

## RESEARCH ARTICLE

# Knowledge, Acceptance, and Willingness to Pay for Human Papilloma Virus (HPV) Vaccination among Female Parents in Thailand

Siraporn Kruiroongroj<sup>1</sup>, Usa Chaikledkaew<sup>2,3</sup>, Montarat Thavorncharoensap<sup>2,3\*</sup>

### Abstract

**Background:** This study aimed to examine the level of knowledge, attitude, acceptance, and willingness to pay (WTP) for HPV vaccination among female parents of girls aged 12-15 years in Thailand. **Materials and Methods:** A cross-sectional survey was conducted in eight schools across Bangkok. **Results:** Of 1,200 questionnaires sent out, a total of 861 questionnaires were received. Knowledge regarding the HPV vaccine among parents was quite low. Only half of the parents knew about the link between HPV and cervical cancer while one-third of them knew that the vaccine should be administered to the children before they become sexually active. Nevertheless, vaccine acceptance was high if it was offered for free: 76.9% for the bivalent and 74.4% for the quadrivalent vaccine. The proportion of respondents who were willing to copay for the vaccine if it was not totally free was also high, ranging from 68.9% for the bivalent to 67.3% for the quadrivalent vaccine. No significant difference between bivalent and quadrivalent vaccines in terms of prevalence of acceptance and willingness to pay was found. About one-third of the participants, who were willing to copay for the vaccine if it was not offered for free, indicated that they would copay less than 500 baht (30 baht = approx US\$1) for three doses of bivalent vaccine. **Conclusions:** Substantial effort should be made to educate parents prior to introduction of a national HPV vaccination program. In terms of acceptance, either bivalent or quadrivalent vaccines can be recommended.

**Keywords:** Knowledge - attitude - acceptance - cervical cancer - HPV vaccine - willingness to pay - Thailand

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### Introduction

Cervical cancer is the third most commonly diagnosed cancer and the fourth leading cause of cancer death among females worldwide (Ferlay et al., 2008). The health and economic burden of cervical cancer is substantial. Infection with the human papillomavirus (HPV) is known to be the major cause of cervical cancer. Given the prevalence and burden of cervical cancer, the public health benefits of the HPV vaccine are substantial. At present, two types of vaccine, bivalent and quadrivalent, are available. Both types of vaccine have proven efficacy against HPV types 16 and 18, which are responsible for 70% of cervical cancer cases (National Cancer Institute, 2011). In addition, quadrivalent HPV vaccine also protects against HPV types 6 and 11, which are responsible for genital warts (National Cancer Institute, 2011). Presently, HPV vaccines are either fully funded or partially funded by the government in several countries.

Since HPV vaccines are targeted at young adolescents, parents will obviously play an important role in decision-making regarding their daughters' vaccination (Kilic et

al., 2012). In fact, recent study indicated that adolescent girls also expressed their need for parent's involvement in this decision (Paul et al., 2012). Previous literature has indicated that parental attitudes toward the HPV vaccine are positive (Olshen et al., 2005; Jasper et al., 2011; Chan et al., 2012), while the intention to vaccinate their daughters against HPV and HPV vaccine acceptance is high (Becker-Dreps Eet al., 2010; Oh et al., 2010; Jasper et al., 2011; Chan et al., 2012; Coleman et al., 2012; Ortashi et al., 2014). Nevertheless, limited knowledge of the HPV vaccines was consistently identified in several studies (Mishra et al., 2010; 2012; Alsaad et al., 2012; Chan et al., 2012; Paul et al., 2012; Tonguc et al., 2013). To date, very little is known about the difference between bivalent and quadrivalent vaccines in terms of acceptance.

In Thailand, cervical cancer ranks as the second most frequent cancer among Thai women (WHO/ICO Information Centre on HPV and Cervical Cancer, 2012). The incidence of cervical cancer among Thai women is estimated at 29.2 per 100,000 population per year (WHO/ICO information center on HPV and Cervical Cancer, 2012). Current estimates show that every year

<sup>1</sup>Rural and Local Consumer Health Products Promotion Protection Division, Food and Drug Administration, <sup>2</sup>Social and Administrative Pharmacy Excellence Research (SAPER) Unit, Department of Pharmacy, Faculty of Pharmacy, Mahidol University, Bangkok, <sup>3</sup>Health Intervention and Technology Assessment Program (HITAP), Ministry of Public Health, Nonthaburi, Thailand  
\*For correspondence: [montarat.tha@mahidol.ac.th](mailto:montarat.tha@mahidol.ac.th)

about 10,000 Thai women are diagnosed with cervical cancer, while approximately 5,000 die from the disease (WHO/ICO information center on HPV and Cervical Cancer, 2012). Both types of HPV vaccine (bivalent and quadrivalent) have been approved in Thailand since 2007. Nevertheless, a recent local study suggested that the HPV vaccine was considerably less cost-effective than cervical cancer screening in the Thai context (Praditsitthikorn et al., 2011).

Recently, there has been a substantial effort to include the HPV vaccine in the Thai health insurance scheme coverage. In 2012, the Ministry of Public Health proposed incorporating the HPV vaccine into the national program (Sajirawattanakul and Sarnsamak, 2012). Under the proposed plan, the ministry prepared to allocate approximately 600 million baht (500 baht per dose) to cover approximately 400,000 girls age 12 and over in the country (Sajirawattanakul and Sarnsamak 2012). However, according to a local study conducted by the Health Intervention and Technology Assessment Program (HITAP), the price of the HPV vaccine should not exceed 190 baht per dose in order to be considered cost-effective (Sajirawattanakul and Sarnsamak, 2012).

As it is expected that the HPV vaccine will be included in the Thai public health insurance scheme in the near future, it is worth noting that the effectiveness of such vaccination program depends heavily on acceptance and uptake rate. According to a previous study, even in settings where the HPV vaccine was mandated, many parents were still reluctant to follow the vaccination requirement (Yeganeh et al., 2010; Pitts and Adams 2013). In fact, parents indicated that the decision to vaccinate against HPV should be made by both parents and daughters as opposed to the government (Coleman et al., 2011). Furthermore, many parents indicated that they needed more information on both the HPV virus and the vaccine before making such decision (Rose et al., 2010; Yeganeh et al., 2010; Pitts and Adams, 2013). Thus, to facilitate the development of a proper vaccination program, as well as the development of effective educational materials to increase the acceptance of vaccine, it is essential to understand parents' knowledge, attitude, level of acceptance, and willingness to pay for the HPV vaccine, as well as factors associated with the acceptance and willingness to pay. At present, very little is known about these issues in Thailand (Juntasopeepun et al., 2012).

Our study aims to evaluate the willingness of Thai female parents to vaccinate their daughters against HPV if it is free of charge (acceptance) or if it is not free of charge (willingness to pay), and to examine their current knowledge regarding HPV vaccine and cervical cancer. In our study, differences between bivalent and quadrivalent vaccines in terms of acceptance and willingness to pay were also examined.

## Materials and Methods

A school-based cross-sectional survey using self-administered questionnaires was conducted. Eight secondary schools (2 private and 6 public schools) in Bangkok that had female students aged between 12-15

years old were randomly selected.

The sample size calculated to estimate a prevalence of HPV vaccine acceptance as high as 50% with an error rate of 5% was 384. To account for a low response rate (30%), the sample size was increased to 1,200 persons. Of the total of 1,200, the actual number of questionnaires distributed in each school was then calculated according to the proportion of the total number of eligible students in each school. Female parents of adolescent girls between the ages of 12-15 years living in Bangkok who were able to read and write Thai were eligible for the study. Questionnaires were distributed to eligible respondents via school teachers, along with an information sheet explaining the purpose of the study. Respondents were requested to return the completed questionnaire by dropping it into a return box at the school within 3-7 days. The study was approved by the Institutional Review Board at Mahidol University.

A 42-item self-administered questionnaire was developed. The questionnaire consisted of five parts, as follows: Part 1 included general information and socio-demographic characteristics; Part 2 examined awareness of the HPV vaccine as well as sources of information about HPV vaccine; Part 3 covered knowledge regarding cervical cancer and the HPV vaccine; Part 4 asked about attitudes toward cervical cancer and the HPV. In the final part, acceptance and willingness to pay for bivalent and quadrivalent vaccines were examined after the information on efficacy and safety of vaccine was fully described. Then, prevalence of HPV acceptance was measured based on the response to the following question: "If the vaccine is free, will you vaccinate your daughter against HPV?" The parents who answered "yes" were classified as acceptors, while the ones who answered "no" were classified as non-acceptors. Finally, prevalence of willingness to pay (WTP) for the HPV vaccine was defined as answering "yes" to the following question: "If the vaccine is not fully free and you have to co-pay out of pocket by yourself, will you vaccinate your daughter against HPV?" The follow-up question was: "If so, what is the maximum amount that you will pay to have your daughter vaccinated against HPV?" In this study, offered WTP values ranged from less than 300 baht (30 baht=approx US\$1) to more than 2,000 baht for bivalent vaccine. Respondents who indicated that they were willing to pay for bivalent vaccine were then asked whether they would pay a higher amount for quadrivalent vaccine, and if so, how much more they would pay, choosing from the following specified ranges: <100 baht, 100-500 baht, and >500 baht.

## Results

### *General characteristics of the respondents*

The overall response rate was about 71.7% (861/1,200). Socio-demographic information of the respondents is displayed in Table 1. According to our findings, majority of the respondents (70%) were aware of the HPV vaccine. Hospital/health care providers (66%) were the major sources of information, followed by TV/radio (50%) and newspapers/magazines (38%), respectively.

### Knowledge

Knowledge of the respondents regarding cervical cancer and the HPV vaccine is displayed in Table 2. Only half of the respondent knew that viral infection is the cause of cervical cancer. Less than half (39%) of the respondents knew that vaginal bleeding is a warning sign of cervical cancer. On the other hand, almost all of the respondents (94%) knew that women aged 30 years and older should be regularly screened for cervical cancer, and that early detection of cervical cancer can improve survival time (90%).

Regarding knowledge concerning the HPV vaccine, a substantial percentage of women did not know that some types of HPV vaccine can also provide protection against genital warts (79%), and that the efficacy of the vaccine is different between women with and without sexual experience (72%). About one-third of the respondents correctly answered that the efficacy of the HPV vaccine is not as high as 100%. Slightly less than half of the respondents knew that the efficacy of the vaccine is not life-long. On the other hand, most respondents knew that there is still a need to use a condom after being vaccinated against HPV (74%), and that there is still a need to be regularly screened for cervical cancer once you have been

**Table 1. Socio-demographic Characteristics of the Respondents**

|   | N (%) or mean (SD) |        |
|---|--------------------|--------|
| Relationship to the student (N=861)         |                    |        |
| Mother                                      | 751                | (87.2) |
| Relative/Caregiver                          | 110                | (12.8) |
| Age of respondent (years) (N=681)           | 43.47              | (6.6)  |
| Age of student (years) (N=808)              | 13.72              | (1.3)  |
| Educational level of the respondent (N=852) |                    |        |
| Primary school or lower                     | 132                | (15.5) |
| Secondary school                            | 327                | (38.4) |
| Bachelor's degree or higher                 | 383                | (46.1) |
| Monthly household income (baht)* (N=852)    |                    |        |
| Less than 5,000                             | 38                 | (4.5)  |
| 5,000-9,999                                 | 113                | (13.3) |
| 10,000-29,999                               | 281                | (33.3) |
| 30,000-49,999                               | 173                | (20.3) |
| More than 50,000                            | 247                | (29.0) |
| Family history of cancer (N=834)            | 251                | (30.1) |
| Family history of cervical cancer (N=834)   | 38                 | (4.6)  |

\*30 baht = approx. US\$1

**Table 2. Knowledge Regarding Cervical Cancer and the HPV Vaccine**

|   | N (% correct) |
|---|---------------|
| 1. A family history of cervical cancer is a risk factor of cervical cancer (N = 857)  | 491 (57.3)    |
| 2. Viral infection is the cause of cervical cancer (N = 857)  | 422 (49.2)    |
| 3. The virus that causes cervical cancer can be transmitted through sexual contact (N = 857)  | 512 (59.7)    |
| 4. Having sex at an early age increases the risk for cervical cancer (N = 856)  | 544 (63.6)    |
| 5. Women aged 30 years and older should be annually screened for cervical cancer (N = 861)  | 805 (93.5)    |
| 6. Early detection of cervical cancer can increase the survival rate (N = 861)  | 774 (89.9)    |
| 7. Vaginal bleeding is a warning symptom of cervical cancer (N = 857)   | 332 (38.7)    |
| 8. The HPV vaccine cannot cure cervical cancer, even at an early stage (N = 857)  | 275 (32.1)    |
| 9. Efficacy of the vaccine is different between women with and without sexual experience (N = 859)  | 245 (28.5)    |
| 10. Efficacy of the vaccine in prevention of cervical cancer is not 100% (N = 860)  | 292 (33.9)    |
| 11. Vaccination against cervical cancer is not recommended for women aged 35 years or older, even though they are a high-risk group (N=859) | 362 (42.1)    |
| 12. A condom is still needed even though you have been vaccinated against HPV (N = 860)   | 634 (73.7)    |
| 13. Some types of HPV vaccine can also protect against genital warts (N = 857)  | 182 (21.2)    |
| 14. Efficacy of the HPV vaccine is not lifelong (N = 860)   | 425 (49.4)    |
| 15. Regular screening for cervical cancer is still needed even though you have been vaccinated against HPV (N = 860)                        | 610 (70.9)    |

vaccinated against HPV (71%).

### Attitudes

Most of the respondents (72%) indicated that cervical cancer is a severe disease. About 46% thought that their daughters/girls under supervision were at high risk for cervical cancer in the future. Concerning the HPV vaccine, about 44% of the respondents believed that the vaccine was highly safe. Approximately half of the respondents (55%) perceived that the HPV vaccine was expensive and that all parents should take their daughters to be vaccinated against HPV (48%).

### Acceptance and WTP

HPV vaccine acceptance and WTP are detailed in Tables 3 and 4. For vaccine acceptance, it was found that about 74% to 77% of the respondents expressed their intention to have their daughters or girls under supervision vaccinated against HPV if it was provided by the government at no charge. No significant difference between bivalent and quadrivalent vaccines in terms of prevalence of acceptance was found, as shown in Table 3. The main reason for non-acceptance of both bivalent and quadrivalent vaccines was concern about the HPV vaccines' side effects. Only small number expressed their concerns that vaccine may increase inappropriate sexual behavior. Regarding WTP for the vaccine, about 67%-69% of the respondents indicated that they were willing to pay an extra charge in terms of co-payment for vaccinating their daughters/girls under supervision. The main reason for unwillingness to copay for both bivalent and quadrivalent vaccines was financial limitations (39%-43%). No significant difference between bivalent and quadrivalent vaccines was found in term of prevalence of willingness to pay was identified.

About 32% of those who were willing to copay for

**Table 3. Acceptance of HPV Vaccination and Willingness to Pay (WTP)**

|            |                      | No. (%)    | p value |
|------------|----------------------|------------|---------|
| Acceptance | Bivalent (N=847)     | 651 (76.9) | 0.242   |
|            | Quadrivalent (N=758) | 564 (74.4) |         |
| WTP        | Bivalent (N=636)     | 438 (68.9) | 0.542   |
|            | Quadrivalent (N=639) | 430 (67.3) |         |

**Table 4. Willingness to Pay (WTP) amount for Bivalent and Quadrivalent Vaccine**

|   | No. | (%)    |
|---|-----|--------|
| WTP amount for 3 doses of bivalent vaccine (N=445)  |     |        |
| Less than 300 baht  | 19  | (4.3)  |
| 300-499 baht  | 140 | (31.5) |
| 500-999 baht  | 134 | (30.1) |
| 1,000-1,499 baht  | 77  | (17.3) |
| 1,500-2,000 baht  | 46  | (10.3) |
| More than 2,000 baht  | 29  | (6.6)  |
| WTP amount for quadrivalent vaccine (N=384)   |     |        |
| Similar to bivalent vaccine   | 149 | (38.8) |
| Higher than bivalent vaccine  | 235 | (61.6) |
| Additional amount of WTP for quadrivalent vaccine as compared to bivalent vaccine (N=219) |     |        |
| Less than 100 baht  | 5   | (2.1)  |
| 100-500 baht  | 144 | (61.3) |
| More than 500 baht  | 70  | (29.8) |

the vaccine if it was not offered for free indicated that the amount of willingness to copay for three doses of bivalent vaccine was 300-500 baht (30 baht=approx US\$1), while about 30% indicated that they would pay 500-1,000 baht for three doses of bivalent vaccine. When looking at the amount of WTP for quadrivalent vaccine, it was found that 62% of the respondents indicated that they would pay more for quadrivalent vaccine as compared to bivalent vaccine. For those who indicated that they would pay more for quadrivalent vaccine, 60% indicated that the extra amount was about 100-500 baht.

## Discussion

Consistent with previous studies (Mishra et al., 2010; 2011; Alsaad et al., 2012; Chan et al., 2012; Paul et al., 2012; Tonguc et al., 2013), a lack of knowledge was identified in our study. About half of the parents knew about the link between HPV and cervical cancer, while less than half of them knew about the warning symptoms of cervical cancer. Based on our findings, education material should therefore focus on this particular issue. On the other hand, almost all of the respondents in our study knew that women aged 30 years and older should be regularly screened for cervical cancer and that there is still a need to use a condom and be regularly screened for cervical cancer after being vaccinated against HPV. The high level of knowledge regarding these issues may be the result of previous campaigns about condom use and cervical cancer screening in Thailand (Rojanapithayakorn et al., 1996 Yothasamut et al., 2010). Nevertheless, these issues should also be continually emphasized in the education material related to the HPV vaccine as they are key important issues.

Regarding knowledge related to HPV vaccine, we found that only one-third of the parents knew that HPV vaccine should be administered to the children before they become sexually active. According to the previous studies, many parents, providers and girls indicated that they would wait until the girls were older to get vaccinated (Askelson et al., 2010; Paul-Ebhohimhen et al., 2010; Rose et al., 2010; Hanley et al., 2012; Pitts and Adams, 2013; Madhivanan et al., 2014). Since Thai teens begin to have sex at an early age, and because Thai parents are often not

really aware of their children's sexual behavior and are less likely to discuss sex with their children (Sridawruang, et al., 2010; Fongkaew et al., 2012), education should emphasize on the fact that it is necessary to be vaccinated against HPV at a young age, especially before the onset of sexual activity.

Consistent with previous studies which found that most parents had a high intention to vaccinate their daughters against HPV (Oh et al., 2010; Jaspers et al., 2011; Becker-Dreps et al., 2012; Coleman et al., 2012), our study found that acceptance toward the HPV vaccine was also high. No significant difference between bivalent and quadrivalent vaccine in term of prevalence of acceptance was found in our study. This was inconsistent with a previous study, which found that acceptance of a quadrivalent HPV vaccine was higher than that of bivalent vaccine (Hoover et al., 2000). This may be due to the fact that most respondents in our study perceived that their daughters or girls under supervision were at low risk for genital warts and that genital wart is not a severe disease. Consistent with previous studies (Askelson et al., 2010; Ferris et al., 2010; Juraskova et al., 2011), the perception that the vaccine would encourage inappropriate sexual behavior was unlikely to be a barrier of acceptance while concerning about safety of vaccine was identified as the important reason for non-acceptance among Thai parents (National Cancer Institute 2011; Ortashi et al., 2014).

In term of WTP, we found that many parents indicated that they were willing to pay for the HPV vaccine, as was the case in previous studies (Becker-Dreps et al., 2010; Oh et al., 2010; Hanley et al., 2012). According to the previous studies, the amount of WTP, however, varied widely (Liao et al., 2009; Becker-Dreps et al., 2010; Brown et al., 2010; Oh et al., 2010; Khoo et al., 2011; Poulos et al., 2011; Hanley et al., 2012). Such variation in WTP amounts across studies may be due to characteristic of vaccine given to the respondents, methods used to determine WTP, and socio-demographic characteristics of the respondents. In our study, about 32% and 30% of the respondents indicated that they would be willing to pay 300-500 baht (US\$10-17) and 500-1,000 baht (US\$17-34), respectively, for three whole doses of bivalent vaccine, given that the efficacy of the vaccine was 70% and the duration of coverage at least 6 years. However, it should be noted that the amount of WTP in our study might be underestimated; this may be due to the fact that the amount was derived from a payment scale method, in which the given range can affect the result. To this point, consistent with previous studies in other countries, we can conclude that acceptance toward the HPV vaccine was high (Becker-Dreps et al., 2010; Mishra, 2010; 2011; Coleman et al., 2011; National Cancer Institute, 2011; Chan et al., 2012; Hanley et al., 2012; Ortashi et al., 2014). In term of acceptance, either bivalent or quadrivalent vaccine can be recommended into the national health insurance program. Although the proportion of respondents who were willing to copay for HPV vaccine was quite high suggesting that introduction of copayment may be possible, however, it should be noted that our sample were from Bangkok who have relatively high income level compared to the general population. As income was significantly associated with

the willingness to copay and that financial limitation was identified as the main reason for unwillingness to copay among our sample, introducing copayment may not be an appropriate option as those with low socioeconomic status who are at higher risk will not be able to afford to copay for the vaccine. As knowledge of the parents regarding HPV vaccine was quite low, efforts should be made to educate parents prior to the introduction of a national HPV vaccination program. Based on our findings, an education program should emphasize on the safety and efficacy of the vaccine, the differences in the benefits of the vaccine among women with and without sexual experience, the warning symptoms of cervical cancer, the link between HPV infection and cervical cancer.

Finally, some limitations of our study need to be addressed. Firstly, the samples in our study only reflect female parents from Bangkok. As a result, our findings may overestimate the knowledge level, acceptance, and willingness to pay amount for the HPV vaccine. Secondly, it should be noted that a difference between intention and real behavior might exist. This can also be the case for the willingness to pay response. Further studies addressing actual behavior should be therefore conducted. Besides the above-mentioned limitations, strength of our study is that the respondents were female parents of daughters aged between 12-15 years old, and not women in general. As a result, the knowledge, attitude and intention to vaccinate their daughters are relevant to the actual situation. In addition, to our knowledge the present study is the first to examine the differences between the bivalent and quadrivalent vaccine in terms of both acceptance and willingness to pay.

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