Research Article

Impact of Educational Intervention on HPV Vaccine Interest in Preclinical Medical Students

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Abstract

Objective: To evaluate the impact of education in HPV vaccination interest among preclinical medical students at the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, considering the importance of HPV vaccination and its low coverage in Indonesia.

Methods: This was a descriptive analytical study with a cross-sectional design. The respondents were 104 preclinical medical students from the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, using a proportional sampling method stratified by year of study. Data were obtained in November 2023 using a self-administered and closed ended questionnaire as a tool that measured knowledge about the HPV vaccine before and after educational intervention. Educational intervention was conducted in the form of a multimedia presentation. The tests used were the Wilcoxon signed-rank test and the McNemar test.

Result: There was a statistically significant increase in knowledge and HPV vaccination interest after the educational intervention. Moreover, there was a significant association between education and HPV vaccination interest (p=0.000, 95% CI).

Conclusion: Education plays a significant role in increasing HPV vaccination interest among preclinical medical students, as demonstrated by a statistically significant improvement after the intervention. HPV vaccination interest increased from 59.6% to 80.8% after the intervention. These findings suggest the importance of integrating structured HPV education programs into medical curricula.

Keywords: education, HPV vaccination interest.

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INTRODUCTION

Cervical cancer is the second most common cancer in women in Indonesia, with 9.2% of total cancer cases.[1,2] In 2020, the Global Cancer Observatory states that there were 36,633 new cervical cancer cases in Indonesia.[3] Cervical cancer is most commonly caused by high-risk Human Papillomavirus (HPV) types. At least 200 types of HPV have been discovered and have been categorized into low risk, potentially high risk and high risk based on the risk of the virus can cause cancer. HPV types 16 and 18 are responsible for most HPV related cancers.[4] Vaccination including HPV vaccination is a cost-effective method to decrease the incidence of infectious diseases.[5] HPV vaccination is the best way of prevention against HPV lesions, non-cancerous and cancerous.[6] HPV vaccine has been shown to be effective in reducing the incidence of cervical cancer by 34% if the vaccine is given at aged 16-18 years and become 62% reduction

if given at aged 14-16 years, and even up to 87% coverage if given to girls at aged 12-13 years, according to a study in the United Kingdom per 2021.[7] The HPV vaccine itself has been introduced in Indonesia in 2016 with a pilot program in 12 provinces and in 2023 has been launched as a national HPV immunization program.[8] A study based in Indonesia, states that HPV vaccination among young adults and adults is still rare, which contributes to Indonesia's HPV vaccine coverage per 2022 was found only 7% for the complete dose and 29% for the first dose, this finding is in contrast with global HPV vaccination coverage that reached 55% for the first dose and 44% for complete dose.[9,10] One of the reasons for this low vaccination rate is a lack of knowledge.[11] According to a research in Europe, lack of information about the benefits of the vaccine played a role why HPV vaccination coverage rate is low.[11] According to a study in Germany in 2017, one factors that affect vaccine acceptance is about confidence or trust so that vaccine acceptance are low due to misinformation about the effectiveness and safety of the vaccines, so it is important to correct the misinformation.[12] Health education plays an important role in improving health in general. An article in 2022 summarized many studies that have been conducted to assess the importance role of health education, one example is a study by the United States CDC Global Disease Detection and Response Program about the effect of handwashing on the incidence of influenza disease in school-aged children in Cairo, Egypt. The result of the study is 50% reduction in influenza incidence at group of children who received health education. The article concluded that health education has a very positive impact on individual attitudes and behaviours related to health.[13] Level of acceptance of HPV vaccination in Indonesia is low, while number of cervical cancer cases are high and moreover there is a fact that misinformation about vaccine is one factor that leads to low vaccination coverage. Therefore, this study aims to assess the impact of health education on the willingness to receive HPV vaccination specifically among preclinical medical students, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, in Jakarta.

METHODS

The design for this study was a descriptive analytical study with a cross-sectional method. The dependent variable in this study is interest in HPV vaccination, while the independent variable is education. Seven hundred and seventeen premedical clinical students have participated in answering the screening questionnaires. From that number, 124 subjects had received the HPV vaccine and had been excluded, and 593 subjects had met the criteria. Then we calculated the sample size for this study using the descriptive study formula, followed by a proportional sampling method based on respondents' year of study (from 2020-2023). From 2020-2023, respectively, 25, 23, 29, 27 respondents, each year, and the total respondents was 104. We use a set of self-administered questionnaires consisting of 11 closed ended questions (the same questionnaires before and after education), where the questionnaires have been passed a validity test (p-values < 0.05). Here are some samples of questions from the questionnaires; HPV vaccine is only essential for women with more than one sexual partner, to prevent cervical cancer, only need pap smears and contraceptive pill using, so the HPV vaccine not yet needed, if there is a vaccination program soon, will you interested in participating the program? Educational intervention was conducted in the form of a multimedia presentation and the topic is about HPV vaccine, what is the vaccine purpose, when its given, who the target is, vaccine side effect, etc. The data was first analyzed using univariate analysis to assess respondent characteristics (age, gender, years of study), level of knowledge before and after education, and interest in HPV vaccination before and after education. To assess the normality data, we used the Kolmogorov-Smirnov test. Then, the Wilcoxon Signed-Rank test was performed to determine whether there is a difference level of knowledge before and after education. The McNemar test, then used to determine the role of education on HPV vaccination interest. All p-values < 0.05 were considered statistically significant. Data analysis was conducted using SPSS version 26.0

RESULTS

One hundred and four preclinical medical students have attended the education session and become respondents in this research. The respondents ranged in age from 17 to 23 years, with the majority of respondents being 20 years old (26.9%), female (54.8%), and second-year college students (27.9%) (Table 1).

Table 1. Demographic Data of Respondents

Variables	Frequency (n)	%
Age (y.o.)		
17	1	1
18	27	26
19	25	24
20	28	26.9
21	20	19.2
22	1	1
23	2	1.9
Gender		
Male	47	45.2
Female	57	54.8
Years of College		
Fourth	25	24
Third	23	22.1
Second	29	27.9
First	27	26

Level of knowledge before and after education intervention was assessed, while we assumed lack of knowledge if score < 8 out of 10, and adequate knowledge if score ≥ 8 out of 10. Adequate knowledge obtained only 3.8% before education and has been rise to 96.2% after education intervention. Interest of the respondents about HPV vaccine also assessed in the questionnaires, that result in HPV vaccine interest are 40.4% before education and become 80.8% after education intervention (Table 2).

Table 2. Knowledge and Interest about HPV Vaccine before and after Education

Variables	Before education		After education	
Level of knowledge	**n**	**%**	**n**	**%**
Lack	46	44.2	4	55.8
Adequate	58	3.8	100	96.2
HPV vaccine interest				
Not interest	62	59.6	20	19.2
Interest	42	40.4	8	80.8

The median level of the respondents' knowledge before education is 5.65 (lack) with a minimum value of 1.00 and a maximum of 10.00. While the median level of respondents' knowledge after education is 8.95 (adequate) with a minimum of value 4.00 and a maximum of 10.00. Median level of knowledge related to HPV vaccine before and after education were carried out using bivariate analysis Wilcoxon signed-rank test and resulted in p-value = 0.000 (Table 3).

Table 3. Median Level of Knowledge before and after Education Intervention

	Median (Min-Max)	*P-value* (95% CI)
Before Education	6.00 (1.00-10.00)	0.000
After Education	9.00 (4.00-10.00)	

Wilcoxon signed-rank test; *p < 0.05; CI 95%

In bivariate analysis, the McNemar test was used to assess the role of education in HPV vaccination interest. The difference in interest in HPV vaccination before and after education was considered statistically significant with a p-value = 0.000. It is proven that there is a role of education in HPV vaccination interest among preclinical medical students of the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia (Table 4).

Table 4. The Role of Education on HPV Vaccination Interest

	HPV Vaccination Interest	*P-value* (95% CI)
	Median (Min-Max)	
Before Education	1.00 (1.00-2.00)	0.000
After Education	2.00 (1.00-2.00)	

McNemar Test; *p < 0.05; CI 95%

Confidence intervals in this research were 95%, and effect sizes were 10%.

DISCUSSION

Data from The Global Cancer Observatory found that cervical cancer cases in Indonesia are still high, with the number of new cases in 2020 at least 36,633 cases.[3] The number of new cases in 2020, even though the HPV vaccine has been available in Indonesia since 2016, is a terrible problem. The HPV vaccination coverage rate in Indonesia is still very low.[10] One of the reasons for the low vaccination coverage rate is the lack of information regarding the HPV vaccine itself among the public. This study aims to determine whether there is a role of education in interest in HPV vaccination.

HPV Vaccination Coverage

Seven hundred seventy students who answered the screening questionnaires, 82.7% had never received the HPV vaccine. This finding is in line with WHO's research that declares HPV vaccination coverage in Indonesia in 2022 is

7% for the complete dose and 29% for the first dose.[10] The HPV vaccination program in Indonesia has been introduced since 2016; however, in that year, the majority of respondents in this study did not fulfil the condition to receive this vaccine due to age and gender reasons (at that time, the programme was only for girls).[8] Nowadays, the HPV vaccination has been included in the national immunization program, with the target of vaccination being grade 5-6 elementary school students (girls and boys), but the respondents in this study were already over the age limit to receive the HPV vaccine from the program.[14]

Respondents' Characteristics

One hundred four preclinical medical students as respondents. The respondents for this study are mixed, female and male, mostly are female with a majority of 54.8%, and men with a minority of 45.2%. There is a difference in gender characteristics of respondents compared with previous studies, whereas mostly using only females as respondents, while this study also involved males, this is aligned with the fact that HPV vaccination is also acceptable and important for men and could help reduce HPV infection incidence directly.[15-17]

Knowledge related to HPV Vaccination

A significant increase in respondents' knowledge after being given an educational intervention, with statistically significant results compared with knowledge before intervention. These findings are in line with the research in Egypt, which found that there was an increase in subjects' knowledge about the HPV vaccine and infection, where the majority of the respondents had good knowledge after being given educational interventions.[15] These results are also similar to the research in Saudi Arabia, which reported that the respondents had good knowledge of HPV infection and vaccine from post-test results.[16] The differences from research in Egypt and Saudi Arabia were found in respondents' baseline level of knowledge (knowledge before being given education). In this study, more than half of the respondents had adequate knowledge before education. This may occur due to differences in respondents' characteristics from the 2 previous studies. Another study, which was conducted in the same place as this study, reported that female students at the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, as their respondents, had good knowledge regarding the HPV vaccine.[18] The results of this study are different from the two previous studies and a study in Alexandria, Egypt, which found that the majority of respondents had a lack of knowledge before the intervention, although the study found that respondents' knowledge increased significantly after the intervention.[19] Another study conducted in Jakarta found results different from this study, although the respondents were also medical students, but had a lack of baseline knowledge of the HPV vaccine and infection. According to that study, these findings are the result of inadequate HPV vaccine material provision in the preclinical education curriculum, which places more emphasis on the early detection of cervical cancer.[20] All medical faculty in Indonesia have the same curriculum according to *SPPDI (Standar Pendidikan Profesi Kedokteran Indonesia),* but with different implementations.[21] Differences in knowledge outcomes in this study and previous studies may occur due to differences in forms of curriculum implementation at each university. However, this study did not involve medical students from other universities, so this study did not further analyze the implementation of HPV materials from other universities in the learning module.

Role of Education on HPV Vaccination Interest

The result of this study was obtained by the bivariate analysis method, using the McNemar test, which found that there is an increase in interest that is statistically significant after being given an educational intervention (p-value = 0.000). This increase may be due to the educational intervention that provides information related to HPV infection and the vaccine, which has a positive impact on respondents' beliefs and behaviors. This showed the role of education in interest in HPV vaccination among preclinical medical students at the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia. Before educational intervention, more than half of the respondents in this study were not interested in receiving the HPV vaccine. There are several reasons why respondents were not interested in receiving the HPV vaccination, such as not knowing the benefits of the HPV vaccine, particularly in men, don't know health facilities that provide HPV vaccination services,

also a reason that they don't have any plan having sexual relationship soon, and cost issues. However, after educational intervention that contained information that answered several reasons above, the interest in HPV vaccination in respondents increased significantly. These results are in line with the research conducted in China, which found the effect of education on increasing interest in HPV vaccination. That study also stated that the higher one's understanding of HPV, the higher the intention to receive the HPV vaccine. That statement is in line with this study.[22] Similar results were also found in a study in Iran, which stated that there is an increase in interest in HPV vaccination after being given education and proved the role of education in interest in HPV vaccination in Iran.[23] There is research among faculty students at the university in Bandung, which found that interest in HPV vaccination is very high. That study also found that prior knowledge of university students about the HPV vaccine was average, but they had good knowledge related to cervical cancer and HPV, which could be a reason why interest in HPV vaccination is high.[24] Above studies support the results of this study, which state that education plays a role in increasing interest in HPV vaccination. In addition, the findings in this study are in line with 2 theories of the relationship between education and health, namely Fundamental Cause Theory and Human Capital Theory. Both theories state that education is a factor that influences lifestyle and leads to increasing knowledge to improve personal health. As in this study, there was an increase in interest in HPV vaccination as a way of improving health after being given education.[25] Outside of the findings, a few respondents remain uninterested despite the educational intervention; we still need another method such as in-depth interviews or focused group discussions. The limitation of this research is that we use a cross-sectional design with 104 respondents from a single institution and use a questionnaire as a sampling method; however, future research is expected to use a longitudinal design with a higher number of respondents to enhance generalizability and consider adding a control group to strengthen causal inference. Future research can also add another method, such as in-depth interviews or focused group discussions, rather than only a questionnaire, to gain deeper insights about confounding factors that would influence interest in HPV vaccination, such as prior exposure to HPV information. Long-term effects of education, specifically whether the respondents proceed to get vaccinated, would be assessed in future research.

ETHICAL CLEARANCE

This research followed a protocol approved by the Research Ethics Committee, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, with reference number 09/11/KEP-FKIKUAJ/2023.

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CONFLICT of INTEREST

We declare that there is no conflict of interest in this research.

CONCLUSION

This research found a statistically significant increase in HPV vaccination interest after education (p=0.000). Although this research has some limitations, including a restricted sample size, it needs to use another sampling data method rather than only a questionnaire, and it needs further long-term assessment of interest. The findings of this research can provide valuable insights for improving medical education curricula or sexual education health in school, strengthening HPV vaccine promotion strategies, and ultimately contributing to the increase in HPV vaccination coverage on a larger scale especially in Indonesia.

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