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HPV Vaccination Uptake and Associated Factors among Health Sciences Students at Duy Tan University: A Cross-Sectional Study

Tỷ lệ tiêm vắc-xin HPV và các yếu tố liên quan ở sinh viên khối ngành khoa học sức khỏe tại Đại học Duy Tân: Một nghiên cứu cắt ngang

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Abstract

Human papillomavirus (HPV) is a major cause of cervical cancer and other HPV-related malignancies. Although vaccination is an effective preventive measure, uptake among university students in Vietnam remains limited. This study aimed to describe HPV vaccination status and analyze factors associated with vaccination among students at the College of Medicine and Pharmacy, Duy Tan University. A cross-sectional study was conducted from January to June 2025 among 234 full-time students selected by simple random sampling. Data were collected by direct interview with a structured questionnaire and analyzed in SPSS 20.0 using chi-square tests and multivariable logistic regression. Overall, 66 of 234 students (28.2%) reported having received at least one dose of an HPV vaccine. Among vaccinated students, 71.2% reported having received three doses, and Gardasil 9 was the most frequently reported vaccine (42.4%). Among 168 unvaccinated students, the leading barriers were high cost (50.6%), lack of time (33.9%), and insufficient vaccine information (29.2%); 81.5% intended to be vaccinated. Vaccination was more frequent in female than male participants (36.9% vs 9.5%; p=0.001) and differed by field of study (p=0.001). Prior access to HPV vaccine information was associated with vaccination in bivariate analysis (30.4% vs 5.0%; p=0.016), but was not significant after multivariable adjustment (OR=5.187, 95% CI 0.658-40.894; p=0.118). In the multivariable model, female sex was associated with higher odds of vaccination (aOR=8.864, 95% CI: 3.464–22.685), whereas Dentistry students had lower adjusted odds than Nursing students (aOR=0.153, 95% CI: 0.058–0.401). HPV vaccination coverage among health sciences students was low despite high future vaccination intention. University-based communication, improved access, and measures addressing financial and scheduling barriers may help increase uptake, with particular attention to male students.

Keywords: human papillomavirus, HPV vaccine, vaccination uptake, university students, health sciences students, Viet Nam

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Tóm tắt

Virus gây u nhú ở người (Human papillomavirus, HPV) là nguyên nhân chính gây ung thư cổ tử cung và các bệnh ác tính khác liên quan đến HPV. Mặc dù tiêm chủng là biện pháp phòng ngừa hiệu quả, tỷ lệ tiêm chủng ở sinh viên đại học tại Việt Nam vẫn còn hạn chế. Nghiên cứu này mô tả tình trạng tiêm chủng HPV và phân tích các yếu tố liên quan đến việc tiêm chủng ở sinh viên Trường Y Dược, Đại học Duy Tân. Một nghiên cứu cắt ngang được thực hiện từ tháng 1 đến tháng 6 năm 2025 trên 234 sinh viên hệ chính quy được chọn ngẫu nhiên. Dữ liệu được thu thập qua phỏng vấn trực tiếp bằng bảng câu hỏi cấu trúc và được phân tích bằng phần mềm SPSS 20.0 sử dụng kiểm định chi-bình phương và hồi quy logistic đa biến. Nhìn chung, 66 trong số 234 sinh viên (28,2%) cho biết đã tiêm ít nhất một liều vắc-xin HPV. Trong số các sinh viên đã tiêm chủng, 71,2% đã tiêm đủ ba liều và Gardasil 9 là loại vắc-xin được sử dụng phổ biến nhất (42,4%). Đối với 168 sinh viên chưa tiêm chủng, các rào cản chính bao gồm chi phí cao (50,6%), thiếu thời gian (33,9%) và thiếu thông tin về vắc-xin (29,2%); 81,5% có ý định tiêm chủng. Tỷ lệ tiêm chủng ở nữ giới cao hơn nam giới (36,9% so với 9,5%; p=0,001) và khác biệt theo ngành học (p=0,001). Việc tiếp cận thông tin về vắc-xin HPV trước đó có liên quan đến tiêm chủng trong phân tích hai biến (30,4% so với 5,0%; p=0,016), nhưng không còn ý nghĩa thống kê sau khi hiệu chỉnh đa biến (OR=5,187; KTC 95%: 0,658-40,894; p=0,118). Trong mô hình hồi quy đa biến, nữ giới có chỉ số khả dĩ đã tiêm cao hơn nam giới (aOR=8,864; KTC 95%: 3,464–22,685), trong khi sinh viên ngành Răng Hàm Mặt có odds đã tiêm sau hiệu chỉnh thấp hơn sinh viên ngành Điều dưỡng (aOR=0,153; KTC 95%: 0,058–0,401). Tỷ lệ tiêm chủng HPV ở sinh viên khối ngành sức khỏe còn thấp mặc dù ý định tiêm chủng trong tương lai là cao. Các hoạt động truyền thông tại trường đại học, việc cải thiện khả năng tiếp cận cùng các biện pháp giải quyết rào cản về tài chính và thời gian có thể giúp gia tăng tỷ lệ tham gia, đặc biệt là đối với sinh viên nam.

Từ khóa: virus gây u nhú ở người (HPV), vắc-xin HPV, tỷ lệ tiêm chủng, sinh viên đại học, sinh viên khối ngành khoa học sức khỏe, Việt Nam

1. Introduction

Human papillomavirus (HPV) is a common sexually transmitted infection with more than 200 identified types, including oncogenic types that are causally related to cervical cancer and several anogenital and oropharyngeal cancers. Persistent infection with high-risk HPV types can lead to precancerous lesions and cancer in both females and males [1, 2]. HPV vaccination is therefore an important primary-prevention strategy, and World Health Organization guidance supports vaccination as a key component of cervical-cancer prevention [2].

Vietnam introduced the HPV vaccine through service-based vaccination in 2008, and the Ministry of Health subsequently issued a national action plan for cervical-cancer prevention and control [3]. Nevertheless, vaccination uptake among Vietnamese students has remained modest. Previous Vietnamese studies reported HPV-vaccination uptake of 25.3% among students at the University of Medicine and Pharmacy at Ho Chi Minh City, 35.1% among female students at Can Tho University of Medicine and Pharmacy, and 29.9% among female students at the University of Medicine and Pharmacy, Vietnam National University, Hanoi [4-6]. A study among health sciences students in Da Nang similarly identified incomplete uptake and financial barriers [7].

Students in health-related disciplines are an important population because, as future health professionals, they may influence vaccine counseling and preventive-health behavior. Previous Vietnamese studies have examined HPV vaccination uptake, associated factors, barriers, and future vaccination intention [5,7-12]. Building on this evidence, the present study provides institution-specific data collected in 2025 among male and female students from medicine, dentistry, pharmacy, and nursing at Duy Tan University. By examining vaccination status alongside reported barriers and future intention among unvaccinated students, the study aims to inform university-level vaccination planning. Particular attention is given to differences in uptake between male and female students and to whether low uptake coexists with willingness to receive vaccination. The objectives were to (1) describe self-reported receipt of at least one HPV vaccine dose and (2) examine selected factors associated with vaccination.

2. Materials and methods

2.1. Study design, setting, and participants

A cross-sectional study was conducted at the College of Medicine and Pharmacy, Duy Tan University, from January to June 2025. Participants were selected by simple random sampling from medicine, dentistry, nursing, and pharmacy students enrolled during the 2024–2025 academic year who provided informed consent to participate. Students were selected using categorization by faculty, major, and academic year, then randomly selecting students from each group. Students who declined participation, did not complete the questionnaire or provided questionnaires with prespecified invalidity criteria.

2.2. Sample size and sampling

The sample size was calculated for the primary descriptive objective of estimating HPV vaccination prevalence using the single-proportion formula, $n = Z^2p(1-p)/d^2$. With a 95% confidence level (Z=1.96), an assumed prevalence of 16.5% based on a previous study by Truong Thi Anh Nguyet [7], and an absolute precision of 0.05, the calculated sample size was 211.71, rounded up to 212 participants. This minimum was increased by 10% to accommodate potential nonresponse or unusable questionnaires, resulting in a target of 234 participants after rounding up. For the multivariable analysis, 66 participants reported receipt of at least one HPV vaccine dose. The model presented in Table 4 included five predictor parameters: one for sex, three for the four-category field-of-study variable, and one for prior HPV vaccine information, excluding the intercept.

2.3. Data collection and study variables

Trained student investigators conducted face-to-face interviews in a private setting using a structured questionnaire developed by the research team. Questionnaire development was informed by previous studies of HPV vaccination among Vietnamese university and health sciences students [7, 12]. The research team used the study objectives and the domains addressed in these publications to draft questions on vaccination history, prior HPV vaccine information, reasons for non-vaccination, and future vaccination intention. The wording was adapted to the context of health sciences students at Duy Tan University. Before the main survey, the questionnaire was piloted with 20 students to assess clarity and feasibility, and revisions were made on the basis of the pilot findings. This pilot addressed the practical use and comprehensibility of the questionnaire. Collected variables included sex, age, ethnicity, year of study, field of study, academic performance, current living arrangement, permanent residence, parental education and occupation, family economic status, exposure to HPV vaccine information, information-seeking behavior, willingness to share HPV vaccine knowledge, vaccination status, number of doses, vaccine type, vaccination site, reasons for non-vaccination, and intention to receive the vaccine. Participants reporting receipt of one or more doses were classified as vaccinated, whereas those reporting no HPV vaccine doses were classified as unvaccinated.

2.4. Statistical analysis

Data were entered using EpiData 3.1 and analyzed with SPSS version 20.0. Descriptive statistics were reported as frequencies and percentages for categorical variables and mean ± standard deviation for age. Associations between categorical variables and self-reported receipt of at least one HPV vaccine dose were assessed using chi-square tests. Multivariable logistic regression was used to examine associations between selected independent variables and the same binary outcome, defined as reported receipt

of at least one dose versus no doses. Statistical significance was defined as $p<0.05$.

2.5. Ethics statement

This study was approved by the ethics committee of College of Medicine and Pharmacy (approval no. 2024-09), confidentiality, and procedure for participants.

3. Results

3.1. Participant characteristics and HPV vaccine information exposure

The final analysis included 234 students. The mean age was 20.9 ± 2.4 years; 68.4% were female and 99.1% were of Kinh ethnicity. Second- and third-year students represented 32.1% and 23.9% of the sample, respectively. Medicine accounted for 33.3% of participants, while Dentistry, Nursing, and Pharmacy each accounted for 22.2%. Overall, 91.5% had previously received information about HPV vaccine; 78.6% had actively searched for information, 87.2% were willing to disseminate vaccine knowledge, and 89.3% wanted additional information (Table 1).

Table 1. Selected characteristics of study participants (n=234)

Characteristic	Category	n	%
Sex	Male	74	31.6
	Female	160	68.4
Age	Mean ± SD (years)	20.9 ± 2.4	
	<21 years	114	48.7
	≥21 years	120	51.3
Year of study	Year 1	46	19.7
	Year 2	75	32.1
	Year 3	56	23.9
	Year 4	29	12.4
	Year 5	14	6.0
	Year 6	14	6.0
Field	Medicine	78	33.3
	Dentistry	52	22.2
	Nursing	52	22.2
	Pharmacy	52	22.2
Prior HPV vaccine information	Yes	214	91.5
	No	20	8.5

3.2. HPV vaccination status, vaccine type, and barriers

Sixty-six students (28.2%) reported receipt of at least one HPV vaccine dose, whereas 168 (71.8%) reported no doses (Figure 1). Among the 66 vaccinated students, 47 (71.2%) reported receipt of three doses, 8 (12.1%) reported two doses, 4 (6.1%) reported one dose, and 7 (10.6%) could not recall the number of doses received (Table 2). These dose counts were not interpreted as evidence of completion of a recommended vaccination schedule. Gardasil 9 was reported by 28 vaccinated students (42.4%), whereas 27 (40.9%) could not recall the vaccine type. Private vaccination centers were the most frequently reported vaccination site (62.1%).

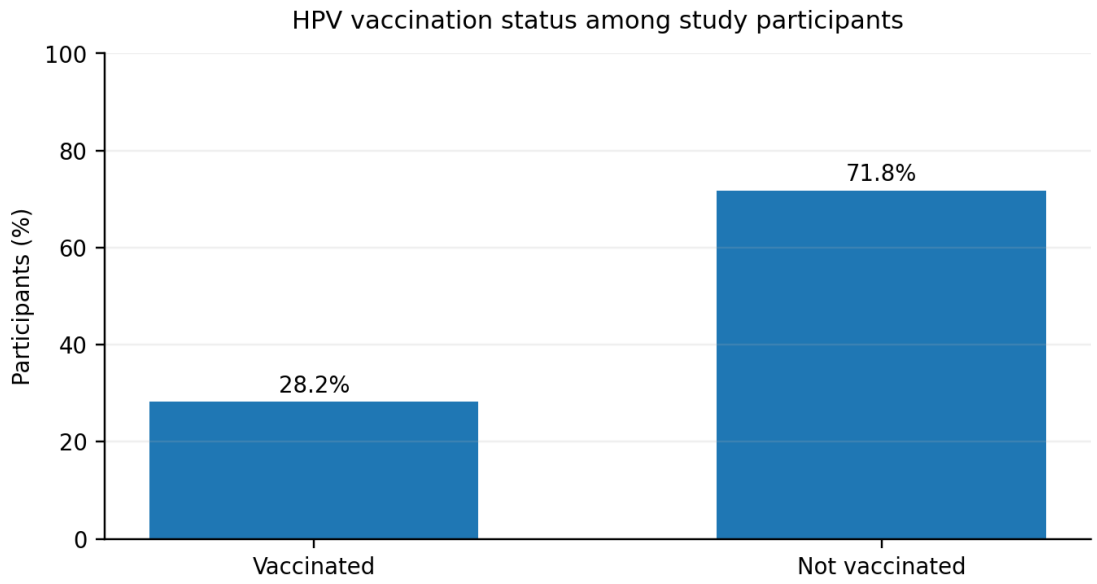


Figure 1. HPV vaccination status among study participants (n=234)

Table 2. HPV vaccination characteristics

Measure	Category	n	%
Doses among vaccinated (n=66)	1 dose	4	6.1
	2 doses	8	12.1
	3 doses	47	71.2
	Could not recall	7	10.6
Vaccine type (n=66)	Cervarix	3	4.5
	Gardasil 4	8	12.1
	Gardasil 9	28	42.4
	Could not recall	27	40.9
Vaccination site (n=66)	Hospital	6	9.1
	Provincial/city CDC	10	15.2
	Reproductive health center	7	10.6
	Private vaccination center	41	62.1

Among the 168 unvaccinated students, the most frequently reported barriers were high cost (50.6%), lack of time (33.9%), insufficient information about the vaccine (29.2%), fear of post-vaccination adverse effects (13.7%), not knowing where to receive vaccination (12.5%), and vaccine unavailability (4.2%). Importantly, 81.5% of unvaccinated students intended to receive HPV vaccine in the future (Figure 2).

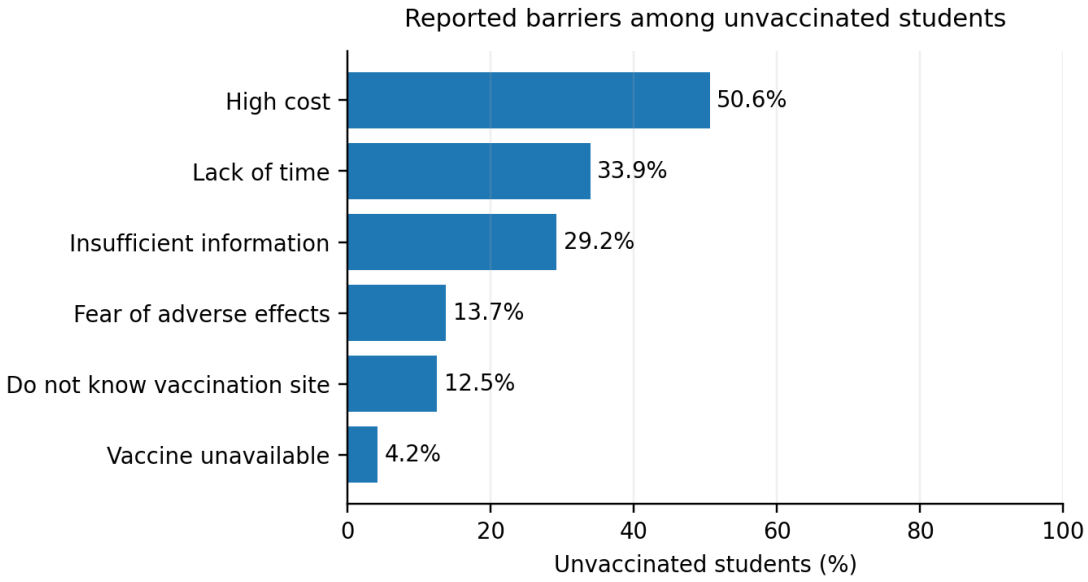


Figure 2. Reported barriers to HPV vaccination among unvaccinated students (n=168)

3.3. Factors associated with HPV vaccination

Vaccination uptake differed significantly by sex: 36.9% of females were vaccinated compared with 9.5% of male (χ^2=18.781, p=0.001). Uptake also differed by field of study (χ^2=15.828, p=0.001), with the highest crude proportion among Dentistry students (50.0%). Age group, year of study, academic performance, and permanent residence were not significantly associated with vaccination. Students who had previously accessed HPV vaccine information had higher uptake than those who had not (30.4% vs 5.0%; χ^2=5.815, p=0.016) (Table 3).

Table 3. Selected bivariate associations with HPV vaccination

Factor	Vaccinated n (%)	Not vaccinated n (%)	p
Male	7 (9.5)	67 (90.5)	0.001
Female	59 (36.9)	101 (63.1)	
<21 years	31 (27.2)	83 (72.8)	0.737
≥21 years	35 (29.2)	85 (70.8)	
Medicine	16 (20.5)	62 (79.5)	0.001
Dentistry	26 (50.0)	26 (50.0)	
Pharmacy	12 (23.1)	40 (76.9)	
Nursing	12 (23.1)	40 (76.9)	
Prior vaccine information: Yes	65 (30.4)	149 (69.6)	0.016
Prior vaccine information: No	1 (5.0)	19 (95.0)	

Variables with p<0.05 in the bivariate analyses were included in the multivariable logistic regression model: sex, field of study, and prior HPV vaccine information. The modeled event was self-reported receipt of at least one HPV vaccine dose. The reference categories were male students, Nursing students, and students without prior HPV vaccine information.

Adjusted odds ratios (aORs) and 95% confidence intervals were reported. In the multivariable model, female students had higher odds of reporting receipt of at least one HPV vaccine dose than male students (aOR=8.864, 95% CI: 3.464–22.685; p<0.001). Dentistry students had lower adjusted odds of vaccination than Nursing students (aOR=0.153, 95% CI: 0.058–0.401; p<0.001), despite their higher crude vaccination proportion. The comparisons of Medicine and Pharmacy with Nursing were not statistically significant. Prior HPV vaccine information was also not statistically significantly associated with vaccination after adjustment (aOR=5.187, 95% CI: 0.658–40.894; p=0.118) (Table 4). aOR, adjusted odds ratio; CI, confidence interval. The modeled event was self-reported receipt of at least one HPV vaccine dose. Estimates were mutually adjusted for sex, field of study, and prior HPV vaccine information.

Table 4. Multivariable logistic regression results as reported in the full research report

Factor	Reference	Adjusted OR	95% CI	p
Female sex	Male	8.864	3.464-22.685	0.001
Medicine	Nursing	0.594	0.239-1.478	0.263
Dentistry	Nursing	0.153	0.058-0.401	0.001
Pharmacy	Nursing	0.911	0.357-2.323	0.845
Prior HPV vaccine information	No prior information	5.187	0.658-40.894	0.118

4. Discussion

4.1. HPV vaccination status among students at the College of Medicine and Pharmacy, Duy Tan University

Overall, only 28.2% of the 234 participants reported having received at least one dose of an HPV vaccine, indicating that HPV vaccination coverage remained relatively low among health sciences students. This finding is noteworthy because medical and health sciences students are expected to have greater exposure to information regarding HPV infection, HPV-related diseases, and preventive measures than the general student population.

The vaccination coverage observed in the present study was comparable with findings from previous studies conducted among health sciences students in Vietnam. Nguyen Hong Khanh reported an HPV vaccination rate of 25.3% among students at the University of Medicine and Pharmacy at Ho Chi Minh City [4]. Similarly, studies conducted among students at the University of Medicine and Pharmacy, Vietnam National University Hanoi, reported relatively low levels of HPV vaccine uptake [6, 12]. In contrast, Duong My Linh reported a vaccination rate of 35.1% among female students at Can Tho University of Medicine and Pharmacy [5]. These differences may reflect variation in study populations, particularly sex composition, as well as differences in access to vaccination services, socioeconomic conditions, awareness, and local vaccination promotion activities. The present outcome was self-reported receipt of at least one dose. Accordingly, the present findings provide additional local evidence rather than demonstrating a change in vaccination coverage over time. Their practical contribution lies in considering uptake together with sex differences, reported barriers, and future vaccination intention within the same university population.

Despite the relatively low overall uptake, adherence among students who had initiated vaccination was encouraging. Among the 66 vaccinated participants, 71.2% reported having received three doses, whereas 6.1% had received one dose, 12.1% had received two doses, and 10.6% could not recall the number of doses received. Gardasil 9 was the most commonly reported vaccine (42.4%), followed by Gardasil 4 (12.1%) and Cervarix (4.5%); however, 40.9% of vaccinated participants could not recall which vaccine they had received. In addition, 62.1% of vaccinated students received their vaccine at private vaccination centers. The predominance of Gardasil 9 may be related to its broader coverage against nine HPV types, including HPV types associated with both malignant diseases and anogenital warts. Nevertheless, the relatively high proportion of students unable to recall the vaccine type suggests that improved documentation and communication of vaccination history may be warranted. The inability to recall vaccine type, together with the inability of 7 vaccinated participants (10.6%) to recall dose number, indicates uncertainty in recalled vaccination details. These findings do not establish that the same participants misreported whether they had ever received an HPV vaccine. Nevertheless, inaccurate recall of vaccination status could lead to outcome misclassification and affect both the estimated uptake and its associations with participant characteristics. An important finding was the coexistence of low current vaccination uptake and high future vaccination intention among students who remained unvaccinated. Although 28.2% of all participants reported receiving at least one HPV vaccine dose, 81.5% of the 168 unvaccinated students expressed an intention to receive vaccination. These percentages have different denominators and should not be interpreted as a numerical measure of an intention–behavior gap. Nevertheless, they indicate that non-vaccination should not be equated with unwillingness to vaccinate. Future vaccination intention has also been reported among unvaccinated female students in Hanoi [12]. The present study adds evidence from a mixed-sex population across four health sciences disciplines at Duy Tan University. Because intention and vaccination history were assessed at a single time point, longitudinal follow-up is needed to determine whether stated intentions lead to subsequent vaccination.

Cost was the most frequently reported barrier to HPV vaccination, cited by 50.6% of unvaccinated students, followed by lack of time (33.9%) and insufficient information about HPV vaccination (29.2%). Other barriers included fear of adverse effects (13.7%), not knowing where vaccination was available (12.5%), and vaccine unavailability (4.2%). Financial barriers to HPV vaccination have also been documented among Vietnamese students. A previous study conducted among health sciences students in Da Nang identified vaccine cost as a major barrier to vaccination [7], while studies in other Vietnamese student populations have reported similar concerns [4, 12]. These findings are particularly relevant in the Vietnamese context, where HPV vaccines have historically been accessed largely through service-based vaccination rather than universal routine vaccination for university students. The combination of relatively high vaccine cost and reliance on private vaccination centers may create a substantial barrier for students who do not have an independent income. The fact that more than four-fifths of unvaccinated students nevertheless intended to receive the vaccine suggests considerable potential for interventions that reduce financial and logistical barriers. University-based vaccination programs, student discounts, installment payment options, vaccination campaigns conducted on campus, and flexible vaccination schedules could

therefore facilitate the conversion of vaccination intention into actual uptake. Insufficient information also deserves attention. Although health sciences students may be expected to have better health knowledge, previous studies have demonstrated persistent gaps in HPV-related knowledge among young adults and students [11, 13, 14]. Blödt et al. reported gaps in HPV awareness and vaccine-related knowledge among young adults [13]. Therefore, simply studying in a health-related discipline should not be assumed to ensure adequate knowledge or appropriate preventive behavior. Structured education regarding HPV transmission, HPV-related diseases in both sexes, vaccine indications, vaccination schedules, safety, effectiveness, and available vaccination services should be incorporated more systematically into health sciences curricula.

The findings show that 28.2% of participants reported receipt of at least one HPV vaccine dose, while 81.5% of unvaccinated participants expressed an intention to receive the vaccine. Among those who reported vaccination, 71.2% reported receipt of three doses; however, this finding does not establish schedule completion or adherence. The reported financial, informational, and logistical barriers identify potential targets for interventions to improve vaccination uptake.

4.2. Factors associated with HPV vaccination

Significant associations were observed for sex, field of study, and access to HPV vaccine information in the bivariate analyses, whereas age, year of study, academic performance, and place of permanent residence were not significantly associated with vaccination status.

Sex was one of the strongest factors associated with HPV vaccination. The vaccination rate among female students was 36.9%, compared with only 9.5% among male students (p=0.001). After adjustment in the multivariable logistic regression model, female students had substantially higher odds of HPV vaccination than male students (OR=8.864; 95% CI: 3.464–22.685; p=0.001). This large sex difference is consistent with the historical framing of HPV vaccination primarily as a strategy for cervical cancer prevention. Consequently, HPV-related communication and vaccination campaigns may have reached females more effectively than male. However, HPV infection and HPV-associated disease are relevant to both sexes. HPV is associated not only with cervical cancer but also with anal, penile, oropharyngeal, and other HPV-related diseases [1, 15]. The markedly low vaccination uptake among male students in this study therefore represents an important prevention gap. Communication strategies targeting university students should explicitly emphasize the benefits of HPV vaccination for males as well as females and should avoid presenting HPV vaccination solely as a cervical cancer prevention measure. Reviews of barriers to HPV vaccination among boys and young men have similarly emphasized the importance of awareness, recommendation, and access in improving vaccine uptake [8].

Field of study was also significantly associated with vaccination status in the bivariate analysis (p=0.001). The highest crude vaccination rate was observed among Dentistry students (50.0%), compared with 23.1% among Pharmacy students, 23.1% among Nursing students, and 20.5% among Medicine students. This variation may indicate differences in exposure to HPV-related information, perceived susceptibility, peer influences, or curriculum content across academic disciplines. These findings support the need for standardized HPV education across all health sciences programs rather than assuming that students from different disciplines receive equivalent exposure to vaccination information.

Dentistry students had a higher crude vaccination proportion than Nursing students (50.0% versus 23.1%), whereas the reported adjusted association was in the opposite direction (aOR=0.153, 95% CI: 0.058–0.401). Crude proportions and adjusted odds ratios represent different comparisons. Therefore, their directions need not necessarily agree. Differences in the distribution of sex and prior HPV vaccine information across fields of study could contribute to this reversal. Sparse observations within combinations of these characteristics may also affect the stability of the adjusted estimates. The adjusted estimate for Dentistry should therefore be interpreted cautiously and should not be taken as evidence that studying Dentistry reduces vaccination uptake.

Access to HPV vaccine information was another relevant factor. Among students who had accessed HPV vaccine information, 30.4% had been vaccinated, compared with only 5.0% among those without such access, and the bivariate association was statistically significant (p=0.016). This finding supports the role of health information in facilitating vaccination decisions. Previous evidence has similarly suggested that knowledge and understanding of HPV and the benefits of vaccination are important factors influencing vaccine acceptance [16]. Information access may increase awareness of personal susceptibility, vaccine effectiveness, recommended schedules, and available vaccination services, thereby facilitating informed decision-making.

However, after adjustment for other variables, access to information did not remain statistically significant (OR=5.187; 95% CI: 0.658–40.894; p=0.118). The point estimate remained relatively large, but the very wide confidence interval indicates considerable statistical uncertainty. This may reflect the small number of participants who had not accessed HPV-related information and limited statistical power for estimating an independent association. Accordingly, access to information should not be described as an independent predictor based on the current multivariable model. Rather, the findings suggest a potentially important association that warrants further investigation in studies with larger samples.

The role of information is also relevant because students increasingly obtain health information through digital media. The full research report noted that 75.6% of participants obtained HPV vaccine information through media channels, particularly the Internet. Digital platforms may therefore provide an effective channel for university-based HPV interventions, although the quality and accuracy of online information remain important concerns. Evidence from qualitative research also indicates that knowledge, perceptions, and understanding of HPV vaccination can influence vaccination decisions [16]. Thus, university communication should prioritize evidence-based information delivered through channels commonly used by students.

In contrast, age, year of study, academic performance, and permanent residence were not significantly associated with HPV vaccination in this study. For example, vaccination prevalence was 27.2% among students younger than 20 years and 29.2% among those aged 21 years or older (p=0.737), and no significant difference was found across years of study (p=0.663). These findings suggest that demographic or academic progression alone may not be sufficient to promote HPV vaccination. Instead, more proximal factors, particularly sex-specific perceptions, access to appropriate information, and practical barriers such as cost and convenience, may be more relevant to vaccination behavior in this population.

Overall, the findings addressing the second objective suggest that HPV vaccination among health sciences students is shaped by a combination of demographic, educational, and informational factors. In the multivariable model, female sex was associated with higher odds of vaccination, while Dentistry was associated with lower adjusted odds than Nursing. These associations are conditional on the variables included in the model and should not be interpreted causally. Access to information was significantly associated with vaccination in bivariate analysis but did not remain statistically significant after adjustment. These results support interventions that are sex-inclusive, accessible across all health sciences disciplines, and supported by reliable vaccine information, while simultaneously addressing the financial and logistical barriers identified under the first study objective.

Based on the study findings, the university should strengthen multi-channel HPV education, integrate HPV prevention and vaccine counseling more deeply into health sciences curricula, and consider partnerships that reduce vaccination cost and facilitate on-campus or conveniently scheduled vaccination. Faculty members can reinforce evidence-based counseling, particularly for male students and groups with lower uptake. Students should be encouraged to use reliable health-information sources and complete recommended vaccination schedules. Public-health authorities may also consider broader communication and financial-access strategies for eligible young adults.

The study included students from four health sciences disciplines and achieved the target sample size for the primary descriptive objective. It also examined both vaccination status and actionable barriers among unvaccinated students. However, the cross-sectional design does not establish causality. Vaccination history, vaccine type, and other information were self-reported and may be affected by recall or social-desirability bias; 40.9% of vaccinated students could not recall the vaccine type. The questionnaire was self-developed, which may limit measurement validity and comparability with other studies. The study was conducted at a single university, limiting generalizability. Finally, some adjusted estimates were imprecise, particularly that for prior HPV vaccine information. Sparse observations within covariate combinations may affect estimate stability, and residual confounding cannot be excluded.

5. Conclusions

Among students at the College of Medicine and Pharmacy, Duy Tan University, 28.2% reported receipt of at least one HPV vaccine dose. Among these vaccinated students, 71.2% reported receipt of three doses, which should not be interpreted as verified completion of a recommended vaccination schedule. Gardasil 9 was the most frequently reported vaccine type. High cost, lack of time, and insufficient information were the principal barriers among unvaccinated students, although 81.5% intended future vaccination. Female sex was associated with higher odds of vaccination after adjustment. Although Dentistry students had higher crude uptake than Nursing students, the adjusted association was in the opposite direction. Prior HPV vaccine information was associated with vaccination in the bivariate analysis but not statistically significant after adjustment. These findings should be interpreted as observational associations rather than causal effects. Interventions should combine accurate communication with practical measures to improve affordability and convenience, and should explicitly include male students.

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