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Cervical Cancer Campaign: Correlation Between HPV Vaccine and Cervical Cancer Knowledge with HPV Vaccination Rate

Mariani Santosa[1*], Ashley Karin Anjaya[2], Veronica Dwi Jani Juliawati[3], Robi Irawan[4], Yuliana[5]

[1]Department of Physiology, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, North Jakarta, Indonesia

[2]Bachelor of Medicine Study Programme, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, North Jakarta, Indonesia

[3]Medical Education Unit, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, North Jakarta, Indonesia

[4]Department of Anatomy, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, North Jakarta, Indonesia

[5]Department Anesthesiology, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, North Jakarta, Indonesia

*Corresponding author: Mariani Santosa, mariani@atmajaya.ac.id

Abstract

Introduction: Cervical cancer ranks second for the highest cancer cases in Indonesia. The main cause is recurring HPV infection. HPV infection commonly occurs when transmission by skin-to-skin contact or skin to mucosa contact is enough to spread it. One prevention effort is HPV vaccination, but there are still obstacles such as a lack of education and expensive prices.

Methods: This study is an analytic cross-sectional study. Data was collected from February through March of 2023 gathering a total of 121 respondents. Questionnaires are used for data collection with 10 questions concerning cervical cancer and 11 questions regarding HPV vaccine knowledge. The Fisher exact probability test was used as bivariate analysis.

Results: This study shows that students of the Faculty of Medicine and Health Sciences at Atma Jaya Catholic University of Indonesia have great knowledge regarding cervical cancer, adequate and great knowledge concerning the HPV vaccine with the majority reporting not being vaccinated (69,4%). Bivariate analysis shows no significant correlation between cervical cancer and HPV vaccine knowledge with HPV vaccination rate (p = 0,499 and p = 0,808).

Conclusion: There is no significant correlation between cervical cancer and HPV vaccine knowledge with HPV vaccination rate among preclinical students of Faculty of Medicine and Health Sciences at Atma Jaya Catholic University of Indonesia

Keywords: Cervical Cancer - Medical Students – Knowledge - HPV Vaccination Rate - HPV Vaccine

INTRODUCTION

Cervical cancer is the second leading cause of death by malignancy in women due to *human papillomavirus* (HPV) infection.[1] GLOBOCAN 2020 stated that breast cancer ranks first for new cases in Indonesia, followed by cervical cancer.[2] Cervical cancer is commonly caused by HPV infection that is transmitted not only through sexual contact but also through skin contact, contact with genital, and oral sex.[3,4] HPV is divided into 16 genus, five of which can infect humans.[5] HPV type 16 and 18 are the most commonly found in high dysplasia.[6] High-risk HPV infection is prevalent in young adults before the age of 25 for its self-limiting trait.[3] Risk factors can be divided into infection factors and behavioral factors, the latter includes sexual activity and lifestyle, specifically actions that increase HPV transmissions, such as having sex at a young age, having multiple sexual partners, unloyal spouse, and having a history of sexually transmitted disease.[7,8]

Vaccine is a biological matter used for protection against bacterial or viral infection by stimulating the immune response system without causing the actual disease.[9,10] There are three types of HPV vaccine depending on the amount and type of virus prevented, namely bivalent, quadrivalent, and 9-valent vaccines. All three are effective in preventing persistent infections but less so in individuals that have been infected with HPV.[5,11,12]

Initial detection is done through HPV test and *Pap smear*[13], whilst prevention is through HPV vaccination.1 In its prevention, knowledge about the HPV vaccine is closely related to its acceptance, but the group of people that needs it the most has low knowledge.[14] Based on a previous study about the correlation between knowledge and health behavior, it is found that there is significant correlation both in Indonesia and the world.[15] In her study, Ekowati *et al*. found that there is a correlation between cervical cancer and HPV vaccination knowledge with the serious perception of cervical cancer and HPV vaccination obstacle.[16] However, Sati *et al*. discovered no correlation between student knowledge about cervical cancer and HPV vaccination with the intention to be vaccinated.[17] Even so, the public's desire to be vaccinated is still limited due to its high cost.[14,18] Therefore, through this study, we wanted to learn more about the correlation between HPV vaccine and cervical cancer knowledge with HPV vaccination rate in an attempt to prevent cervical cancer among preclinical students of the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia.

METHODS

Study Design

This study is an observational analytic study with a cross-sectional method and was conducted online from February 2023 until March 2023.

Subject and Sampling method

The study population was female preclinical students of the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, which were selected through stratified random sampling from four classes (class of 2019, 2020, 2021, 2022). Stratified random sampling was used to ensure that each stratum is adequately represented in the sample and reduces the sampling error and variability within each group. Inclusion criteria was female students aged 15-24, while the exclusion criteria include have a history of hysterectomy, and disagreed to participate in this study. Based on predetermined inclusion and exclusion criteria, 121 respondents were obtained.

Data Collection

Data was collected online using Google Forms, which consists of 3 questionnaires that is used by previous studies regarding the HPV vaccine, cervical cancer, and vaccination history. Additionally, this study has been granted approval by Atma Jaya's Ethics Committee with the letter number: 12/02/KEP-FKIKUAJ/2023.

Statistical Analysis

Data were analyzed using SPSS v27 software for two types of tests. Univariate analysis is used to view the distribution of each variable, while bivariate analysis, namely the Fisher exact probability test, is employed to tell the correlation between variables with *p*-value <0.05 considered significant.

RESULTS

Among 121 respondents ranging from 17-23 years old, most are aged 19 (25.6%) and are from the year 2022 (29,8%)(Table 1).

Table 1. Respondent's Demographic Characteristics

Characteristics	n	%
Age		
17	6	5
18	28	23,1
19	31	25,6
20	28	23,1
21	20	16,5
22	7	5,8
23	1	0,8
Total	121	100
Class Year		
2019	26	21,5
2020	25	20,7
2021	34	28,1
2022	36	29,8
Total	121	100

More than 90% have previous knowledge about cervical cancer and HPV vaccination, with 46,3% having educational institutions as

their source of knowledge for cervical cancer. As for HPV vaccine knowledge, sources for the year 2019 and 2021 were derived from educational institution, whereas the year 2020 and 2022 comes from family (Table 2). All years of preclinical female students have great

Table 2. Respondent's Initial Information

Initial Information	2019		2020		2021		2022		Total	
	n	%	n	%	n	%	n	%	n	%
Have received information about cervical cancer	24	92.3	24	96.0	33	97.1	30	83.3	111	91.7
Have received information about the HPV vaccine	25	96.2	24	96.0	31	91.2	29	80.6	109	90.1
Source of information about cervical cancer										
Educational institution	16	61.5	9	36.0	19	55.9	12	33.3	56	46.3
Friends	0	0,0	1	4,0	0	0,0	0	0,0	1	0,8
Family	3	11,5	5	20,0	5	14,7	10	27,8	23	19,0
Media	5	19,2	5	20,0	6	17,6	7	19,4	24	19,8
Others	0	0,0	0	0,0	3	8,8	1	2,8	8	6,6
Source of information about the HPV vaccine										
Educational institution	12	46,2	5	20,0	12	35,3	9	25,0	38	31,4
Friends	1	3,8	0	0,0	1	2,9	2	5,6	4	3,3
Family	6	23,1	10	40,0	7	20,6	11	30,6	34	28,1
Media	5	19,2	5	20,0	8	23,5	6	16,7	24	19,8
Others	1	3,8	4	16,0	3	8,8	2	5,6	10	8,3

knowledge about cervical cancer with students in each year having poor knowledge (Table 3). The year 2019 and 2020 have great knowledge of the HPV vaccine, while the years 2021 and 2022 have adequate (Table 4). In total, there are 37 respondents (30.6%) that have been vaccinated for HPV, though there is a difference in recommended dosage according to age (Table 5).

Fisher exact probability test shows no significant correlation between cervical cancer knowledge with HPV vaccination rate in all years, with a *p*-value of 0.499 (Table 6). There is also no significant correlation found between knowledge of the HPV vaccine with HPV vaccination rate in the year 2019-2022 of female preclinical students with a *p*-value of 0.808 (Table 7).

Table 3. Knowledge of Cervical Cancer

Level of	**2019**		**2020**		**2021**		**2022**	
Knowledge	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Poor	1	3,8	1	4,0	1	2,9	1	2,8
Adequate	6	23,1	3	12,0	8	23,5	9	25,0
Great	19	73,1	21	84,0	25	73,5	26	72,2
Total	26	100,0	25	100,0	34	100,0	36	100,0

Table 4. Knowledge of the HPV Vaccine

Level of	**2019**		**2020**		**2021**		**2022**	
Knowledge	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Poor	3	11,5	4	16,0	11	32,4	11	30,6
Adequate	9	34,6	6	24,0	14	41,2	19	52,8
Great	14	53,8	15	60,0	9	26,5	6	16,7
Total	26	100,0	25	100,0	34	100,0	36	100,0

Table 5. Vaccination Rate

Vaccination Rate	**2019**		**2020**		**2021**		**2022**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Vaccinated	9	34,6	11	44,0	6	17,6	11	30,6	37	30,6
Age of Vaccination										
<15	2	7,7	6	24,0	4	11,8	6	16,7	18	14,9
≥15	7	26,9	5	20,0	2	5,9	5	13,9	19	15,7

Vaccination Rate	2019		2020		2021		2022		Total	
	n	%	n	%	n	%	n	%	n	%
Vaccinated	9	34,6	11	44,0	6	17,6	11	30,6	37	30,6
Vaccination Dosage										
1 Dosage	0	0,0	1	4,0	0	0,0	3	8,3	4	3,3
2 Dosage	3	11,5	1	4,0	0	0,0	3	8,3	7	5,8
3 Dosage	6	23,1	9	36,0	6	17,6	5	13,9	26	21,5

Table 6. Correlation Between Cervical Cancer Knowledge with HPV Vaccination Rate

Cervical Cancer Level of Knowledge	HPV Vaccination Rate										*p*
	Not Vaccinated		1 Dosage		2 Dosage		3 Dosage		Total		
	n	%	n	%	n	%	n	%	n	%	
Poor	2	50,0	0	0,0	0	0,0	2	50,0	4	100,0	0,499
Adequate	18	69,2	1	3,8	3	11,5	4	15,4	26	100,0	
Great	64	70,3	3	3,3	4	4,4	20	22,0	91	100,0	
Total	84	69,4	4	3,3	7	5,8	26	21,5	121	100,0	

Table 7. Correlation Between HPV Vaccine Knowledge with HPV Vaccination Rate

HPV Vaccine Level of Knowledge	HPV Vaccination Rate										*p*
	Not Vaccinated		1 Dosage		2 Dosage		3 Dosage		Total		
	n	%	n	%	n	%	n	%	n	%	
Poor	18	62,1	1	3,4	3	10,3	7	24,1	29	100,0	0,808
Adequate	36	33,3	2	4,2	2	4,2	8	16,7	48	100,0	
Great	30	68,2	1	2,3	2	4,5	11	25,0	44	100,0	
Total	84	69,4	4	3,3	7	5,8	26	21,5	121	100,0	

DISCUSSION

This study shows the majority of female preclinical students of the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, have great knowledge of cervical cancer with the main source of educational institution. This aligns with a study by Milecki *et al.* that shows Poland medical students got a mean grade of 11.74 ± 2.51 from the maximum grade of 15, Khatidawa *et al.* in Indonesia also show that 90% of students from Padjadjaran University know about cervical cancer, and HPV with media as their main source of knowledge.[19,20] Though different from a couple of other studies that discovered both students from medical and other faculty have poor knowledge of cervical cancer with class or media as the main source.[21,22] As in a study by Patel *et al.* on medical students and paramedics in India that got a mean grade of 5.19 ± 2.24 with a total grade obtainable is 17. It is explained that this difference is caused by some factors such as residence, economic status, and source of information.[23] In addition, some studies concluded that knowledge grade positively correlates with duration of education and faculty.[19,24–26] It can be explained because there is an increase in education and experience, although not shown in this study.

It is seen in this study that most female students of the years 2019 and 2020 have great knowledge about the HPV vaccine (53.8% and 60.0%), while the years 2021 and 2022 have adequate (41.2% and 52.8%). Similar to other studies that show the majority of medical and health science students have great knowledge.[25,27] Even so, some studies don't align as they state that a larger part of students have lack or poor knowledge, but it is positively associated with academic years and age.[16,24,28] Previous studies found that even though male and female students have medical education as their main source of knowledge, female students have a better understanding of HPV infection and vaccines.[27,29,30] Some explained that it is because females have more interest in the topic that leads to higher grades.[27]

This study founds that many students have great knowledge regarding cervical cancer (70.3%), yet most have not been vaccinated (69.4%). Analysis got a *p*-value of 0.499 (>0.05) that displays no significant correlation between cervical cancer knowledge and HPV vaccination rate. This outcome is in line with a study by Gismondi *et al.* on medical students all over the world that results in students having inaccurate and incomplete information. Moreover, even though 85.3% know of the vaccine's existence, only 39.8% have been vaccinated.[31] Other studies also discovered

that albeit medical students have better knowledge and express higher awareness, it is still considered poor and doesn't influence the vaccination rate.[27,28,32] This study discovered that among unvaccinated students, the difference between great and adequate knowledge students is only 1.1% with students tending to get full dosage along with their level of knowledge. Some studies figured there are other barriers regardless of knowledge, such as lack of information regarding the HPV vaccine, the belief that the HPV vaccine is only for sexually active females, economic barriers, and high cost of vaccine.[31–33] There was no significant correlation between knowledge of the HPV vaccine and vaccinationrate in this study (p = 0.808). As many as 68.2% of students have great knowledge and 62.1% have poor knowledge that they have not been vaccinated. Thus, there is no significant difference in vaccination rate at different levels of knowledge. Even so, it is shown that those who have full dosage (3 dosage) increases along with their level of knowledge. This result is similar to a study on medical and nursing students in Poland and Turkey that concluded the level of knowledge is not linked to vaccination rate.[19,26] Koutrakou *et al.* got a different result which there is a significant correlation between student's knowledge, perception, and screening of HPV with HPV vaccination rate, except the main reason for vaccination is not from their knowledge, but from family encouragement, nationality, and faculty of study.[34] These can better explain the results of this study that express an increase of full dosage vaccination alongside the level of knowledge.

There are several limitations to this study including the use of questionnaires that have no gold standard available yet to measure cervical cancer and HPV vaccine level of knowledge and can cause recall biases. We also did not perform a reliability test, so the reliability value could not be known.

CONCLUSION

Female preclinical students of the School of Medicine and Health Sciences have great knowledge of cervical cancer, a mixed level of knowledge of the HPV vaccine (2019 and 2020 great, 2021 and 2022 adequate), and the majority have not been vaccinated for HPV. There is also no significant correlation between knowledge of cervical cancer and the HPV vaccine with HPV vaccination rate. Even so, students tend to have a full dosage of HPV vaccination along with an increased level of knowledge.

In further studies, it is recommended to use other study designs to better evaluate the cause and effect of each variable. It is also

necessary to find out more about the barriers to HPV vaccination.

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CONFLICT OF INTEREST

The author declares there is no conflict of interest.

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