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Self-efficacy, intention, and attitude toward human papillomavirus vaccination among urban females in indonesia: a cross-sectional study

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ABSTRACT

Introduction: Women's choice to undergo vaccination against the Human Papillomavirus (HPV) is shaped by a multitude of factors. This study seeks to investigate the differences of intentions and attitudes toward the HPV vaccine and its effect size among women categorized into three groups based on their level of self-efficacy.

Methods: As many as 441 respondents were selected using the consecutive sampling method. The samples were divided into three groups based on their level of self-efficacy (low, medium, and high). The research employed a cross-sectional design from 13 May to 15 June 2023 in the working area of Public Health Centers located in Jakarta by implementing individual home visits. The research instruments comprised the Self-Efficacy Scale for HPV vaccination, the Intentions to Receive the HPV Vaccine Questionnaire, and the Attitude of HPV, Cervical Cancer, and Vaccine HPV Questionnaire; all were declared valid and reliable. The Kruskal-Wallis Test, the Tukey HSD Post Hoc Test, and the Epsilon Squared Test were performed to examine intention and attitude based on the type of self-efficacy and the effect size found.

Results: Significant differences were observed in intention ($p<0.001$) and attitude ($p<0.001$) among the three self-efficacy groups, demonstrating relatively robust effect sizes (attitude: $\varepsilon^2=0.109$, $p<0.001$; intention: $\varepsilon^2=0.159$, $p<0.001$).

Conclusions: The research demonstrated discernible discrepancies in intention and attitude across the three sample groups distinguished by their self-efficacy levels. It is advisable to design interventions focusing on health promotion that highlight the diverse needs and characteristics of different groups of women.

keywords: attitude, cervical cancer vaccine, intention, self-efficacy, women

Introduction

Cervical cancer stands as the fourth most prevalent malignancy among women worldwide, recording an estimated 660,000 new diagnoses in the year 2022 (World Health Organization, 2024). Concurrently, an overwhelming 94% of the 350,000 cervical cancer-related fatalities are concentrated in low- and middle-income countries (World Health Organization, 2024). Disparities in cervical cancer burden across these regions are intricately linked to inequities in accessing vaccination, screening, and treatment services, alongside various risk factors such as HIV prevalence and socioeconomic determinants encompassing gender biases and poverty (Stelzle *et al.*, 2021). Cervical cancer remains a significant cause of mortality among Indonesian women, with projections indicating an annual increase of 15,000 cases and a mortality rate of 50% (Ministry of Health of Republic of Indonesia, 2022)

Numerous individuals affected by cervical cancer include young and less educated women residing in the world's most impoverished nations, where access to pre-screening and treatment services is restricted

(Arbyn *et al.*, 2020; Okunade, 2020). Patients typically seek medical attention only after complications have progressed to an advanced stage, and the majority lack access to prevention programs or services (Vu *et al.*, 2018). The expenditures of therapy and care for cervical cancer patients are high, whether by the government or third-party insurance, especially if the patient is self-funding (Pangribowo, 2019). Sufferers' prognosis and survival rates vary significantly. As a result, several parties recommend and campaign for early prevention of this disease (Samaria, 2022; Samaria *et al.*, 2023). Conversely, cervical cancer can be avoided by avoiding human papillomavirus (HPV) infection (Bruni *et al.*, 2021). This problem can be remedied with a highly successful and cost-efficient HPV vaccine-based preventative method that prevents the most frequent kinds of high-risk and low-risk human papillomavirus infection.

HPV is one of the leading causes of cervical cancer, a significant public health concern worldwide. HPV vaccine is beneficial in preventing HPV-related illnesses and malignancies and is recommended internationally for preventing cervical cancer and other HPV-related disorders is the HPV vaccine. However, the level of acceptance and usage of the HPV vaccine continues to vary amongst individuals and populations and can be influenced by a variety of factors, including psychological characteristics such as self-efficacy (Lee, 2022; Lismidiati *et al.*, 2022; Osaghae *et al.*, 2022).

One of the factors that play an essential role in achieving the target of vaccination coverage is self-efficacy, namely, confidence that a person will receive a type of vaccine up to a complete dose (Christy, Winger and Mosher, 2019; Myhre *et al.*, 2020; Stout *et al.*, 2020). In the context of HPV infection transmission, self-efficacy can also be defined as the belief in one's ability to prevent disease, trust in vaccines that are safe for oneself, and reflects people's confidence in their ability to carry out health behaviors in the face of various people and obstacles (Myhre *et al.*, 2020). In the context of the HPV vaccine, self-efficacy includes an individual's beliefs regarding their ability to obtain, access, and receive the HPV vaccine. Self-efficacy can play an essential role in shaping intentions and individual attitudes related to receiving the vaccine.

Self-efficacy holds particular significance when contemplating a young woman's intention to receive the HPV vaccine. Several steps are required to complete the vaccination, including getting three injections over six months (Christy, Winger and Mosher, 2019). Enhanced self-efficacy concerning HPV vaccination has been linked to heightened vaccine acceptance and intention among college students and young adults. Insights gleaned from qualitative research suggest that self-efficacy may serve as a mechanism through which social norms influence the inclination to be vaccinated (Thompson *et al.*, 2018). Consequently, self-efficacy emerges as a pivotal factor warranting further exploration concerning women's intentions and attitudes toward receiving the HPV vaccine, extending to completion of the vaccination regimen. Additionally, intentions and attitudes toward the HPV vaccine play crucial roles in determining acceptance and adherence to the vaccine (Stout *et al.*, 2020; Elgzar *et al.*, 2022). Intention pertains to an individual's readiness to receive the HPV vaccine, while attitude reflects an individual's favorable or unfavorable appraisal of the HPV vaccine.

A prior investigation revealed that a significant majority (72.3%) of the nursing students under examination exhibited favorable attitudes toward Pap smear, HPV, and vaccination (Mohammed *et al.*, 2022). Specifically, the findings indicated that slightly over two-thirds of the surveyed nursing students (68.2%) expressed agreement with Pap smear, while slightly less than two-thirds (62.6%) were uncertain about HPV, and approximately half (52.8%) concurred with vaccination, thereby reflecting their intentions and self-efficacy concerning young adult women's health. These outcomes are consistent with another study involving young adult female university students from Korea and China, both of whom demonstrated a positive attitude toward HPV vaccination and expressed a strong intention to receive the vaccine (Kim *et al.*, 2022).

On the other hand, parental attitudes and intentions regarding HPV vaccination for their children were found to be influenced by parental gender, HPV vaccination status, and having at least one daughter (López *et al.*, 2022). Mothers in Ethiopia demonstrated a strong inclination and intention to vaccinate their daughters despite having limited knowledge about HPV vaccination (Sinshaw, Berhe and Ayele, 2022). Similarly, parents in Nigeria exhibited a positive attitude toward and high intention to uptake the HPV vaccine for their adolescents (Balogun and Omotade, 2022). In contrast, a notable proportion of parents aged over 65 years indicated a lack of intention to vaccinate their adolescents with the HPV vaccine.

Among adolescents, a study conducted in Uganda revealed that only 43.3% of girls achieved timely completion for both doses of the HPV vaccination, which reflected their lack of self-efficacy (Patrick *et al.*, 2022). Conversely, a study in Indonesia examined self-efficacy

in adolescents regarding HPV vaccine uptake (Lismidiati *et al.*, 2022). The results indicated that 50.1% of adolescent girls exhibited high self-efficacy in acquiring the HPV vaccine, while 57.9% demonstrated a robust understanding of HPV and the corresponding vaccine. Notably, parental support emerged as a significant factor, with adolescents being almost 18 times more inclined to possess high self-efficacy when backed by their parents. Additionally, social persuasion enhanced the likelihood by nearly nine times for adolescents to develop self-efficacy in obtaining the HPV vaccination. Therefore, parental support and social persuasion emerged as significant predictors of self-efficacy in obtaining HPV vaccination, with parental support being the primary factor influencing adolescents' decisions to obtain the HPV vaccine (Lismidiati *et al.*, 2022).

Previous studies also have highlighted the relationship between self-efficacy with attitude, intention, and other factors regarding HPV vaccination in women (Christy et al., 2019; Elgzar et al., 2022; Lismidiati et al., 2022; Stout et al., 2020. However, there is a lacuna that demonstrates limited studies investigating intention and attitude toward HPV vaccination based on the type of self-efficacy and its effect size found, explicitly examining its impact on three groups of women, involving unmarried women aged 18-26, female adolescents aged 9-17 years, and mothers with adolescents who were eligible for the HPV vaccine simultaneously. Each group of women reflects diverse decision-making characteristics which have different implications for self-efficacy, intention and attitude to the HPV vaccine (Polonijo, Mahapatra and Brown, 2022; Lam *et al.*, 2023; Zhang *et al.*, 2023). Young adult women represent autonomous decision-makers, while female adolescents rely on parental guidance, and mothers play a supportive role in their daughters' vaccination decisions. All cohorts require comprehensive assessment and categorization based on their self-efficacy levels.

To the best of the authors' knowledge, there is currently limited research exploring variances in intention and attitude among respondent groups with varying levels of self-efficacy. Existing studies have primarily focused on assessing the correlation between self-efficacy and intention as well as attitude, overlooking the nuanced spectrum of self-efficacy levels among women (Christy, Winger and Mosher, 2019; Stout *et al.*, 2020; Elgzar *et al.*, 2022; Lismidiati *et al.*, 2022). Indeed, through acquiring more granular insights, interventions can be tailored more precisely to align with the unique needs and attributes of women.

The purpose of this study was to examine the different types of HPV vaccine self-efficacy (low, medium, and high self-efficacy) on the intentions and attitudes of women, especially young women who are eligible to receive HPV vaccination (age 18-26 years old), adolescents aged 9-17 years, and mothers with adolescent children who are eligible for the HPV vaccine in the working area of the Jakarta Public Health Center.

This study can provide better insight into the role of self-efficacy in HPV vaccine acceptance and help design appropriate interventions to increase vaccination adherence rates. In addition, this research can provide valuable information for health professionals, policymakers, and nursing practitioners in developing effective strategies to increase acceptance and adherence to the HPV vaccine by enhancing self-efficacy. More effective intervention strategies can be designed to increase the adoption of the HPV vaccine in the female population of reproductive age. In addition, this research can also provide new insights into psychological factors that influence individual decisions regarding HPV vaccination.

Materials and Methods

Design and Settings

A cross-sectional design was utilized to observe the variations in intentions and attitudes toward the HPV vaccine, as well as its effect size concurrently among women who were divided in three groups level of self-efficacy (low, medium, and high). The study ran from 13 May to 15 June 2023 in the working area of the Health Center located in Jakarta.

Samples

The study included 147 young adult women who were eligible to receive the HPV vaccination (18-26 years old), 147 female adolescents aged 9-17 years, and 147 mothers with female adolescents who live in Jakarta. The sample size was calculated using the G*Power 3.1 by setting the effect size of 0.25, a power value of 95%, and an alpha level of 5%, resulting in 400 candidates as participants. Considering a 10% for anticipated dropout, the total number of respondents was 441; they were split into three groups regarding their level of self-efficacy. Prospective respondents were recruited using the consecutive sampling method. Respondents were selected sequentially until the predetermined sample size was attained (Setia, 2016). The data collection was conducted simultaneously across all working areas of Health Public Centers in Jakarta. Data meeting the specified criteria were sequentially sorted until the

desired sample size was achieved. The data collection process was completed within approximately one month.

Research Instruments

This study employed a sociodemographic survey and three other questionnaires to analyze self-efficacy, intention, and attitude toward HPV vaccination. The sociodemographic questionnaire explored the frequency distribution of age, total family income, level of education, and respondents' work type.

Self-efficacy was measured by the Self-Efficacy Scale for the HPV vaccination questionnaire (Christy, Winger and Mosher, 2019). This questionnaire consists of three favorable statements, with seven answer choices, including 1=strongly disagree, 2=quite disagree, 3=slightly disagree, 4=neutral, 5=slightly agree, 6=quite agree, and 7=very much agree. In this questionnaire, participants rated their confidence in their ability to obtain the HPV vaccine even though (1) it is expensive, (2) getting the injection is slightly painful, and (3) it means finding the time to go to the doctor three times. Total self-efficacy scores are in the range of 7-21. Self-efficacy scores were categorized into three groups, namely, low self-efficacy (score: 0-10), moderate self-efficacy (score: 11-14), and high self-efficacy (score: 15-21). The scale underwent translation into Bahasa Indonesia with the assistance of experts in the field of health. Subsequently, two faculty members reviewed the questionnaire for clarity prior to validity and reliability testing. Thereafter, the tests for validity and reliability were conducted on 30 women. The questionnaire had excellent validity (r item 0.786-0.886) and reliability (Cronbach's $\alpha = 0.801$).

A questionnaire measured intention, namely the Intentions to Receive the HPV Vaccine Questionnaire. Five items measured intention to receive the HPV vaccine. Participants rated on a 7-point scale how likely they were to (1) get more information about the HPV vaccine, (2) consider getting the vaccine, (3) try to get the vaccine, (4) get the vaccine, and (5) get the vaccine if the doctor offers it (1=very unlikely to 7=very likely). This subscale exhibits good reliability in the current sample ($\alpha = 0.95$) (Stout *et al.*, 2020). This questionnaire was also translated to Bahasa Indonesia and was tested for validity and reliability on 30 people with a value of r count (0.836-0.962) and Cronbach's $\alpha = 0.950$.

The attitude variable was measured using the Attitude HPV, Cervical Cancer, and Vaccine HPV questionnaire (Winarto *et al.*, 2022), which contains 12 questions with five questions about HPV infection and cervical cancer and seven questions about HPV vaccine on the Guttman scale. Each answer choice has a specific value. Questions with two and three-answer options get a score of 0 for a negative answer and a score of 2 for a confirming answer. Questions with four answer options received a score of 0 for a negative response, a score of 1 for a confirming answer, and a score of 2 for a very confirming answer. This questionnaire was already in Bahasa Indonesia (Winarto *et al.*, 2022) and tested for the validity and reliability of 30 people with an r value between 0.365-0.697 and $\alpha = 0.772$.

Data Collection

The data were collected offline by conducting home visits individually to all respondents. Respondents willing to participate in this study after the protocol explanation were asked to sign an informed consent form and manually fill out a paper-based questionnaire. Respondents completed filling out the questionnaire in about 20 minutes.

Ethical Consideration

This research prioritized the principle of anonymity and volunteerism to respondents. The study protocol was explained to respondents before they agreed to participate and signed the informed consent. The study protocol has passed a research ethics review from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Pembangunan Nasional "Veteran" Jakarta, with letter number 205/V/2023/KEPK.

Data analysis

Univariate analysis was used in this study to identify the characteristics of the respondents, including the frequency distribution of age, total family income, level of education, and type of work. Additionally, bivariate analysis was conducted using the Kruskal-Wallis test due to abnormal data values detected in the normality test. Given that the Kruskal-Wallis test yielded a p-value of <0.05 for both attitude and intention, a Post Hoc test was subsequently employed using the Tukey HSD method to identify significant correlations between different levels of self-efficacy and attitudes and intentions. Furthermore, the Epsilon Squared test was employed to quantify the effect size of the observed differences.

Results

Most respondents in this survey attended high school, followed by higher education, junior high schools, and elementary schools (Table 1). The respondents' employment status is almost balanced;

Table 1. Characteristics of Respondents (n=441)

Variable	Group Classification			Total (%)	Mean±SD	P-value*
	Female Adolescents	Young Adults	Mothers			
	n(%)	n(%)	n(%)			
Age					21.10±2.099	0.000
9-17 years old	147(100)	0(0)	0(0)	147(33.3)		
18-26 years old	0(0)	147(100)	0(0)	147(33.3)		
>26 years old	0(0)	0(0)	147(100)	147(33.4)		
Educational background						0.000
Elementary school	4(0.9)	1(0.2)	3(0.7)	8(1.8)		
Junior high school	142(32.2)	2(0.5)	51(11.6)	195(44.2)		
Senior High School	1(0.2)	81(18.04)	77(17.5)	159(36.1)		
Higher education	0(0)	63(14.3)	16(3.6)	79(17.9)		
Working Status						0.000
Unemployed	147(33.3)	10(2.3)	60(13.6)	217(49.2)		
Employed	0(0)	137(31.1)	87(19.7)	224(50.8)		
Socioeconomic status						0.085
Low (<(Minimum regional wage of Jakarta: Rp. 4,901,798)	79(17.9)	75(17)	93(21.1)	247(56)		
High (≥Minimum regional wage of Jakarta: Rp. 4,901,798)	68(15.4)	72(16.3)	54(12.2)	194(44)		
Self-efficacy					12.61±3.756	0.001
Low	37(8.4)	18(4.1)	63(14.3)	118(26.8)		
Medium	81(18.4)	45(10.2)	64(14.5)	190(43.1)		
High	29(16.6)	84(19.00)	20(4.5)	133(30.2)		
Attitudes toward the HPV Vaccine					17.02±3.27	0.000
Low	62(14.1)	0(0)	14(3.2)	76(17.2)		
Medium	4911.1)	26(5.9)	33(7.5)	108(24.5)		
High	36(8.2)	121(27.4)	100(22.7)	257(58.3)		
Intention to receive HPV vaccine					26.33±5.65	0.000
Low	6(1.4)	0(0)	3(0.7)	9(2)		
Medium	8719.7)	21(4.8)	71(16.1)	179(40.6)		
High	54(12.2)	126(28.6)	73(16.6)	253(57.4)		

*Levene test for assessing variances in three groups of women

however, most hold jobs (50.8%). An almost equal distribution is anticipated due to the balanced representation of respondents from two nearly equivalent employment status categories. The non-working cohort may consist of adolescent females who are not yet employed and approximately half of the unemployed mothers. On the other hand, the employed group consists of employed young unmarried women alongside some working mothers. This balanced representation ensures near parity between the two categories. Nonetheless, the respondents' socioeconomic level was unequal. Respondents from low socioeconomic status (56%) outnumbered those from high socioeconomic status (44%) based on the minimum regional wage of Jakarta in 2023.

The HPV vaccine had never been administered to any of the participants in this study. Table 1 also shows that 147 respondents came from the category of female adolescents, 147 young adult women (aged 18-26 years and not married yet) and 147 mothers (>26 years old) who had adolescent daughters. Most sociodemographic variables depict a non-homogeneous variance, so they cannot meet the requirements for parametric statistical tests. Therefore, we chose a non-parametric statistical analysis, Kruskal-Wallis test, to process the data (see Table 2).

The results of the investigation into intentions and attitudes based on the three self-efficacy categories are presented in Table 2. Respondents with high self-efficacy exhibited the highest value for attitudes toward the HPV vaccine (mean=19.226; median= 24). Conversely, respondents with low self-efficacy demonstrated the lowest value attitude score regarding the HPV vaccine (mean=14.839; median=18). Regarding the intention variable in obtaining the HPV vaccine, individuals with high self-efficacy recorded the highest

Table 2. Attitude and Intention to Receive HPV Vaccine Regarding Type of Self-Efficacy (n=441)

Dependent Variable	Self-Efficacy Type	Median	Interquartile Range	Mean±SD	95% CI	P-value*
Attitudes toward the HPV Vaccine	Low (n= 118)	18.00	17	14.839±3.274	14.274 to 15.404	<0.001
	Medium (n= 190)	17.00	16	17.016±2.818	16.571 to 17.461	
	High (n= 133)	24.00	13	19.226±3.384	18.694 to 19.757	
Intention to receive HPV vaccine	Low (n= 118)	22.50	8	21.610±6.879	20.689 to 22.531	<0.001
	Medium (n= 190)	27.00	7	26.237±4.635	25.511 to 26.963	
	High (n= 133)	30.00	5	29.180±3.651	28.313 to 30.048	

*Kruskal-Wallis test

Table 3. Post Hoc Test Results: Tukey HSD (n=441)

Dependent Variable	Self-Efficacy Type	Pairwise	P Value	95% CI
Attitude	Low	Medium	<0.001	-3.04 to -1.32
		High	<0.001	-5.31 to -3.46
	Medium	Low	<0.001	1.32 to 3.04
		High	<0.001	-3.04 to -1.38
	High	Low	<0.001	3.46 to 5.31
		Medium	<0.001	1.38 to 3.04
Intention	Low	Medium	<0.001	-6.03 to -3.22
		High	<0.001	-9.08 to -6.06
	Medium	Low	<0.001	3.22 to 6.03
		High	<0.001	-4.30 to -1.59
	High	Low	<0.001	6.06 to 9.08
		Medium	<0.001	1.59 to 4.30

SE: Standard error

score (mean=29.180; median=30.00) while those with low self-efficacy exhibited the lowest intention score (mean=21.610; median=22.50). Notably, both respondents' attitudes toward the HPV vaccine and their intention to receive it were found to exhibit an equal or directly proportional relationship.

Table 2 presents the results of the attitude and intention variables regarding the receipt of the HPV vaccine across different levels of self-efficacy. The analysis revealed a significant p-value of <0.001 for the relationship between attitudes toward the HPV vaccine and self-efficacy. This indicates a substantial association between attitudes toward the HPV vaccine and self-efficacy levels. Furthermore, the findings regarding the intention variable, as shown in Table 2, indicate a significant p-value of <0.001, signifying a notable difference in intention among respondents with high, medium, and low levels of self-efficacy. Thus, it can be inferred that self-efficacy also plays a role in influencing a woman's intention to receive the HPV vaccine.

Table 3 illustrates the results of the correlation between different types of self-efficacy and attitudes and intentions. The table indicates that all pairs of self-efficacy groups, when correlated with attitudes and intentions, yielded significant values ($p<0.001$). This implies that each category of self-efficacy group is significantly associated with attitudes and intentions regarding the HPV vaccine. Table 4 displays effect sizes of self-efficacy on attitude and intention. The effect size (ε^2) for attitude is 0.200 ($p<0.001$), and intention is 0.223 ($p<0.001$), both indicating a relatively strong effect size.

Discussions

This study discloses most respondents have a high school education, work, and come from families of low economic status. Socioeconomic status can affect the ability and intention of respondents to get vaccines. These results are similar to the findings from previous study (Dereje *et al.*, 2021). Socioeconomic position can influence a person's motivation to obtain the vaccine. A person from a lower-income family is less likely to desire to vaccinate their children than someone from a higher-income family (Dereje *et al.*, 2021).

This study offers detailed findings from intention and attitude assessments conducted among groups of women categorized by varying levels of self-efficacy: low, medium, or high. The research demonstrates discernible discrepancies in intention and attitude across the three sample groups distinguished by their self-efficacy levels. These findings can serve as a basis for recommending more tailored interventions that align closely with the individual needs and characteristics of women in each group.

Groups characterized by low, medium, and high levels of self-efficacy all exhibited significant correlations with attitudes and intentions. Upon closer examination, it becomes evident that as the level of self-efficacy increases, so does the mean attitude score, as well as the mean intention score in all categories of ages of women—female adolescents, young adults women, and mothers. Conversely, the group with low self-efficacy demonstrated the lowest intention score, whereas the group with the highest self-efficacy exhibited the highest intention score. This pattern suggests a linear relationship between self-efficacy

Table 4. Results of the Epsilon Squared Kruskal-Wallis Test for Measuring Effect Size

Independent Variable	Dependent Variable	N	ε	ε^2	P Value
Self-Efficacy Type	Attitude	441	0.447	0.200	<0.001
	Intention	441	0.472	0.223	<0.001

ε^2: Epsilon Squared

levels and both attitude and intention scores, as reported in previous study (Alene *et al.*, 2020). This result indicates that self-efficacy can be a predictor variable in determining the mean scores of attitudes and intentions (Christy, Winger and Mosher, 2019).

This study's effect size was relatively strong, indicating that self-efficacy is a good predictor of the variable intentions and attitudes. Thus, the effect size of self-efficacy is clinically essential to evaluate how efficiently health professionals can predict the expected outcomes of attitudes and intentions to receive the HPV vaccine. However, the clinical significance of the impact must be examined by HPV vaccine experts.

The novel contribution of this research lies in the conclusion that individuals with higher levels of self-efficacy tend to exhibit stronger attitudes and intentions toward receiving the HPV vaccine. However, it is noteworthy that the high self-efficacy group is predominantly female adolescents, whereas the medium self-efficacy group consists mostly of young adults, and the low self-efficacy group primarily includes mothers. This observation indicates that female adolescents with the highest self-efficacy levels also harbor the most favorable attitudes and intentions. Consequently, it implies that individuals in the youngest age bracket exhibit the highest inclination and readiness to receive the vaccine, despite potentially possessing less experience and knowledge compared to young adults or parents. Given the characteristics of young adolescents, it becomes imperative to provide them with support in the critical thinking process to effectively absorb and discern information pertaining to cervical cancer and the HPV vaccine (Lismidiati *et al.*, 2022; Patrick *et al.*, 2022). By doing so, their understanding and self-efficacy can be further refined, subsequently enhancing their attitudes and intentions regarding vaccine acceptance.

Among the three categories of responders, an adolescent's average mother or guardian appears to have the lowest self-efficacy. This problem can be due to lower parental literacy. This issue could be attributed to their low exposure to digital mass media messages, low levels of health literacy, and low exposure to the effects of globalization and urbanization (Alene *et al.*, 2020; Dereje *et al.*, 2021). Since 2021, as the government declared that the HPV vaccine was free and mandatory for schoolchildren in the fifth and sixth grades, myths and false information about the HPV vaccine have increased in Indonesia (Sitaresmi *et al.*, 2020; Frianto *et al.*, 2022). The problems have multiplied and are easily accessible through online media. Parents' digital literacy abilities were regarded as less equivalent to those of teenagers and adults, consequently impacting their self-efficacy.

On the other hand, young adult women who made their own vaccine decisions had the highest level of self-efficacy. Someone concerned about determining whether or not to vaccinate themself has greater self-efficacy than teenagers or parents (Chanprasertpinyo and Rerkswattavorn, 2020; Rabiu *et al.*, 2020; Stout *et al.*, 2020). Health education is suggested to be given based on the three main points of the statement in the self-efficacy questionnaire, namely being confident in getting the HPV vaccine despite the cost, being confident in receiving the HPV vaccine despite the injection being a little painful, and feeling able to take the time to go to a healthcare facility as many as three times, according to the provisions of the total dose of the HPV vaccine (Christy et al., 2020). It will be a stronger attraction to have a positive attitude toward vaccination and raise the intention to receive the HPV vaccine if women believe that the cost of vaccines is cheaper considering prospective benefits to avoid cervical cancer rather than having to pay more if they develop cervical cancer (Rabiu *et al.*, 2020; Elgzar *et al.*, 2022).

This study employs non-probability sampling, specifically consecutive sampling, which warrants cautious generalization. Another limitation pertains to the exclusive emphasis on three levels of self-efficacy groups, overlooking sociodemographic variances in each group which could be a confounding factor. Nonetheless, this research marks the inaugural endeavor in Indonesia to investigate self-efficacy, intentions, and attitudes toward the HPV vaccine across adolescent girls, young adult women, and parents concurrently. These insights lay the groundwork for future research endeavors, particularly in designing intervention programs that account for these sociodemographic nuances.

Conclusion

The study reveals noticeable variations in intention and attitude among the three sample cohorts categorized by their levels of self-efficacy. Across all levels of self-efficacy—low, medium, or high—a consistent positive correlation is observed with women's mean attitude and intention scores regarding vaccination acceptance. Moreover, our investigation reveals a notable effect size associated with the self-efficacy variable in predicting women's attitudes and intentions, indicating its practical relevance in clinical contexts. Drawing from these findings, it is advisable to

design interventions focusing on health promotion that highlight the diverse needs and characteristics of different groups of women. Such tailored interventions can effectively address individual differences and enhance vaccine acceptance among women. We also recommend for subsequent studies to incorporate demographic variables into statistical analysis to mitigate potential confounding effects and ensure the accuracy of the findings.

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Conflict of Interest

None declared.

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