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Knowledge and Acceptance of HPV Vaccination among Early Adolescents in Secondary Schools

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ABSTRACT
Human Papillomavirus (HPV) infection remains the leading cause of cervical cancer and continues to pose a public health problem in Indonesia. While previous studies have widely examined HPV-related knowledge and vaccines acceptance, evidence focusing on early adolescents within school-based vaccination settings remain limited. This study aims to analyze the relationship between the level of knowledge and acceptance of the HPV vaccine among third-grade junior high school students, a key target group for national immunization programs. A cross-sectional quantitative design was conducted among 48 students selected through total sampling. Data were collected using a structured questionnaire that measured respondent characteristics, knowledge levels about HPV, and acceptance of the HPV vaccine. Data analysis was performed univariately and bivariately using Fisher's Exact test with a significance level of 0.05. Most respondents were aged 14 years (60.4%), had high knowledge about HPV (72.9%), and showed positive acceptance of the HPV vaccine (64.6%). Bivariate analysis showed that students with high knowledge were 1.14 times more likely to accept the HPV vaccine positively than students with poor to moderate knowledge. However, this relationship was not statistically significant (p = 0.731; PR = 1.14; 95% CI: 0.67–1.94). There was no significant relationship between students' level of knowledge about HPV and their acceptance of the HPV vaccine. The study highlights the need for multidimensional intervention strategies involving parental engagement, school support, and health worker communication.

Keywords: Human Papillomavirus (HPV), HPV Vaccine, Knowledge, Vaccine Acceptance, Junior High School Students.

ABSTRAK
Infeksi Human Papillomavirus (HPV) masih menjadi penyebab utama kanker serviks dan terus menjadi masalah kesehatan masyarakat di Indonesia. Meskipun studi sebelumnya telah secara luas meneliti pengetahuan tentang HPV dan penerimaan vaksin HPV, bukti yang berfokus pada remaja awal dalam ranah vaksinasi berbasis sekolah masih terbatas. Studi ini bertujuan untuk menganalisis hubungan antara tingkat pengetahuan dan penerimaan vaksin HPV di kalangan siswa kelas 3 SMP, yang merupakan kelompok sasaran utama program imunisasi nasional. Desain kuantitatif cross-sectional dilakukan pada 48 siswa yang dipilih melalui sampling total. Data dikumpulkan menggunakan kuesioner terstruktur yang mengukur karakteristik responden, tingkat pengetahuan tentang HPV, dan penerimaan vaksin HPV. Analisis data dilakukan secara univariat dan bivariat menggunakan Uji Fisher's Exact dengan tingkat signifikansi 0,05. Hasil penelitian menunjukkan sebagian besar responden berusia 14 tahun (60,4%), memiliki pengetahuan tinggi tentang HPV (72,9%), dan menunjukkan penerimaan positif terhadap vaksin HPV (64,6%). Analisis bivariat menunjukkan bahwa siswa dengan pengetahuan tinggi 1,14 kali meningkatkan penerimaan vaksin HPV secara positif dibandingkan siswa dengan pengetahuan rendah hingga sedang. Namun, hubungan ini tidak signifikan secara statistik (p = 0,731; PR = 1,14; 95% CI: 0,67–1,94). Tidak ada hubungan yang signifikan antara tingkat pengetahuan siswa tentang HPV dan penerimaan mereka terhadap vaksin HPV. Studi ini menyoroti pentingnya strategi intervensi multidimensi yang melibatkan keterlibatan orang tua, dukungan sekolah, dan komunikasi tenaga kesehatan.

Kata Kunci: Virus HPV, Vaksin HPV, Pengetahuan, Penerimaan Vaksin, Siswa SMP.

INTRODUCTION

Human papillomavirus (HPV) is the most common sexually transmitted infection worldwide and is the primary cause of cervical cancer, which remains one of the leading causes of death among women in many developing countries, including Indonesia. Although most HPV infections are asymptomatic and resolve spontaneously, persistent infection with high-risk HPV types can lead to precancerous cervical lesions and develop into cervical cancer within 15–20 years (WHO, 2024). This situation makes HPV a public health issue that requires comprehensive and sustained prevention efforts. HPV vaccination is a proven, safe, and cost-effective primary prevention strategy, particularly when administered before initial sexual activity. The HPV vaccine provides protection against the high-risk HPV types most commonly associated with cervical cancer, namely HPV16 and HPV18. The World Health Organization (WHO) recommends administering the HPV vaccine to adolescent girls before the age of 15 as a strategic step to reduce future cervical cancer rates (WHO, 2022). In Indonesia, the HPV immunization program has become one of 14 basic immunizations for children as a preventive measure to reduce deaths from cancer (Kementerian Kesehatan Republik Indonesia, 2022).

Low HPV vaccine coverage is not solely attributable to access or service availability but is strongly influenced by vaccine acceptance. Previous studies hava shown that acceptance is determined by multiple interrelated factors, including knowledge, perceived risk, trust in vaccine safety, sociocultural beliefs, and exposure to misinformation (Yunus et al., 2024; Rahmah et al., 2024; Universitas Muhammadiyah Yogyakarta, 2025). In addition to knowledge, various studies show that HPV vaccine acceptance among adolescents is influenced by other interrelated factors, such as trust in vaccine safety, perception of disease risk, social norms, and support from parents and schools (Ashrtika et al., 2025; Wantini & Indrayani, 2020). Research in other countries has also reported that low health literacy and the influence of inaccurate information from social media contribute to negative attitudes toward HPV vaccines among adolescents and parents (Burki, 2019; Nkemngong et al., 2024).

At the family and institutional levels, parental approval and school support play decisive roles in adolescent vaccination decisions. Even when adolescents demonstrate adequate knowledge, parents often retain decision-making authoritu, considering safety concerns, cultural or religious values, and recommendations from trusted sources such as health worker and teachers (Jaiswal et al., 2025; Nguyen et al., 2024). School-based vaccination programs are therefore considered strategic platforms for HPV prevention. However, their effectiveness are influenced by various factors such as knowledge, attitudes, inter-actor relationships, resource availability, approval processes, and media influence (Dionne et al., 2024; Dubé et al., 2024). Despite extensive literature on these determinants, empirical evidence focusing on early adolescents within specific school contexts remains limited, particularly in relation to how knowledge influences vaccine acceptance.

Although numerous studies have examined HPV knowledge and vaccine acceptance, few have specifically focused on third-grade junior high school students as a distinct developmental group within school-based vaccination settings. This age group represents a critical transitional phase characterized by increasing cognitive autonomy but continued reliance on parental decision-making (Arna et al., 2024; Wantini et al., 2020), making it a strategically important yet underexplored population. Moreover, evidence from single-school contexts can provide nuanced insights into localized barriers and facilitators that are often obscured in large-scale surveys. Therefore, measuring students' knowledge and acceptance of the HPV vaccine is important as a basis for planning effective educational interventions.

Based on this description, this study focuses on third-year junior high school students as a strategic age group in HPV prevention programs. This study aims to determine the level of students' knowledge about the HPV virus and their acceptance of the HPV vaccine. The results of this study are expected to provide a comprehensive initial overview of students' readiness to accept the HPV vaccine and serve as a consideration for schools, health workers, and policymakers in designing comprehensive, contextual, and sustainable educational interventions to support the success of the national HPV vaccination program.

RESEARCH METHODS

This study used a quantitative research design with a cross-sectional approach to provide preliminary evidence on the relationship between HPV-related knowledge and HPV vaccine acceptance among early adolescents. The study was conducted in November 2025 at SMP N 6 Bandar Lampung, Indonesia, a public junior high school participating in school-based health programs. The population in this study was all third-year students at SMP N 6 Bandar Lampung during the study period. A total of 48 students were included using a total sampling technique, as the number of eligible students was limited. The inclusion criteria were active enrollment as a third-grade student, having no visual impairments, and willingness to participate. Data were collected using a structured self-administered questionnaire developed based on a review of previous studies. The questionnaire consisted of three sections: 1) respondent characteristics, 2) knowledge about HPV and HPV vaccination, and 3) acceptance of the HPV vaccine. The knowledge section consists of 10 multiple-choice items covering basic concepts of HPV transmission, health risks, prevention, and vaccination benefits. Knowledge levels were categorized as poor (≤50%), moderate (51–75%), and high (>75%). The vaccine acceptance section included 20 items assessing willingness to receive the HPV vaccine, perceived importance, and readiness to recommend vaccination. Acceptance was categorized as positive if respondents answered “yes” to ≥70% of items and negative otherwise.

Data were collected through questionnaires distributed online via Google Forms to be filled out by respondents directly in class with the assistance of teachers and researchers. Before filling out the questionnaire, respondents were explained the purpose of the study and a guarantee of data confidentiality. Data analysis was performed using SPSS software univariately to describe the characteristics of the respondents, their level of knowledge, and their acceptance of the HPV vaccine, and bivariately using Fisher's Exact Test to determine the relationship between the students' level of knowledge and their acceptance of the HPV vaccine, given the small sample size and expected cell count. This study involved a minimal-risk, non-interventional online survey and did not include any clinical procedures, biological sampling, or sensitive personal identifiers. Therefore, formal ethical clearance was not required under institutional guidelines for educational and public health research involving anonymous questionnaires.

RESULTS

The following is univariate data on the characteristics of research respondents, consisting of age, vaccination status, HPV vaccine information, knowledge about HPV, and acceptance of the HPV vaccine.

Table 1. Respondent Characteristics (N=48).

Variable	Frequency (F)	Percentage (%)
Age		
13 years old	4	8.3
14 years old	29	60.4
15 years old	15	31.3
HPV Vaccine Status		
Already Vaccinated	13	27.1
Not Yet Vaccinated	25	52.1
Don't Know	10	20.8
Information about HPV and the HPV Vaccine		
School/Teachers	23	47.9
Parents	1	2.1
Friends	1	2.1
Social Media	13	27.1
Health Facilities	10	20.8
Knowledge about HPV		
High	35	72.9

Variable	Frequency (F)	Percentage (%)
Moderate	7	14.6
Poor	6	12.5
Acceptance of the HPV Vaccine		
Positive	31	64.6
Negative	17	35.4
Total	48	100

Table 1 shows the proportion of respondents in this study, with most respondents aged 14 years (60.4%), while only 4 respondents (8.3%) were aged 13 years. Regarding the HPV vaccination status of respondents, the majority had not received the HPV vaccine (52.1%), and only 13 respondents (27.1%) had received the vaccine. In addition, most respondents obtained information about HPV and the HPV vaccine from school/teachers (47.9%), while the rest obtained information from social media, health facilities, parents, and friends. The majority of respondents had a high level of knowledge about HPV (72.9%). Regarding acceptance of the HPV vaccine, 64.6% of respondents had a positive acceptance, while only 35.4% had a negative acceptance.

Table 2. Relationship between Respondents' Knowledge and Acceptance of HPV Vaccines.

Variable	Acceptance of the HPV Vaccine				Total	p-value	PR (CI 95%)
	Positive		Negative				
	F	%	F	%			
Knowledge about HPV							
High	24	66.7	12	33.3	36	0.731	1.14 (0.67–1.94)
Moderate – Poor	7	58.3	5	41.7	12		

Table 2 shows that 24 respondents (66.7%) had high knowledge and positive acceptance of the HPV vaccine, while 5 respondents (41.7%) had low knowledge and negative acceptance of the HPV vaccine. The results of the bivariate analysis show that respondents with high knowledge are 1.14 times more likely to accept the HPV vaccine positively than respondents with moderate to low knowledge. However, Fisher's Exact test results show that this relationship is not statistically significant ($p = 0.731$; PR = 1.14; 95% CI: 0.67–1.94). Fisher's Exact test was used as an alternative to the Chi-Square test because the requirements were not met (2x2 table for moderate-low knowledge and small cell count).

DISCUSION

The majority of respondents in this study were 14 years old, reflecting the general characteristics of third-year junior high school students. This age is the early adolescent phase, where cognitive abilities begin to develop to understand health information, but health decision-making is still greatly influenced by the surrounding environment, particularly school and parents (Hamidah & Rizal, 2022). This is relevant to the findings of this study, which show that most respondents obtained information about HPV and the HPV vaccine from school or teachers.

The dominant source of information about HPV and the HPV vaccine comes from schools/teachers (47.9%), indicating that educational institutions play a strategic role in providing reproductive health education and HPV vaccination. This finding is in line with the national policy that places schools as the primary means of implementing HPV education and immunization through the BIAS (School Children Immunization Month) program (Ditjen P2P Kementerian Kesehatan Republik Indonesia, 2022). The role of schools as a source of health information is considered effective in reaching adolescents, but its effectiveness is highly dependent on the quality of the material, the quality of the facilitators, the delivery methods, and the educational media provided (INSERM Collective Expertise Centre, 2001). However, even though almost half of the respondents obtained information from school, the presence of alternative information sources, such as social media, may further contribute to variability in knowledge quality and perceptions, potentially influencing vaccine-related attitudes.

Based on vaccination status, the results of the study show that most respondents have not received the HPV vaccine, and others do not know their vaccination status. This condition indicates that there is still a gap between the availability of the HPV vaccination program and students' understanding of their own immunization status. These findings are in line with previous studies, which state that low understanding of vaccination often occurs in children, because vaccination decisions are generally made by parents (Susanti, 2022). Another study of health students in Romania showed that participation in vaccination was not positively correlated with high awareness of HPV risks. Factors such as education level, age, gender, and smoking status were significantly associated with awareness and acceptance of vaccination, highlighting the need for targeted educational interventions (Baranga et al., 2025).

Most respondents in this study had a high level of knowledge about HPV (72.9%). This can be attributed to the role of schools as the main source of information and increased access to health information. However, despite the high level of knowledge among respondents, bivariate analysis showed that knowledge was not statistically significantly associated with HPV vaccine acceptance ($p = 0.731$). The above findings indicate that good knowledge does not necessarily translate directly into acceptance or willingness to receive the vaccine. The results of this study reinforce the findings of previous studies, which state that vaccine acceptance is a complex health behavior and is influenced by various factors other than knowledge, such as perceptions of vaccine safety, trust in health services, social norms, and parental support (Wantini et al., 2020). Other research results also confirm that knowledge alone is not enough to encourage vaccination, thus requiring interventions that not only increase knowledge but also support preventive behavior change (Halim et al., 2025). In the early adolescent age group, the role of parents is very dominant in decision-making related to vaccination, so that students' knowledge is not necessarily the main determining factor for vaccine acceptance.

A literature review by Rahmah et al., (2024) shows that the factors most frequently mentioned in 23 studies regarding HPV vaccine acceptance include knowledge, cost, and public trust, which are significant contributors in ASEAN countries. In Uganda, initial concerns, fears, and misconceptions about the HPV vaccine initially made parents hesitant to give their children the HPV vaccine. However, the absence of serious side effects after vaccination and education from schools and health workers increased adolescent participation in HPV vaccination (Turiho et al., 2017). These findings confirm that continuous education, active involvement of schools and health workers, and strengthening public trust are key strategies in increasing HPV vaccine acceptance among adolescents, even in social and cultural contexts that initially show resistance to vaccination programs.

Proportionally, respondents with high knowledge showed a more positive tendency to accept the vaccine compared to respondents with moderate to low knowledge. This is reflected in the Prevalence Ratio value of 1.14, which indicates that respondents with high knowledge are 1.14 times more likely to accept the HPV vaccine positively. However, the confidence interval range that exceeds one (95% CI: 0.67–1.94) indicates that the relationship is not statistically significant. This condition indicates that the influence of knowledge on vaccine acceptance in this study is relatively weak. The insignificance of this relationship may also be influenced by methodological factors, particularly the relatively small number of respondents and the unbalanced distribution of knowledge categories. The number of respondents in the moderate and low knowledge categories was far fewer than in the high knowledge category, which could reduce the statistical power of the test in detecting a meaningful relationship. Therefore, Fisher's Exact test was used as an alternative to the Chi-Square test to accommodate these limitations (Amruddin, 2020). Despite several limitations, this study still makes an important contribution in describing the level of knowledge and acceptance of the HPV vaccine among third-year junior high school students.

Overall, this exploratory study contributes context-specific evidence highlighting the gap between knowledge and acceptance of HPV vaccination among third-grade junior high school students. The findings of this study imply that efforts to increase HPV vaccine acceptance among adolescents are not sufficient if they only focus on increasing knowledge. More comprehensive interventions are needed, such as strengthening education through lectures, discussions, and the use of digital media as educational tools (Imelda et al., 2024). In addition, active parental

involvement in school vaccination programs and consistent communication between schools and health facilities are also important in increasing student acceptance of the HPV vaccine. This multidimensional approach is considered more effective in increasing HPV vaccine acceptance among adolescents. Future research should employ larger and more diverse samples, incorporate longitudinal designs, and explicitly examine parental, social, and psychosocial determinants to better understand pathways influencing HPV vaccine acceptance among adolescents.

CONCLUSION

Most respondents had a high level of knowledge about HPV, and the majority showed positive acceptance of the HPV vaccine. However, bivariate analysis showed that there was no significant relationship between the level of knowledge and acceptance of the HPV vaccine. These findings indicate that knowledge is not yet a determining factor in the acceptance of the HPV vaccine by junior high school students. Therefore, increasing acceptance of the HPV vaccine among school-aged adolescents needs to be done through a more comprehensive approach that involves the role of parents, schools, and health workers, as well as education that emphasizes the safety and benefits of the vaccine. Further research is recommended to use a larger sample size and include psychosocial variables and family support in order to gain a deeper understanding of the factors that influence HPV vaccine acceptance among adolescents.

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