RESEARCH ARTICLE

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Protecting HPV Vaccination Acceptance Among Parents 5th and 6th Grade Elementary School in Indonesia

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Abstract

Objective: This study seeks to determine parents' intentions to accept HPV vaccination for their daughters in the 5th and 6th grades elementary school in Indonesia to support future HPV vaccine acceptance. **Methods:** Eligible participants from all provinces in Indonesia were recruited using a 25-item questionnaire. We summarized the sociodemographic data and mortgage scores of the participants using descriptive statistics. To identify independent determinants of vaccination intentions, we conducted bivariate and multivariate ordinal logistic regression analysis. **Result:** A total of 1,000 parents responded. Overall, only 48.7% intended to receive HPV vaccination. In addition, 56.3% exhibited negative attitudes, 50.3% reported negative subjective norms, and 60.5% demonstrated negative perceived behavioral control. Subjective norms were significantly associated with HPV vaccination acceptance intentions (p-value = 0.000; Exp(B) 7.020). **Conclusion:** Participants demonstrated moderately high intentions to refuse HPV vaccination, with subjective norms being a significant influencing factor. Therefore, to increase vaccine acceptance, targeted interventions aimed to improving subjective norms are essential.

Keywords: HPV vaccination- acceptance- theory of planned behavior- Indonesia- cervical cancer

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Introduction

One of the largest risks to women's health is cervical cancer [1]. The Human Papillomavirus (HPV) caused an estimated 620,000 new cancer cases in women globally in 2019 [2]. Cervical cancer rose to the fourth-leading cause of cancer incidence and death among women by 2022 [3]. Over 90% of female HPV-related malignancies are cervical cancers [2]. Bruni et al. indicate that women are most susceptible to cervical cancer in Sub-Saharan Africa (24%), followed by Latin America and the Caribbean (16%), Eastern Europe (14%), and Southeast Asia (14%) [4]. Cervical cancer is the second most frequent malignancy among women in Indonesia [5]. HPV vaccination is an effective method for preventing cervical cancer, offering 89% protection [6]. In August 2023, the HPV vaccination program has expanded nationwide [5]. However, despite the clinically proven efficacy of HPV vaccination, vaccination coverage remains suboptimal, particularly among 5th and 6th grade elementary school students. The initial goal of the HPV vaccination program in Indonesia being only 14%, and a target of 50% by 2025 [7]. Reports of parental HPV vaccination refusal in girls show varying levels across Asian countries: 55.4% in Saudi Arabia; 20.3% and 15.1% in Hong Kong; and 12.4% in China [8 - 11]. Countries in Europe, Africa, and the Americas showed 52% in the United States, 32.5% and 20.90% in Ethiopia, 24% in Sweden, and 17% in Finland [12-15]. However, the present study cannot generalize these findings, as the inclusion criteria focus specifically on girls in the 5th and 6th grades, which are the targets for the first priority goal of HPV immunization from 2023 to 2027 [5].

Parents play an important role in their children's health [16]. Various factors, including psychological and social aspects, influence girls' acceptance of HPV vaccination. A theoretical framework relevant to understanding vaccination behavior is the Theory of Planned Behavior (TPB), which emphasizes the role of social influence, individual beliefs and intentions in taking certain actions. According to TPB, people's intentions to engage in a behavior are shaped by their attitudes, subjective norms, and perceived behavioral control, which collectively influence their decision-making process [17]. Few research have been conducted using TPB,including those by Tihalun et al. and Aragaw et al. in Ethiopia, Wijayanti et al. in Jakarta, Indonesia, and Yi et al. in China [14, 15, 18, 19]. However, none of these studies conducted extensive research in Indonesia.

Investigating behavioural theory concepts that have a major influence on HPV vaccination can yield intervention strategies to boost vaccine uptakeintervention plans to increase vaccination acceptance. This study aims to analyze HPV vaccination acceptance behavior among

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girls in Indonesia using the TPB framework.

Materials and Methods

Study Design and Population

This national study employed a cross-sectional design, questionnaire-based design to analyze HPV vaccination acceptance behavior among Indonesian girls, using the Theory of Planned Behavior (TPB) framework. The questionnaires were distributed online via Google Forms through WhatsApp and social media platforms like Facebook and Instagram, from 12 July to 7 August 2024. The study population consisted of parents of daughters in 5th and 6th grades across all districts and cities in Indonesia, with a target population of 2,978,132 parents.

Sampling and Sample Size

The sample size was determined with Slovin's approach, incorporating a 5% margin of error and a 95% confidence level [20], targeting the population of 2,978,132 parents of daughters in 5th and 6th grades Indonesia, resulting in a minimum sample size of 400 participants. The population's heterogeneity suggests that a larger sample would be more accurate and representative of the entire population. A total of 1,000 were recruited the inclusion criteria. Inclusion criteria: parents aged ≥18 years with daughters in 5th and 6th grades in Indonesia who have not yet received the HPV vaccine. Exclusion criteria: daughter with contraindications to the HPV vaccine.

Research Instrument

Following a review of relevant research literature [14], we designed the questionnaire to collect data from participants. The final questionnaire was translated into Bahasa Indonesia and divided into sections, featuring both closed-ended and multiple-choice questions. Section 1 covered parents' sociodemographic information, including age, marital status, religion, education level, occupation, and monthly income. Section 2 identifying HPV vaccination acceptance using a 15-item TPB questionnaire, consisting of 5 attitude toward the behavior questions, 8 subjective norm questions, and 2 perceived behavioral control questions. Section 3 addressed 4 questions on HPV vaccination acceptance intention. A Likert scale with responses ranging from strongly disagree to strongly agree was used by the participants.

Thirty participants tested the questionnaire for validity and reliability. Validity was assessed using Pearson's Product-Moment correlation, with statements considered valid if the correlation coefficient (r) was greater than or equal to the r-table value of 0.361. All statements exceeded this threshold. Cronbach's alpha was calculated assess reliability, yielding values of 0.937 for the TPB questionnaire, which measures HPV vaccination acceptance, and 0.923 for the intention-to-accept HPV vaccination questionnaire. Reliability was shown by a Cronbach's alpha of more than 0.6 [21].

Ethical approval

This research obtained formal authorisation from Sari Mulia University (Number: 097/KEP-UNISM/VI/2024). Consent from participants was acquired through a Google Form, and only individuals who granted consent were permitted to complete the questionnaire. Participants received an introduction detailing the study's objectives and methodologies, with assurances of anonymity and voluntary participation provided in a specific consent section.

Data analysis

A descriptive analysis was conducted to evaluate participants' sociodemographics, their identification of the TPB conducts, and their intention to accept HPV vaccination. Responses related to the HPV vaccination acceptance based on the TPB included attitudes, subjective norms, perceived behavioral control, and vaccination intention, with options ranging from strongly disagree to strongly agree. Responses were scored on a scale of 1 to 5 for each option. The maximum possible total scores were 25 for attitude toward the behavior, 40 for subjective norms, 8 for perceived behavioral control, and 20 for HPV vaccination acceptance intention. Each statement's overall score was determined by dividing the sum of the scores for attitude toward the behavior, subjective norms, perceived behavioural control, and intention to accept HPV vaccination by the maximum attainable score, and then multiplying the result by 100%. Descriptive analysis was used to present demographic information in frequencies and percentages. Attitude toward the behavior, subjective norms, and perceived behavioral control were categorized as positive if the score exceeded the average, and negative if it was below the average [22]. Similarly, the intention to accept HPV vaccination was categorized as accepting if the score exceeded the average, and not accepting if it was below the average. Bivariate analysis, a chi-square test was conducted to analyse the relationship between attitude toward the behavior, subjective norms, perceived behavioural control, and the intention to accept HPV vaccination. For multivariable analysis, ordinal logistic regression was applied to identify significant predictors of HPV vaccination intention. The dependent variable was intention to accept HPV vaccination (categorized as accept/reject), while the independent variables included attitudes toward the behavior, subjective norms, and perceived behavioral control. The proportional odds assumption was tested to ensure that the ordinal logistic regression model was appropriate. Results were reported as odds ratios (Exp(B)) with 95% confidence intervals, and statistical significance was set at $p < 0.05$. To enhance the robustness of our statistical approach, a statistician was consulted to validate the model selection and interpretation of findings.

Results

Demographic characteristics of study participants

Table 1 presents the sociodemographic characteristics of the participants. The study involved 1,000 parents of daughters in 5th and 6th grade in elementary schools across Indonesia. The majority of participants were between 18 to 30 years old (n = 837, 83.7%). A total of 927 participants

were married (92.7%). Most participants (n = 918, 91.8%) identified as Muslims, with the sample representing all religious groups to allow for comparisons of HPV vaccination acceptance across religious demographics.

Table 1. Descriptive Sociodemographics of Study Participants (n = 1,000)

Variable n (%)	Participants,
Parent's Age in Years	
> 50	6 (0.6%)
18—30	837 (83.7%)
31—40	117(11.7%)
41—50	40 (4.0%)
Marital Status	
Divorced	38 (3.8%)
Widow/Widower (Divorced/Dead)	35 (3.5%)
Marr	927 (92.7%)
Religion	
Buddhism	5 (0.5%)
Hinduism	7 (0.7%)
Islam	918 (91.8%)
Catholic	20 (2.0%)
Christianity	50 (5.0%)
Last Degree of Education	
University/College	581 (58.1%)
Senior High School	5 (0.5%)
Junior High School	404 (40.4%)
Elementary School	10 (1.0%)
Occupation	
Housewife	163 (16.3%)
Self-employed	145 (14.5%)
Private Employee	247 (24.7%)
Civil Servant	46 (4.6%)
Others	399 (39.9%)
Monthly income	
< IDR 1,000,000	335 (33.5%)
IDR 1,000,001 – 3,000,000	114 (11.4%)
IDR 3,000.001, - 5,000,000	359 (35.9%)
> IDR 5,000,000	192 (19.2%)

Over half of the participants (n = 581, 58.1%) had a tertiary education, and the majority reported a monthly income of IDR 3,000,001–5,000,000 (n = 359, 35.9%). Further details on sociodemographic characteristics are provided in Table 1.

Factors Associated with Intention to Accept HPV Vaccination

Among the participants, 51.3% (n = 513) expressed an intention to refuse HPV vaccination for their daughters, while 58.7% (n = 587) showed an intention to accept it. More than half of the participants reported negative attitude toward the behavior (56.3%) and subjective norms (50.3%) towards HPV vaccination. In contrast, 43.7% and 49.7% reported positive attitude toward the behavior and subjective norms, respectively. Additionally, the majority of participants demonstrated negative perceived behavioral control (60.5%) as outlined in Table 2.

In the bivariate analysis, all constructs of TPB attitude toward the behavior, subjective norms, and perceived behavioral control had a p-value of 0.25 (Table 3), warranting their inclusion in the multivariate ordinal logistic regression. In the multivariable ordinal logistic regression analysis, subjective norms emerged as the strongest predictor of HPV vaccination intention (p = 0.000, Exp(B) = 7.020), indicating that parents with positive subjective norms were significantly more likely to accept HPV vaccination for their daughters. While attitude toward the behavior and perceived behavioral control were initially significant in the bivariate analysis,

Table 2. Categories of Parents' Level of Attitude Toward the Behavior, Perceived Behavioral Control, Subjective Norms, and Intentions to Accept HPV Vaccination

Variable n (%)	Categories	Participants,
Attitude toward the behavior	Negative	563 (56.3%)
	Positive	437 (43.7%)
Subjective Norms	Negative	503 (50.3%)
	Positive	497(49.7%)
Perceived Behavioral Control	Negative	605 (60.5%)
	Positive	395 (39.5%)
Intentions to Accept HPV Vaccination	Accept	487 (48.7%)
	Reject	513 (51.3%)

Table 3. Bivariate Analysis of Intentions to Accept HPV Vaccination and Potential Determinants

Variable	Intentions to Accept HPV Vaccination		
	Reject n (%)	Accept n (%)	p-value
Attitude Toward the Behavior			0
Negative	360 (36.0%)	203(20.3%)	
Positive	127 (12.7%)	310(31.0%)	
Subjective Norms			0
Negative	400 (40.0%)	103(10.3%)	
Positive	87(8.7%)	410 (41.0%)	
Perceived Behavioral Control			0
Negative	380 (38.0%)	225(22.5%)	
Positive	107 (10.7%)	288(28.8%)	

Table 4. Multivariate Analysis of Intentions to Accept HPV Vaccination and Potential Determinants

Variable	B	Wald	p-value	Exp (B)
Attitude toward the behavior	0.036	0.033	0.857	1.037
Subjective Norms	1.949	100.114	0.000	7.020
Perceived behavioral control	0.164	0.656	0.418	1.178

they were not statistically significant in the multivariable model (p = 0.857 and p = 0.418, respectively). This suggests that subjective norms play a dominant role in influencing parental decision-making regarding HPV vaccination (Table 4).

Discussion

This is the inaugural thorough study in Indonesia evaluating the acceptability of HPV vaccination among parents of daughters in fifth and sixth grades. We conducted this study from June to August, aiming to analyze the HPV vaccination acceptance behavior of girls in Indonesia based on a review of the Theory of Planned Behavior (TPB).

Despite the Government of the Republic of Indonesia mandating vaccinations for this age group since 2023, more than half of the Participants (n = 513, 51.3%) expressed an intention to refuse HPV vaccination for their daughters. This finding is lower when compared to studies conducted in Ethiopia (67.5%), Ireland (68.1%), China (78.3%), and the United States (79.8%) [14, 23 - 25]. This disparity may seem from the advantages of globalization in Chinese and American communities, facilitating awareness of HPV vaccination.

In this study, attitude toward the behavior, subjective norms, and perceived behavioral control were identified as predictors of parents' acceptance of HPV vaccination. This aligns with the research by Tilahun et al. [14], which states that all three factors predict acceptance of the HPV vaccine. More than half of the participants (n = 563, 56.3%) had attitude toward the behavior to HPV vaccination acceptance. This finding is higher than systematic reviews conducted in China (36%), Kazakhstan (46%), and studies in the United States (41%) [23, 25, 26]. The differences in vaccine uptake are notable; HPV vaccines are routinely administered in medical facilities in China and the United States alongside with other vaccines. In contrast, vaccine uptake in Indonesia relies primarily on outreach programs that provide immunizations in schools, along with the requirement for parental consent for medical interventions for children under 18. In Ethiopia, researchers found that 73.7% of participants had negative attitude toward the behavior to HPV vaccine [14].

Only 49.7% of parents believed that HPV vaccination was a good idea. This figure is lower than findings from the United States (61%) and China (56%) [23, 25]. The disparity in vaccine costs may explain this anomaly; because HPV vaccinations are provided free of charge in Indonesian schools, participants may perceive that free vaccinations are less effective and efficient.

Parents with negative subjective norms were significantly more likely to refuse vaccination (40.0%), while those with positive subjective norms demonstrated a higher likelihood of accepting it (41.0%). This is consistent with the findings of Tilahun et al., which demonstrate that mothers who hold positive subjective norms about the HPV vaccine are more inclined to intend to accept HPV vaccination for their daughters[14]. This also corroborates studies conducted in the United States [23, 27]. This data supports the idea that subjective norms can significantly influence an individual's motivation to align with those norms.

Subjective norms significantly influence parents' intentions to vaccinate their children against HPV. This is consistent with the Theory of Planned Behaviour, which holds that perceived behavioral control social pressure or subjective norms have a significant influence on behaviouralintentions.Higher rates of HPV vaccination rejection intention (38.0%) were also associated with negative perceived behavioral control, while acceptance of the vaccination (28.8%) correlated with positive perceived behavioral control. This finding is consistent with a study indicating that mothers who accepted the HPV vaccine were more likely to feel they had good behavioral control over the immunization process [23]. It is reasonable to suggest that activities addressing both internal and external obstacles are more effectively implemented when there is a positive perception of behavioral control.

Furthermore, the TPB model identifies subjective norms as the most significant independent determinant of HPV vaccination acceptance. However, the relatively weak impact of attitude toward the behavior and perceived behavioral control in the multivariate model suggests that other variables, such as knowledge and perceived risk variables not assessed in this study may mediate these relationships.

Author Contribution Statement

N.M. conceptualised and designed the study, collected the data, and conducted the data analysis, secured funding for the study, managed the overall project administration, and drafted the manuscript. D.S. conceptualized and designed the study, played a role in the results' interpretation. S.H. and N.W. supervised the project and coordinated the research activities..

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General

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Approval

This study was approved by the Ethics Committee of Sari Mulia University under approval number 097/KEP-UNISM/VI/2024. Additionally, this study is not part of an approved student thesis. The final manuscript has been evaluated and approved for submission by all authors.

Ethical Declaration

This study was conducted in accordance with ethical principles. The Ethics Committee of Sari Mulia University granted approval for this investigation under the number 097/KEP-UNISM/VI/2024. Before participating in the investigation, each participant executed a written informed consent form.

Data Availability

Data can be obtained by contacting the corresponding author with a reasonable request.

Study Registration

This study does not require registration as it is an observational study

Conflict of Interest

The authors affirm that there are no conflicts of interest associated with the study and publication of this paper. ULM does not interfere the professional judgment or action regarding the study processes and outcomes.

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