaysia.
Data source location	Peninsular Malaysia
Data accessibility	https://data.mendeley.com/datasets/jjn2y7zxgz/1

METHODOLOGY

Experimental Design, Materials and Methods

The self-administration questionnaires were based on a validated study conducted by Arham et al. (2022) [1]. They incorporated the Health Belief Model (HBM) to investigate the factors influencing attitudes and willingness to pay for the dengue vaccine. The questionnaire consisted of six independent variables: trust in key players, attitudes towards technology, religiosity, perceived benefits, perceived barriers, perceived risks, perceived severity, self-efficacy, and cues to action. The questionnaire content was developed collaboratively by eight researchers specializing in environmental health, sustainability, bioethics, and society. Language experts reviewed the questionnaire to ensure language accuracy and relevance, thereby minimizing bias. A structured questionnaire using Google Forms was built in Malay, where respondents had to answer a questionnaire to facilitate understanding so that the terminology and phrases in the questionnaire coincided with the use of the language of the local population. Respondents were asked to participate in this study voluntarily and complete the questionnaire in a period not exceeding 20 minutes. As a non-random sampling method, the snowball sampling method was used by including a survey link at the end of the study and asking respondents to spread it to their contacts online. The survey, conducted from March to June 2024, involved 580 Malaysian stakeholders above 18 years old who have access to the Internet and use applications such as WhatsApp, Facebook and Gmail. Krejcie and Morgan (1970) recommended a sample size of 384 respondents for a population of over 1 million. Therefore, this study's total number of respondents is sufficient to represent Peninsular Malaysia. The multi-dimensional survey instrument used to assess public attitudes and willingness to pay for the dengue vaccine consists of three sections. Section A collects demographic information, Section B includes questions based on previous research and incorporates a willingness to pay component, and Section C incorporates additional factors from source H. All items were measured using a 5-point Likert scale from 1 (indicating strong disagreement) to 5 (indicating strong agreement). The Statistical Package for Social Sciences (SPSS®) software assessed descriptive and inferential statistics using Pearson Correlation and Multiple Regression analysis. The study aimed to assess their attitudes and willingness to pay for dengue vaccines.

Ethics Statement

This research was exempt from obtaining ethical approval according to the rules established by the Medical Ethics and Review Committee (MREC), Ministry of Health Malaysia, and the Declaration of Helsinki. All procedures have been executed following relevant legislation and regulations. Every participant willingly provided their consent to take part in this research.

FINDINGS AND DISCUSSIONS

The participants were explicitly chosen for their maturity and ability to provide meaningful responses to the research questions. The survey participants consisted of 339 girls and 241 men. Among them, 80.7% were between 18 and 28, and 48.4% expressed a willingness to spend between zero and 49 Ringgit in Malaysia for the dengue vaccination. Approximately 66.2% of the respondents identify as Muslim, with 384 Malays. This corresponds to the proportion of Malays and Muslims in the overall population of Malaysia, where Malays and Islam are the majority. Ultimately, almost 69% of them possessed a degree or above. Hence, the findings are deemed reliable as they are directly implicated in regulating dengue vectors. Table 1 displays the demographic characteristics of the participants.

Table 2. Demographic Profiles of Respondents (n=580).

	Items	Frequency	Percentage %
Gender	Male	241	41.6
	Female	339	58.4
Cost of Willingness to Pay	RM0-RM49	281	48.4
	More than RM50	299	51.6
Religion	Muslim	384	66.2
	Non-Muslim	196	33.8
Race	Malay	346	59.7
	Non-Malay	234	40.3
Age (years old)	18-28	468	80.7
	29-39	71	12.2
	Above 40	41	7.1
Level of Education	High School	44	7.6
	Pre-University and Diploma	134	23.1
	Degree, Master and PhD	402	69.3
Household Income	Less than RM999	107	18.4
	RM1000-RM2999	102	17.6
	More than RM3000	371	70.0
State	Pulau Pinang	60	10.3
	Wilayah Persekutuan Kuala Lumpur & Putrajaya	53	9.1
	Perlis	51	8.8
	Pahang	51	8.8
	Selangor	50	8.6
	Johor	50	8.6
	Perak	50	8.6
	Kelantan	48	8.3
	Terengganu	47	8.1
	Negeri Sembilan	41	7.1
	Kedah	40	6.9
	Melaka	39	6.7

Social Acceptance of the Dengue Vaccine through Attitudes and Willingness to Pay

Mean Score and Correlation Analysis

According to Figure 1, stakeholders in Malaysia have shown a positive attitude (M=4.30) and were willing to pay positively for the dengue vaccine (M=3.90). It can also be seen by looking at the perceived benefits of this technique (M=4.22) higher than the risks (M=3.57). They also affirmed a high level of religiosity (M=4.41), trust in key players (M=4.01), self-efficacy (M=3.74), and cues to action (M=4.05). They also showed a moderate attitude toward technology (M=3.64), perceived severity (M=3.63), and perceived barrier (M=3.10). The results suggested that they expressed a good attitude and were willing to pay for the dengue vaccine because they perceived it as beneficial, had high trust in key players and clung to their religiosity. This finding aligns with the study of Arham et al. (2022a), who showed a high level of attitude driven by the perception of the benefits of the dengue vaccine, trust in key players and the influence of religious commitment. Interestingly, the stakeholders also manifested high self-efficacy and cues to action [2]. This result was expected suggested by Arham et al. (2022b) [4], with stakeholders asking if those with strong religious beliefs would keep themselves healthy from contracting the seriousness of dengue by expressing their acceptance of the dengue vaccine based on perceived benefits, trust in key players and cues to action. However, they have also claimed moderate

attitudes towards technology, perceived risk, perceived severity, and perceived barriers to receiving this dengue vaccine. In a simple understanding, they are willing to pay for the dengue vaccine. Still, they acknowledge moderately perceived barriers, perceived severity, attitudes toward technology that will happen, and the level of risk of it. Subsequently, Pearson correlation analysis was conducted as suggested by Cheung and Chan (2005) to develop hypotheses [5] to determine the relationship between trust in key players, attitudes toward technology, religiosity, perceived benefits, perceived barriers, perceived risks, perceived severity, self-efficacy, and cues to action with the attitudes and willingness to pay for dengue vaccine. Table 2 showed a high correlation between perceived benefits (r=0.782, p=0.000) and cues to action (r=0.648, p=0.000) towards attitude towards dengue vaccine and had a moderate relationship between self-efficacy (r=-0.478, p=0.000) and trusted in key players (r=-0.487, p=0.000) towards this technique. At the same time, perceived severity (r=0.099, p=0.017) and attitude to technology (r=0.115, p=0.017) also showed a very low correlation with attitude towards this technique. Table 2 also showed a moderate correlation between cues to action (r=0.516, p=0.000), perceived benefits (r=0.518, p=0.000), trust in key players (r=0.459, p=0.000) and attitudes (r=0.571, p=0.000) towards willingness to pay for dengue vaccine. However, perceived severity (r=0.098, p=0.018), perceived risks (r=0.127, p=0.002) and attitude toward technology (r=0.114, p=0.006) showed a very low correlation with willingness to pay for dengue vaccine. Religiosity also highlighted a weak positive correlation with attitudes (r=0.357, p=0.000) and desire to pay for the dengue vaccine (r=0.280, p = 0.000). The perceived barriers had no significant relationship with the attitudes and willingness to pay for the dengue vaccine.

Multiple Regression Analysis

Analysis for Attitudes Toward Dengue Vaccine

The F-value of 353.942 with a p-value of 0.000 indicates that the models in Table 3 are statistically significant overall, explaining 64.8% of the variance. Perceived benefits positively and significantly impact attitudes toward the dengue vaccine. For every one-unit increase in Perceived benefits, the attitude score increases by 0.592 units. This relationship is statistically significant (p < 0.001). The findings of this study are parallel with Arham et al. (2023, 2022, 2021) studies, which showed that the most contributory factor was perceived benefits, having a significant relationship with attitude towards the dengue vaccine and Wolbachia-Aedes mosquitoes' technique [1,6,7]. Cues to Action positively and significantly impact attitudes toward the dengue vaccine. For every one-unit increase in Cues to Action, the attitude score increases by 0.214 units. This relationship is statistically significant (p < 0.001). Perceived barriers negatively and significantly impact attitudes toward the dengue vaccine. For every one-unit increase in the perceived barrier, the attitude score decreases by 0.049 units. This relationship is statistically significant (p < 0.01). The constant term is 1.087, indicating the baseline attitude toward the dengue vaccine when all independent variables are zero. This value is statistically significant (p < 0.001). Overall, the analysis shows that perceived benefits and cues to action positively impact attitudes toward the dengue vaccine, while perceived barrier has a negative impact.

Analysis for Willingness to Pay for Dengue Vaccine

In Table 4, the constant term for willingness to pay is -0.073, but it is not statistically significant (p = 0.733). This means that when attitudes, trust in key players, and cues to action are all zero, the model's predictions do not rely on the intercept, indicating that this value is not significantly different from zero. All predictors (attitudes, trust in key players, and cues to action) are statistically significant and contribute 80.5% to the willingness to pay for the dengue vaccine. Attitudes have the largest standardized coefficient (Beta) at 0.381, indicating the strongest effect on willingness to pay for the dengue vaccine. Trust in key players and cues to action also have significant effects, with standardized coefficients of 0.173 and 0.164, respectively. These values suggest that increasing attitudes, trust in key players, and cues to action are all associated with increased willingness to pay for the dengue vaccine. The R value (0.618) indicates the strongest positive correlation among the three models, suggesting that adding cues to action further improves the model. However, the R Square value (0.381) indicates that attitudes, trust in key players, and cues to action explain 38.1% of the variance in willingness to pay.

CONCLUSION

The study on the social acceptance of the dengue vaccine in Malaysia reveals that stakeholders have a positive attitude and a strong willingness to pay for the vaccine, driven by perceived benefits, high trust in key players, and strong religiosity. Correlation analysis shows that perceived benefits and cues to action have the strongest positive relationships with attitudes, while perceived barriers had no significant relationship with attitudes or willingness to pay. Multiple regression analysis confirms that perceived benefits and cues to action positively impact attitudes, explaining 64.8% of the variance, and attitudes, trust in key players, and cues to action significantly contribute to willingness to pay, explaining 38.1% of the variance. The findings are crucial for Malaysia and globally, as they highlight the importance of understanding and leveraging social factors to increase vaccine acceptance and uptake. For Malaysia, this can aid in formulating effective public health strategies to combat dengue, while globally, the insights can guide similar efforts in dengue-endemic regions. To enhance acceptance and willingness to pay, focusing on the benefits and addressing moderate concerns regarding technology, risks, and barriers through targeted communication strategies is recommended.

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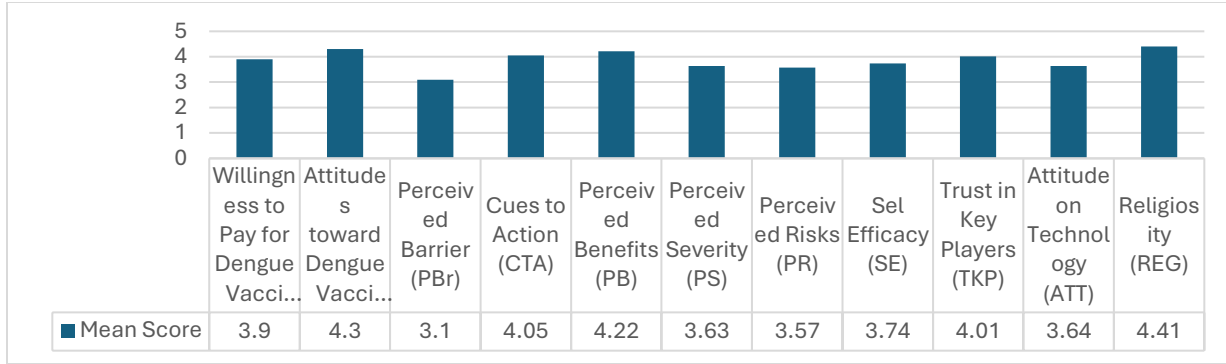
Figure 1. Mean Score of Attitude Attitudes and Willingness to Pay for Dengue Vaccine.

Note: 1-2.33: Low; 2.34-3.66: Moderately; 3.67-5.00: High.

Table 3. The Correlation Matrix among The Factors with Attitudes and Willingness to Pay for Dengue Vaccine.

		WTP DV	ATD V	PBr	CTA	PB	PS	PR	SE	TKP	ATT	REG
ATDV	Pearson Correlation	-	1	-0.074	0.648**	0.782**	0.099*	0.118**	0.478**	0.487**	0.115**	0.357**
	Sig. (2-tailed)	-	-	0.075	0.000	0.000	0.017	0.000	0.000	0.000	0.000	0.000
	N	580	580	580	580	580	580	580	580	580	580	580
		WTP DV	ATD V	PBr	CTA	PB	PS	PR	SE	TKP	ATT	REG
WTP DV	Pearson Correlation	1	0.571*	-0.011	0.516**	0.518**	0.098*	0.127**	0.345**	0.459**	0.114**	0.280**
	Sig. (2-tailed)	-	0.000	0.790	0.000	0.000	0.018	0.002	0.000	0.000	0.006	0.000
	N	580	580	580	580	580	580	580	580	580	580	580

Note: *$p < 0.05$, **$p < 0.01$ (2-tailed).

Table 4. Multiple Regression Analysis for Attitudes toward Dengue Vaccine.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1: (Constant), Perceived Benefits	0.782	0.612	0.611	0.398
2: (Constant), Perceived Benefits, Cues to Action	0.801	0.642	0.641	0.382
3: (Constant), Perceived Benefits, Cues to Action, Perceived Barrier	0.805	0.648	0.646	0.380
Coefficients				
Factors	B	Beta (β)	*t*	Significant Value
Perceived Benefits	0.592	0.623	18.875	0.000
Cues to Action	0.214	0.240	7.266	0.000
Self-Efficacy	-0.049	-0.078	-3.142	0.002
Attitudes toward Dengue Vaccine (Constant)	1.087		9.413	0.000
F value=353.942, *p*=0.000 (*p*<0.05)				
* Predictors: (Constant), Perceived Benefits, Cues to Action, Perceived Barrier				

Table 5. Multiple Regression Analysis for Willingness to Pay for Dengue Vaccine.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1: (Constant), Attitudes	0.571	0.326	0.325	0.744
2: (Constant), Attitudes, Trust in Key Players	0.607	0.369	0.367	0.720
3: (Constant), Attitudes, Trust in Key Players, Cues to Action	0.618	0.381	0.378	0.714
Coefficients				
Factors	B	Beta (β)	*t*	Significant Value
Attitudes	0.540	0.381	8.754	0.000
Trust in Key Players	0.203	0.172	4.121	0.000
Cues to Action	0.207	0.164	3.402	0.001
Willingness to Pay for Dengue Vaccine (Constant)	-0.073		-0.342	0.733
F value=118.342, *p*=0.000 (*p*<0.05)				
* Predictors: (Constant), Attitudes, Trust in Key Players, Cues to Action				