

Level of Understanding of HPV Vaccine as Cervical Cancer Prevention at Ulin Hospital

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ABSTRACT

Cervical cancer is one of the most common cancers in women worldwide. HPV (Human Papilloma Virus) vaccination is approved by the WHO (World Health Organization) as a prevention method for cervical cancer. This research aims to determine the level of knowledge, attitudes, and behaviors of the community in Banjarmasin, specifically around RSUD Ulin, regarding HPV vaccination as a prevention method for cervical cancer. The study was conducted using a cross-sectional design at RSUD Ulin, Banjarmasin, South Kalimantan. The study population consisted of productive-age patients who came for treatment at RSUD Ulin Banjarmasin. Data were collected using quota sampling technique. The questionnaire consisted of 4 major sections: the first part contained socio-demographic information (8 questions), the second part focused on knowledge level (21 questions), the third part assessed attitudes (12 questions), and the fourth part covered practices (7 questions). The results revealed a total sample of 150 women aged between 20 to 62 years with an average age of 33.46 ± 9.69 years. Out of the 150 research subjects, it was found that 67 women (44.7%) had high knowledge, 96 women (64%) had positive attitudes, and 79 women (52.7%) exhibited positive behaviors. Therefore, enhancing public knowledge about HPV vaccination is likely to have a positive impact on patients' attitudes and behaviors towards HPV vaccination.

Keywords : Attitudes, Behavior ,Cervical cancer, HPV Vaccination, Knowledge.

INTRODUCTION

Cervical cancer is one of the 4th most common cancers in women in the world with an estimated 604,000 new cases in 2020. It is estimated that there will be 342,000 deaths from cervical cancer alone in 2020, and 90% of these cases will be from lower-middle income countries (1). Research data from 2018 shows that Asian countries had 315,346 new cases with 168,411 deaths from cervical cancer (2). Cervical cancer is the 3rd most common type of cancer in women in Asia (3). In Indonesia, cervical cancer occurs in 24.5 per 100,000 women per year (4). At the end of 2018, about 5 years after the government launched the cervical cancer screening program, the screening capability was only 7.3% of the target population of 37 million women aged 30 - 50 years (5).

HPV vaccination is approved by WHO as one of the ways to prevent cervical cancer. There are currently 4 WHO-approved vaccines that all protect against HPV types 16 and 18, which are known to cause 70% of cervical cancer cases. The 9-valent vaccine protects against 5 other oncogenic types of HPV, which cause 20% of cervical cancer cases (1). Therefore, WHO has recommended its use in young women aged 9 - 13 years and has become a national immunization program in more than 60 countries in the world (6). The use of HPV vaccine was found to prevent the incidence of invasive (66.2%) and anal (79.4%), cervical cancer (7,8).

Knowing the importance of HPV vaccination in preventing cervical cancer, acceptance of vaccine use is very important. A study conducted in Indonesia by Endarti et al, in 2018 found

that out of 392 women in Yogyakarta, only about 60% of the sample had good knowledge of HPV vaccination. However, more than 90% of the subjects accepted to get HPV vaccination (9). Another study conducted in Jakarta by Winarto et al in 2022 showed that out of 400 male and female respondents only around 50.8% had good knowledge of the HPV vaccine. The study also showed that only 30.3% of the population had good practice of HPV vaccination and only about 20% of 5,397 women in Indonesia knew about cervical cancer screening (10,11).

Knowledge and attitude in any population play a very important role in practice. Therefore, it is important to look at the level of knowledge, attitudes and practices towards cervical cancer screening uptake among the people of Banjarmasin, especially around Ulin Hospital, regarding HPV vaccination as cervical cancer prevention. HPV has many genotypes that cause anogenital and non-genital warts, but carcinogenesis is mostly seen in high-risk or carcinogenic genotypes. HPV types 16 and 18 account for about 70% of CC cases globally, while types 31, 33, 35, 45, 52, and 58 account for about 20% of cases (11, 13).

Early detection of precancerous lesions and vaccination are critical in the fight against cervical cancer globally. To promote early detection of cervical cancer, knowledge and attitudes must be improved to enhance clinical practice. HPV vaccine is the most important preventive measure against HPV-related cancers and prevents more than 75% of cervical cancer incidence. The World Health Organization (WHO) has recommended the introduction of HPV vaccines into childhood and adolescent immunization programs. However, only 1.4% of all eligible girls have received the full HPV vaccination, resulting in very low global coverage (12, 13).

Known risk factors for cervical cancer are human papilloma virus (HPV), low socioeconomic status, smoking, marriage before 18 years of age, young age at first intercourse, multiple partners, multiple partners, and multiple births. The association between HPV infection and CC has been known for a long time. HPV has a global prevalence of 99.7% in women with carcinoma. This study aims to determine the level of knowledge, attitudes, and behavior of the Banjarmasin community, especially around Ulin Hospital, towards HPV vaccination as a prevention of cervical cancer. With the assessment of public perceptions of HPV vaccination, a good program can be formed in order to increase public acceptance of the HPV vaccine and reduce the number of cervical cancer cases around Ulin Hospital.

METHODS

Study design, population, and inclusion criteria

This study was conducted with a cross-sectional design that will be implemented at Ulin Hospital, Banjarmasin, South Kalimantan. The study population is productive age patients with an age range of 9 - 40 years who come for treatment at RSUD Ulin Banjarmasin. Samples are expected to have lived in the Banjarmasin area for at least 6 months, have a good level of literacy and have given consent to be involved in the study. Participants who do not complete the questionnaire thoroughly will be excluded from the study. The minimum sample size required was 145 samples, which was calculated using the Lemeshow test.

Sampling technique and data collection

Data was collected using quota sampling technique. Questionnaires will be distributed to respondents who fit the inclusion and exclusion criteria of the study. Each respondent will be asked to fill out a consent form first and the data will be collected anonymously to maintain the privacy of the respondents.

Assessment tools and measurement process

The questionnaire used is a questionnaire that has been modified and validated by previous research Winarto et al, in 2022 (10). The questionnaire consisted of 4 major sections with the first section containing socio-demographic information (8 questions), the second

section on knowledge level (21 questions), the third section on attitude (12 questions), and the fourth section on practice (7 questions). The scoring system consisted of 3 types of questions. For questions with 2 or 3 options, negative answers will be scored 0 while confirming answers will be scored 2. For questions with 4 options, negative answers will be scored 0, confirming answers will be scored 1, highly confirming answers will be scored 2. All points will then be divided into the total points that can be earned and multiplied by 100% to get the final score. The cut-off point used for good knowledge, attitude, and practice was a score of $\geq 60\%$. The questionnaire and scoring system used will be attached at the end of the article.

Study variables

The independent variables used were age data and several components of questions related to knowledge and attitudes toward HPV infection, cervical cancer, and HPV vaccination. The dependent variables consisted of knowledge, attitude, and practice levels and were independent of each other. Other possible confounding variables include government programs related to HPV vaccination, access to internet and health information, conditions of the regional pandemic, access to health facilities, culture, myths, beliefs, and religious influences, as well as parenting, birth, and family habits related to health perceptions that were not assessed in this study.

Statistical analysis

Responses from participants will be collected with the help of Ms Excel software. Categorical data will be presented as frequencies and percentages, while numerical data will be presented as mean or median according to the normality of the data which will be tested by Kolmogorov-Smirnov. Each answer from the questionnaire will be analyzed, Correlations between knowledge, attitude and practice points will be tested for intercorrelation using Pearson or Spearman correlation tests.

RESULTS AND DISCUSSION

The results of research data collection obtained a total sample of 150 women aged between 20 - 62 years with an average age ranging from 33.46 ± 9.69 years. Of the 150 research subjects, it was found that there were 67 women (44.7%) had high knowledge, 96 women (64%) had a good attitude, and 79 women (52.7%) had positive behavior. Descriptive research results can be seen in table 1 below.

Tabel 1. Descriptive data results

Variable	n (%) atau mean $\pm$ SD	Normality Test
Age (years)	33,46 $\pm$ 9,69*	0,001
Knowledge Score	56,45 $\pm$ 31,00	0,001
Attitude Score	69,33 $\pm$ 22,29	0,011
Behavior Score	65,69 $\pm$ 28,12	0,0005
Knowledge Score		
High	67 (44,7%)	
Low	83 (55,3%)	
Attitude		
Positive	96 (64%)	
Negative	54 (36%)	
Behavior		
Appropriate	79 (52,7%)	
Inappropriate	71 (47,3%)	
Total	145	

Source: Primary Data, 2023

Each variable of knowledge, attitude and behavior was then tested in correlation between each other to determine the association between them and it was found that each of these variables had an interrelated attachment and the strongest correlation was between knowledge and attitude where the value of $r = 0.648$ and $p\text{-value} = 0.0005$. Meanwhile, the association between knowledge and behavior was $r = 0.608$ with $p\text{ value} = 0.0005$ and the association between attitude and behavior was $r = 0.565$ with $p\text{ value} = 0.0005$. In this study, researchers also compared the age factor to the knowledge, attitude and behavior scores, and found that the older the age of the respondent had a significant association with a negative correlation model both with the knowledge score, attitude score and behavior score.

Table 2. Correlation values between research variables.

Correlation Test		R value	P-value
Variable A	Variable B		
Age	Knowledge	-0,438	0,0005
	Attitude	-0,230	0,005
	Behavior	-0.356	0,0005
Knowledge	Attitude	0,648	0,0005
	Behavior	0,608	0,0005
Attitude	Attitude	0,565	0,0005

Source: Primary Data, 2023

The results of this study indicate that the level of knowledge about the HPV vaccine and cervical cancer is still low in the area around Ulin Hospital, and this aspect is the aspect with the lowest score when compared to aspects of attitude and behavior. This should certainly be a concern for health workers to improve public knowledge. This study also shows that these three aspects are interconnected with each other in influencing people's knowledge, attitudes and behaviors towards the HPV vaccine and cervical cancer. Thus, it is reasonable that increasing community knowledge of the HPV vaccine will positively impact patient attitudes and behaviors towards the HPV vaccine. However, the community around Ulin Hospital will certainly have a younger generation with better knowledge. It is evident from the statistical test results that the older the age of the respondents, the lower the knowledge, attitude and behavior scores.

The results of this study are in accordance with previous research by Endarti et al and Winarto et al that the knowledge of Indonesian people regarding HPV vaccination and awareness of cervical cancer is still unsatisfactory. Surely this can be a concern for health workers in Indonesia to achieve better public welfare and health. The younger generation must be able to become a better generation to reduce the rate of cervical cancer.

METHOD

Human papillomavirus (HPV) infection and associated diseases including oropharyngeal, anal, cervical, vaginal, vulvar, and penile cancers, are public health concerns worldwide. However, the risk of HPV infection and associated disease burden is influenced by geographic, socioeconomic, cultural, and virus-specific factors, as well as subjective characteristics such as age, gender, and health status. Various publicity strategies can be combined to increase HPV vaccination rates and improve prevention and control of HPV-related diseases. Prevention of HPV infection may rely on primary prevention through vaccination, which has been shown to be effective against CIN and invasive cervical cancer, as well as secondary prevention through organized screening programs using HPV-DNA testing and PAP testing. The main barriers to HPV vaccination are lack of initial information, fear of side effects, poor perception, and the absence of a regular immunization program or schedule. At the time of treatment, doctors should strengthen the promotion of CC and related knowledge. Medical colleges should equip teachers and students with relevant knowledge to inform the public, and

also promote mass communication through the power of the media. Schools should also introduce relevant knowledge to improve public understanding of CC and HPV (15, 16, 17, 22).

Ong, et al's study found that all ANCCA member countries identified lack of awareness and knowledge about cervical cancer prevention and screening, fear of gynecological examination, fear of cancer diagnosis and cultural reasons as major barriers. ANCCA member countries (n = 17, 81%) also highlighted existing disparities in health service utilization across different social groups. More than half of ANCCA member countries (12 out of 21) identified lack of access to health facilities in urban and rural areas as a major barrier to screening, coupled with a lack of national surveillance data (11 out of 21), and a lack of trained health care professionals (n = 11, 52%) to perform the necessary tests (18).

Fortunately, cervical cancer has a good prognosis if it can be screened, detected and treated early. In this study, 43% of women said they could accept the current price of cervical cancer screening, and those who had undergone cervical cancer screening had higher recognition of cervical cancer and HPV than women who had not undergone cervical cancer screening. Therefore, cervical cancer screening prices play an important role in women's awareness of cervical cancer and HPV. Giuseppe et al. investigated HPV awareness among 1,348 adolescent girls and young women and reported that those who felt at risk of cervical cancer and HPV infection had higher levels of knowledge about HPV vaccination. Through these results, it appears that females lack sufficient information about the HPV vaccine and insufficient education regarding the HPV vaccine is required (15, 16).

In the study of Beyen, et al. found that initial information about the vaccine before vaccination, attitude, and the presence of awareness creation about cervical cancer or HPV vaccine especially in schools were found to be statistically significant with HPV vaccine use. There may be several factors that could contribute to the difference in cervical cancer awareness between developed and developing countries. For example, access to healthcare services such as routine check-ups and screening tests such as Pap smears are usually higher in developed countries. Developed countries usually have higher literacy rates and better access to health education (17,18). Developed countries often have more resources to devote to health promotion campaigns. Women in developed countries, who generally have higher incomes, may have more access to preventive health information and services. In some developing countries, cultural beliefs and stigma around sexual health can inhibit discussion of diseases such as cervical cancer, leading to reduced awareness. Policies that support preventive health services, routine check-ups and vaccinations are implemented and enforced in developed countries (20).

There are several recommendations to improve vaccination and screening coverage, the first being political and financial commitment, health system strengthening, this includes capacity building to improve the vaccine supply chain, workforce training, development of a national surveillance system, development of efficient public-private partnerships, and health financing that accounts for the table and uses high-performance laboratory tests, self-sampling facilities, optimal triage and treatment. Integration of services into primary health care packages and ensuring continuity of care, evidence-based communication to raise awareness and dispel misinformation, and support for women, families and vulnerable populations (18).

Based on a national study of girls and young women aged 10 to 30 years who had received vaccination through the HPV vaccination program, it was found that HPV vaccination was associated with a significantly reduced risk of invasive cervical cancer. Cervical cancer is preventable and also curable if detected and treated early. According to the International Agency for Research on Cancer (IARC), about 95% of cervical cancer cases worldwide are caused by persistent oncogenic HPV infection. In Horio, et al's study, they conducted a questionnaire survey among university pharmacy students and adult workers, and compared knowledge and awareness about cervical cancer between men and women in Japan. Men had less knowledge and awareness of cervical cancer than women (21,22).

In addition, men had lower levels of knowledge regarding HPV vaccination. In addition, their results showed that men were less willing than women to obtain information about cervical cancer. This is because many believe that cervical cancer is a female-only disease. The low awareness and few educational opportunities among men may reflect the influence of the length of time that HPV vaccination has not been actively recommended in Japan. However, HPV affects both men and women. If men do not know that the main cause of cervical cancer is HPV and that both men and women can transmit the virus, then they will not be able to understand the importance of HPV vaccination. Lack of understanding about HPV and HPV-related diseases can be a barrier to HPV transmission (22).

In Gholamzad, et al's study, in their unvaccinated sample, 391 genotypes were identified, of which 209 (53.4%) low-risk genotypes, outnumbered 182 (46.6%) high-risk genotypes. In unvaccinated female individuals, 185 (47.3%) were LR and 138 (35.3%) were HR. However, in unvaccinated male individuals, 24 (6.1%) were LR and 44 (11.3%) were HR (chi-squared: 10.909, p-value<0.001). However, in vaccinated individuals, 49 genotypes were identified, all of which were high-risk, and no low-risk genotypes were identified. In addition, there were no reports of high-risk genotypes such as HPV16 and HPV-18 in these individuals (23).

In their study, the five most common HR HPV subtypes in cervical cancer were HPV 16, 18, 52, 58, and 33, and HPV 16/18 accounted for 80.19% of all cervical cancers. Although HPV 16/18 is still the most common cause of cervical cancer, the prevalence of non-HPV 16/18 genotypes has a considerable role in cervical cancer management and vaccination strategies. We found that the prevalence of non-HPV 16/18 in cervical cancer had an increasing trend over time, from 15.21% in 2015 to 26.32% in 2019. In addition, we also found that the proportion of cervical cancer caused by non-HPV 16/18 increased with age, from only 12.50% in the <40 years age group to 25.00% in the >59 years age group (24).

Based on their findings, it appears that receiving HPV vaccination does not eliminate an individual's susceptibility to uncommon high-risk HPV genotypes such as 59, 52, and 56 that pose a high risk for infection. Our study suggests that this may be due to a lack of understanding of the safety profile and effectiveness of the vaccine triggered by misplaced beliefs about immunization status, and risky sexual behaviors. It is important to note that engaging in high-risk sexual behaviors increases the likelihood of contracting HPV infection. Our study closely collaborates with the findings made by Ghobadi et al, who identified various risk factors related to the spread of HPV. Some common features include initiating sexual activity prematurely, performing frequent sex acts, and having sexual experiences with multiple partners while neglecting genital hygiene; in addition, having intercourse with men who engage in unprotected sexual activity also poses a significant danger. According to the findings of Cossellu, et al; research on HPV, the risk factors are similar. In addition, STIs can be spread through sexual contact, such as vaginal, oral, and anal sex, for example HIV, syphilis, gonorrhea, and genital herpes (25). They create a strong background for co-infectious diseases such as HPV by suppressing the immune system. A study of 145 infected people among 292 subjects documented a higher prevalence of HPV (51%) in the STI group compared to the healthy population (43%). The study also showed that lack of information was a key factor in not vaccinating. It is important to provide active education on how HPV infection develops and how vaccination can help increase vaccination rates across the country (23).

The World Health Organization (WHO) on November 17, 2020 proposed a global strategy to increase the elimination of cervical cancer as a public health problem. Among the many goals of this global strategy are vaccinating 90% of girls with the HPV vaccine by age 15, screening 70% of women with high-performance tests by age 35-45, and providing treatment to 90% of women with cervical disease (90% of women with precancerous lesions treated, and 90% of women with invasive cancer treated) (25). The Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP) has developed recommendations on all vaccinations in the United States, including HPV vaccination. The current ACIP recommendations for HPV vaccination are: Children and adults aged 9 to 26

years. HPV vaccination is routinely recommended at 11 or 12 years of age; vaccination may begin at 9 years of age. HPV vaccination is recommended for everyone up to 26 years of age who did not reach adequately before; Adults aged 27 to 45 years. Although the HPV vaccine is approved by the Food and Drug Administration (FDA) to be given up to 45 years of age, HPV vaccination is not recommended for all adults aged 27 to 45 years. Instead, ACIP recommends that clinicians consider discussing with their patients in this age group who do not adequately explain in advance whether HPV vaccination is right for them. HPV vaccination at this age provides less benefit as more people have already been exposed to the virus; People who are pregnant. HPV vaccination should be delayed until after pregnancy, but a pregnancy test is not required before vaccination. There is no evidence that vaccination will affect pregnancy or harm the fetus (26).

There are three safe and effective HPV vaccines. The first HPV vaccine was approved in 2006 and is a quadrivalent vaccine, which prevents infection with HPV types 6, 11, 16 and 18. In 2009, a bivalent vaccine was approved, which prevents infection with HPV types 16 and 18. More recently, in 2014, the 9-valent was approved, and this prevents infection with HPV types 6, 11, 16, 18, 31, 33, 45, 52 and 58. The Pap test reduces the incidence and mortality of CC in low- and middle-income countries. However, this method has limitations, such as low sensitivity, requiring repeated testing; dependence on laboratory infrastructure and trained professionals; high likelihood of defaulters; and difficulty in implementing the necessary strict quality control procedures (27).

Among the many goals of this global strategy are vaccinating 90% of girls with the HPV vaccine by age 15, screening 70% of women with high-performance tests by age 35-45, and providing treatment to 90% of women with cervical disease (25). In accordance with the study of Abate S. et al. in Addis Ababa, Ethiopia, the prevalence of HPV infection and cervical lesions in the present study was similar across age groups with a peak in the age range of 40 to 49 years. These studies, including ours, suggest that age is not an independent factor associated with persistent HPV infection, but older women are more likely to have persistent HR-HPV infection and cervical lesions. Susceptibility to HPV infection depends not only on exposure, but also on host characteristics such as immunosuppression and the presence of HIV (28).

Furthermore, stratification by age group showed the highest incidence in the 23-29 years age group, in contrast to the data obtained in the previous study. In detail, the incidence was higher in the 23-29 years age group (42.53%) compared to the 30 years age group (19.35%). In contrast, Martora et al. reported a higher prevalence in the 30-year age group (38.2%). Based on our study, there was an association between HPV positivity and age group. In particular, based on our findings, the 30-year age group had the least risk compared to other age groups. The highest risk was in the 23-29 age group due to sexual activity, multiple partners and lack of vaccine exposure. The decrease in the <23 years age group is encouraging, as it is included in the study group, possibly due to greater vaccination adhesion (25).

Successful implementation of primary and secondary prevention measures has reduced CC morbidity and mortality. Primary prevention includes HPV vaccination, and secondary prevention consists of CC screening with Pap test, visual inspection with acetic acid (VIA), HPV testing, and treatment of cervical precancerous lesions. In low- and middle-income countries, a combination of vaccination and HPV screening programs has been shown to be a cost-effective strategy to prevent CC (27).

Anal/rectal SCC is associated with sexual practices as well as HPV infection. Previous studies have noted an increase in rectal SCC in the US with a greater increase in females compared to males. Our study also observed racial and ethnic disparities in the increase of anal/rectal cancer incidence, with the highest increase in black males. Previous studies on racial and ethnic disparities using National Inpatient Survey data have also reported that black men have a higher risk of developing cancer and Hispanic men have a lower risk. However, we noted an increased incidence across all racial and ethnic groups, including Hispanic men. .

Anal/rectal cancer has a mean age of onset of 62 years. When compared to cervical cancer, whose mean age is 49 years, this older age distribution may also account for the continued rise of this cancer and the unseen potential benefits of HPV vaccination. These findings on the increasing incidence of anal/rectal cancer highlight the importance of HPV vaccination and the need to develop more effective screening strategies to prevent anal/rectal cancer, particularly in high-risk populations (29).

The mode of transmission of the virus is primarily sexual, so HPV infection affects not only the female population but also males. HPV is one of the leading causes of death among women today. There are several weapons to prevent the spread of infection, and prevention through vaccines is fundamental. However, vaccines are not 100% efficient as they cannot protect humans against pre-existing HPV infections or other HPV genotypes. Therefore, it is important to control behaviors that increase the chances of contracting the infection, such as having unprotected sex or multiple sexual partners (25).

In the 1970s, H. Zur Hausen detected HPV in warts and biopsies from women with cervical cancer. Later, the etiologic link between HPV infection and cervical cancer was confirmed. Therefore, based on its oncogenic potential, α -HPV was classified into high- and low-risk types. Low-risk (LR) HPV genotypes such as HPV6 and 11 are associated with most benign lesions such as condylomata acuminata and are involved in the development of respiratory papillomatosis. According to the International Agency for Research on Cancer (IARC), 12 high-risk (HR) HPV types (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, and 59) are considered carcinogens (30).

In fact, the redistribution of genotype frequencies in total positive patients emerging from a small population was analyzed and compared with the published data in this study (2011-2017). Although the variation in percentage frequency differed in most genotypes, we only highlighted the variation pertaining to the most representative genotypes. Similar to previous findings, the most frequent genotype among HR-HPV genotypes was HPV-16, although its frequency decreased slightly (from 23.8% recorded in previous studies to 14.6%). The second most frequent genotype was HPV-31, which decreased from 12.1% to 13.8%. The frequency of HPV18 increased from 6.9 to 9.2, becoming the third most frequent genotype (25).

Globally, HPV types 16 and 18 dominate and are responsible for the majority of anogenital HPV-related cancers in women. In our findings, HPV prevalence among women without cervical lesions was 2.4% which is comparable to studies in Sudan (3.2%), but much lower than other East African countries, Mozambique (40.3%) and Kenya (41.4%). HPV prevalence in female participants with cervical lesions was 38.6%. Our findings were lower than previous reports by Bekele A. et al. and Gemechu A. et al. in Ethiopia: Jimma (67.1%) and Hawasa (49.3%). The lower HPV prevalence in this study may be justified as women with complaints of cervical cancer who visited family planning or gynecology clinics were not included in this study. However, the proportion of VIA positives in this study was 13.1%, consistent with findings in different regions in Ethiopia, Addis Ababa, 13.1%, Debreworkos, 14.1% and Hawassa, 12.9% (28).

HPV types 16 and 18 are associated with approximately 70% of cervical cancers worldwide. Interestingly, only HPV16 accounts for 90% of HPV-positive head and neck SCC. The oncogenic mechanism of HR-HPV has been essentially characterized in human keratinocytes. It has been reported that E6 and E7 oncoproteins interact with a large number of intracellular proteins from cells derived from cervical cancer, leading to cancer promotion and progression. Thus, E6/E7 overexpression is a necessary condition for HPV-mediated tumorigenesis, as this promotes cell proliferation. The complete genome of HR-HPV is often integrated into host chromosomes, although the mechanisms involved in such integration remain elusive. However, HPV-associated cancers contain integrated, episomal, or episomal/integrated forms of the HPV genome with varying copy numbers. Moreover, it appears that integration events occur randomly on the host cell genome, although specific hot spots have been reported in cervical exfoliating cells. When integration is not detected in

carcinomas, other mechanisms lead to E6 and E7 overexpression. For example, frequent methylation motifs at the E2 binding site (E2BS) leading to E6/E7 upregulation in cervical cancer and head and neck cancer have been described (30).

Various studies have reported an increase in HPV-associated oropharyngeal cancer in different parts of the world. In the US, studies note that HPV-associated oropharyngeal cancer has increased over the past few decades, from 16% in 1984 to more than 70% in 2000.³⁰ HPV vaccines were approved in 2020 as an expanded indication to prevent oropharyngeal cancer. As oropharyngeal cancer typically presents 20 to 45 years after HPV-16 infection, with the average age at disease onset being 63 years, it may be too early to expect outcomes from the vaccine. Modeling studies of the long-term outcomes associated with HPV vaccination among men in the US suggest that, at current vaccination rates, the incidence of vaccine-type oropharyngeal cancer will remain high until the mid-2030s and then decline and stabilize after 2080. If vaccination uptake of 80% is achieved (Healthy People goal), an even greater decline in incidence is expected after 2060.³² Unlike cervical cancer, there is no adequate and cost-effective screening test for oropharyngeal cancer. There are also sex differences in HPV prevalence and persistence. In this study, we found that more than 80% of new diagnoses of oropharyngeal cancer occurred in men, and the numbers are increasing. Previous studies have reported that men have twice the risk of contracting oncogenic oral HPV infection than women and are less likely to eliminate oral HPV infection. The intersectional analysis in this report also identifies specific at-risk populations that may benefit from screening. In addition, this analysis demonstrates the importance of HPV vaccination in both men and women, although additional studies are needed to determine the efficacy of HPV vaccines against oropharyngeal cancer (29).

Trends in Incidence of HPV-Related Cancers that Cannot Be Screened for HPV-Related Cancers in Women Over the past 17 years, there has been a significant increase in the incidence of anal/rectal (AAPC, 2.83%) and vulvar (AAPC, 1.19%) cancers in women. ($P < 0.001$ for all). Anal/rectal cancer was increased in black and white women. Regarding age, there was an increased incidence of anal/rectal cancer in all women older than 50 years, with the greatest increase in women aged 60 to 64 years (AAPC, 5.15%; $P < 0.001$). Vulvar cancer increased in all women older than 45 years, with the greatest increase in women aged 60 to 64 years (AAPC, 3.06%; $P < 0.001$). Rates of oropharyngeal and vaginal cancers remained stable. **HPV-Related Cancers in Men** In men, there was a significant increase in HPV-related cancers, with an AAPC of 2.36% per year ($P < 0.001$) (table 8 in the Supplement). Significant increases were noted in oropharyngeal cancer (AAPC, 2.71%) and anal/rectal cancer (1.83%) ($P < 0.001$ for both). Oropharyngeal cancer increased across US regions, with a significant increase in distant disease stages (AAPC, 3.79%; $P < 0.001$). Oropharyngeal cancer increased in all men over 50 years of age, with the greatest increase occurring in men aged 65 to 69 years (AAPC, 4.24%; $P < 0.001$).

When examining new cases by race and ethnicity, we observed a decrease in the number of black men (AAPC, -1.35%) versus an increase in the number of white men (AAPC, 3.48%) ($P < 0.001$). Rectal cancer increased across all racial and ethnic groups, with the largest increase occurring in black men (AAPC, 3.40%; $P < 0.001$). Penile cancer rates remained stable.⁽²⁹⁾ The lack of well-structured HPV vaccination programs and CC screening raises concerns regarding the possibility of eliminating this disease. Only 37.5% of low- and middle-income countries have HPV vaccination compared to 78.6% of high-income countries (27).

CONCLUSION

The knowledge of the community around Ulin Banjarmasin Hospital regarding the HPV Vaccine is lacking, from our research we found that the attitude towards understanding the HPV vaccine is positive, but the understanding of the HPV vaccine and its usefulness is less attention, which is reflected in the high number of cases of cervical cancer, as well as other factors, such as socio-economic factors that influence, namely the expensive price of vaccines,

not all people can afford. Appropriate and inappropriate behavior is almost balanced, along with changes in lifestyle patterns that facilitate the transmission of the HPV virus.

This should certainly be a concern for health workers to increase public knowledge. This study also shows that these three aspects are interconnected with each other in influencing community knowledge, attitudes and behaviors towards the HPV vaccine and cervical cancer.

Providing information about the HPV vaccine and cervical cancer is important to be held more often to increase the insight of ordinary people in understanding its usefulness regardless of gender, because HPV can infect both men and women. As well as the need for assistance from the government to organize the provision of free HPV vaccines for the community in the future, it can increase public interest in knowing and getting the HPV vaccine.

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