



Relationship between Knowledge, Perception, and Self-Efficacy of Junior High School Students towards HPV Vaccination as Cervical Cancer Prevention in Surakarta

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[Creative Commons Attribution-ShareAlike 4.0 International License](#)**Abstract****Background:** Cervical cancer remains a major health concern for women in Indonesia, including Surakarta, where participation in HPV screening and vaccination is still low.**Objective:** This study aimed to examine the relationship between knowledge, perception, and self-efficacy regarding HPV vaccination among junior high school girls in Surakarta.**Methods:** A cross-sectional study was conducted among 200 students from four randomly selected junior high schools using cluster sampling, with data analyzed using the Spearman Rho correlation test. **Results:** More than half of the students (52.6%) demonstrated poor knowledge about cervical cancer and the HPV vaccine, yet the majority exhibited high self-efficacy toward vaccination. The analysis revealed no significant relationship between knowledge and self-efficacy ($p = 0.589$), but a significant, albeit weak, correlation was found between knowledge and perception ($p = 0.036$; $r = 0.15$). These findings indicate that improved knowledge contributes to more positive perceptions of HPV vaccination, though self-efficacy tends to be shaped by personal motivation and external support such as parental or peer encouragement. **Conclusion:** Strengthening health education programs through schools and families is essential to enhance awareness, correct misconceptions, and foster stronger motivation among adolescent girls to participate in HPV vaccination as a preventive strategy against cervical cancer.**Keywords:** Cervical cancer; HPV Vaccination; Knowledge; Perception; Self-Efficacy.

Introduction

One of the cancers that is a health problem for women worldwide, including in Indonesia, is cervical cancer. According to the World Health Organization (WHO), cervical cancer is a disease caused by the Human papillomavirus (HPV), which attacks the skin, genitals, and throat areas. Continuous HPV infection in the cervix or cervix untreated is what causes 95% of cervical cancer¹.

The World Health Organization (WHO) report in 2024 stated that cervical cancer is the fourth most common cancer in women in the world, with around 660,000 new cases in 2022 and 94% of the 350,000 deaths from cervical

cancer that occur in low- and middle-income countries¹. Based on the 2023 Indonesian Health Profile, cervical cancer is in second place after breast cancer, with 37,200 new cases or covering 18% of all cancer cases in women in Indonesia². The death rate from cervical cancer is also quite significant, namely 21,500 deaths or 19.5% of all deaths from cancer. The high number of cervical cancer cases in Indonesia is due to the low level of screening and early detection in women in Indonesia. This is evidenced by only 7.02% of women aged 30-50 who underwent screening with the IVA (Visual Inspection with Acetic Acid) method in 2023, which is still far below

the national target of 70%³. The main prevention of cervical cancer recommended by the World Health Organization (WHO) is HPV vaccination for girls aged 9-14 years who are not yet actively involved in social relationships⁴.

Based on data from the Central Java Provincial Health Profile in 2023, the overall prevalence of cervical cancer in Central Java is 1.2 per thousand population. This figure is higher than the national average prevalence of around 0.8 per thousand population. Talking about the prevalence of cervical cancer in Central Java Province, Semarang City is the city with the highest prevalence of cervical cancer in Central Java, and this is evidenced by the discovery of a higher number of cases compared to the number of cases in the province as a whole. The increase in the number of cervical cancer cases in Semarang City from 2,782 in 2010 to 5,155 in 2011 reflects the need for more intensive prevention and treatment efforts in this area⁵.

The Surakarta City Health Profile in 2023 states that the prevalence of cervical cancer is quite high, with many cases found in women of productive age, namely 30 to 50 years old. In handling it, early examinations, such as Visual Inspection with Acetic Acid (IVA) and Pap Smear, are essential for early detection of cervical cancer. However, the level of participation in this examination is still relatively low, namely 4,143 (4.75%) of women aged 30 - 50 years. From the examination, it was found that 20 WUS (0.48%) had positive IVA results, with 3 WUS (0.07%) of them suspected of having cervical cancer. This was followed by the finding of 13 WUS (56.52%) who were referred because they had positive IVA results and suspected cervical cancer. This shows the need to increase awareness and health education regarding the importance of early detection of cervical cancer⁶.

Cervical cancer prevention is best done since early adolescence when young women enter menarche, namely by vaccination. However, children tend not to have the authority to make their own decisions regarding receiving HPV vaccination. Parental knowledge about cervical cancer and HPV vaccination is one of the factors that influences their acceptance and willingness to provide HPV vaccination to their children. Several factors influence the acceptance of HPV vaccination in adolescents, namely knowledge, attitude, belief in HPV vaccination, and parental approval⁷. A study in Yogyakarta found that 59.3% of parents had high knowledge about HPV and cervical cancer, and 92.5% of them were willing to provide HPV vaccination to their children⁴. In addition, other factors such as education, income, and exposure to information about cervical cancer also have a significant influence on parental knowledge and attitudes. According to another related study, there is a positive correlation between parental knowledge and parental willingness to provide HPV vaccination to boys. Knowledge will underlie a person's attitude and actions to do something. Even though parents know the benefits of vaccines and are willing to vaccinate their children, sometimes children can refuse if they do not know and do not understand the disease that must be prevented⁸.

Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 12 of 2017 concerning the Implementation of Immunization, the government has established an immunization program to protect children's health, including HPV vaccination focused on girls aged 9-14 years^{9,10}. This program aims to prevent Human Papillomavirus (HPV) infection or the primary virus that causes cervical cancer. Another related study also stated that the HPV vaccine is safe and effective when given to children to build

immunity and has been part of the School Children's Immunization Month (BIAS) program since 2016 with a target of 90% coverage in girls aged 15 years in 2030¹¹. However, despite HPV vaccination being considered vital because it can prevent cervical cancer, public acceptance, especially among parents, is still relatively low. Low parental acceptance of HPV vaccination is reflected in a systematic study that found that public awareness of the HPV vaccine is still lacking. However, their acceptance of it is pretty positive. However, several factors make them reluctant to give this vaccine to their children, such as high prices, fear of side effects, and concerns related to sexuality and gender¹².

Several previous studies also emphasize that individual perception, self-efficacy, and readiness toward health programs are significantly influenced by educational interventions and social environments. Tikasari et al. (2023) found that students with a positive perception of interprofessional education tend to have a higher level of readiness to collaborate in healthcare service¹³. This highlights the importance of fostering positive perceptions among adolescent girls to enhance their readiness in accepting HPV vaccination.

In this study, it was found that several female students stated that they had received HPV vaccination during elementary school. However, most of them stated that they had not received it and did not want to receive it because they were afraid of the side effects of HPV vaccination. This illustrates the unequal distribution of HPV vaccination efforts for female adolescents in Surakarta City, as well as the lack of socialization regarding cervical cancer and HPV vaccination itself, both to schools, parents, and students.

This study was conducted in response to the high incidence and mortality rate of cervical cancer in Indonesia, especially in Surakarta City, which is not balanced with adequate HPV

vaccination coverage in adolescent girls. Although the HPV vaccination program has been integrated into the national immunization scheme and is a government priority to reduce cervical cancer cases, in reality the coverage is still low, mainly due to lack of knowledge, misconceptions, and low self-efficacy in students. The urgency of this problem is further exacerbated by the limited research related to cervical cancer and HPV vaccination in Surakarta City, especially in junior high school students. Currently, HPV vaccination efforts in Surakarta City have only been implemented in SMP Negeri 8 Surakarta by the Ngorasan Health Center, which shows that access and socialization are still uneven¹⁴. The novelty of this study lies in its specific analysis of the relationship between knowledge, perceptions, and self-efficacy of junior high school students towards HPV vaccination in Surakarta City, which is an area where similar research has rarely been conducted. The findings of this study are expected to be the basis for developing more effective educational interventions to increase HPV vaccination coverage among adolescent girls in Surakarta City and to support government efforts in cervical cancer prevention. Therefore, this study aims to answer what is the relationship between knowledge, perception, and self-efficacy of junior high school students regarding HPV vaccination in Surakarta.

Materials and Methods

Research Design

This study employed an analytical observational cross-sectional design to examine the relationships between knowledge, perceptions, and self-efficacy of junior high school students regarding HPV vaccination as a preventive measure against cervical cancer in Surakarta City, Indonesia, using structured questionnaires and statistical analysis to

support evidence-based school health promotion strategies programs..

Sample

The population in this study were all junior high school students in Surakarta City. The sample consisted of 200 female students selected using cluster sampling from four schools, namely SMP Muhammadiyah 4 Surakarta, SMP Al-Irsyad Surakarta, SMP Negeri 20 Surakarta, and SMP Warga. The sample size was determined to provide adequate representation of each selected school.

Data Collection Technique

Data collection was conducted in August 2024 using a structured questionnaire distributed to selected students. Before data collection, the researcher explained the purpose of the study and how to fill out the questionnaire. Students who agreed to participate signed the consent form. If there were any questions that were unclear, the researcher provided clarification. The questionnaire was filled out independently by the students.

Data Analysis Technique

The collected data were processed and tested for normality using the One-Sample Kolmogorov-Smirnov Test which showed that the knowledge, perception, and self-efficacy variables were not normally distributed. Therefore, the Spearman Rho correlation test was used for hypothesis testing. Data analysis was performed using SPSS version 25.

Ethical Consideration

This study obtained ethical approval from the Ethics Commission of the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta, approval number 417/KEPK-FIK/VI/2024. All participants provided informed consent before data collection. Confidentiality and anonymity were

maintained throughout the study, and all procedures complied with applicable ethical principles and institutional research guidelines standards.

Results

Respondents were obtained from four randomly selected schools. The number of students from each school was balanced, namely 47 female students (24%) from SMP Muhammadiyah 4 Surakarta, 55 female students (28.1%) from SMP Al-Irsyad, 44 female students (22.4%) from SMP Negeri 20 Surakarta, and 50 female students (25.5%) from SMP Warga. Based on class level, most respondents were from class 8 (grade 2 of junior high school), namely 111 female students (56.6%). Based on the category of religion, it is known that most respondents are Muslim, namely 168 female students (85.7%).

Related to the education of the student's parents, the highest number of father's last education was high school/vocational high school, namely 95 people (48.5%), and the highest number of mother's previous education was more than half of high school/vocational high school, namely 105 people (53.6%). Based on the category of the students' parents' jobs, the father's job was dominated by private workers, namely 76 people (38.8%), and the mother's job was dominated by other jobs (many mentioned housewives), 108 people (55.1%).

Based on Table 2. the level of knowledge, self-efficacy, and feelings are categorized based on the median score of each variable. More than half of junior high school students (52.6%) have insufficient knowledge regarding cervical cancer. In the certainty variable (self-confidence), it is known that most female students have complete confidence in receiving HPV vaccination. Regarding the feeling variable (perception), more than half of female

students (64.7%) agree with the provision of HPV vaccination.

Based on Table 3, statistical analysis was conducted using the *Spearman-rank test*, and a *p-value* of 0.589 (>0.05) was obtained, so H_0 was accepted, which means there is no relationship between knowledge and students' certainty regarding HPV vaccination.

Meanwhile, in the feeling variable, a *p-value* of 0.036 (<0.05) was obtained, so H_0 was rejected, which means that there is a relationship between knowledge and feelings of female students towards HPV vaccination with a correlation coefficient of 0.15 (weak relationship).

Tabel 1. Characteristics of junior high school student respondents in Surakarta City (n=196)

Respondent Characteristic	Frequency (f)	Percentage (%)
School		
SMP Muhammadiyah 4 Surakarta	47	24
SMP Al-Irsyad	55	28,1
SMP Negeri 20 Surakarta	44	22,4
SMP Warga	50	25,5
Class		
7	57	29,1
8	111	56,6
9	28	14,3
Religion		
Islam	168	85,7
Buddha	1	0,5
Christian	24	12,2
Catholic	3	1,5
Father's Education		
Elementary School	10	5,1
Junior High School	23	11,7
Senior High School	95	48,5
College	68	34,7
Mother's Education		
Elementary School	9	4,6
Junior High School	17	8,7
Senior High School	105	53,6
College	65	33,2
Father's Occupation		
Civil Servant	6	3,1
Indonesian National Armed Forces/Indonesian National Police	4	2
Self-employed	68	34,7
Private sector worker	76	38,8
Others	42	21,4
Mother's Occupation		
Civil Servant	4	2
Self-employed	44	22,4
Private sector worker	40	20,4
Others	108	55,1
TOTAL		196
TOTAL		100

Source: Primary data, 2024.

Tabel 2. Categories of Knowledge Level, Self-Efficacy, and Feelings of Junior High School Students in Surakarta City Regarding Cervical Cancer

Variables	Frequency (f)	Percentage(%)
Level of Knowledge		
Not enough	103	52.6
Good	93	47.4
Self-Efficacy Level		
Certain	145	73.9
Not sure	51	26.1
Feeling Level		
Agree	127	64.7
Don't agree	69	35.3
TOTAL		100

Source: Primary data, 2024.

Tabel 3. Relationship between Knowledge and Certainty and Feelings of Junior High School Students in Surakarta City Regarding the Provision of HPV Vaccine

Variables	N	p-value	r
Knowledge – certainty about HPV vaccine	196	0,589	0,039
Knowledge – feelings about HPV vaccine	196	0,036	0,150

Source: Primary data, 2024

Discussion

Knowledge is defined as the result of knowing after someone senses a particular object through their five senses, namely sight, hearing, smell, feeling, and touch¹⁵. Knowledge of a particular object can then influence a person's attitude and behavior.

In this study, 52.6% of junior high school students still have poor knowledge about cervical cancer and the HPV vaccine. However, 47.4% of junior high school students are classified as having good knowledge. Most students (85.2%) have known precisely how cervical cancer is transmitted. And only 14.3% of respondents were able to answer correctly regarding tertiary prevention that must be carried out by people living with cervical cancer. This study is not in line with the study of female adolescents in grades X and XI at SMK Muhammadiyah Berbah which stated that 76.3% of female students at the high school level had good knowledge regarding cervical cancer and the study of 408 female students

from 11 private high schools in Badung Regency, Bali which stated that as many as 50% of respondents had a pretty good level of knowledge regarding HPV vaccination¹⁶. The level of female students' knowledge regarding cervical cancer is made possible by the availability of information sources such as leaflets and posters displayed on school wall magazines, as well as activities and socialization carried out by the School Health Unit (UKS)¹⁷.

This finding is in line with Hasymi et al. (2022), who reported that knowledge and work motivation among health workers were positively associated with promotive health behaviors at primary health centers¹⁸. Just as knowledge and motivation drive health professionals to take promotive actions, knowledge among junior high school students also expected to stimulate perception and confidence regarding preventive measures such as vaccination.

Based on Table 3, it is known that 114 respondents (58.2%) did not have strong self-

confidence or certainty about HPV vaccination, and 82 respondents (41.8%) had strong self-confidence or certainty about HPV vaccination. Certainty or self-efficacy is defined as a person's belief in themselves to be able to do or overcome something¹⁹.

In this case, the study's results showed no relationship between knowledge and the certainty of junior high school students in Surakarta City regarding HPV vaccination (*p-value* = 0.589). Thus, although self-efficacy can stimulate young women's behavior to find out about cervical cancer and HPV vaccination, self-efficacy is not influenced by a person's level of knowledge²⁰.

This is supported by the study of Paudi et al. (2023), which applied Health Belief Model and founds that perceived susceptibility, perceived benefits, perceived barriers, cues to action, and self-efficacy were all significantly related to individuals behavior regarding COVID-19 prophylaxis²¹. These findings affirm that perception and self-efficacy are critical in shaping preventive health behaviors, including adolescent acceptance of HPV vaccination.

This is in line with research on cervical cancer patients at Dr. Hospital. Moewardi Surakarta stated a significant relationship exists between self-confidence or self-efficacy and the quality of life of cervical cancer patients (*p-value* = 0.002)²². This self-efficacy is formed automatically in the patient based on observations made by others²³. So, when he sees other people undergoing treatment, the patient will be motivated that he can overcome his own health problems and will reduce symptoms of depression and anxiety that affect the patient's stress levels and health conditions so that indirectly, the patient has made efforts to improve his quality of life¹⁷. Based on the questions given, most junior high school students gave neutral answers. The points of the questions include confidence in receiving the

HPV vaccine dose (66.15%), comfort in talking to parents/caregivers about the HPV vaccine (55.89%), comfort in asking nurses about the HPV vaccine (63.58%), and hope (58.2%) and confidence (61.02%) in reducing pain after getting the HPV vaccination. From these results, it is known that the certainty or self-confidence of female students is not influenced by the students' knowledge but rather by self-motivation and support from those closest to them. The support from those closest to them here is specifically focused on parental acceptance of HPV vaccination, where parental knowledge and attitudes are related to providing HPV vaccination to adolescent girls (*p-value* = 0.000). Thus, the better the parental knowledge, the more positive the parental attitude toward providing HPV vaccination to teenage girls²⁴.

The study's results showed a relationship between knowledge and feelings of junior high school students in Surakarta City towards the administration of the HPV vaccine (*p-value* = 0.036). Perceptions or feelings are often associated with a person's attitude and interests. In this study, someone with a high level of knowledge tends to have a good perception or view, a good attitude, and a high interest in the HPV vaccine. This is in line with research which states that someone with a good level of knowledge will be able to understand themselves better and maintain their health²⁵. A study that examining HPV vaccination in adolescent girls also shows a relationship between knowledge and interest in HPV vaccination, and another study also states a relationship between knowledge and a person's behavior toward HPV vaccination²⁶²⁷. This interest and behavior depend on a person's knowledge about cervical cancer, HPV vaccination, and how to prevent cervical cancer itself²⁸. This is in line with the research who states that the higher a person's knowledge, the person's behavior towards an object or

information will tend to improve and it will be easier to understand information, especially information related to HPV vaccination as an effort to prevent cervical cancer²⁹.

Furthermore, Sumarni and Bangkele (2023) emphasized that although parents, teachers, and health workers are aware of the risk of obesity in adolescent, some misconceptions still persist, such as viewing obesity as a symbol of family pride³⁰. This illustrates the importance of educational interventions that are not only informative but also corrective, especially when addressing students' misperceptions about HPV vaccination and cervical cancer.

Based on the students' answers regarding feelings, the majority of junior high school students answered neutrally. The most neutral answers from students' feelings include feelings about receiving injection needles (38.46%), feelings about the estimated pain due to HPV vaccination (48.71%), fear of HPV vaccination (47.69%), concerns about the side effects of HPV vaccination (50.76%), perceptions when discussing HPV vaccination (47.18%), and concerns about getting cervical cancer in the future (61.02%).

In addition, several questions that received positive responses from students included 63 people (32.14%) did not mind getting vaccinated, 43 people (21.9%) did not agree that HPV vaccination would be very painful, 56 people (28.5%) were not worried about the side effects of HPV vaccination, and 47 people (23.9%) were not afraid to get HPV vaccination. From these results, it can be concluded that junior high school students with good knowledge will have positive feelings about HPV vaccination, although the relationship is weak. In this study, there were still 103 female students (52.6%) with inadequate knowledge regarding cervical cancer and HPV vaccination. Therefore, a more effective approach is needed in conveying

information regarding HPV vaccination to increase knowledge and good perceptions of HPV vaccination³¹. This aligns with research which found that communication, information, and education (IEC) can increase knowledge and perceptions about reproductive health, which is part of efforts to prevent cervical cancer³².

Last, in addition to educational efforts, local health authorities in Surakarta should consider formulating and strengthening policy measures to improve cervical cancer prevention. This may include mandating school-based HPV vaccinations programs across all junior high schools, allocating regional health budgets specifically for adolescent reproductive health promotion, and establishing routine intersectoral collaboration between schools, community health centers, and parents. Clear policy directives with measurable vaccination targets and consistent monitoring mechanism can significantly enhance HPV vaccine coverage and reduce cervical cancer risk at the city level.

Conclusion

Junior high school students do not have sufficient knowledge about cervical cancer, so they do not have strong self-confidence regarding receiving HPV vaccination. However, good knowledge of female students about cervical cancer and HPV vaccination can shape good perceptions of junior high school students receiving HPV vaccination. Further research is expected to make efforts to improve female students' knowledge by intensively approaching the communication, information, and communication (KIE) method through collaboration between schools, health workers, and parents, also considering the formulation and strengthening of policy steps to improve cervical cancer prevention such as HPV vaccination programs in all junior high schools, regional health budgets specifically for

promoting adolescent reproductive health, and multisectoral collaboration between schools, health centers, and parents.

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Conflict of Interest Statement

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