FACTORS RELATED TO AWARENESS OF HPV AND HPV VACCINATION AMONG STUDENTS IN HAINAN UNIVERSITY

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摘要

题目：海南某高校大学生 HPV **及疫苗**认知现状及影响因素研究

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本研究旨在研究大学生对 HPV 和 HPV 疫苗接种的认识及相关的因素，研究 HPV 和 HPV 疫苗的知识和认识之间的相关性。本研究采用横断面描述性研究设计，以分层抽样的方法抽取 465 名学生，使用问卷调查收集数据，并运用 SPSS 进行数据分析，采用频率、百分比、卡方检验和皮尔逊相关性分析方法进行数据处理。

研究发现，结果显示，整体 HPV 认知水平偏低至中等，其中 41.29%的学生对 HPV 本身的认知处于低水平，仅 29.25%达到高水平；在对 HPV 疫苗的认知方面，38.28%的学生得分偏低，仅 24.09%为高水平；而在 HPV 预防知识方面，表现相对较好，高水平比例达 59.57%。在影响因素方面，年龄、专业类别、受教育水平、及是否接收过医疗人员的信息等变量与认知水平均具有统计学显著差异（$p<0.05$）。进一步的皮尔逊相关分析显示，学生的知识水平与其 HPV 认知水平呈显著正相关（$r>0.4$, $p<0.01$）。

结论方面，研究验证了所有三个研究假设：（1）大学生对 HPV 及疫苗的认知处于中等偏低水平；（2）个人因素如年龄,学科类别和信息来源与认知水平显著相关；（3）知识水平与认知呈正向相关关系。因此，应特别加强对非医学专业学生的定向健康教育，利用医疗专业人员与网络渠道普及 HPV 相关知识，进一步提高疫苗接种的主动性和覆盖率，为高校健康管理和公共卫生政策提供实证依据。

关键词: 人乳头瘤病毒（HPV）,HPV 疫苗,认知水平,影响因素

ABSTRACT

Title: Factors Related to Awareness of HPV and HPV Vaccination Among Students in Hainan University

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This study aims to investigate the correlation between awareness of HPV and HPV vaccine among university students and related factors. In this study, a cross-sectional descriptive study design was adopted, 465 students were selected by stratified sampling, data were collected by questionnaire survey, SPSS was used for data analysis, and frequency, percentage, Chi-square test and Pearson correlation were used for data processing.

The study found that the overall HPV awareness level was low to moderate, with 41.29% of the students having a low level of HPV awareness and only 29.25% reaching a high level. In terms of awareness of HPV vaccine, 38.28% of the students scored low, and only 24.09% scored at a high level. In terms of HPV prevention awareness, the performance was relatively good, with a high level of 59.57%. In terms of influencing factors, there were statistically significant differences between age,

subject category, education level, and whether they had received information from medical personnel and aware level ($P<0.05$). Further Pearson correlation analysis showed that students' awareness level was significantly positively correlated with HPV awareness level ($r>0.4$, $p<0.01$).

In terms of conclusions, the study verified all three research hypotheses:(1) University students' awareness of HPV and the HPV vaccine was at a moderate level; (2) Personal factors such as grade, age and information source were significantly related to aware level; (3) Awareness level was positively correlated with awareness .Therefore, special attention should be paid to targeted health education for non-medical students, and HPV-related awareness should be popularized through medical professionals and online channels, so as to further improve the initiative and coverage of vaccination, and provide empirical basis for university health management and public health policies.

Keywords: Human Papillomavirus (HPV), HPV Vaccination, Awareness, Influencing Factors

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CHAPTER I

INTRODUCTION

Background and Rationale

Human papillomavirus (human papilloma virus, HPV); is a risk factor for cervical cancer. China is the world's second largest cervical cancer incidence of the highest country, it poses a great threat to women's health, has a great impact on the family and society HPV persistent infection as the main factors that induce cervical cancer, in the average chance of infection is 15%, especially in 15-19 sex frequently the chance of infection is 20% to 25%. The current global average infection rate among women is 11% -12% (Liu et al., 2020), Infection shows a trend of younger age, and it is more likely to occur in women aged 20-24 years old (Brisson et al., 2020).

Most men still believe that HPV infection is only a serious problem that women need to face (Wu et al., 2023). This may be because most of the HPV-related health education is only aimed at women, and the HPV vaccine is often labeled as "cervical cancer vaccine", resulting in a cognitive bias between male and female college students (Ran et al., 2022). Men can also be HPV infection oropharyngeal cancer, anal cancer, penile cancer.

There were 109,700 new cases of cervical cancer in China in 2020, an increase of about 3.5 percent over 2018. The number of deaths was 59,000, an increase of about 23.0% compared with 2018 (International Agency for Research on Cancer [IARC], 2020). At present, the incidence and mortality of cervical cancer are still increasing in China, and HPV vaccination, health education and the establishment of safe sex are primary prevention strategies for cervical cancer. The HPV vaccination rate in China was low (Chen et al.,

2024) , and the first dose of HPV vaccination for women aged 9 to 14 years in Shanghai from 2017 to 2019 was less than 1% (Guo et al., 2022).The main route of infection for HPV is through sexual transmission, The increase of sexual disease infection rate is related to the change of sexual concept and the decrease in the initial age of sexual behavior among college students .

Due to its clear etiology and treatability, and its onset is a relatively long process, which provides the opportunity and possibility for the early detection, early diagnosis and early treatment of cervical cancer (Lekhalawan & Buhachat, 2023). Interventions at this stage would greatly reduce morbidity and improve cure rates. How to reduce the incidence of cervical cancer and improve the cure rate of cervical cancer before the onset of cervical cancer is an urgent problem to be solved at this stage.

Cervical cancer prevention in China has gone through three stages: "clinical treatment first", "prevention and treatment coordination" and "prevention first"(Ji et al., 2023). Before the marketing of HPV vaccine in China, the incidence of cervical cancer was relatively high, and it was mainly treated by surgery. Later, cervical cancer screening mainly adopted secondary prevention in China. With the popularization of HPV vaccine in China, cervical cancer prevention in China has gradually turned to primary prevention (Wang, 2022). Primary prevention is an important means to fundamentally eliminate or reduce the risk factors, is really with the cure of preventive medicine thought fit the combination of theory and practice, therefore, as soon as possible and HPV vaccine this primary prevention in as far as possible to eliminate and control cervical cancer play an increasingly important role.

Although HPV vaccines are effective in preventing HPV infection and preventing cervical cancer, the promotion of HPV vaccines worldwide also needs to consider the

following issues. First and foremost, the shortage of HPV vaccine in China; second, the safety of HPV vaccine is still important (Wang et al., 2023); moreover, the effectiveness of HPV vaccine needs to be further confirmed, it is affected by the age of vaccination and sex; finally, the affordability and rationality of HPV vaccine price need to be balanced (Zhao et al., 2024). The status of vaccination intentions at home and abroad is as follows.

As of 2020,55% of the 194 WHO member countries have introduced the HPV vaccine (Bruni et al., 2020). The Americas and Europe have the largest introductions of HPV vaccines, with 85% and 77% of the countries, respectively. 2019 was the year with the largest number of HPV vaccine introduced countries, and 16 countries introduced HPV vaccines (about 7~8 countries were introduced in other years), 87% of which came from middle- and low-income countries. In terms of gender, about 15 percent of women and 4 percent of men worldwide received the whole-process dose of HPV vaccine in 2019, and 20 percent of women and 5 percent of men received at least one dose of HPV vaccine. In terms of region, the highest HPV vaccine coverage was in Australia / New Zealand (77%) and Latin America (61%), followed by Europe and North America (35%), while North Africa, Oceania (excluding Australia and New Zealand) and Asia all had very low coverage. Although more than half of the world (55%) has introduced HPV vaccine, but due to the different population size, still 70% of the girls living in countries have not yet introduced, this is because in the largest 10 countries, seven countries have not been introduced or only in the sub-national level, including China, Russia, Nigeria, Indonesia, Bangladesh, Pakistan and India. This greatly affected the estimates of global coverage, reaching only 15% (Bruni et al., 2020) in 2019. The results of the 2017 National Health Interview Survey showed that the HPV vaccination rate was 9.7%, with 15.8% in women and 3.2% in men, and 26.6% of the samples aged 19 to 45 years had their first HPV

vaccination (Kasting et al., 2020) in adulthood. The HPV immunization programmed of ACIP with clinicians was associated with an immediate increase in adult vaccination and variation in adult HPV vaccination rates over time (e. g., 19.0% for women aged 40 to 45 years in 2019 and 22.7% in 2020) (Suk et al., 2022).

Cui Meimei retrieved the phase of HPV vaccine acceptance among parents of adolescents in mainland China after 2004 According to the literature, the acceptance of HPV vaccination for their children was 41.35% (Cui et al., 2023). College students in Yantai also showed higher levels of HPV vaccination intentions, with 85.3% of the students showing higher vaccination intentions (Deng et al., 2021). This may be due to the more conservative parents that their children have no sex and no risk of HPV infection. Moreover, parents know less about HPV vaccines and are concerned about the safety and efficacy of HPV vaccines. However, some college students have some concerns and hesitation about the safety, effectiveness and high price of HPV vaccine, resulting in a low willingness to vaccinate.

This paper study object selection for college students, because the students is the main age group of HPV vaccination, students in sexually active period, pay more attention to related diseases, and students learning absorption ability is stronger, can very good awareness into behavior, makes the group of HPV vaccination possibility is higher.

This study was conducted in Hainan Province, as the national study of 2.72 million women showed that the overall HPV infection rate among Chinese women was 17.70%, with the high-risk type (HR-HPV) infection rate at 13.12%. However, the HPV infection rate in Hainan Province was 25.11%, the highest in the country; the high-risk type HPV infection rate was 23.42% (ebioweb.com, 2025).

In addition, students have various ways to obtain information, and they can obtain relevant awareness through communication with peers, reading books and Internet search, which improves their awareness of HPV and HPV vaccines and increases the possibility of HPV vaccination. At present, many studies have shown that the HPV vaccination rate is low.

In conclusion, this research studies the awareness level and relate factors of HPV and HPV vaccine, and provides a basis for the promotion and guidance of HPV vaccine for college students in the future.

Objectives

1. To study the level of awareness about HPV and the HPV vaccination.

2. To study factors related to university students' awareness of HPV and the HPV vaccine.

3. To study correlation between awareness of HPV and the HPV vaccine.

Research Questions

1. What is the level of university students' awareness about HPV and the HPV vaccine?

2. What factors related to university students' awareness of HPV and the HPV vaccine?

3.What is the relationship between university students' awareness of HPV and the HPV vaccine?

Hypothesis

1. University students have moderate level of awareness of HPV and the HPV vaccine

2. There are factors that related to university students' awareness of HPV and the HPV vaccine.

3. There are positive correlations between university students' awareness of HPV and the HPV vaccine.

Operational deFinition

HPV: It is the abbreviation of human papillomavirus that is human papillomavirus. According to the different nucleotides of the virus, more than 150 types of HPV have been found, and the pathogenicity of different types of HPV is also different.

HPV vaccine: It is short for human papillomavirus vaccine for the prevention of human papillomavirus (HPV) infection and the occurrence of cervical cancer and other diseases due to persistent infection of high-risk human papillomavirus.

Awareness of HPV: It refers to whether the student knows what HPV (human papillomavirus) is, including that it is a common virus capable of infecting human skin and mucous membranes, especially the genital area. It is associated with a variety of diseases, such as genital warts and cervical cancer. This dimension assesses the student's understanding of the basic concepts of HPV.

Awareness of HPV transmission: This refers to whether the student understands how HPV is transmitted. HPV is mainly transmitted through sexual contact, mother-to-child transmission, and blood-borne transmission. Some types of HPV can even be transmitted through skin-to-skin contact.

Awareness of HPV prevention: This part is to assess students' awareness of ways to prevent HPV infection. These include using condoms, limiting the number of sexual partners, avoiding high-risk sexual behaviors, and getting regular HPV-related screenings (such as Pap smears). In addition, education and sexual health awareness are important tools for prevention.

Awareness of HPV vaccine: This refers to the student's awareness of the HPV vaccine, including the existence of the vaccine, the applicable population, the timing of vaccination (e.g., it is recommended to be vaccinated before the start of sexual activity), and the protective effect of the vaccine (e.g., it can prevent many high-risk types of HPV, especially HPV types 16 and 18 associated with cervical cancer).

Student: Refers to college students at Yunlong Campus of Hainan University of Science and Technology.

Related factors: participant gender, age, education, living expenses and other military services will influence the perception of HPV and HPV vaccine. For example, people with higher education usually have wider health awareness and better health habits, and can accept and understand information on HPV faster.

Hainan University: This research study in Yunlong Campus of Hainan University of Science and Technology.

Expected Benefits and Applications

It is of great significance to study the awareness and influencing factors of HPV and HPV vaccine. From the perspectives of individuals, schools and society, it can be elaborated as follows:

Personal perspective

1. Health management: College students are in their early adulthood, a key stage of physical health management. Understanding of HPV (human papillomavirus) and its vaccines will help them take preventive measures to reduce their future risk of cervical cancer and other HPV-related cancers (Liu et al., 2019). Improving their awareness of HPV can encourage them to get vaccinated and maintain their own health (Zhang F, et al., 2022).

2. awareness acquisition: Many college students are exposed to more health education resources after entering the university (Chen et al., 2024). By understanding HPV and vaccines, they can better identify the reliability of information sources and avoid the wrong decisions made due to insufficient information. This acquisition of awareness could also help to raise their attention to other health issues (Kitur et al., 2021).

3. Psychological factors: Understanding of HPV and vaccines can reduce panic and anxiety among college students. Many diseases and health risks often cause psychological stress, and mastering scientific awareness can help relieve this stress and improve mental health.

School perspective

1. Health education: As educational institutions, colleges and universities can carry out health education activities on campus to enhance students' understanding of HPV and its vaccines. Studying students' perceptions of these topics could help schools to

develop more effective health education courses, ensuring the coverage and accuracy of the information(Yang et al., 2025).

2. Policy making: Understanding students' acceptance and influencing factors of HPV vaccine can help schools to formulate relevant policies (Hu et al., 2024), such as providing vaccination services or cooperating with medical institutions for campus vaccination activities. Such policies can directly improve the vaccination rate of students and reduce the incidence of disease.

3. Psychological support: The study of college students' awareness and attitudes can help them to understand their needs in health management. Schools can address these needs and provide corresponding psychological support and counseling services to help students deal with related health problems.

Social perspective

1. Public health: As the main force of the society in the future, the health status of college students has an important impact on the public health of the whole society. Improving college students' awareness of HPV and its vaccines can reduce the incidence of HPV-related diseases in the society (Zhang et al., 2020), thus reducing medical costs and improving the overall public health level.

2. Vaccine promotion: By studying the awareness and attitudes of college students, valuable feedback can be provided to public health departments and relevant institutions, and help them develop more targeted vaccine promotion strategies and publicity programs (Zhang et al., 2020). This helps to improve the vaccination rate and enhance the immune barrier of the public.

3. Social awareness improvement: College students' health concepts and behaviors will affect their families and society to a certain extent. Improving their awareness level and vaccination rate can promote the whole society to pay attention to HPV prevention and control, and form a good health education atmosphere (Fahrni et al., 2022).

CHAPTER II

LITERATURE REVIEW

This chapter outlines several concepts and explains the overall conceptual framework within which the study is situated. The following are specific studies that support this study:

1. Human papillomavirus

    1.1 Overview of HPV

    1.2 Pathological features of HPV

    1.3 HPV pathogenic mechanism

    1.4 Diseases caused by HPV infection

    1.5 HPV vaccines

2. Awareness of HPV and its vaccines among university students at home and abroad

    2.1 Awareness of HPV and its vaccine among domestic university students

    2.2 Awareness of foreign university students about HPV and HPV vaccines

3 . Factors influencing the awareness of HPV and HPV vaccines

    3.1 Personal level

    3.2 Social level

    3.3 National level

4. Related research

    4.1The following articles are about “Level of HPV awareness”

4.2 The following articles are about “Factors related with HPV and HPV vaccines”

5. Conceptual Framework

Human papillomavirus

1. Overview of HPV

Human papillomavirus (Human Papilloma Virus, HPV), belonging to the Papillomaviridae family, is an unenveloped circular deoxyribonucleotide virus between 55 and 60 nm in diameter, slightly smaller than 8 kb, showing a 20-faceted symmetrical structure(Pollock, 2020). Based on the viral genomic DNA sequence, HPV can be divided into multiple types, and more than 200 subtypes have been identified(International Human Papillomavirus Reference Center,2023).

2. Pathological features of HPV

Over millions of years, HPV has evolved synchronously with the species they infect, being extremely cell-specific and highly adaptive to epithelial tissues. They are a group of viruses with obvious species specificity, can produce subclinical infection, evolution for a long time, low virus replication rate, and HPV resistance, can be stored in a dry environment for a long time, but can be inactivated by heating or formalin treatment, so high temperature and 2% glutaraldehyde for disinfection and inactivated.

According to the intensity of HPV carcinogenicity, it is divided into two categories: high-risk HPV (High-risk HPV, HR-HPV) and low-risk HPV (Low-risk HPV, LR-HPV). HR-HPV includes 12 types clearly associated with human cancer (HPV-16, -18, -31, -33, -35, -39, -45, -51, -52, -56, -58 and-59) and other types with limited evidence

of cancer (e. g. HPV-66, -68 and-73), and LR-HPV mainly includes HPV-6, -11, -30, -42, -4, -43, -44 and-61 (“Progesterone in Obstetrics and Gynaecology - Volume 69 Multiple Choice Answers,” 2021).

Persistent low-risk HPV infection does not cause cancer, and generally will cause genital diseases (condyloma acuminatum), non-genital warts (common warts, etc.) and recurrent papilloma and other benign diseases. Persistent high-risk HPV, infection can cause cervical cancer, vulva cancer, vaginal cancer and its precancerous lesions, and can also lead to anal cancer, oropharyngeal cancer.

3. HPV pathogenic mechanism

Human HPV infection mainly through the following ways: sexual transmission; mother to child vertical transmission: common in the reproductive tract infection of women, transmitted to the newborn during delivery, causing children respiratory recurrent papilloma and squamous cell carcinoma of the oral cavity, throat, etc.; Close contact transmission (manual transmission, etc.); indirect contact transmission: through contact with clothing and living utensils of infected persons; iatrogenic infection. Sexual behavior is the most important route of HPV transmission, and the same sex and (or) the opposite sex can cause HPV infection.

At the same time, personal sexual habits, smoking conditions, drinking conditions and hygiene habits will affect the HPV infection. HPV can also infect the human mouth, throat, anal mucosa, and even the skin through the contact with the skin and mucosa. When HPV infects the body, the virus can not only replicate itself in the nucleus, but also integrate with the DNA of the host cell, and replicate and transcription with the host cell, inducing epithelial hyperplasia, causing epidermal thickening with

acanthlayer hyperplasia and different degrees of epidermal keratosis, and eventually forming warts (Lee et al., 2020)

However, some types of HPV with the ability to induce cell transformation can integrate their DNA into the chromosome of the host epithelial cells, so that the skin, especially the mucosal epithelial cells, can become immortalized cells, thus inducing premalignant lesions or developing to malignant tumors (Lee et al., 2020).

4. Diseases caused by HPV infection

HPV (human papillomavirus) infection can cause a variety of diseases, such as: common condyloma, cervical cancer, etc. Although most human papillomaviruses are eliminated after 1-2 years, if the infection continues, it is possible to develop pre-cancerous disease, or even cancer. Infection with high-risk HPV is associated with the occurrence of a variety of cancers (Arbyn et al., 2019).

Table 1 Classification of diseases due to HPV infection

Position	Disease
Skin	Common wart
	Flat wart
	Plantar wart
	Cutaneous squamous cell carcinoma
Anal andurogenital tract	Cauliflower excrescence
	Cervical warts
	Bowen's disease

Table 1 (Continued)

Position	Disease
	Carcinoma of vagina
	Carcinoma of vulva
	Cervical carcinoma
	Carcinoma of penis
	Carcinoma of testis
	Prostatic carcinoma
	Rectal carcinoma
Air tube	Laryngeal papillary carcinoma
Ocular region	Corneatal conjunctival papillary carcinoma
	Corneal cancer
Oral and digestive tract	The mouth is sharp and wet warts
	Oral common warts
	Oral papilloma
	Oral squamous carcinoma
	Oral and pharyngeal cancer
	Esophageal squamous cancer

5. HPV vaccines

HPV vaccine is based on the L1 protein gene sequence, through recombinant DNA technology production virus sample (VLPs) HPV vaccine development and vaccination provide an ideal way to reduce HPV infection (Erbelding et al., 2018)

HPV vaccine can be divided into preventive vaccine, therapeutic vaccine and both prevention and treatment of combined vaccine, currently only prevent HPV vaccine developed, including 2,4 and 9 price three valences (Erbelding et al., 2018).2-valent HPV vaccine prevents HPV-16 and-18,4-valent HPV vaccine prevents HPV-16, -18, -6, -6, and-11, and 9-valent HPV vaccine prevents four types of 4-valent HPV vaccine and five other high-risk types, including HPV-31, -33, -45, -52, and-58. The details are shown in Table 2.

Table 2 Introduction to vaccines

HPV vaccine	**Cervarix Bivalent price**	**Gardasil Tetravalent**	**Gardasil Nine-price**
Manufacturing enterprise	Glaxo Smith Kline	Mersha east	Mersha east
Global listing time	In October, 2009	In June, 2006	In December, 2014
Prevention of viral subtypes	Type HPV16, and type 18	HPV types 6,11,16, and 18	And HPV types 6,11,16,18,31,33,45 ,52, and 58
Domestic vaccination age	9-45 Years old	20-45 Years old	16-26 Years old
Prevent disease	Prevention of HPV16 / 18 leads to more than 70% of precancerous and cervical cancer	Prevention of cervical cancer from HPV16 / 18;	Prevent cervical cancer in more than 90% of HPV infections
Vaccination procedures	0-1-June	0-2-June	0-2-June

Awareness of HPV and its vaccines among college students at home and abroad

1. Awareness of HPV and its vaccine among domestic university students

Their awareness of HPV is generally low (Li et al., 2024), and their awareness and vaccination willingness are influenced by the national economic development level, gender, parental education level, and surrounding groups. (Galvin et al., 2022) The study showed that only 55.6% of college students in five cities in North China had heard of HPV vaccine, proving that the awareness of HPV vaccine among college students in the surveyed areas was low. Although HPV vaccine was put on the market in China as early as 2016, many college students have doubts about HPV vaccine due to the lack of publicity and are in a state of hesitation in HPV vaccination, so the health popularization of HPV vaccine for college students should be strengthened (Xu et al., 2021).

2. Awareness of foreign university students about HPV and HPV vaccines

Through the study of domestic and foreign literature data, it is found that foreign students have a high awareness rate of HPV. While the systematic evaluation of HPV vaccine in the sub-Saharan region showed a low level of awareness of cervical cancer, HPV or HPV vaccines. The awareness of foreign college students about HPV and its vaccines is closely related to the national development degree and vaccine accessibility (Lacy et al., 2021), therefore, thus showing different awareness levels.

Factors influencing the awareness of HPV and HPV vaccines

1. Personal level

1.1 Gender: Women have a higher degree of HPV awareness than men (G. Chen et al., 2021). This may be because most people's impression of HPV remains that it is associated with cervical cancer, which is a gynecological disease. This may be because most of the HPV-related health education is only for women (Reiter et al., 2011), and HPV vaccine campaigns are often labeled as "cervical cancer vaccine", resulting in deviations in male perception. In fact, infection with HPV can not only lead to cervical cancer, but also cause anal, anal cancer, oral cancer and other problems. Women are more likely to be infected because of their body structure and other reasons, so men may also be infected with. However, with the inclusion of male students in many foreign countries in the vaccination program, the research on the male vaccination group is gradually deepening, and its awareness rate is gradually increasing.

1.2. Sexual experience: Sexual life experience has a great impact on the awareness of HPV and HPV vaccines. Sexual life experience will inspire people with a higher awareness of their own health, thus conducting corresponding risk intervention for the disease (Boakye et al., 2022). Individuals experienced sexually are more likely to understand that sexual contact is one of the major HPV transmission routes (Akpinar & Tosun, 2023). They may be more aware of the presence and possibility of HPV infection. Understanding of risk factors in sexual behavior, such as nonuse of contraception or variability of sexual partners, may increase the risk of HPV infection. Individuals with sexual experience may be more inclined to receive regular cervical cancer screening and

HPV vaccination, measures that can help to prevent HPV-related diseases (Kim et al., 2022).

1.3. Parents' awareness and attitude: Parents are the guardians of students 'health and the disseminators of health information, and their awareness of vaccines will also affect their children's awareness of vaccines (Maria et al., 2021). Parental behavior patterns also have a strong impact on their children. If parents value their health checks and precautions, such as regular health checks and HPV vaccination, the child may consider it a normal and important behavior and adopt similar health habits while growth. Parents 'vaccine awareness, their own HPV vaccination experience, reproductive tract lesions, and doctors' recommended vaccination will all improve parents 'enthusiasm for their children's vaccination, and their active life after vaccination and the cost of vaccination are the factors that hinder their children's vaccination. Parents play a key role in vaccination awareness and immunization, and guidelines and decisions for their children play an indicator role (Nguyen et al., 2024).

2. Social level

2.1 The level of public trust in HPV vaccines: During HPV vaccination, some minor adverse reactions may occur, such as injection site pain, fever, headache, etc. These reactions are often short-lived and most people can easily cope with them, but for some people, these minor adverse reactions may be the cause of resistance to HPV vaccination (McCormick et al., 2022), thus affecting vaccine availability and vaccination rates. Here are some factors that may lead to resistance:

2.1.1 Personal bias and fear: Some people may refuse HPV vaccination because of fear of the injection process or post-injection reactions. Especially for vaccines that require multiple doses (for example, HPV vaccine usually require two to three doses),

some people may be reluctant to continue due to adverse reactions to the first vaccination (Bodor et al., 2013).

2.1.2 Misinterpretation and exaggeration of adverse reactions: Sometimes, adverse reactions in individual cases may be exaggerated or misinterpreted as common phenomena, although scientific evidence suggests that most of these reactions are mild and transient. This misunderstanding may lead to public doubts about the safety of HPV vaccine, which may affect the willingness to vaccinate (Villegas et al., 2023). Medical and health education are critical to these resistances. By providing accurate scientific information, emphasizing the safety and importance of HPV vaccines, and the support and management during the vaccination process, it can help to dispel public doubts and misunderstandings and increase the vaccination rate. In addition, medical providers 'advice and trust relationships are also very important to overcome resistance, as their words and actions can greatly affect individuals' vaccination decisions (Njogu et al., 2024).

2.2. Influence of the media and public opinion: With the rapid development of science and technology, the era of all-media has arrived. The information access is more convenient and is no longer limited by the traditional way of information dissemination. However, the information explosion also brings problems. How to screen out the real and valuable content in the massive information has become a new challenge for us. The media plays a very important role in the dissemination and guidance of public opinion (Wang Y, 2024). The lack of dimensional integrity, transparency and correct reporting, which plays a role in hindering the correct dissemination of vaccine information. To effectively promote the acceptance and adoption of HPV vaccines, medical experts and public health managers need to work with the media to ensure the accuracy and balance of information, while timely responding to possible negative events and public concerns (Calo et al., 2021).

3. National level

National economic level development the economic development of a country is the basis of supporting the supply of medical resources and the development of education, and the economic state of the country largely determines the accessibility of vaccines to the masses. The level of economic development determines how much money and resources a country can invest in the construction of medical infrastructure, health care staff training and health services provision. The adequacy of medical resources directly affects the convenience and coverage of vaccination, such as the distribution of vaccination sites, the construction of cold chain facilities, etc. (Luong & Le-Van, 2024) Countries with good status are often able to provide broader and quality education, including health education and dissemination of vaccine-related awareness. The level of education affects the public's understanding of vaccines and health concerns, and thus affects the acceptance of vaccination (Trepanowski & Drążkowski, 2024).

The economic situation of the country directly affects the affordability of vaccines and the stability of the supply chain. Economically stronger countries can more easily provide subsidized or free vaccination programs to ensure access to the required vaccine services for all, while economically weaker countries may face inadequate vaccine supplies or rely on international assistance (Sriudomporn et al., 2023).

In developed regions such as Europe and America, people show high awareness of vaccines, because the country has included HPV vaccine in the national immunization program, and has a series of publicity activities and policies. However, HPV vaccine was introduced in China relatively late.Vaccine introduction and immunization programs at the national level are an important prerequisite for current vaccine accessibility (Huang Y. et al., 2024).

Related research

1. The Level of HPV awareness

Lin et al. (2019) Awareness and attitude towards human papillomavirus and its vaccine among females with and without daughter(s) who participated in cervical cancer screening in Shenzhen, China. To evaluate the awareness of HPV and HPV vaccine, and willingness to be vaccinated against HPV, among women with and without daughter(s) in Shenzhen, China. Cross-sectional survey in January and June 2015 by means of a self-administered questionnaire to collect information. Multivariate logistic regression was used to explore the factors associated with awareness of HPV and its vaccine and the willingness to be vaccinated. A total of 9855 women (mean age 37.09 years, SD 7.48) were included in the analysis. Although only 42.3% had heard of HPV and 21.0% of HPV vaccine, 63.3% were willing to be vaccinated. 73.9% of the 5799 women with daughter(s) were willing have their daughter(s) vaccinated. Women with daughter(s) did not have a higher awareness of HPV (43.2% vs. 41.5%, P = 0.109) and HPV vaccine (21.1% vs. 20.9%, P = 0.854) than women without daughter(s), but did tend to be more willing to be vaccinated themselves (66.3% vs. 59.9%, P < 0.001).conclusions: Although awareness of HPV and HPV vaccine among women in Shenzhen was low, willingness to have themselves and their daughter(s) vaccinated was relatively high, especially among mothers. High awareness of HPV and its vaccine will help improve the acceptability of HPV vaccination according to residency status, education and monthly income.

Taebi et al. (2019) awareness and Attitude Toward Human Papillomavirus and HPV Vaccination in Iranian Population: A Systematic Review. This systematic review was performed to provide an overview of awareness and attitude about HPV infection and HPV

vaccine in Iranian population. The information was identified by searching international and national databases; pubmed/MEDLINE (NCBI), Embase (Elsevier), Google Scholar, Scientific Information Database, MagIran, and IranDoc. The current research was performed using the terms of medical subject headings (MeSH) and combinations of the keywords including: "human papillomavirus" or "human papillomavirus vaccine" with the words "awareness," "awareness," "attitude" and "Iran." Studies were evaluated according to the checklist of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE). Results: A total of 10 observational studies that met the inclusion criteria were included in this review. The overall awareness and awareness of the Iranian population (parents, women, university students, medical students, nurses and hospital staff) about HPV and HPV vaccination was low; however, the attitude toward this issue was positive and strong. Conclusion: Due to the low levels of awareness about HPV infection and its methods of prevention, efforts should be increased to enhance the awareness of the general population about HPV infection and vaccination to prevent its incidence and complications.

Che Deng. (2021) Human papillomavirus vaccination: coverage rate, awareness, acceptance, and associated factors in college students in mainland China**.** This cross-sectional online survey study, conducted from December 2018 to March 2019, sought to investigate HPV vaccination rates, awareness, acceptance, and associated factors in this population. Descriptive analysis and ordinal logistic regression analysis were conducted to analyze the factors associated with HPV vaccination intention. A total of 1,029 questionnaires were collected, of which 1,022 were valid. Chinese college students' awareness of HPV and its vaccination is limited. More than half of the sample was unsure about undergoing HPV vaccination, with concerns about safety and effectiveness serving as the main barriers. Measures such as strengthening health education, improving

vaccination safety and effectiveness, and reducing vaccine prices should be taken to promote HPV vaccination among Chinese college students.

Beyen. (2022) Human papillomavirus vaccination uptake and its associated factors among adolescent school girls in Ambo town, Oromia region, Ethiopia, 2020.To assess the uptake of human papillomavirus vaccination and its associated factors among adolescent school girls in ambo town, Oromia, Ethiopia, 2020.An institution-based cross-sectional quantitative study design supplemented with the qualitative inquiry was employed to assess Human Papillomavirus vaccination uptake and its associated factors among 422 adolescent school girls in Ambo town, central Ethiopia from December 1–30, 2020. The collected data were coded, entered, and cleaned by using Epiinfo 7.2.3 and exported to SPSS version 25 for analysis. The proportion of HPV vaccination uptake among school girls in this study was 44.4%. Hearing about HPV vaccine [AOR = 2.50, 95%CI: (1.045–5.959)], availability of awareness creation [AOR = 2.53, 95%CI: (1.507–4.258)], and favorable attitude [AOR = 2.049, 95%CI: (1.153–3.64)] were the key identified factors associated with vaccination uptake. In addition, poor perception, fear of side effects, and misunderstanding were among the major factors identified by qualitative findings. There was low uptake of HPV vaccination among the school Adolescents in the study area. Availability of awareness creation programs, favorable attitude towards HPV vaccine, and hearing about HPV vaccine was significantly associated with the uptake of the HPV vaccination. Therefore, awareness creation and behavior change education are mandatory to scale up the vaccination.

Abdelaliem et al. (2023) A survey of potential acceptance of 9-valent HPV vaccine among Chinese male college students. This study investigated Chinese male college students' awareness of, attitude toward, and acceptance of the 9vHPV vaccine and

the independent predictors. An online cross-sectional study was conducted among male college students at Chinese colleges and universities from March 12 to March 23, 2022. Based on a literature review of similar studies, a self-questionnaire was designed to investigate the students' awareness of, attitude toward, and acceptance of the 9vHPV vaccine. to be vaccinated. In addition, the structural equation model was constructed. A total of 1,547 male college students completed the survey. Of all the students, 54.95% were unwilling to receive a 9vHPV vaccination, while only 45.05% expressed willingness. Multivariate logistic regression analysis revealed that the male college students willing to receive the vaccine included medical students, those in a romantic relationship, those whose relatives and friends had cervical cancer, those whose relatives and friends had received the 9vHPV vaccine, those supportive of promoting the vaccine for men, and those who would recommend the vaccine to their relatives and friends. Male college students exhibited high hesitancy toward the 9vHPV vaccine. Acceptance of the 9vHPV vaccine by male college students can be improved by deepening their accurate understanding of the vaccine and enhancing their positive attitude toward it.

2. The factors related with HPV and HPV vaccines

Zhang et al. (2020) conducted a multi-center, school-based intervention study to assess the impact of structured educational programs on Chinese adolescents' awareness of human papillomavirus (HPV), awareness of the HPV vaccine, and willingness to be vaccinated. The study involved students from several regions across China and employed a pre- and post-intervention design to evaluate changes in awareness and attitudes. Prior to the intervention, many students exhibited limited understanding of HPV and held misconceptions regarding the purpose and benefits of vaccination. The intervention consisted of educational sessions delivered by trained personnel, focusing on HPV

transmission routes, its association with diseases such as cervical and other anogenital cancers, and the protective effects of the HPV vaccine. Following the intervention, a statistically significant improvement was observed in both HPV-related awareness and the willingness to receive the vaccine. Notably, students with low baseline awareness demonstrated the most substantial gains. The study also found that female students and those whose parents had higher levels of education were more awareness able prior to the intervention and more receptive to educational messages.These findings highlight the importance of early health education in shaping adolescents' preventive health behaviors. The results suggest that structured, school-based educational interventions are effective in addressing misinformation and improving public health literacy. Zhang et al. recommend integrating HPV-related content into school health curricula as a scalable and sustainable strategy to promote vaccination uptake, especially in regions with low awareness. Conclusion:School-based educational interventions represent a practical and effective method for increasing HPV vaccine awareness and acceptance among adolescents. Public health authorities should consider incorporating such initiatives into national vaccination promotion strategies to address vaccine hesitancy and reduce the burden of HPV-related diseases

Dingyun You et al. (2020) Human Papillomavirus (HPV) Vaccine Uptake and the Willingness to Receive the HPV Vaccination among Female College Students in China: A Multicenter Study. An online cross-sectional survey of female college students across the eastern, central, and western regions of China was undertaken between April and September 2019. Partial least squares structural equation modeling (PLS-SEM) was used to examine factors associated with the HPV vaccine uptake and willingness to receive the HPV vaccine. Results: Among the total 4220 students who participated in this study, 11.0%

reported having been vaccinated against HPV. There are direct effects of indicators of higher socioeconomic status, older age and geographical region on HPV vaccine uptake. Higher awareness and perceived susceptibility were also predictors of HPV vaccine uptake. Likewise, social economic status indicators were associated with the willingness to receive the HPV vaccine. Conclusions: Geographical region and socioeconomic disparities in the HPV vaccination uptake rate and willingness to receive the HPV vaccine provide valuable information for public health planning that aims to improve vaccination rates in underserved areas in China. The influence of awareness and perceptions of HPV vaccination suggests the importance of communication for HPV immunization.

Rajkhowa et al. (2023) Evidence on factors influencing HPV vaccine implementation in South Asia: A scoping review. To successfully implement the vaccine, a tailored risk communication strategy is necessary for these countries. The factors influencing the implementation of human papillomavirus (HPV) vaccination in South Asia. Adopting the 'Arksey and O'Malley and Levac et al.' methodology, multiple electronic databases were searched to identify relevant records. The results were narratively synthesized and discussed, adopting the Consolidated Framework for Implementation Research (CFIR) model. We identified 527 records, which were assessed for eligibility based on title, abstract, and full text by three reviewers, followed by data extraction of 29 studies included for analysis in the review. Implementing HPV vaccination programs in South Asia faces various challenges, such as economic, health system, financial, health literacy, and sociocultural factors that hinder their successful implementation.

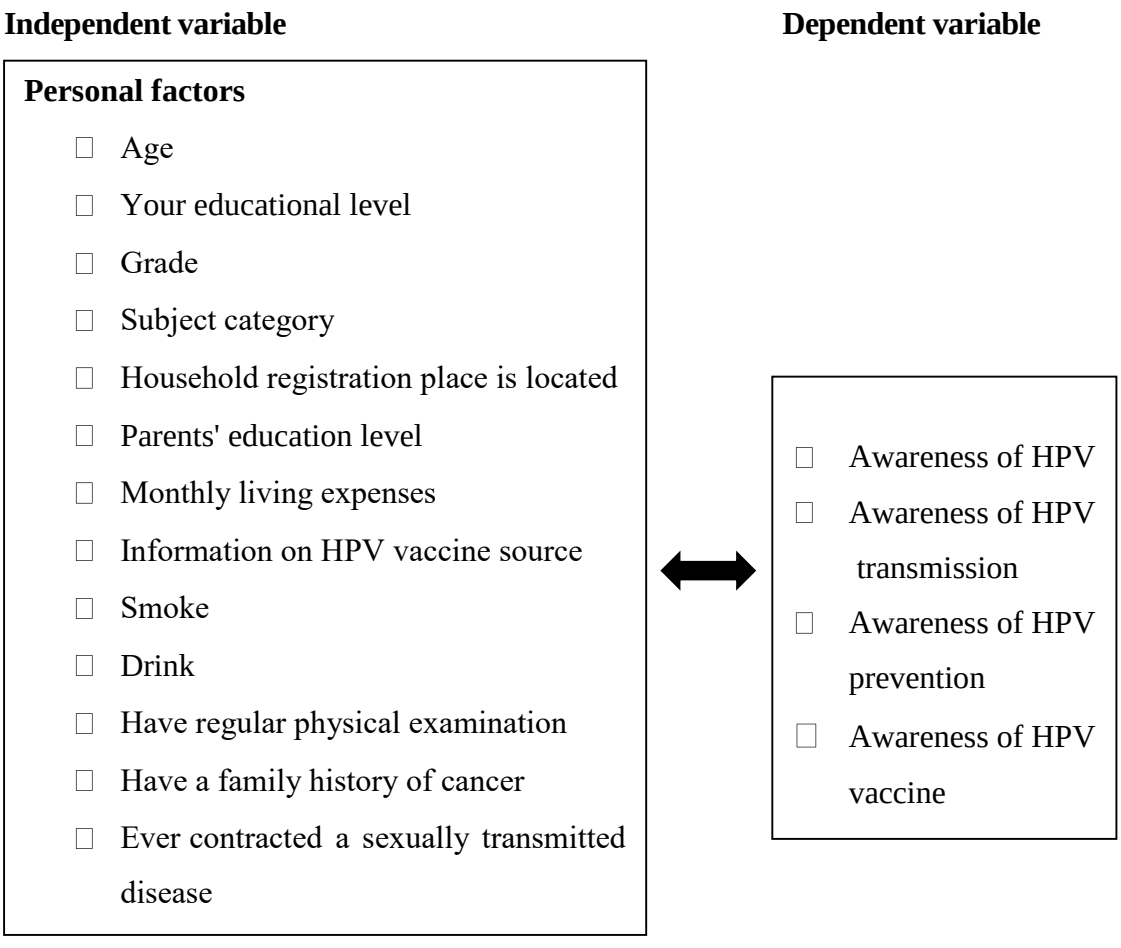
Chen et al. (2024) Factors associated with HPV vaccine hesitancy among college students: A cross-sectional survey based on 3Cs and structural equation model in China. This study aimed to explore college students' attitudes toward HPV vaccination and

identify associated factors. Data was collected through a cross-sectional survey using self-administered questionnaires in four cities from May to June 2022. Chi-square tests and logistic regression analyses were conducted to identify factors. Additionally, an integrated structural equation model (SEM) based on the 3Cs (confidence, convenience, complacency) was developed to understand underlying factors contributing to hesitancy. The results from 2261 valid questionnaires were enlightening. A significant 89.47% (59.4% for females) considered HPV vaccination necessary, with 9.82% remaining neutral and only 0.71% deeming it unnecessary. Factors like higher education, being a medical student, residing in urban areas, having medical insurance, more extraordinary living expenses, a family history of tumors, and a solid understanding of HPV played a role in perceiving the vaccine as necessary. Among the 1438 female respondents, 84.36% had no hesitancy toward HPV vaccination, 13.53% expressed hesitancy, and 2.11% refused vaccination. Factors like age, understanding of HPV, medical staff recommendations, living expenses, and family history influenced hesitancy levels. SEM revealed that the 3Cs significantly affected vaccine hesitancy. Factors like price, booking process, vaccination times, trust in vaccines, medical staff recommendations, efficiency, and risk perception collectively influenced hesitancy. In conclusion, this study found high acceptance of HPV vaccination but acawarenessd the complexity of hesitancy factors. It recommends medical staff disseminate scientific awareness, offer recommendations, simplify booking procedures, and expand vaccination sites to address vaccine hesitancy effectively.

Cernasev et al. (2024) Factors Influencing USA Women to Receive the Human Papillomavirus Vaccine: A Systematic Literature Review. This study aimed to evaluate qualitative studies conducted in the USA to characterize the facilitators and barriers to HPV uptake among eligible women. Four databases, including PubMed/MEDLINE, Embase,

Scopus, and the Cumulative Index for Nursing and Allied Health Literature (CINAHL), were utilized to search the literature for comprehensive qualitative studies from 2014 to 2023 with pre-selected inclusion criteria. Three themes emerged from the data: (1) facilitators perceived by women to uptake the HPV vaccine, (2) barriers perceived by women to uptake the HPV vaccine, and (3) barriers and facilitators perceived by women to uptake the HPV vaccine. These themes highlighted different barriers and facilitators to HPV vaccines uptake, such as the lack of healthcare provider recommendation, cost, and safety concerns as barriers to receiving the vaccine. To change the norms towards HPV vaccine hesitancy, the healthcare team has an important opportunity to impart the awareness and skills known to elicit behavior change.

Conceptual Framework



CHAPTER III

RESEARCH METHODOLOGY

This chapter conducts a systematic investigation and analysis of HPV and its vaccine awareness among college students in Haikou city, Hainan Province, to provide scientific basis for relevant education departments and improve the vaccination rate of students. This study can be divided into the following eight parts:

1. Research design
2. Population and sample size
3. Study area
4. Study period
5. Research method
6. Measurement instruments
7. Data collection
8. Data analysis

Research design

The research design was a cross-sectional descriptive study.

Population and sample size

Population

The population used in the study is 14,187 students from Yunlong Campus of Hainan University of Science and Technology.

Sample size

The sample size is 428 with a slope of no more than 5%, or 95% confidence, so, in this study, we used the following method to calculate it. (Taro Yamane,1967)

$$n = \frac{N}{1 + Ne^2}$$

n= sample size

N= population

e is the acceptable error, e=0.05.

Then the sample size is

$$n = \frac{14187}{1 + 141187 \times 0.05^2}$$

n =389

Error level=389×10%=38.9

Sample size=389+39=428

Based on the above calculation, the size of the sample is 428 people,They were proportion selected from the study population below;The institute has five colleges (School of International Nursing, School of Accounting, School of Urban Construction,School of Media and Music, and School of Clinical Medicine)

Table 3 Proportion of sample size

College name	Population (N)	Sample size (n)
School of Media and Music	744	22
School of Urban Construction	2365	71
School of Accounting	2021	61
School of Clinical Medicine	3120	94
School of International Nursing	5955	180
Total	**14,187**	**428**

Sampling

The Simple random sampling (SRS) is used to select samples to ensure equal representativeness between selected sample groups. This method is applied to sample selection.

Inclusion Criteria

1. The respondents were college students at the Yunlong Campus of Hainan Vocational University of Science and Technology.

2. Normal comprehension ability, able to read, speak and write;

3. After fully understanding the purpose and process of the study, students voluntarily participate in the survey.

Exclusion Criteria

1. Uncooperative survey subjects.

2. Failure to obtain informed consent.

Study Area

Yunlong Campus of Hainan Vocational University of Science and Technology, Haikou City, Hainan Province, China.

Figure 1 show Yunlong Campus of Hainan Vocational University of Science and Technology, Haikou City, Hainan Province, China. (From Google Maps)

Study period

It lasts for 3 months from November 2024 to February 2025.

Research method

Analysis of the factors related to awareness of HPV and HPV vaccines in Hainan university;

1. First, the research questions and objectives of the paper were clarified, and many literature and relevant research data were collected and understand the relevant information of HPV and HPV vaccine awareness level of university students in Haikou, Hainan Province, to lay a solid theoretical foundation for subsequent research.

2. According to the research content of this paper, a questionnaire was developed, including the basic information of the respondents (e. g., gender, school, grade, etc.), basic awareness of HPV, understanding of HPV transmission, awareness of HPV transmission, and awareness of HPV prevention. According to the inclusion and exclusion criteria of the study population, structured questionnaires were distributed to the representative study population, and information was collected to understand the awareness of HPV and HPV vaccine in Haikou city, Hainan Province.

3. Through the detailed analysis and processing of the questionnaire survey data, the statistical analysis of the HPV and its vaccine awareness questionnaire data in Haikou, Hainan Province, and the degree of HPV and HPV vaccine awareness was calculated.

Measurement instruments

The sections are as follows:

1. Basic Information: This section collects demographic and social information about the participants, such as age, grade, education level.

2. Awareness of HPV: This section assesses the participants' awareness of fundamental aspects of HPV, including its symptoms, causes, and affected populations.

3. Awareness of HPV transmission: This part investigates the participants' understanding of how HPV is transmitted, including awareness about the modes of transmission and factors that increase the risk of spreading the disease.

4. Awareness of HPV prevention: This section evaluates the participants' awareness of preventive measures against HPV, such as hygiene practices, vaccination and other strategies to reduce the risk of infection.

Based on Bloom, B.S. (1956), The scoring method is 1 score for correct answer and the wrong answer to score 0 score. The relevant awareness scores are divided into three levels: low, moderate and high. Low level is 0-59%; moderate level is 60-79%; high level is 80-100%.

The awareness of HPV: 0-7.19 into low level, 7.20-9.59 into moderate level, 9.60-12.00 into high level; Awareness of HPV (transmission and vaccine): 0-4.79 into low level, 4.80-6.39 into moderate level, 6.40-8.00 into high level; Awareness of HPV prevention: 0-5.9 into low level,6.0-7.9 into moderate level, 8.0-10.0 into high level.

Data collection

In this research, the researcher will follow these steps to collect data:

1. Request a letter of certification from I-SEM, Chiang Rai Rajabhat University, to authorize the data collection process.

2. Coordinate with the relevant areas to conduct the data collection using the questionnaire.

3. Collect data using the questionnaire by coordinating with the heads of departments to schedule dates for data collection from the sample groups of each college.

4. The questionnaire used for data collection has been validated by three experts, with a validity score of >0.5, and its reliability has been calculated from a sample group like the target population of the research, composed of 30 university students from Liaoning Province in China, There are four reliability factors: Awareness of HPV: 0.875; Awareness of HPV transmission: 0.832; Awareness of HPV prevention:0.767; Awareness of HPV vaccine:0.878.

5. Collect data from the target sample group of the research.

6. Verify the accuracy and completeness of the data obtained from the questionnaires.

7. Compile the data and conduct statistical analysis.

Data analysis

1. Descriptive Analysis to summarize the basic characteristics of the sample and the awareness levels. Demographic Information: Use frequencies and percentages to describe the distribution of demographic variables (e.g., age, gender, education level, occupation). Awareness Levels: The scores of the questionnaire were calculated, and the level of awareness of participants was determined by frequency and percentage.

2. Chi-square and Exact test to analyze each independent variable individually to determine its association with HPV awareness.

3. Correlation test to analyze the correlation between HPV awareness and awareness and HPV vaccine

CHAPTER IV

RESULTS

This study aims to study the awareness of HPV and HPV vaccine in students of Science and Technology and its influencing factors and correlation between awareness and awareness of HPV and the HPV vaccine. Data were collected from samples of 465 individuals, selected using stratified sampling. The data collection tool is a questionnaire survey. Analysis the collected data, the results can be classified as follows:

1. General Information of the Respondents
2. Level of awareness of HPV and HPV vaccine
3. Factors related with awareness of the HPV and HPV vaccine
4. Correlation analysis between awareness of HPV and HPV vaccine.

General Information of the Respondents

Table 4 Frequency and percentage by student age(n=465)

Age (year old)	Frequency	Percentage (%)
19	170	36.55
20	126	27.10
21	103	22.15
22	37	7.96
23	29	6.24
Maximum=23 Minimum=19 Mean=20.20		
Total	**465**	**100**

Table 4 The most of age 19 years old 170 case (36.55%) than age 20 years old 126 (27.10%) and less of age 23 years old 29 case (6.24%).

Table 5 Frequency and percentage by student educational level(n=465)

Educational level	Frequency	Percentage (%)
Undergraduate degree	225	48.39
Junior college education	240	51.61
Total	**465**	**100**

Table 5 The education level of students is undergraduate and junior college, 240, accounting for 51.61%, 225, accounting for 48.39%.

Table 6 Frequency and percentage by student grade (n=465)

Grade	Frequency	Percentage (%)
freshman	119	25.59
sophomore	114	24.52
junior	120	25.80
senior	112	24.09
Total	**465**	**100**

Table 6 The largest number of grades is junior 120 case （25.81%） than freshman 119 (25.59%) and sophomore 114 (24.52%).

Table 7 Frequency and percentage by student Subject (n=465)

Subject	Frequency	Percentage (%)
School of International Nursing	212	45.59
School of Clinical Medicine	92	19.78
School of Urban Construction	71	15.28
School of Accounting	62	13.33
School of Media and Music	28	6.02
Total	**465**	**100**

Table 7 The largest proportion was School of International Nursing 212 (45.59%), 92 (19.78%) in the School of Clinical Medicine, and 28 (6.02%) in the School of Media and Music.

Table 8 Frequency and percentage by student residence (n=465)

Residence	Frequency	Percentage (%)
City	298	64.09
Village	167	35.91
Total	**465**	**100**

Table 8 Most of the students register in 298 (64.09%) in cities, and the remaining 167 are registered in townships (35.91%).

Table 9 Frequency and percentage by Father's education level (n=465)

Father's education	Frequency	Percentage (%)
Never received the trial education	33	7.10
primary school	98	21.08
junior high school	149	32.04
High school	144	30.96
junior college or above	41	8.82
Total	**465**	**100**

Table 9 The most is 149 cases of junior high school education (32.04%) than 144 case of high school education (30.97%) and the lowest is 33 cases (7.10%) who did not receive the trial education.

Table 10 Frequency and percentage of Mother's education level (n=465)

Mother's education	**Frequency**	**Percentage (%)**
Never received the trial education	28	6.02
primary school	100	21.51
junior high school	149	32.04
High school	131	28.17
junior college or above	57	12.26
Total	**465**	**100**

Table 10 The most is 149 cases of junior high school education (32.04%) than 131case of high school education (28.17%) and the least is 28 cases (6.02%) who did not receive the trial education.

Table 11 Frequency and percentage by student's living expenses (n=465)

Living expenses	**Frequency**	**Percentage (%)**
800 yuan below	51	10.97
800-1200 yuan	79	16.99

Table 11 (Continued)

Living expenses	Frequency	Percentage (%)
1201-1800 yuan	200	43.01
1801-2500 yuan	88	18.92
More than RMB 2,500 yuan	47	10.11
Total	**465**	**100**

Table 11 The most living expenses are 1,201-2,500 yuan, 200 (43.01%), there were 79 people with living expenses of 800-1200yuan, accounting for (18.92%) and the least is more than 2,500 yuan, 47 (10.11%).

Table 12 Frequency and percentage by information of HPV (n=465)

Information of HPV	Frequency	Percentage (%)
TV	296	63.66
Newspaper / Magazine	232	49.89
Internet	364	78.28
Medical Provider	282	60.65
Friends / relatives	111	23.87
Other	**415**	**89.25**

Table 12 Among them, 415 (89.25%) chose to get the information through Other, 364 people (78.28%) chose to get information through the Internet, and 111 people (23.87%) got their information from friends or relatives.

Table 13 Frequency and percentage by student's drink (n=465)

Drink	Frequency	Percentage (%)
never	95	20.44
occasionally	165	35.48
sometimes	95	20.43
often	88	18.92
always	22	4.73
Total	**465**	**100**

Table 13 The highest was “occasionally” 165 (35.48%), both “never” and “sometimes” are 95(20.43%) and the least “always”22 (4.73%).

Table 14 Frequency and percentage by student's smoke (n=465)

Smoke	Frequency	Percentage (%)
never	258	55.48
occasionally	106	22.80
sometimes	61	13.12

Table 14 (Continued)

Smoke	Frequency	Percentage (%)
often	20	4.30
always	20	4.30
Total	**465**	**100**

Table 14 The highest was “never”258 (55.48%) and “occasionally” 106 (22.80%) and the least “always”20 (4.30%) and “often” 20(4.30%).

Table 15 Frequency and percentage by student's physical examination (n=465)

physical examination	Frequency	Percentage (%)
Yes	331	71.18
No	134	28.82
Total	**465**	**100**

Table 15 The highest was “Yes” 331 (71.18%） and the least “No”134 (28.82%).

Table 16 Frequency and percentage by family's history of cancer (n=465)

History of cancer	Frequency	Percentage
Yes	83	17.85
No	382	82.15
Total	**465**	**100**

Table 16 The highest was “No” 382 (82.15%) and the least “Yes”83 (17.85%).

Table 17 Frequency and percentage by student's history of STD infection (n=465)

History of STD infection	Frequency	Percentage (%)
Yes	47	10.11
No	418	89.89
Total	**465**	**100**

Table 17 The highest was “No” 418(89.89%) and the least “Yes”47(10.11 %).

Table 18 Frequency and percentage by "Have a male / girlfriend" (n=465)

Have a male / girlfriend	Frequency	Percentage (%)
Yes	243	52.26
No	222	47.74
Total	**465**	**100**

Table18 The highest was "Yes"243(52.26%) and the least "No"222(47.74%).

Levels of awareness of HPV and HPV vaccine

Table19 Frequency and percentage by level of awareness about HPV (n=465)

Awareness about HPV	Frequency	Percentage (%)
Low	192	41.29
Moderate	137	29.46
High	136	29.25
Total	**465**	**100**

Table19 According to the table results, the HPV awareness level was 192 at low level, accounting for 41.29%, 137 at moderate level, accounting for 29.46%, and 136 at high level, accounting for 29.25%.

Table 20 Frequency and percentage by level of awareness about HPV transmission (n=465)

Awareness about HPV transmission	Frequency	Percentage (%)
Low	161	34.62
Moderate	185	39.78
High	119	25.60
Total	**465**	**100**

Table 20 According to the table results, the HPV transmission level was 161 at low level, accounting for 34.6%, 185 at moderate level, accounting for 39.8%, and 119 at high level, accounting for 25.6%.

Table 21 Frequency and percentage by level of awareness about HPV prevention(n=465)

level of Awareness about HPV prevention	Frequency	Percentage (%)
Low	36	7.74
Moderate	152	32.69
High	277	59.57
Total	**465**	**100**

Table 21 According to the table results, the HPV prevention level was 36 at low level, accounting for 7.74%, 152 at moderate level, accounting for 32.69%, and 277 at high level, accounting for 59.57%.

Table 22 Frequency and percentage by level of awareness about HPV vaccine (n=465)

level of Awareness about HPV vaccine	Frequency	Percentage (%)
Low	178	38.28
Moderate	175	37.63
High	112	24.09
Total	**465**	**100**

Table 22 According to the table results, the HPV vaccine level was 178 at low level, accounting for 38.28%, 175 at moderate level, accounting for 37.63%, and 112 at high level, accounting for 24.09%.

Factors related with awareness of the HPV and HPV vaccines

Table 23 Correlation between Subject category and Level of Awareness about HPV by Fisher's exact test

Personal factors	Level of Awareness about HPV			Exact P-value
	Low	Moderate	High	
Subject category				
School of Clinical Medicine	16 (17.39%)	35 (38.04%)	41 (44.57%)	<.001**

Table 23 (Continued)

Personal factors	Level of Awareness about HPV			Exact P-value
	Low	**Moderate**	**High**	
School of International Nursing	28 (13.21%)	90 (42.45%)	94 (44.34%)	
School of Urban Construction	66 (92.96%)	4 (5.63%)	1 (1.41%)	
School of Accounting	59 (95.16%)	3 (4.84%)	0 (0.00%)	
School of Media and Music	23 (82.14%)	5 (17.86%)	0 (0.00%)	

** < 0.01

Table 23 According to the tabular results, the p-value of the subject category option is 0.000, less than 0.05, and it is statistically significant.

Table 24 Correlation between education level and Level of Awareness about HPV transmission by Chi-square

Personal factors	Level of Awareness about HPV transmission			χ^2	P-value
	Low	Moderate	High		
Education level					
Undergraduate	70 (31.11%)	104 (46.22%)	51 (22.67%)	7.551	.023*
Junior	91 (37.92%)	81 (33.75%)	68 (28.33%)		

* < 0.05

Table 24 According to the tabular results, the p-value of the education level option is 0.023, less than 0.05, and it is statistically significant.

Table 25 Correlation between Subject category and Level of Awareness about HPV transmission by Fisher's exact test

Personal factors	Level of Awareness about HPV transmission			Exact P-value
	Low	Moderate	High	
Subject category				
School of Clinical Medicine	12 (13.04%)	48 (52.18%)	32 (34.78%)	<.001**
School of International Nursing	26 (12.26%)	99 (46.70%)	87 (41.04%)	
School of Urban Construction	54 (76.06%)	17 (23.94%)	0 (0.00%)	
School of Accounting	47 (75.81%)	15 (24.19%)	0 (0.00%)	
School of Media and Music	22 (78.57%)	6 (21.43%)	0 (0.00%)	

** < 0.01

Table 25 According to the tabular results, the p-value of the subject category option is 0.000, less than 0.05, and it is statistically significant.

Table 26 Correlation between Information from Medical provider and Level of Awareness about HPV transmission by Chi-square

Personal factors	Level of Awareness about HPV transmission			χ^2	P-value
	Low	Moderate	High		
Information from Medical provider					
Yes	88 (31.21%)	106 (37.58%)	88 (31.21%)	12.112	.002**
No	73 (39.89%)	79 (43.17%)	31 (16.94%)		

** < 0.01

Table 26 According to the tabular results, the p-value is 0.002, less than 0.05, and it is statistically significant.

Table 27 Correlation between Information from other and Level of Awareness about HPV transmission by Chi-square

Personal factors	Level of Awareness about HPV transmission			χ^2	P-value
	Low	**Moderate**	**High**		
Information from other					
Yes	153 (36.87%)	154 (37.11%)	108 (26.02%)	12.844	.002**
No	8 (16.00%)	31 (62.00%)	11 (22.00%)		

** < 0.01

Table 27 According to the results of the table, the p value is 0.002 less than 0.05, and it is statistically significant.

Table 28 Correlation between Subject category and Level of Awareness about HPV prevention by Chi-square

Personal factors	Level of Awareness about HPV prevention			χ^2	P-value
	Low	Moderate	High		
Subject category					
School of Clinical Medicine	4 (4.35%)	23 (25.00%)	65 (70.65%)	57.681	<.001**
School of International Nursing	5 (2.36%)	57 (26.89%)	150 (70.75%)		
School of Urban Construction	13 (18.31%)	33 (46.48%)	25 (35.21%)		
School of Accounting	11 (17.74%)	26 (41.94%)	25 (40.32%)		
School of Media and Music	3 (10.71%)	13 (46.43%)	12 (42.86%)		

** < 0.01

Table 28 According to the tabular results, the p-value of the subject category option is 0.000, less than 0.05, and it is statistically significant.

Table 29 Correlation between Age and Level of Awareness about HPV vaccine prevention by Chi-square

Personal factors	Level of Awareness about HPV vaccine			χ^2	P-value
	Low	Moderate	High		
Age					
19	69 (40.59%)	68 (40.00%)	33 (19.41%)	18.253	.019*
20	59 (46.83%)	40 (31.74%)	27 (21.43%)		
21	36 (34.95%)	40 (38.84%)	27 (26.21%)		
22	7 (18.92%)	14 (37.84%)	16 (43.24%)		
23	7 (24.14%)	13 (44.83%)	9 (31.03%)		

* < 0.05

Table 29 According to the tabular results, the p-value of the age option is 0.019, less than 0.05, and it is statistically significant.

Table 30 Correlation between personal factors and Level of awareness about HPV vaccine prevention by Fisher's exact test

Personal factors	Level of Awareness about HPV vaccine			Exact
	Low	Moderate	High	P-value
Subject category				
School of Clinical Medicine	10 (10.87%)	45 (48.91%)	37 (40.22%)	
School of International Nursing	28 (13.21%)	109 (51.41%)	75 (35.38%)	
School of Urban Construction	60 (84.51%)	11 (15.49%)	0 (0.00%)	<.001**
School of Accounting	55 (88.71%)	7 (11.29%)	0 (0.00%)	
School of Media and Music	25 (89.29%)	3 (10.71%)	0 (0.00%)	

** < 0.01

Table 30 According to the results in the table, the subject category p-value was 0.000, and it is statistically significant.

Correlation between awareness and awareness of HPV and HPV vaccine

Table 31 Correlation between Awareness of HPV/Awareness of HPV transmission/Awareness of HPV prevention/Awareness of HPV vaccine by using Pearson Correlation

Correlation	r	P-value
HPV awareness **VS** Awareness of HPV transmission	.511	<.001**
HPV awareness **VS** Awareness of HPV prevention	.370	<.001**
HPV awareness **VS** HPV vaccine	.554	<.001**
Awareness of HPV transmission **VS** HPV prevention	.268	<.001**
Awareness of HPV transmission **VS** HPV vaccine	.522	<.001**
HPV prevention **VS** HPV vaccine	.315	<.001**

** < 0.01

Table 31 The Pearson correlation study was found between the HPV awareness and the awareness of HPV transmission, the HPV prevention and the awareness of HPV vaccine, all p-values were less than 0.05 and were statistically significant.

CHAPTER V

CONCLUSION AND DISCUSSION

The title of the study was factors relate to awareness of HPV and HPV vaccination among student in Hai Nan University. This study aims to examine university students' awareness of HPV and HPV vaccination and explore the factors related to their awareness and investigate the correlation between awareness and awareness of HPV and HPV vaccination. The sample size was determined using Taro Ya-mane's formula, yielding a final sample of 465 participants, selected through stratified random sampling method. The study employed a structured questionnaire as the primary research instrument, comprising demographic factors, awareness of HPV, Awareness of HPV transmission, Awareness of HPV prevention, awareness of HPV vaccine. The collected data were analyzed using statistical software, employing the Frequency distribution, Percentage, Chi-Square Test and Fisher's exact test method for data processing. The study findings are structured as follows:

1. Conclusion
2. Discussion
3. Study Limitation
4. Recommendation for using Research
5. Recommendation for Further Research

Conclusion

This study aimed to investigate the awareness of HPV and HPV vaccine among students at Hainan Vocational University of Science and Technology, focusing on the factors influencing their awareness and the correlation between awareness and awareness levels. The research collected data from 465 students through stratified sampling and analyzed the results using various statistical methods. The findings revealed that:

1. General Information of the Respondents:

Most respondents were 19 years old (36.55%), with a nearly equal distribution between undergraduate (48.39%) and junior college students (51.61%). The largest proportion of students were from the School of International Nursing (45.59%), and most resided in urban areas (64.09%). Most students had living expenses between 1201-1800 yuan (43.01%), and the primary source of HPV information was the internet (78.28%).

2. Awareness Levels:

Awareness about HPV: There are 192 students had a low level of awareness (41.29%), and only 137 had a moderate level of awareness (29.46%) and 136 had a high level of awareness (29.25%). Therefore, the students' awareness of HPV was low.

Awareness about HPV transmission: There are 185 students had a moderate level of awareness (39.78%), and only161 had a low level of awareness (34.62%) and 119 had a high level of awareness (25.59%). Therefore, the students' awareness of HPV transmission was moderate.

Awareness about HPV prevention: There are 277 students had a high level of awareness (59.57%), and only152 had a moderate level of awareness (32.69%) and 36 had a low level of awareness (7.74%). Therefore, the students' awareness of HPV prevention was high.

Awareness about HPV vaccine: There are 178 students had a low level of awareness (38.28%), and only175 had a moderate level of awareness (38.28%) and 112 had a low level of awareness (24.09%). Therefore, the students' awareness of HPV prevention was low.

3. Factors Influencing Awareness:

The study identified several factors influencing HPV awareness, including educational level, subject category, and age. Students from medical-related fields (e.g., School of Clinical Medicine and School of International Nursing) exhibited higher awareness levels compared to those from non-medical fields (e.g., School of Urban Construction and School of Accounting). Additionally, undergraduate students showed higher awareness than junior college students, and older students (seniors) had better awareness compared to younger students (freshmen). Students who obtained information from medical providers had higher awareness levels than those who did not.

4. Correlation Analysis:

There was a significant positive correlation between awareness of HPV and awareness of the HPV vaccine ($r = 0.554$, $p < 0.05$). Similarly, awareness of HPV prevention was positively correlated with awareness of the HPV vaccine ($r = 0.315$, $p < 0.05$). Students with higher awareness levels were more likely to seek vaccination and preventive measures.

Discussion

level of Awareness about HPV and HPV and the HPV vaccination

1. The level of HPV awareness is low

The results showed a lower level of awareness about HPV. This is primarily due to: HPV awareness was not included in the compulsory health education curriculum in colleges and universities, and was only mentioned sporadically in medical schools or elective courses. Students mainly obtain information through the Internet, but the quality of network information is uneven, lack of authority and systematization. Students tend to pay more attention to short-term health problems (such as influenza, mental health), and lack of attention to the long-term harm of HPV (long incubation period, carcinogenic risk). The publicity activities of schools and public health institutions mostly focus on HIV/AIDS, and the publicity and education of HPV related awareness are insufficient. The low frequency of HPV related publicity and the single form (such as leaflets and lectures) lead to the lack of basic understanding of students. Due to cultural and social factors, sexual health-related topics may be seen as sensitive, and students are ashamed to actively discuss or ask questions due to the characteristics of HPV through sexual transmission. The lack of open dialogue in the family and community exacerbates the HPV misunderstanding. Similarly, (Zhang et al. 2022)、Che Deng. 2021) The results showed that college students had limited awareness of the relevant awareness and the HPV vaccination rate was low. Cheet al. (2021) The results indicate that the cognitive level of HPV and its vaccine is low among Chinese college students Charles et al. (2024) a study conducted among female university students found that only 33.7% had adequate awareness of HPV, indicating a low level of awareness.

2. The level of awareness about HPV transmission is moderate

The results indicate a moderate level of awareness about HPV transmission. This is mainly because although some health education activities mention HPV transmission, they do not cover all students. To avoid "sex education" disputes, public health advertisements often use obscure expressions (such as "close contact") and fail to clarify the details of communication. Most students know that HPV is transmitted through sexual contact, but ignoring "skin-skin contact" can also be transmitted (such as genital warts). Some students disbelieve that HPV can be transmitted through blood, mother and child or public goods, confusing the transmission mechanism of HPV and HIV / hepatitis B. Students may obtain information from different sources, but this information may be incomplete or biased. Moreover, students rely on search engines for information, but they lack the ability to identify the content of professional websites (such as WHO, CDC) and marketing accounts. Similarly, Chen, X.et al. (2024) The awareness level of college students regarding HPV transmission was generally moderate. Ergün, S. (2023). The results indicate a generally moderate level of awareness for HPV transmission, highlighting the importance of strengthening HPV-related literacy and vaccination education in this population. Abdelaliem et al. (2023) mentioned in a study published in China Public Health that the cognitive status of Chinese male college students on HPV shows that some students understand the transmission route of HPV, but their overall cognitive level still needs to be improved, Beyen et al. (2022) which is consistent with the conclusion of our study.

3. The level of awareness about HPV prevention is high

The results showed a higher level of awareness regarding HPV prevention. This is mainly due to: modern college students pay more attention to their own health and actively obtain information about disease prevention. Increasing media coverage of HPV

prevention is making it easier for students to access relevant information. Discussion on HPV prevention on social media platforms, social media marketing of nine-price vaccine, WeChat public account, TikTok and other platforms launched HPV popular science animation, with "high click-through rate problem" (such as " Do boys need to get vaccinated?") It stimulates the attention of students and improves the cognitive level of students. Discussion and sharing among students also facilitated the understanding of HPV prevention measures. Similarly, Zhang, (2022) and GUO et al. (2022) and Lin et al. (2019) noted an association between social media use and college students' willingness to vaccinate HPV vaccine, indicating a positive role of social media in disseminating awareness of HPV prevention, which is consistent with the conclusion of our study.

4.The level of awareness about HPV vaccine is low

The results showed a low level of awareness about the HPV vaccine. This is mainly due to: Insufficient promotion and publicity of HPV vaccine led to limited understanding among students. The few cases of post-vaccination adverse reactions are exaggerated, concealing the vaccine safety confirmed by large sample studies. Some students have doubts about the safety and effectiveness of the vaccine, which affects their access to and acceptance of relevant information. And the cost of the HPV vaccine may be high, so students pay little attention to it. Similarly, (Charles et al. 2024) The same study among female university students reported that only 43.2% were aware of the cervical cancer vaccine, indicating a low level of awareness about the HPV vaccine. Li et al (2024) and Abdelaliem et al. (2023) HPV vaccine awareness and vaccination rates were low among college students.

Factors relate to university students' awareness of HPV and the HPV vaccine

1. Level of HPV awareness and HPV transmission and HPV prevention and HPV vaccine/ Subject category

The findings of this study reveal significant variations in HPV awareness and HPV transmission and HPV prevention and HPV vaccine among students, particularly when comparing students from medical-related fields (e.g., School of Clinical Medicine and School of International Nursing) to those from non-medical fields (e.g., School of Urban Construction and School of Accounting). The results indicate that medical students consistently demonstrated higher levels of awareness regarding HPV, its prevention, and the HPV vaccine compared to their non-medical counterparts. These results are mainly due to ： Medical-related courses naturally include public health, infectious disease and immunology. HPV, as the main cause of cervical cancer, is a required awareness point in pathology or preventive medicine. This systematic learning enables students to form an "awareness inertia" of HPV. However, the core awareness framework of urban construction, accounting and other disciplines does not intersect with medicine, and students rely on fragmented information (such as social media), which is vulnerable to information bias. Nursing students are often exposed to HPV-related cases during internships, which also enhances their awareness and awareness of prevention. Similarly, a study by Liu et al. (2020) found that medical students had a higher level of awareness about HPV and its vaccine compared to non-medical students. The study also noted that vaccinated family members or friends were significant predictors for students' vaccination status. Akpinar, C (2023). Medical students had more comprehensive awareness than their non-medical counterparts on HPV vaccination, including the carcinogenicity of HPV.

2. Level of Awareness about HPV transmissions/education level

Our study found that undergraduate students have higher awareness of HPV prevention than Junior college students. This result is mainly due to： First, differences in educational levels may lead to differences in educational resources. Undergraduate courses often have a richer curriculum that may cover HPV in public health or related courses. Junior college education focuses more on vocational skills and may involve less of this type of health awareness. Junior college courses are more practical operation and may not have so many theoretical courses, resulting in less exposure to HPV related awareness Alternatively, undergraduate students may have higher awareness of self-directed learning and more proactive access to health information, while junior students may invest less time in this. Similarly, research by Zhang Fengzhi et al. (2022) revealed that undergraduate students exhibited significantly higher awareness of cervical cancer prevention and treatment compared to junior college students. The study also noted that non-medical students had lower levels of awareness, highlighting the need for targeted educational interventions to address these gaps. Xin Wang et al. (2021) Found that undergraduates had higher awareness about HPV and vaccine acceptance than college students.

3. Level of Awareness about HPV transmission/Information from Medical provider

The results found a link between healthcare providers and HPV transmission. This result is mainly due to the: The student population often lacks medical awareness and is vulnerable to misinformation by social media or informal channels. The information provided by doctors, nurses and other medical professionals is more authoritative. After receiving advice from doctors or nurses on HPV students are more likely to take corresponding preventive measures, such as HPV vaccination and avoiding high- risk

sexual behaviors, thus reducing the risk of infection. Similarly, N. Loren Oh et al. (2021) and Esraa Aldawood et al. (2023) studies have highlighted the critical role of healthcare providers in increasing HPV vaccination rates and suggested that public health efforts should continue to focus on and strengthen healthcare provider communication strategies.Cheng Chen et al. (2024) and Alina Cernasev et al. (2024) The study highlights the emphasis on the role of healthcare providers, which is consistent with our conclusions.

4. Level of Awareness about HPV transmission / Information from other

We found that the source of information was other options related to HPV transmission awareness. About this "other" refers to sources of information other than television, newspapers and magazines, Internet medical providers, friends / relatives. For example, school health education courses or public lectures, community activities, etc. This result is mainly due to the: HPV is associated with sexual transmission; many communities or individuals may have misconceptions or shame about HPV. School courses and community activities can eliminate public fear, misunderstandings and prejudices, and promote correct health concepts through scientific explanation and interactive questions and answers. Schools can reach many students, while community activities can reach a wider range of people, including teenagers, parents, teachers and general residents. Compared with individual medical consultations, public health education has a broader impact and contributes to the group level of HPV transmission awareness. Similarly, Zhang et al. (2020) and Zeynep Dasikan et al. (2023) Studies showed that students' awareness of awareness related to HPV improved significantly after the health education intervention and this promotion remained partially maintained after one year. Highlighting the importance of health education in increasing HPV awareness and willingness to vaccinate.

The study recommends that hospital and community campaigns target HPV vaccine promotion

5. Level of Awareness about HPV vaccine / Age

The findings of this study indicate that older college students exhibit higher levels of awareness regarding HPV vaccine compared to younger students. This positive correlation between age and the awareness about HPV vaccine can be attributed to several factors: Freshman students usually focus on general education, while senior students are gradually exposed to professional courses or electives. For example, senior students of medical-related majors systematically study courses. Senior students were more likely to participate in research programs or internships, such as medical students exposed to HPV positive cases during hospital internships or involved in vaccine effectiveness surveys. Such practice strengthens the application of theoretical awareness and improves the depth of awareness. Senior students have a wider social range, and may receive HPV information through their peers (especially friends from a medical background), internship mentors, or health lectures. For example, senior teams participating in campus HPV science competitions are more likely to form awareness-sharing networks. Similarly, a study by Wu et al. (2021) found that undergraduate students in Hangzhou had an average HPV-related awareness accuracy rate of 29.61%, with senior students demonstrating better awareness levels.Yingnan Liu et al. (2022)Senior and medical students had higher levels of awareness of HPV prevention.

Correlation between awareness and awareness of HPV and HPV vaccine

The results indicated a low level of awareness about the HPV vaccine. This can be attributed to several factors: insufficient promotion and public education have led to limited understanding among students; rare cases of post-vaccination adverse reactions are

often exaggerated, overshadowing the vaccine's safety as confirmed by large-scale studies; and doubts about the vaccine's safety and efficacy have affected students' willingness to seek and accept accurate information. Additionally, the relatively high cost of the HPV vaccine may discourage students from paying attention to it. Similarly, Charles et al. (2024) reported that only 43.2% of female university students were aware of the cervical cancer vaccine, reflecting a generally low level of HPV vaccine awareness. Li et al. (2024) and Abdelaliem et al. (2023) also found low awareness and vaccination rates among college students, highlighting the need for improved education and accessibility.

In summary, while there are similarities in the findings across different regions, the relationship between age and HPV awareness varies depending on the educational system and cultural context. Our study adds to the growing body of literature by highlighting the importance of curriculum design, practical exposure, and risk perception in shaping HPV awareness among college students. The findings underscore the need for targeted educational interventions, particularly for non-medical students, to improve HPV awareness and promote vaccination.

Research limitations

Despite the valuable insights provided by this study, several limitations should be acawarenessd:

1. Sample Representation: The study was conducted at a single university, which may limit the generalization of the findings to other regions or educational institutions. The sample was also limited to students from specific faculties, which may not represent the broader student population.

2. Cross-Sectional Design: The study employed a cross-sectional design, which limits the ability to establish causal relationships between variables. Longitudinal studies would provide more robust evidence on the factors influencing HPV awareness over time.

3. Limited Scope of Variables: The study focused primarily on demographic and educational factors influencing HPV awareness. Other potential factors, such as cultural attitudes, sexual behavior, and access to healthcare services, were not explored in depth.

Recommendation for using Research

Based on the findings of this study, several practical recommendations can be proposed to improve HPV awareness and vaccination uptake among university students. These recommendations are tailored to address the specific gaps identified in the research, particularly the low to moderate levels of HPV awareness among non-medical students and junior college students. The following suggestions aim to guide universities, healthcare providers, and policymakers in implementing effective strategies to enhance HPV education and promote vaccination.

Targeted Educational Programs for Non-Medical Students

The study revealed that students from non-medical fields, such as urban construction and accounting, had significantly lower awareness of HPV and its vaccine compared to their medical counterparts. Universities should develop targeted educational programs specifically designed for non-medical students. These programs could include workshops, seminars, or online courses that provide basic information about HPV, its transmission, prevention, and the importance of vaccination. By focusing on students with lower awareness levels, universities can bridge the awareness gap and ensure that all

students, regardless of their field of study, have access to accurate and comprehensive HPV information.

Integration of HPV Education into General Curriculum

Given the low awareness levels among junior college students and non-medical undergraduates, universities should consider integrating HPV education into the general curriculum. This could be done through public health courses, biology classes, or even as part of general education requirements. By embedding HPV-related content into the curriculum, students will have more opportunities to learn about the virus and its prevention in a structured and systematic manner. This approach would also help to normalize discussions about HPV and reduce the stigma associated with it, particularly among male students who may perceive HPV as a "gynecological issue unrelated to themselves."

Collaboration with Healthcare Providers for Information Dissemination

The study found that students who obtained HPV information from medical professionals had higher awareness levels. Universities should collaborate with local healthcare providers, such as campus health clinics or nearby hospitals, to organize regular health talks, vaccination drives, and informational campaigns about HPV. These events could feature healthcare professionals who can provide accurate information, address misconceptions, and encourage students to get vaccinated. Additionally, universities could invite medical experts to give lectures or participate in panel discussions, providing students with direct access to reliable sources of information.

Utilization of Social Media and Digital Platforms for Health Education:

Since most students (78.3%) reported obtaining HPV information from the internet, universities should leverage social media and digital platforms to disseminate accurate and engaging content about HPV. Universities could create dedicated social media

accounts or websites that provide fact-based information and videos about HPV and the vaccine. Additionally, universities could develop mobile apps or online quizzes to test students' awareness and encourage them to learn more about HPV.

Peer Education Programs:

Universities could establish peer education programs where trained student volunteers, particularly those from medical or nursing fields, educate their peers about HPV and the vaccine. These peer educators could organize informal discussions, distribute informational materials, or host campus events to raise awareness. Peer-led initiatives can create a more relatable and less intimidating environment for students to learn about sensitive topics like HPV.

Incentive's HPV vaccination:

To increase vaccination rates, universities could consider offering incentives for students who get vaccinated against HPV. For example, universities could provide discounted or free vaccinations through campus health clinics, or offer small rewards such as gift cards, extra credit in health-related courses, or priority access to campus events. By making the vaccine more accessible and appealing, universities can encourage more students to take proactive steps toward protecting their health.

Regular Awareness Campaigns and Health Fairs

Universities should organize regular awareness campaigns and health fairs focused on HPV and other sexually transmitted infections (STIs). These events could include informational booths, free HPV screenings, and opportunities for students to speak with healthcare professionals. By making HPV education a recurring part of campus life, universities can reinforce the importance of vaccination and prevention, particularly for

students who may not have been exposed to this information earlier in their academic careers.

By implementing these recommendations, universities can play a crucial role in improving HPV awareness and vaccination rates among students. These efforts will not only benefit the students themselves but also contribute to the broader public health goal of reducing the burden of HPV-related diseases in the population.

Recommendation for Further Research

Future research should employ longitudinal designs to track HPV awareness retention and behavioral changes among students from freshman to senior year. This would help determine whether academic exposure leads to sustained awareness or requires reinforcement through continuing education.

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APPENDIX

Appendix A

Interview forms

Research Title: Factors Related to Awareness of HPV and HPV Vaccination Among Students in Hainan University

Consent day Date.....Month.....Year.....

I am Mr./Mrs./Miss..... address..... Read the details from the information sheet for participants in the research project and I agree to voluntarily participate in the research project.

I have received a copy of the consent form that I signed and dated, along with an information sheet for research participants. This is before signing the consent form to conduct this research. I was explained by the researcher about the purpose of the research. The duration of the research, research methods, dangers or symptoms that may arise from the research. or from the medicine used Including the benefits that will arise from the research and guidelines for treatment by other methods in detail I have had enough time and opportunity to ask questions until I have a good understanding. The researcher answered various questions willingly and without concealment until I was satisfied.

I have the right to terminate my participation in the research project at any time. There is no need to inform the reason. and termination of participation in this research It will not affect treatment or other rights that I will continue to receive.

The researcher guarantees that my personal information will be kept secret. and will be disclosed only with my consent. Other persons on behalf of the research sponsoring company Human Research Ethics Committee the Food and Drug Administration may be permitted to inspect and process my information. This must be done for the purpose of verifying the accuracy of the information only. By agreeing to participate in this study, I am giving consent to have my medical history reviewed.

I have read the above and have a complete understanding of it. Willing to participate in research willingly. Therefore, signed this consent document.

.....Sign the person giving consent.

(.....) Name of person giving consent

Date .....Month.....Year.....

I have explained the purpose of the research, the research methods, dangers or adverse reactions or risks that may arise from the research. or from the medicine used Including the benefits that will arise from thorough research. Let the participants in the research project named above know and have a good understanding. Ready to sign the consent document willingly

.....

Signed by the researcher

(.....)

Name of researcher in detail

Date .....Month……. Year…….

.....	.....
Witness signature	Witness signature
(.....)	(.....)
Name of witness in detail	Name of witness in detail
Date .....Month….Year…….	Date .....Month……. Year…….

FACTORS RELATED TO AWARENESS OF HPV AND HPV VACCINATION AMONG STUDENTS IN HAINAN UNIVERSITY

Dear Madam / Sir,

Shalom! The purpose of this study is to understand college students' awareness and influencing factors of HPV and HPV vaccine, to provide a theoretical basis for the promotion of HPV vaccine and further promote health. Thank you very much for participating in this survey work. This questionnaire will be answered anonymously. Please choose the most appropriate option or fill in the blanks according to the actual situation. We promise that the information you provide is only used for academic research, please feel free to fill in!

Part I Please fill in or circle the relevant personal information for statistics thank you for your answer

1. Age…Years old

2.Your education level:

① undergraduate degree

② Junior college education

3. Grade:

① freshman ② sophomore ③ junior ④ senior

4. Your subject category:

5. Your household registration place is located:

① City ② Village

6. Father's education level:

① Never received the trial education

② primary school

③ junior high school

④ High school

⑤ junior college or above

7.Mother's education:

①Never received the trial education

② primary school

③ junior high school

④ High school

⑤ junior college or above

8.Your monthly living expenses:

① 800 yuan below

② 800-1200 yuan

③ 1201-1800 yuan

④ 1801-2500 yuan

⑤ More than RMB 2,500 yuan

9. The information on HPV vaccine source:

① TV

② newspaper / magazine

③ Internet

④ Medical provider

⑤ friends / relatives ⑥ other

10. Whether you drink:

① never ② occasionally ③ sometimes ④ often ⑤ always

11.Whether you smoke:

① never ② occasionally ③ sometimes ④ often ⑤ always

12. Do you have regular physical examination:

① Yes ② No

13. Do you have a family history of cancer:

① Yes ② No

14. Have you ever contracted a sexually transmitted disease:

① Yes ② no

15. Do you have a male / girlfriend:

① Yes ② no

Part II

The following is about HPV, please choose what you think is the right answer.

Title	know	unknow
1.HPV is associated with sexual contact		
2.Men are infected with HPV		
3.Most of the HPV-infected persons are almost asymptomatic		
4.Smoking increases the risk of cervical cancer		
5.HPV can be transmitted to partners even in the absence of symptoms of HPV infection		
6.HPV is associated with the development of cervical cancer		
7.HPV vaccination prevents HPV		
8.Premature sex can increase HPV infection		
9.Having multiple sexual partners increases HPV infection		
10.If pregnant women are infected with HPV, cesarean section can prevent neonatal infection		
11.Most patients are asymptomatic after HPV infection, and some patients have skin manifestations of various warts		
12.Irregular vaginal bleeding may be an HPV infection		

Part III

The following is about awareness of the HPV dissemination, please choose what you think is the right answer.

Title	know	unknow
1. Contact to excreta in patients with HPV		
2. Women can transmit the virus to their baby during childbirth		
3. Close contact with the sexual organs of persons infected with HPV		
4. Use of syringes used in HPV patients		
5. Sharing hygiene supplies with HPV-infected patients		
6. The patient's skin had the virus present and had direct contact with the skin of the family members		
7. Share a set of tableware with HPV patients		
8. People with broken oral mucosa kiss with HPV-infected people		

Part IV

The following is about the awareness of HPV prevention, please choose what you think is the right answer.

Title	**Know**	**unknow**
1. Wash the underwear separately and rinse in hot water or disinfectant:		
2.Replace and clean the underwear in time every day		
3.Sanitary products such as towels, bath towels and toothbrushes should be frequently disinfected and isolated		
4. Tub, washbasin and toilet should be scrubbed and disinfected every day		
5.Often drying clothes quilt		
6.Single sexual partner		
7.Clean up before and after sex		
8.Condom use in sex		
9.HPV vaccination		
10.Actively participate in HPV monitoring		

Part V

The following is the awareness of HPV vaccine, please select You think this is the right answer.

Title	know	unknow
1. HPV vaccination can occur prior to sexual debut		
2. HPV vaccination at the age of 9-46 years old		
3. HPV vaccination can against cervical cancer		
4. HPV virus prevented by nine-valent vaccines than bivalent and quadrivalent vaccines More types		
5.HPV screening is also needed after HPV vaccination		
6. Men can also get the HPV vaccination		
7.After the vaccine may appear a short period of fever or skin redness, pain and other symptoms		
8 The HPV vaccine is safe, but may have some side effects		

Appendix B

Validity and Reliability

Part I

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
1. Age ……. years	+1	+1	+1	3	1	/
2. Your education level ( ) Junior college education ( ) undergraduate degree	+1	+1	+1	3	1	/
3.Grade ( ) freshman ( ) sophomore ( ) junior ( ) senior	+1	+1	+1	3	1	/
4.Your subject category…….	+1	+1	+1	3	1	/
5.Your household registration place is located? ( ) City ( ) Village	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
6. Father's education level ( ) Never received the trial education ( ) primary school ( ) junior high school ( ) High school ( ) junior college or above	+1	+1	+1	3	1	/
7.Mother's education ( ) Never received the trial education ( ) primary school ( ) junior high school ( ) High school ( ) junior college or above	+1	+1	+1	3	1	/
8.Your monthly living expenses? ( ) 800 yuan below ( ) 800-1200 yuan ( ) 1201-1800 yuan ( ) 1801-2500 yuan ( ) More than RMB 2,500 yuan	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
9.The information on HPV vaccine source ( ) TV ( ) newspaper / magazine ( ) Internet ( ) Medical provider ( ) friends / relatives ( ) other	+1	+1	+1	3	1	/
10.Whether you drink ( ) never ( ) occasionally ( ) sometimes ( ) often ( ) always	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
11.Whether you smoke ( ) never ( ) occasionally ( ) sometimes ( ) often ( ) always	+1	+1	+1	3	1	/
12.Do you have regular physical examination ( ) Yes ( ) No	+1	+1	+1	3	1	/
13.Do you have a family history of cancer ( ) Yes ( ) No	+1	+1	+1	3	1	/
14.Have you ever contracted a sexually transmitted disease ( ) Yes ( ) No	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
15. Do you have a male / girlfriend ( ) Yes ( ) No	+1	+1	+1	3	1	/

Part II

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
1.HPV is associated with sexual contact ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
2. Men are infected with HPV ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
3.Most of the HPV-infected persons are almost asymptomatic ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
4.Smoking increases the risk of cervical cancer ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
5.HPV can be transmitted to partners even in the absence of symptoms of HPV infection ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
6. HPV is associated with the development of cervical cancer ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
7.HPV vaccination prevents HPV ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
8.Premature sex can increase HPV infection ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
9.Having multiple sexual partners increases HPV infection ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
10.If pregnant women are infected with HPV, cesarean section can prevent neonatal infection ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
11.Most patients are asymptomatic after HPV infection, and some patients have skin manifestations of various warts ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
12.Irregular vaginal bleeding may be an HPV infection ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Part III

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
1.Contact to excreta in patients with HPV ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
2. Women can transmit the virus to their baby during childbirth ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
3.Close contact with the sexual organs of persons infected with HPV ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
4.Use of syringes used in HPV patients ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
5.Sharing hygiene supplies with HPV-infected patients ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
6. The patient's skin had the virus present and had direct contact with the skin of the family members ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
7.Share a set of tableware with HPV patients ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
8.People with broken oral mucosa kiss with HPV-infected people ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Part IV

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
1.Wash the underwear separately and rinse in hot water or disinfectant: ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
2. Replace and clean the underwear in time every day ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
3.Sanitary products such as towels, bath towels and toothbrushes should be frequently disinfected and isolated ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
4.Tub, washbasin and toilet should be scrubbed and disinfected every day ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
5.Often drying clothes quilt ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
6. Single sexual partner ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
7.Clean up before and after sex ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
8.Condom use in sex ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
9.HPV vaccination ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
10.Actively participate in HPV monitoring ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Part V

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
1. HPV vaccination can occur prior to sexual debut ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
2.HPV vaccination at the age of 9-46 years old ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
3.HPV vaccination can against cervical cancer ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
4.HPV virus prevented by nine-valent vaccines than bivalent and quadrivalent vaccines More types ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Question	Comment Scores			Total score	IOC	Summary
	1	2	3			
5.HPV screening is also needed after HPV vaccination ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
6. Men can also get the HPV vaccination ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
7.After the vaccine may appear a short period of fever or skin redness, pain and other symptoms ( ) Know ( ) Unknow	+1	+1	+1	3	1	/
8.The HPV vaccine is safe, but may have some side effects ( ) Know ( ) Unknow	+1	+1	+1	3	1	/

Cronbach's alpha coefficient

Measurement	(Cronbach's alpha coefficient)
Awareness of HPV	**0.875**
Awareness of HPV transmission	**0.832**
Awareness of HPV prevention	**0.767**
Awareness of HPV vaccine	**0.878**

BIOGRAPHY

Name - Surname Ms. Zhang Wanting

Date of birth January, 2001

Current address

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Educational record

Primary school: Huludao city chemical industry four small

Junior high school: Huludao City Junior High School

Senior high school: Huludao City, Lianshan District Century Senior High School

University: Hainan Vocational University of Science and Technology studying

Bachelor's degree Name the institution from which you graduated Hainan Vocational University of Science andTechnology

Work experience

25// August 2023, Hainan Vocational University of Science and Technology

Specify district, province Haikou City, Hainan Province

date Specify the location of the workplace.

25August 2023 Hainan University of Science and Technology (Yunlong Campus), No. 118, Yunding Road, Yunlong Town, Qiongshan District, Haikou City, Hainan Province

Specify district, province Haikou City, Hainan Province