Do Male University Students Know Enough About Human Papillomavirus (HPV) to Make Informed Decisions About Vaccination?

Shuai Wang
Bingfeng Han
Yongmei Wan
Jiang Liu
Tianshuo Zhao
Hanyu Liu
Fuqiang Cui

Background: The aim of this study was to evaluate the awareness of human papillomavirus (HPV), knowledge of HPV-associated diseases, as well as willingness to undergo HPV vaccination among male university students in China, especially factors influencing vaccination willingness.

Material/Methods: We conducted a cross-sectional study among university students in Beijing, Tianjin, and Hebei, China by using a convenience sampling method. We assessed a) the awareness of HPV, b) knowledge of HPV-associated diseases, c) willingness to undergo HPV vaccination, and d) sexual behaviors among male university students.

Results: A total of 1274 male university students aged 16 to 26 years old were recruited to complete a self-administered questionnaire. In total, 39.6% of students had awareness of HPV. Among students who were aware of HPV, the percentage of participating students who knew that HPV causes cervical cancer, genital warts, penile cancer, anal cancer, and oropharyngeal cancer were 94.0%, 66.1%, 32.7%, 20.4%, and 18.7%, respectively. In total, 79.0% knew that men can acquire HPV; 38.7% were willing to receive HPV vaccination. Age, region, and major were related to the awareness of HPV. In addition, students who had previous sexual experiences had more knowledge about HPV and were more likely to express willingness to vaccinate.

Conclusions: Male university students do not know enough about HPV infection, and males’ attitudes regarding vaccination are not sufficient. Education should be provided to promote awareness of HPV-associated diseases and vaccination.

MeSH Keywords: Attitude • Awareness • Papillomavirus Vaccines • Students • Young Adult

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**Background**

Human papillomavirus (HPV) infection is one of the most commonly encountered sexually transmitted infection (STI) worldwide [1]. HPV can be divided into high-risk and low-risk types according to its malignant potential [2]. Low-risk HPV types generally cause genital warts, while high-risk HPV types are associated with several cancers in different areas of the body, including cervical cancer, anal cancer, vaginal cancer, penile cancer, and oropharyngeal cancer, which together are responsible for 630,000 new cases of cancer per year worldwide [3–5]. Of these diseases, cervical cancer is the most common HPV-associated disease in females [6]. However, it cannot be neglected that HPV infections also remain common in males. According to the results of a population-based study, the prevalence of HPV infection among males in China is 10.5% [7]. HPV concordance levels are high among heterosexual couples, therefore infected males also put their female partners at increased risk of cervical cancer [8].

HPV vaccination is safe and highly effective against targeted HPV types and reduces the burden of HPV-associated diseases [9,10]. However, the HPV vaccine has not yet been approved for males in mainland China. A successful vaccination program depends on the population having adequate HPV-associated knowledge [11].

A number of researchers have investigated the awareness and knowledge of HPV in different populations and their willingness to undergo HPV vaccination [12–14]. Generally, limited HPV-associated awareness and knowledge were observed in China [15–17]. According to a meta-analysis of 58 studies, the awareness rate of HPV among the Chinese population was 16.0% [15]. However, only limited studies assessing the awareness and knowledge of HPV in young males are available. Tian et al. reported that the level of HPV awareness was 47.6% among men who have sex with men [18]. A study investigated a total of 1004 male university students in Hong Kong, revealing that 66.2% of participants had heard of HPV and 23.3% considered vaccinating for HPV acceptable [19]. While more studies are needed for further analyzing the association between sexual behavior and willingness to undergo HPV vaccination.

Young males at high risk for HPV due to risky sexual behaviors such as short-term partnerships, casual partnerships, and high number of sex partners [20,21]. Therefore, the aim of this study was to assess the awareness of HPV, knowledge of HPV-associated diseases, and willingness to undergo HPV vaccination among Chinese male university students.

**Material and Methods**

**Study area and participants**

This cross-sectional descriptive study was conducted over a period of 4 months from September 2018 to December 2018. Male university students aged 16 to 26 years were included, and foreign students were excluded. A convenience sampling approach was employed to recruit participants for this study from 16 public universities in Beijing, Tianjin, and Hebei, China. This group represented a population with higher education in China.

The survey was conducted using the Wenjuanxing Online Survey System. Students completed the survey using a smartphone application. All potential participating students accessed the questionnaires by scanning the WeChat (a Chinese social media app) QR code. Participants were each supplied a unique IP address to only submit a questionnaire once.

The sample size was assuming a prevalence of 50% for HPV awareness, a 95% confidence interval, and a sample error of 3%; a sample of 1067 was calculated.

**Questionnaires**

A modified questionnaire was adopted according to a study published by Blödt et al. [22]. The questions were structured into 4 sections and included 26 items. The questionnaire was pre-tested with 40 university students, and revisions were made after repeated discussions with experts. The final version of the questionnaire is shown in Supplementary Material.

**Ethical approval**

The study was approved by the Peking University Health Science Center Ethics Committee. Participants were briefly on the purpose of the study. Oral informed consent for participation in the survey was obtained from each university student. All the responses were collected voluntarily, and the information was processed with a high level of confidentiality and anonymity.

**Data analysis**

Data collection was performed by trained research assistants. The Statistical Packages for Social Sciences (SPSS, version 20.0, IBM) was used for all data entry and analyses. All descriptive statistics were presented as proportions. Chi square tests of heterogeneity were used to compare proportions. P-values <0.05 were regarded as statistically significant.
Results

Participants’ characteristics

The demographic characteristics are shown in Table 1. A total of 1274 male university students participated in the study; the mean ± standard deviation (SD) age of participants was 20.4 ± 2.4 years (range 16 to 26 years). Most of participants were Han, which is the main ethnic group in China.

Awareness about HPV

Male university students’ awareness about HPV is shown in Table 1. Before the study, 60.4% (770 out of 1274 students) had never heard of HPV. The main variables influencing HPV knowledge were age, region, and education major. Older participants had higher levels of awareness about HPV than the younger participants (47.8% versus 34.2%, P <0.001). Medical students were more aware than students of other majors. The awareness of students from different regions (northern and southern; urban and rural) were also different. Ethnicity was not related to HPV awareness.

Knowledge about HPV-associated diseases

Among the participants who had heard of HPV, 94.0% (474 out of 504 participants) knew that HPV causes cervical cancer, but only 66.1%, 32.7%, 20.4%, and 18.7% knew HPV can cause genital warts, penile cancer, anal cancer, and oropharyngeal cancer respectively. Regarding transmission route, most students (94.0%) knew that HPV might be transmitted through sex, 73.6% knew about blood transmission, and 32.1% knew that close contact was one of the HPV transmission routes. When asked about whether women can acquire HPV, almost

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Table 1. Male university students’ awareness about HPV based on demographic characteristics.

| Characteristics | Distribution | Total | No. of participants aware of HPV | % | P-value* |
|-----------------|--------------|-------|---------------------------------|---|----------|
| Age (years)     |              |       |                                 |   | <0.001   |
| 16–20           | 774          | 265   | 34.2                            |   |          |
| 21–26           | 500          | 239   | 47.8                            |   |          |
| Ethnicity       |              |       |                                 |   | 0.914    |
| Han             | 1178         | 467   | 39.6                            |   |          |
| Other           | 96           | 37    | 38.5                            |   |          |
| Birth place     |              |       |                                 |   | 0.010    |
| Northern China  | 866          | 364   | 42.0                            |   |          |
| Southern China  | 408          | 140   | 34.3                            |   |          |
| Major           |              |       |                                 |   | <0.001   |
| Arts            | 160          | 60    | 37.5                            |   |          |
| Science         | 162          | 77    | 47.5                            |   |          |
| Engineering     | 424          | 144   | 34.0                            |   |          |
| Medicine        | 172          | 107   | 62.2                            |   |          |
| Economics       | 200          | 71    | 35.5                            |   |          |
| Other           | 156          | 45    | 28.8                            |   |          |
| Total           | 1274         | 504   | 39.6                            |   |          |

* Pearson chi-square test was used for comparing proportions and continuity correction, or Fisher’s exact test was used if appropriate. HPV – human papillomavirus.
all participants (96.2%) answered correctly; however, when asked about whether men can acquire HPV, a smaller portion (79.0%) answered correctly (Table 2).

### Willingness to undergo HPV vaccination

Among all participants, 38.7% (493 out of 1274 participants) reported being willing to undergo HPV vaccination, 12.4% refused to receive the vaccine, and approximately half of them (48.9%) hesitated to receive the vaccine. As shown in Table 3, age, ethnicity, region, and education major were not related to the willingness to undergo HPV vaccination.

In addition, the reasons for refusing vaccination and the measures to promote vaccination were investigated. The most common reasons for denial of the vaccination were “I’m not at risk for getting HPV” (51.9%), “I worry about the safety of vaccine” (40.5%), and “The vaccine has not been widely used” (38.0%). The main measures to promote vaccination among students who hesitated to take the vaccine included “Doctor recommends vaccination” (80.7%) and “The safety and efficacy of the vaccine are confirmed” (75.4%).

The relationship between the knowledge level regarding HPV and the willingness to undergo HPV vaccination are displayed in Table 4. Students who know that HPV infection may lead to penile cancer, anal cancer, and oropharyngeal cancer were more likely to accept HPV vaccination than students who did not have previous knowledge (P<0.05). Similarly, students who knew that HPV could affect males were more likely to uptake of vaccination than students who did not have the relevant knowledge (P<0.001).

### Sexual behaviors of participants

Among male university students, 75.7% of participants (965/1274) had no sexual experience. In total, 24.3% (309/1274) had sexual experience, of whom 64.2% reported that the age of sexual debut was ≤20 years old, only 58.5% reported that a condom was always used during sexual intercourse, and 87.0% reported that the number of sexual partners was ≤3 (Table 5).

In addition, students who had sexual experience had a higher level of awareness of HPV (50.5% vs. 36.1%, P<0.001), and were more likely to express willingness to vaccinate (44.7% vs. 36.8%, P=0.016). The awareness and attitude were negatively associated with the age of sexual debut, number of sexual partners, and condom usage (P>0.05).

### Discussion

Vaccinating males is expected to reduce virus transmission, enhance herd immunity, and prevent HPV-associated diseases in both genders [23]. Higher education is associated with better awareness of health [24]. In our study, we chose male

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**Table 2. Male university students’ knowledge about HPV infection.**

| Variable                  | No. of correct answers (Total=504) | %    |
|---------------------------|------------------------------------|------|
| HPV infection may lead to | Genital warts                      | 333  | 66.1 |
|                           | Penile cancer                      | 165  | 32.7 |
|                           | Anal cancer                        | 103  | 20.4 |
|                           | Oropharyngeal cancer               | 94   | 18.7 |
|                           | Cervical cancer                    | 474  | 94.0 |
| HPV can be transmitted through | Sex                               | 474  | 94.0 |
|                           | Blood                              | 371  | 73.6 |
|                           | Close contact                      | 162  | 32.1 |
| HPV can affect            | Males                              | 398  | 79.0 |
|                           | Females                            | 485  | 96.2 |

HPV – human papillomavirus.
university students as the target population, which has higher education and more knowledge about HPV. The level of knowledge about HPV in the male general population may be lower than the target population. In addition, university age males are potentially the most interested in HPV vaccination and other preventive measures.

Our data showed that 39.6% had previously heard of HPV, and the results were similar to recent studies [19,25–27]. Of note, the awareness rate of HPV vaccines in China are lower than those in some developed countries (e.g., the United States, Italy, and Korea) [28–30]. Among participants who had heard of HPV, the majority correctly recognized that HPV is the cause of cervical cancer (94.0%). However, the relationship between HPV and other cancers, such as penile cancer (32.7%), anal cancer (20.4%), and oropharyngeal cancer (18.7%), is less known. Knowledge about the association of HPV with male cancer types was also low in other studies [19,31,32]. Whether in males or females, HPV is actually a very common infection. However, in our research, 3.8% of the population were unaware that HPV could affect females, and 21.0% were unaware that HPV could affect males. These findings reflect these male university students had poor knowledge about HPV-related diseases. Due to most participating students from national key universities, we can infer that the general male population lacks knowledge of HPV. This knowledge gap should be filled by strengthening HPV-associated health education.

In our study, 38.7% of participants indicated they would agree to be vaccinated, 48.9% were unsure whether they would receive vaccination, and 12.4% refused to be vaccinated. Lower acceptability was found in several studies [33]. The results of a survey conducted in the United States showed that 28.9% of male university students aged 18 to 27 years had...

Table 3. Attitude of male university students towards HPV vaccination based on demographic characteristics.

| Characteristics | Distribution | Total | No. of participants willing to undergo vaccination | % | P-value* |
|-----------------|--------------|-------|-----------------------------------------------|----|---------|
| Age (years)     |              |       |                                              |    |         |
| 16–20           | 774          | 292   |                                              | 37.7| 0.378   |
| 21–26           | 500          | 201   |                                              | 40.2|         |
| Ethnicity       |              |       |                                              |    |         |
| Han             | 1178         | 459   |                                              | 39.0| 0.515   |
| Other           | 96           | 34    |                                              | 35.4|         |
| Birth place     |              |       |                                              |    |         |
| Northern China  | 866          | 327   |                                              | 37.8| 0.327   |
| Southern China  | 408          | 166   |                                              | 40.7|         |
| Birth place     |              |       |                                              |    | 0.065   |
| Urban area      | 682          | 280   |                                              | 41.1|         |
| Rural area      | 592          | 213   |                                              | 36.0|         |
| Major           |              |       |                                              |    | 0.632   |
| Arts            | 160          | 63    |                                              | 39.4|         |
| Science         | 162          | 67    |                                              | 41.4|         |
| Engineering     | 424          | 166   |                                              | 39.2|         |
| Medicine        | 172          | 72    |                                              | 41.9|         |
| Economics       | 200          | 68    |                                              | 34.0|         |
| Other           | 156          | 57    |                                              | 36.5|         |
| Total           | 1274         | 493   |                                              | 38.7|         |

* Pearson chi-square test was used for comparing proportions and continuity correction, or Fisher’s exact test was used if appropriate.

HPV – human papillomavirus.
Table 4. Male university students’ attitude towards HPV vaccination based on HPV knowledge.

| Variable                           | Total | No. of participant willing to undergo vaccination | % | P-value* |
|------------------------------------|-------|--------------------------------------------------|---|----------|
| **HPV infection may lead to**      |       |                                                  |   |          |
| Genital warts                      |       |                                                  |   |          |
| Correct                            | 333   | 185                                             | 55.6| 0.85     |
| Incorrect                          | 171   | 93                                              | 54.4|          |
| Penile cancer                      |       |                                                  |   |          |
| Correct                            | 165   | 102                                             | 61.8| 0.045    |
| Incorrect                          | 339   | 176                                             | 51.9|          |
| Anal cancer                        |       |                                                  |   |          |
| Correct                            | 103   | 67                                              | 65.0| 0.026    |
| Incorrect                          | 401   | 211                                             | 52.6|          |
| Oropharyngeal cancer*              |       |                                                  |   |          |
| Correct                            | 94    | 64                                              | 68.1| 0.006    |
| Incorrect                          | 110   | 214                                             | 52.2|          |
| Cervical cancer                    |       |                                                  |   |          |
| Correct                            | 474   | 262                                             | 55.3| 0.852    |
| Incorrect                          | 30    | 16                                              | 53.3|          |
| **HPV can be transmitted through** |       |                                                  |   |          |
| Sex                                |       |                                                  |   |          |
| Correct                            | 474   | 263                                             | 55.5| 0.575    |
| Incorrect                          | 30    | 15                                              | 50.0|          |
| Blood                              |       |                                                  |   |          |
| Correct                            | 371   | 208                                             | 56.1| 0.542    |
| Incorrect                          | 133   | 70                                              | 52.6|          |
| Close contact                      |       |                                                  |   |          |
| Correct                            | 162   | 584                                             | 53.8| 0.389    |
| Incorrect                          | 342   | 184                                             | 53.8|          |
| **HPV can affect**                 |       |                                                  |   |          |
| Males                              |       |                                                  |   |          |
| Correct                            | 398   | 238                                             | 59.8| <0.001   |
| Incorrect                          | 106   | 40                                              | 37.7|          |
| Females                            |       |                                                  |   |          |
| Correct                            | 485   | 270                                             | 55.7| 0.0252   |
| Incorrect                          | 19    | 8                                               | 42.1|          |
| Total                              | 504   | 278                                             | 55.2|          |

* Pearson chi-square test was used for comparing proportions and continuity correction, or Fisher’s exact test was used if appropriate. HPV – human papillomavirus.
positive attitude toward HPV vaccination [34]. The findings in our study support that there is a clear need for improving the knowledge about HPV infection and the corresponding vaccines among young males, with the goal to reduce HPV-associated diseases burden.

The results indicated university students may not be aware of their risk for HPV or other STIs, and many of them had unprotected sexual behaviors. 51.9% of participants who refused to be vaccinated declared that they were not at risk of HPV infection. When we investigated factors that would increase the willingness among the participants who hesitated to be vaccinated, doctors’ recommendation ranked as the top factor (80.7%). While recommendations to be vaccinated from parents or friends did not seem to have a major impact on vaccination acceptance. Interestingly, participants were more likely to uptake vaccination if they were aware that men were susceptible to HPV infection.

Furthermore, the results showed that among medical students, 62.2% had heard of HPV, significantly higher than other majors; while 41.9% were willing to receive HPV vaccination, no difference from other majors. The difference between awareness of HPV and willingness of vaccination in medical students, suggested that vaccination intention might not be only influenced by the level of medical knowledge, but also by economic, cultural, policy, and other factors.

The results in the study have some limitations. First, because of limited manpower available, we used convenience sampling for data collection. The sample may be not representative of all male students in these study universities; in addition, the results cannot be generalized to other types of colleges in China. Second, this study was reliant on self-reported data. Therefore, responses to sensitive questions may be biased.

**Table 5.** Association of sexual behaviors with awareness about HPV and willingness to undergo vaccination.

| Characteristics          | Total | Awareness about HPV | Willingness to undergo vaccination |
|--------------------------|-------|----------------------|-----------------------------------|
|                          | No.   | %   | P-value* | No.   | %   | P-value* |
| Sexual experience        |       |     |          |       |     |          |
| Yes                      | 309   | 156 | 50.5     | 138   | 44.7 | 0.016    |
| No                       | 965   | 348 | 36.1     | 355   | 36.8 |          |
| Age of sexual debut (years) |   |     |          |       |     |          |
| <20                      | 197   | 99  | 50.3     | 95    | 48.2 | 0.095    |
| >20                      | 110   | 56  | 50.9     | 42    | 38.2 |          |
| Blank**                  | 2     |     |          |       |     |          |
| Number of sexual partners|       |     | 0.234    | 0.058 |     |          |
| ≤3                       | 260   | 126 | 48.5     | 110   | 42.3 |          |
| >3                       | 39    | 23  | 59.0     | 23    | 59.0 |          |
| Blank**                  | 10    |     |          |       |     |          |
| Condom use               |       |     | 0.643    | 0.294 |     |          |
| Always                   | 179   | 92  | 51.4     | 85    | 47.5 |          |
| Not always               | 127   | 61  | 48.0     | 52    | 40.9 |          |
| Blank**                  | 3     |     |          |       |     |          |

* Pearson chi-square test was used for comparing proportions and continuity correction, or Fisher’s exact test was used if appropriate; ** omitted from % calculations. HPV – human papillomavirus.

Conclusions

Male university students in China were not knowledgeable about HPV, and they did not have enough information to make an informed decision about HPV vaccine. There are numerous barriers to HPV vaccination in young adults. Considering the present findings, future research should evaluate interventions that could effectively enhance the awareness and knowledge of HPV-associated diseases, develop strategies to remove barriers to immunization and achieve high level of immunity in the young adult males.
Supplementary Data

Supplementary Material 1. Human papillomavirus (HPV) survey.

**Human papillomavirus (HPV) survey**

1. Personal Characteristics

1.1 Age: __________
1.2 Ethnicity: __________
   - Han
   - Other: __________
1.3 Birth place: __________
   - Urban
   - Rural
1.4 Major:
   - Arts
   - Science
   - Engineering
   - Medicine
   - Economics
   - Other: __________

2. Awareness and Knowledge of HPV Infection

2.1 Have you ever heard of human papillomavirus or HPV?
   - Yes
   - No

2.2 If you checked “Yes”, please answer the following questions

HPV infection may lead to

|                      | Correct | Incorrect |
|----------------------|---------|-----------|
| Genital warts        |         |           |
| Penile cancer        |         |           |
| Anal cancer          |         |           |
| Oropharyngeal cancer |         |           |
| Cervical cancer      |         |           |

HPV can be transmitted through

|                      | Correct | Incorrect |
|----------------------|---------|-----------|
| Sex                  |         |           |
| Blood                |         |           |
| Close contact        |         |           |
| Food and water       |         |           |
| Mosquito bites       |         |           |
| Respiratory droplets |         |           |
HPV can affect

| Male | Correct | Incorrect |
|------|---------|-----------|
| Female | Correct | Incorrect |

3. Attitude towards HPV vaccination

3.1 Are you willing to receive the HPV vaccine if it is licensed for males in mainland China?
- Yes
- No
- Unsure

3.2 If you checked “No”, please answer the following questions

What is the main reason you would NOT want to receive the vaccine?
- I’m not at risk for getting HPV.
- HPV infection causes serious health problems.
- I’m concerned about safety or side-effects.
- The vaccine is not effective.
- The vaccine costs too much.
- The vaccine is not available.
- Other: __________

3.3 If you checked “Unsure”, please answer the following questions

What would prompt you to receive the HPV vaccine?
- Doctor’s suggestion
- Parents’ suggestion
- Friends’ suggestion
- Media’s suggestion
- Health authority’s suggestion
- Other: __________

4. Sexual Behaviors

4.1 Have you had a sexual experience?
- Yes
- No

4.2 If you checked “Yes”, please answer the following questions

What age did you have your first sexual experience?
- ≤20 years old
- >20 years old

How many lifetime sexual partners have you had?
- ≤3
- >3

Condom use frequency?
- Always
- Not always
References:

1. Schiffman M, Doorbar J, Wentzensen N et al: Carcinogenic human papillo-

2. de Villers EM: Cross-roads in the classification of papillomaviruses. Virology,

3. Tommassino M: The human papillomavirus family and its role in carcino-

4. Herrero R, Gonzalez P, Markowitz LE: Present status of human papilloma-

5. de Martel C, Plummer M, Vignat J, Franceschi S: Worldwide burden of can-

6. Cohen PA, Jhung A, Oaken A, Denny L: Cervical cancer. Lancet, 2019;

7. Wei F, Yin K, Wu X et al: Human papillomavirus prevalence and associat-

8. Reiter PL, McRee AL, Kadis JA, Brewer NT: HPV vaccine and adolescent males.

9. Harper DM, DeMars LR: HPV vaccines – a review of the first decade. Gynecol

10. Human papillomavirus vaccines: WHO position paper, May 2017. Wkly

11. Rashid S, Labani S, Das BC: Knowledge, awareness and attitude on HPV,

12. Bianco A, Pileggi C, Iozzo F et al: Vaccination against human papilloma vi-

13. Clark SJ, Cowan AE, Filipp SL et al: Parent HPV vaccine perspectives and the

14. de Martel C, Plummer M, Vignat J, Franceschi S: Worldwide burden of can-

15. Zhang Y, Wang Y, Liu L et al: Awareness and knowledge about human pap-

16. Liu CR, Liang H, Zhang X et al: Effect of an educational intervention on HPV

17. Napolitano F, Gualdieri L, Santagati G, Angelillo IF: Knowledge and attitudes

18. Tian T, Wang D, Papamichael C et al: HPV vaccination acceptability among

19. Cheung T, Lau J, Wang JZ et al: Acceptability of HPV vaccines and associa-

20. Cassidy C, Curran J, Steenbeek A, Langille D: University students’ sexual

21. Kasymova S, Harrison SE, Pascal C: Knowledge and awareness of human pap-

22. Blödt S, Holmberg C, Müller-Nordhorn J, Rieckmann N: Human papillomavi-

23. Crosignani P, De Stefani A, Fara GM et al: Towards the eradication of HPV

24. Hahn RA, Trumpin BI: Education improves public health and promotes health

25. Choi E, Kong J, Lau A, Fong D: Gender and sexual orientation differences in

26. Zou H, Wang W, Ma Y et al: How university students view human papillo-

27. Chiang VC, Wong HT, Yeung PC et al: Attitude, acceptability and knowl-

28. Napolitano F, Napolitano P, Liguori G, Angelillo IF: Human papillomavirus

29. Choi JS, Park S: A study on the predictors of Korean male students’ intention

30. Barnard M, George P, Perryman ML, Wolff LA: Human papillomavirus (HPV)

31. Ortashi O, Raheel H, Khamis J: Acceptability of human papillomavirus vac-

32. Khan TM, Buksh MA, Rehman IU, Saleem A: Knowledge, attitudes, and

33. Ortashi O, Raheel H, Khamis J: Acceptability of human papillomavirus vac-

34. Cooper DL, Zellner-Lawrence T, Mubasher M et al: Examining HPV aware-

35. Baloch Z, Yasmineen N, Li Y et al: Knowledge and awareness of cervical can-

36. Liu CR, Liang H, Zhang X et al: Effect of an educational intervention on HPV

37. Zhang Y, Wang Y, Liu L et al: Awareness and knowledge about human pap-

38. Tommasino M: The human papillomavirus family and its role in carcino-

39. Herrero R, Gonzalez P, Markowitz LE: Present status of human papilloma-

40. Blödt S, Holmberg C, Müller-Nordhorn J, Rieckmann N: Human papillomavi-

41. Kasymova S, Harrison SE, Pascal C: Knowledge and awareness of human pap-

42. Napolitano F, Napolitano P, Liguori G, Angelillo IF: Human papillomavirus

43. Choi E, Kong J, Lau A, Fong D: Gender and sexual orientation differences in

44. Zou H, Wang W, Ma Y et al: How university students view human papillo-

45. Choi JS, Park S: A study on the predictors of Korean male students’ intention