Perception, knowledge and attitude towards Human Papilloma Virus infection and vaccination for cervical cancer prevention among university students

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ABSTRACT

Introduction: Human papillomavirus (HPV) is a major factor for cervical cancer. However, routine HPV vaccination to combat the disease is not widely available in most developing countries, and the uptake is poor. Lack of knowledge or awareness may be a factor. This study assessed the perception, knowledge and attitude of university students toward HPV vaccination and cervical cancer prevention.

Methods and Materials: A cross-sectional survey among 826 students using a validated questionnaire was conducted at Universiti Kebangsaan Malaysia. The convenience sampling technique was used to recruits study subjects. The knowledge score was categorised into poor (score ≤5), moderate (score 6-10) and good (score 11-15).

Results: Sixty-eight percent were aware that persistent HPV infection can lead cervical cancer and 76% had heard about HPV vaccination to prevent cervical cancer. Female students were aware of the role of HPV vaccine against cervical cancer compared to their counterparts (41% vs. 28%, \( p < 0.001 \)). The pool mean total knowledge score was 8.03 (95% Confidence Interval [CI]; 7.83-8.24). Although only 12% of the students perceived themselves as at risk of HPV infection, only 55% had an intention to receive HPV vaccination. Of those who declined HPV vaccination, 36% worried about the side effects, and 28% doubted on its effectiveness. Female students had significantly higher acceptability towards HPV vaccine compared to male (39% vs. 16%, \( p=0.001 \)). Intention to receive HPV vaccine was significantly correlated with the scores for awareness and knowledge of HPV vaccination, student’s perception on their susceptibility and seriousness of HPV infection.

Conclusion: The perception and knowledge of HPV infection and vaccination for cervical cancer prevention was unimpressive. This greatly will contribute to diminish acceptability for the vaccination.

Keywords: Cervical cancer, Human Papilloma Virus, vaccination, knowledge

INTRODUCTION

In Southeast Asia, cervical cancer is the third most common and the second most common cancer in women. 1 Approximately 470,000
new cases of cervical cancer with 233,000 deaths are reported each year. Majoriy of cases (83%) are from the developing countries, and the Asia Pacific region itself accounted for half of the world’s total cervical cancer cases (51.6%) and cervical cancer deaths (50.3%). In Malaysia, the cervical cancer age-standardised incidence rate (ASR) was 15.7 per 100,000 women and is higher than Japan (8.0), Hong Kong (9.6) and Singapore (10.6), but lower than Thailand (19.8), India (30.7) and Cambodia (38.7).

Persistent Human papillomavirus (HPV) infection is the main aetiological factor in the development of cervical cancer. HPV DNAs are identified in more than 99% of cervical cancer. Although over 100 genotypes of HPV have been discovered, only several types notably HPV-16 and HPV-18, are considered to be ‘high risk’ due to their oncogenic potential. HPV infects the basal cells of the cervical epithelium through microtrauma, and in most case, the HPV infection is self-limiting. In persistent infection, the HPV genome modulates the immune system, allowing it to freely proliferate within the cervical cells.

Due to lack of resources and limited coverage, cervical cancer screening programme remains a challenge for most of developing countries. Furthermore, poor awareness among general population reduces uptake of any screening programmes. The prevalence rates of HPV infection among women in the developing countries are relatively higher than those in developed countries. In addition, the oncogenic (high risk) HPV types also predominate in some developing countries including Malaysia.

Published data for the west estimated that 30–60% of all sexually active adults will acquire HPV infection at some point in their lives. The highest incidence of HPV infection is among adult aged between 18 and 28 years, accounting for between 10 and 39%. Despite the high incidence of HPV infection among young women/teenagers, most have poor knowledge about this infection and its consequences. Even among teenagers/young adult who have heard of HPV, misconceptions about the disease, its related conditions, association to cervical cancer, and the usefulness of cervical cancer screening is common. Knowledge level on HPV also varies widely. Dell et al. found only 13% of teenagers in Canada have heard of HPV. In contrast Holcomb et al. reported that 67% have heard of HPV among patients attending university and family practice clinics in the United States. Baer et al. found that despite good awareness of sexually transmitted diseases among both gender of college students, knowledge and awareness of HPV was poor. This study also reported that 96% of teenagers (both gender) have heard of genital warts, but only 4.2% of males and 11.6% of females, were aware that genital warts is caused by HPV.

Realising the potential benefit of HPV vaccination, many countries including Malaysia have introduced HPV vaccination programme which was implemented in 2010. Unfortunately, local data revealed relatively poor knowledge regarding HPV infection, vaccine and its role in cervical cancer prevention among university female students. However, there is still limited data on the perception and knowledge of HPV and cervical cancer among male teenagers/young adults.
Hence this questionnaire study was conducted to assess the perception, knowledge and attitude towards HPV infection, and its vaccine in cervical cancer prevention, among male and female university students.

**MATERIALS AND METHODS**

This questionnaire study recruited 826 students studying at the main campus of Universiti Kebangsaan Malaysia using a convenience sampling method. This study was approved by the institutional ethics committee approval of the University Hospital. Local students aged between 18 to 25-year-old, who attended academic lectures between September and October 2011 were invited to participate in this study. International students and student in the medical field were excluded. Students were given 15 minutes to complete the questionnaire.

The questionnaire was adapted following permission from previous published studies. It consisted of four sections. Section A assessed the socio-demographic background. Section B consisted of 11 close-ended questions assessing students’ perception and knowledge of HPV infection and cervical cancer. This section only required yes or no answers. Section C consisted of seven questions to assess awareness of HPV vaccine which required yes, no or unsure answers. A score of 1 was assigned to a correct answer, and a score of 0 to an incorrect answer in both Section B and C. No score was given for unsure response. The knowledge score was categorised into poor (score ≤5), moderate (score 5.1-10) and good (score ≥ 11). Section D assessed students’ attitude towards HPV vaccine. The data was analysed using SPSS package version 19.

**RESULTS**

Overall 826 students responded from a total of 950 questionnaires distributed, giving a response rate of 86.9%. The gender distribution was almost equal with 443 (54%) female and 383 (46%) male students. The mean age was 20.9 years (SD ± 1.43) for female and 21.1 (SD ± 1.36) for male students (p=0.34). Majority of the participants were Malay (61.1%), followed by Chinese (20.9%), Indian (13.5%) and others (4.5%). Of the 826 respondents, 726 (92.3%) were not sexually active and 64 (7.7%) had previous sexual contact at the time of study.

The mean scores for knowledge of HPV infection and cervical cancer was 5.05 (SD ± 1.99). Female had a higher mean scores compared to their male counterpart (5.18, SD ± 2.00 vs. 4.90, SD ± 1.97) but it was not statistically significant (p=0.692).

Of the 826, 51.7% (n=427) were aware that HPV infection can cause genital warts, and 68.2% (n=563) were aware that persistent infection can cause cervical cancer. Female had a significantly higher knowledge of HPV infection and its association with genital warts and cervical cancer (p=0.006). However, a majority (73.7%, n=609) were not aware that HPV infection was a sexually transmitted disease. There was no statistical difference between both groups (p=0.678).

Altogether, 630 (76.3%) had heard about HPV vaccine: 340 females and 290 males. However, it was not statistically significant different (p=0.728). The most common sources of information on HPV were newspapers (37%), internet (22%), school (7%) and health clinic (7%), magazine (6%), mass
A pool data of both the mean scores (knowledge of HPV infection and cervical cancer, and awareness and knowledge of HPV vaccine) in both genders, revealed a mean scores of 8.04, (SD 3.0) out of 18 total scores. Female had a higher mean scores of 8.16 (SD 3.2) than males (7.9 [SD 2.98]).

Only 97 (11.7%) perceived themselves as vulnerable to HPV infection, and 132 (16%) perceived HPV infection as a serious disease. A total of 452 (54.7%) were willing to be vaccinated against HPV infection (Table 2). The distribution of students who responded to questions regarding perceived susceptibility, perceived seriousness and perceived benefits were significantly different by media (5%) and health brochures (5%). Of those who were not aware of HPV vaccine, a majority (49%) mentioned that they will obtain the information from internet.

A total of 605 (73.2%) students were aware that HPV vaccination was for cervical cancer prevention, significantly more female students (n=341) compared to their male counterparts (p=0.009). The overall mean scores for awareness and knowledge of HPV vaccine was 2.98 (SD 1.57) out of total score of 7 (Table 1): no significant difference in the mean scores between both the genders (2.98 [SD 1.57] versus 2.99 [SD 1.58]) with p value of 0.08.
gender \((p<0.05)\) (Table 2).

Logistic regression analysis revealed that intention to receive HPV vaccine was significantly correlated with the score of knowledge of HPV infection and cervical cancer, and the score for awareness and knowledge of HPV vaccine. Participant’s perception to ‘vulnerability to HPV infection’ was also significantly correlated with knowledge of HPV infection and cervical cancer. However, their perception on ‘HPV infection as a serious disease’ was not significantly correlated with the overall score for knowledge and awareness of HPV infection, and vaccination in cervical cancer prevention. Generally, the total score for knowledge and awareness of HPV vaccine was significantly correlated with students’ intention to accept HPV vaccine. Participants who perceived themselves at risk of HPV infection were more willing to be vaccinated (OR: 5.30; 95% CI 3.00-9.37, \(p<0.01\)). Those who perceived HPV infection as a serious disease also were more likely to accept HPV vaccine (OR: 4.58; 95% CI 2.87-7.30, \(p<0.01\)).

A total of 374 participants declined to receive HPV vaccine. Of those who refused, 136 (36%) were worried of the potential adverse effects, 108 (29%) were considering of the cost, and 106 (28%) were concerned about the effectiveness of protection.
efficacy of vaccine and its side effects, none were willing to be vaccinated (OR: 0.23 95% CI 0.20–0.26, \( p < 0.001 \)). Male were more likely to be concerned about the adverse effects, uncertain effectiveness and high cost (\( p = 0.001 \)) (Table 4).

Logistic regression analysis revealed that doubt of the HPV vaccine efficacy and concern about the adverse effects was significantly associated with the score of knowledge and awareness of HPV vaccine and cervical cancer (Table 5).

**DISCUSSION**

Despite low level of awareness and misconception regarding HPV infection and HPV vaccination, the national HPV vaccination programme has been introduced in Malaysia to all secondary school girls from 13 years and above in 2010. \(^{19}\) It is a new milestone for the government to control and prevent cervical cancer in Malaysia. However focusing this issue on female alone undermines the significance of HPV infection in male and downplays the facts that male are the potential source for HPV virus transmission.

We found that university’s students generally had poor knowledge of HPV infection and HPV vaccination against cervical cancer prevention reflected by the low mean score among female and male students in all categories. The mean scores for ‘knowledge of HPV infection and cervical cancer’ was 5.05 (SD 1.99), ‘awareness and knowledge of HPV vaccine was only 2.99 (SD 1.58) with a total mean scores of 8.04 (SD 3.0). Surprisingly, there was no difference between the genders despite HPV infection is more common in women and cervical cancer is one of the most common cancer among women. Published studies assessing universities students’ knowledge of HPV infection and HPV vaccine also indicated a widespread knowledge deficiency. \(^{18-21}\) In our study, 51.7% participants (30.4% were females and 21.3% were males) were aware that HPV infection cause genital warts, which showed an overall improvement compared to other published data. \(^{18}\)

Approximately 68.2% participants in our study were aware that persistent HPV infection caused cervical cancer, which was relatively lower compared to 91.4% in Lopez et al., 2007. \(^{20}\) However, as expected, this rate has significantly increased compared to 27.2% reported in other local study in 2010. \(^{19}\) This indicates a positive milestone in public education regarding HPV infection, and its relation to cervical cancer among young adults in higher learning institutions.

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**Table 5: Associations between predictor variables and students doubted the HPV vaccine’s efficacy and adverse effects (n=826).**

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<tr>
<th>Predictor variables</th>
<th>Logistic regression</th>
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<tr>
<td></td>
<td>Doubt and worry of HPV vaccine efficacy and adverse effects</td>
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<tr>
<td>Score for Section B: Knowledge of HPV infection and cervical cancer</td>
<td>0.88</td>
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<tr>
<td>Score for Section C: Awareness and knowledge of HPV vaccine</td>
<td>0.92</td>
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<tr>
<td>Total score of Section B and C</td>
<td>0.92</td>
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OR: Odds ratio, CI: Confidence interval
Awareness of HPV among university students in Malaysia has improved increasing from 10.3% \(^ {18}\) to 76.7% within two years. The awareness of HPV vaccine among overall students (male and female) was comparable to students in the United States \(^ {22}\) (Table 6).

In our study, 55% expressed intention to be vaccinated. However, our participants’ interest in receiving HPV vaccine was still lower than the 84% reported in a study from United State. \(^ {24}\) Despite this, there was improvement among female students who wanted to be vaccinated compared to a previous local study. \(^ {19}\) Interestingly, we found that 35% of the studied male students who expressed interest to receive HPV vaccine. A recent review interestingly reported a high acceptability rate of between 74% and 78% of male college students for HPV vaccination for prevention of HPV infections and subsequent sequelae. Despite the lower acceptability rate, it is a good start for an Asian multicultural country to move forward, as a strategy to prevent cervical cancer. Apart from protection against cervical cancer, vaccination may also prevent genital warts in young male and female adults. This positive effect of herd immunity is important in combatting a prevalent disease and this can only be achieved through widespread immunisation. Our results illustrated that the intentions to receive HPV vaccination increase in tandem with increase in knowledge and awareness of HPV infection and vaccine \((p<0.001)\), consistent with findings from other studies. \(^ {22,26-28}\) Hence, more efforts should be made to improve the knowledge and awareness of HPV infection, and its relation to cervical cancer among young adults.

Of concern is the high misconception rates among our student subjects. A large proportion (80.8%) thought that Pap smear will not be necessary after receiving the HPV vaccine among sexually active adult. This is a real concern as Pap smear would still remain an important screening tool for prevention and early detection of cervical cancer. Hence, continuous efforts to promote cervical cancer awareness that includes primary and secondary preventions should be continued, targeting especially young adults, not just in institutions but also at community levels. This poor awareness could be a reason of 26–45% coverage of cervical screening nationwide. \(^ {26}\)

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<th>Table 5: Associations between predictor variables and students perceived HPV infection as a serious disease (n=826).</th>
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<td><strong>Comparison between studies for awareness of HPV vaccine</strong></td>
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<td>Our study, (n = 826)</td>
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<tr>
<td>Wong LP et al., 2010 (^ {18}) (n=650)</td>
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<td>Lenselink et al., 2008 (^ {22}) (n=659)</td>
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<tr>
<td>Gerend et al., 2008 (^ {21}) (n=124)</td>
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<td><strong>Comparison between studies for acceptance of HPV vaccine</strong></td>
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<td>Our study, (n = 826)</td>
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<tr>
<td>Wong et al., 2010 (^ {14}) (n=650)</td>
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<tr>
<td>Lenselink et al., 2008 (^ {21}) (n=659)</td>
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<tr>
<td>Jones et al., 2008 (^ {21}) (n=340)</td>
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The scope of knowledge and misconceptions in HPV is diverse. In our study, only 12% perceived a susceptibility to HPV infection, which is much lower compared to what have been reported from the West with the rate ranging from 21% to 46%. As expected, those who perceived high susceptibility resulted to higher acceptability for the vaccine, consistent to our findings. However in previous studies, the perceived seriousness of HPV infection was not correlated to greater HPV vaccine acceptability. Unlike our current findings, participants who perceived seriousness of HPV infection were more likely to accept vaccination ($p < 0.001$).

Doubts and concerns about the efficacy and adverse effects of HPV vaccine were the most important barrier to the acceptance. This concern is also seen in other parts of the world based on published studies. Use of designated health promotion programmes to educate the public or target population can reduce this doubts and concerns.

In our study, doctors’ recommendation was the most important factor to promote HPV vaccine. A majority of the students (61%) relied on their doctor’s opinion to make decisions for HPV vaccination. Worldwide, vaccine acceptability is higher among young adults who were given recommendation by their physicians. Thus, continued medical education is needed to promote better knowledge of HPV infection and cervical cancer among health care providers. Besides this, wider media coverage and integrated sex education in school syllabus, which is being implemented in western countries will also have positive impact on this issue.

In conclusion, knowledge of HPV infection and cervical cancer is generally low among our university students. Although there has been some improvement of the awareness and knowledge of HPV vaccine, there is still a need for continued health education to promote awareness among young adults in our multi-ethnic community. This should emphasis on the safety and efficacy of the vaccine is the essential key to ensure their acceptability of the vaccine. The importance of routine cervical smear screening must also be highlighted.

REFERENCES


