A Predictive Model of Human Papillomavirus Vaccination Intention Among Young Women in Southern Thailand

Sukmadewi, Sopen Chunuan, Kamonthip Wiwattanawongsa, Aris Widayati*

Abstract: Cervical cancer is still a major public health problem worldwide. However, the uptake of human papillomavirus vaccine remains low among college women in Thailand. A cross-sectional and structural equation model to predict the intention to obtain human papillomavirus vaccine by young college women in Thailand was developed and tested. Data were collected from 191 college women aged 18-26 from the non-health sciences who were enrolled in two universities in Southern Thailand. Data collection involved the use of a structured questionnaire, which included demographic information, human papillomavirus and vaccine awareness, attitudes, subjective norms, perceived behavioral control, perceived susceptibility, perceived effectiveness, cost, knowledge of HPV and cervical cancer, and intention to obtain HPV vaccination. The data were analyzed using descriptive statistics and structural equation modeling.

The results showed that, in the modified Model of Human Papillomavirus Vaccination Intention among Young Women, attitudes, subjective norms, perceived behavioral control, and perceived susceptibility of HPV-related disease all had significant and direct effects on the intention to obtain HPV vaccine, and able to explain 38% of the variance. Attitude was found to be the mediator of knowledge about human papillomavirus and cervical cancer, subjective norms, perceived behavioral control and the perceived effectiveness toward the intention to obtain human papillomavirus vaccination. Thus, nurses should take the initiative and make college women more familiar with the human papillomavirus vaccine, promote positive attitudes towards human papillomavirus vaccination and empower college women to take control of their vaccination decision-making.

Pacific Rim Int J Nurs Res 2021; 25(2) 298-311

Keywords: College women, Human papillomavirus, Human papilloma vaccine, Health Belief Model, Structural equation modeling, Theory of Planned Behavior, Thailand

Received 31 May 2020; Revised 29 August 2020; Accepted 8 November 2020

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Introduction

Human papillomavirus (HPV) is a sexually transmitted infection and has been recognized as the leading cause of cervical cancer.[1] Cervical cancer was the cause of women's deaths world-wide with more than 85% of the deaths occurring in low and middle income countries, including Thailand.[2,3,4] The highest HPV prevalence in women with normal cervical cytology is found in young Thai women aged < 25

years.[4] In practice, the highest prevalence of HPV infection is found in the southern region (97.1%) of Thailand.[5] Two sources of HPV vaccines have been approved by the Thai Food and Drug Administration.[6] The vaccines are designed to prevent the most common genotype, HPV-16 (61.5%), identified in cervical lesions in Thailand.[5]

In Thailand, the HPV vaccine is currently recommended for all girls in fifth grade; this will cover all fifth grade students country-wide by 2020.[7] Since the introduction of the HPV vaccine in recent years, the infection rates have decreased.[4] However, Gardasil® is available at a cost of up to 2,464 Baht or 72 USD.[8] In other words, of those eligible to receive it, there are disparities among women receiving the HPV vaccine, yet they are not a target population for the government's free vaccination program.

The HPV vaccine is able to control the HPV-16 or HPV-18 infection with an efficacy of 66%, and the side effects are insignificant.[9,10] Apart from the matter of the vaccine price, the perceptions of the protection provided by the vaccine, the coverage of the vaccination, and perceptions of the disease are crucial elements concerning the vaccine's capacity to reduce the burden of the disease in a community.[11] When the disease is perceived to be significant and visible and the vaccine is perceived to be effective and safe, then the uptake increases.[11]

The HPV vaccination protects a sexually active person.[12] This is because they are unlikely to have been infected with all the types of HPV prevented by the vaccines.[12] The HPV vaccination series for older women should be given according to the 3-dose schedule.[13] The monitoring of the uptake of the HPV vaccination involves repeated measurement at regular intervals over time. Nevertheless, the uptake could be illustrated through intention. However, intention accounts for considerable variance in actual behavior, and the average correlation is 0.50.[14,15] The literature on intention concerning HPV vaccination in Thailand is limited. Two cross-sectional studies have reported on intention with regards to HPV vaccine in North and Northeast Thailand.[16,17] Therefore, this study in Southern Thailand could be beneficial because there is a substantial Muslim population in the south of the country. Accordingly, the aim of this research was to develop and test a hypothetical model to predict the intention of college women to obtain the HPV vaccine.

Conceptual Framework and Literature Review

The Theory of Planned Behavior (TPB) and the Health Belief Model (HBM) were the most prominent health behavioral theories in the literature reviewed.[16-22] In this present study the TPB, the HBM and the Protection Motivation Theory (PMT) were used to develop the initial hypothetical Model of Human Papillomavirus Vaccination Intention Among Young Women (MHPVV-YW). TPB includes the attitudes, the subjective norms and the perceived behavioral controls.[14] The HBM model is made up of the perceived susceptibility and perceived severity, perceived benefits, perceived barriers and cues to action.[23] PMT hypothesizes that self-efficacy, the efficacy of responses and the appraisal of threats can predict intention.[24]

The TPB model suggests that these three constructs can predict intentions with regards to performing behaviors, with the correlation to intention at 0.27 and behavior at 0.39.[14,25] The TPB also notes that knowledge would indirectly affect intention.[26] The first construct, the attitude to obtain HPV vaccination, refers to the feelings of the woman about the idea, and the favorability, usefulness, safety, and pleasantness of the vaccine as well as their desire to obtain the benefits of HPV vaccination. The second construct, the subjective norms about obtaining HPV vaccination, refers to the agreement of the woman concerning the opinions of boyfriends, girlfriends, parents, physicians, public health nurses, best friends and teachers about obtaining the HPV vaccination. The third construct, perceived

behavioral control to obtain HPV vaccination, refers to the identification of the woman concerning her own confidence about obtaining the HPV vaccination and to overcome the obstacles preventing her from obtaining it.

Several studies show that perceived susceptibility and cost have appeared as predictors of intention regarding vaccination.[16,17,21] A survey conducted in the US showed that one of several common reasons mentioned by college women who did not intend to obtain HPV vaccination was the high cost that had to be paid, a cost that involved using their own money.[21] In 2015, Ratanasiripong[17] pointed out that Thai college women gave the lack of perceived susceptibility and cost as reasons for not being vaccinated. The perceived susceptibility of HPV-related disease refers to the understanding on the part of the woman of her low chance of developing genital HPV, cervical cancer and genital warts if they did not obtain HPV vaccination. The cost of HPV vaccination refers to the woman's estimation of the cost which prevents her from obtaining HPV vaccination. Response efficacy was found to be the most important determinant on the part of Canadian college women's intentions.[19] The perception of vaccine effectiveness refers to the recognition by the woman of her ability to protect her health status specifically against genital warts, cervical cancer and HPV infection if she obtained HPV vaccination.

Furthermore, a knowledge of HPV and cervical cancer was added to the conceptual framework. In the interview stage that researchers conducted to construct the conceptual framework in this study, the lack of knowledge of HPV and cervical cancer was commonly mentioned as reasons that hinder participants from obtaining the HPV vaccine. Knowledge of HPV and cervical cancer refers to the understanding of the woman of HPV infections and cervical cancer, and the related behavioral risk factors, causes, prevention and treatment.

From the TPB, the HBM, PMT and literature review, the Model of Human Papillomavirus Vaccination Intention among Young Women (MHPVV-YW) was constructed (**Figure 1**). It was hypothesized that attitudes, subjective norms, and perceived behavioral control to obtaining HPV vaccine, perceived susceptibility to HPV-related disease, and perceived effectiveness of HPV vaccine, all had direct effects on women's intention to obtain the HPV vaccine. Furthermore, knowledge has an indirect effect on intentions to obtain HPV vaccine through attitudes, subjective norms and perceived behavioral control.

Methods

Design: A cross-sectional design was used in this study.

Sample and Settings: Data were obtained from college women aged 18-26 years who attended ten non-health science faculties in two public universities in Southern Thailand. According to the Advisory Committee on Immunization Practices, the HPV vaccine is recommended for females between the ages of 9 to 26 years.[27] Undergraduate students in Thailand usually commence their studies from the age of 18. The participants were selected by the primary investigator (PI) and research assistants through a convenience sampling technique that made it easier to access and recruit participants. This was based on the following inclusion criteria: (1) undergraduate students in a non-health-science faculty; and (2) not having received any HPV vaccine prior to the study. Staff in the research centre or faculties were contacted by the PI and research assistant who coordinated to identify the students who met the inclusion criteria. Later, the data collection was conducted in classrooms or student lounge. According to Bentler and Chou as cited by Kyriazos,[28] 5 to 10 observations per estimated parameter should be included in the sample size in an SEM analysis. As the number of parameters of the variables in this study was 37, a minimum number of 185 participants were required.

Ethical Considerations: After approval was obtained from the Centre for Social and Behavioral Sciences Institutional Review Board, Faculty of Nursing, Prince of Songkla University (Document number ref.: 2018 PSU – St – Qn 004), this university and Songkhla Rajabhat University were authorized as sites for data collection. The participants were informed of the study objectives and procedures and their right to decline to participate or withdraw at any time without penalty. The participants were required to sign an informed consent agreement. In order to maintain ethical principles and the privacy of the participants, all personal information was kept confidential by ensuring the questionnaire sheets and data were anonymous.

Instruments: Data were collected using 10 structured questionnaires. The number of items, response options and reliability of these is presented in **Table 1.** All questionnaires (except demographic information) were developed in English and modified and translated into Thai with permission using the WHO backward translation method,[29] then the content validity was reviewed by 3 experts: a gynaecologist, a pharmacist and a nurse with expertise in health behavior and instrument development. After adjustments and modifications on the second round by these experts, the CVI was 1 for all questionnaires. Detailed items for the construct, except for the knowledge of HPV and cervical cancer questionnaire, are presented in **Table 2.**

Table 1 Overview of the MHPVV-YW questionnaires

Measure	Number of items	Response options	Cronbach's alpha (α)
1. Demographic information	19	NA	NA
2. HPV and HPV vaccine awareness	2	Yes = 1, No = 0	NA
3. Attitudes to obtain HPV vaccination	6	Strongly disagree = 1 Strongly agree = 7	0.93
4. Subjective norms to obtain the HPV vaccination	6	Strongly agree = 1 Strongly disagree = 7	0.87
5. Perceived behavioral control to obtain the HPV vaccination	4	Strongly disagree = 1 Strongly agree = 7	0.89
6. Perceived susceptibility of HPV-related disease	3	Strongly disagree = 1 Strongly agree = 7	0.92
7. Perceived effectiveness of the HPV vaccine	4	Strongly disagree = 1 Strongly agree = 7	0.91
8. Cost of the HPV vaccination	4	Strongly agree = 1 Strongly disagree = 7	0.88
9. Knowledge of HPV and cervical cancer	9	Yes = 1, No = 0 Don't Know = 0	0.71*
10. Intention to obtain HPV vaccination	2	Strongly disagree = 1 Strongly agree = 7	NA

Note. NA = Not applicable, *The Kuder-Richardson 20 (KR-20)

Table 2 Factor loadings for the 27-items on exploratory factor analysis (N = 172)

Items	Factor loadings						
	1	2	3	4	5	6	7
Attitudes to obtain HPV vaccination							
Obtaining vaccine would be favorable to do.	0.87						
Obtaining vaccine would be a good idea.	0.87						
Obtaining vaccine would be useful.	0.85						
Obtaining vaccine is safe.	0.74						
Obtaining vaccine is desirable.	0.65						
Perceived effectiveness of the HPV vaccine							
Being vaccinated leads to certainty about my health status.		0.82					
Being vaccinated would protect me against genital warts.		0.81					
Being vaccinated would protect me against cervical cancer.		0.80					
Being vaccinated would be protect me against viruses that causes cervical cancer.		0.79					
Cost of the HPV vaccination							
I do not get vaccination because I do not have money for vaccination.			0.89				
I do not get vaccination because my university health insurance/ universal health coverage does not pay for the vaccine.			0.88				
I do not get vaccination because the vaccine cost too much.			0.87				
I do not get vaccination because the lack of the coverage of university health insurance.			0.80				
Subjective norms to obtain the HPV vaccination							
If my public health nurse disapproves of my obtaining vaccination, I would...				0.86			
If my physician disapproves of my obtaining vaccination, I would...				0.79			
If my teacher disapproves of my obtaining vaccination, I would...				0.76			
If my best friend disapproves of my obtaining vaccination, I would...				0.73			
If my parents disapprove of my obtaining vaccination, I would...				0.63			
Perceived behavioral control to obtain the HPV vaccination							
I could obtain the vaccine if I wanted to do so.					0.84		
If it is entirely up to me, I would be able to obtain the vaccination.					0.83		
I could overcome obstacles that prevent me from obtaining the vaccine.					0.83		
I am confident that I would be able to obtain the vaccination.					0.63		
Perceived susceptibility of HPV-related disease							
If I do not obtain the HPV vaccine, I have chances of getting cervical cancer.						0.88	
If I do not obtain the HPV vaccine, I have chances of getting genital warts.						0.88	
If I do not obtain the HPV vaccine, I have chances of getting the virus infection.						0.86	
Intention to obtain the HPV vaccine							
I plan to obtain the HPV vaccination.							0.87
I expect to obtain the HPV vaccination.							0.83

Demographic Information Questionnaire. This included age, religion, family income per month, monthly allowance from family per month, parents' occupation, parents' highest educational background, health insurance status, universal health coverage, university health coverage, marital status, and history of smoking.

HPV and HPV vaccine awareness were assessed using the following two items: "Have you ever heard about human papillomavirus or HPV?" and "Have you ever heard about HPV vaccine?" The total score ranges from 0 to 2, and the higher the score, the higher the level of awareness of HPV and HPV vaccine.

Attitude to Obtaining HPV Vaccination Questionnaire. Six items from Ratanasiripong et al.[30] were used for this construct. The total score ranges from 6 to 42, with a higher score indicating a better attitude to obtaining the HPV vaccine.

Subjective Norm to Obtain HPV Vaccination Questionnaire. Two items from Bennett et al.[18] and four items from Wang et al.[31] were used for this construct. The total score ranges from 6 to 42, with a higher total score indicating a greater consistency with subjective norm.

Perceived Behavioral Control to Obtain HPV Vaccination Questionnaire. Four items from Gainforth et al.[19] were used for this construct. An example of the item is "I could obtain the vaccine if I wanted to do so." The total score ranges from 4 to 28, with a higher total score indicating a higher level of perceived behavioral control to obtain HPV vaccination.

Perceived Susceptibility of HPV-related Disease Questionnaire. Three items from Gerend and Shepherd[32] were used for this construct. The total score ranges from 3 to 21, with a higher total score indicating a higher suscpetibility to being infected by HPV viruses and HPV-related diseases if not obtaining HPV vaccination.

Perceived Effectiveness of HPV Vaccine Questionnaire. Four items from Gainforth et al.[19] were used for this construct. The total score ranges from 4 to 28, with a higher total score indicating higher levels of perceived effectiveness of HPV vaccination.

Cost of HPV Vaccination Questionnaire. One item each from Patel et al.[21] and Gerend and Shepherd[32] and two items modified from Donadiki et al.[33] were used for this construct. The total score ranges from 4 to 28, with a higher total score indicating higher levels of cost of HPV vaccination.

Knowledge of HPV and Cervical Cancer Questionnaire. Nine items from Juntasopeepun et al.[16] were used for this construct. An item example is "Having multiple sexual partners increases risk of HPV infection." The total score ranges from 0 to 9, with a higher total score indicating a greater level of knowledge of HPV and cervical cancer.

Intention to Obtain HPV Vaccination Questionnaire. Two items from Ratanasiripong et al.[30] were used for this construct. The total score ranges from 2 to 14, with a higher score indicating a higher level of intention to obtain HPV vaccination.

Data Collection: Data were collected from October to November 2018. The PI asked the head director of each faculty for permission to collect data. The participants were given 30 to 45 minutes to answer the questions and after this the PI or a trained research assistant ensured the completeness of the answers and gave a closing statement.

Data Analysis: Descriptive statistics were used for analyzing the demographic characteristics. The validity of the instrument was analyzed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). These gave the factor loading, the average variance extraction (AVE) and the composite reliability (CR), apart for knowledge of HPV and cervical cancer.

Factor analysis was performed using principal components analysis. The number of factors retained was based on the eigenvalue and clarified with a scree-plot. The eigenvalues exceeding 1 indicated how many factors to retain.[34] An exploratory analysis using Varimax rotation to achieve a simple structure was computed. A method used by Kaiser-Meyer-Olkin (KMO) to measure sampling adequacy and the Bartlett's test of sphericity were conducted. A KMO value

above 0.70 was considered as acceptable for factor analysis.[35] Bartlett's test showed significance, indicating that there were correlations among the questions.[35] A factor loading above 0.60 was used to identify the adequacy of the questions for each factor.[35]

CFA was performed to build the general structural equation model (SEM), estimate the AVE and measure the CR. The root mean square error of approximation (RMSEA) with a 90% confidence interval, comparative fit index (CFI) and chi-square were used. The RMSEA values that were 0.08 or less and CFI values > 0.09 were considered to be indicators of the models with goodness-of-fit. According to Hair's study[36], an acceptable AVE should be >50% with composite reliability ≥ 0.70 to 0.90.

Prior to the SEM analysis, the common method bias (CMB) was calculated using a chi-square test of the comparison and Harman's single factor score. If the Harman single factor score was < 50%, the CMB did not appear in the data. The SEM was used to confirm the causal relationships among multiple variables. The goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), the RMSEA, the normed fit index (NFI), the Turker-Lewis index (TLI), and CFI values at 0.90 or above were considered suitable as indicators. An acceptable value of RMSEA of 0.08 or less was considered to indicate good fit. An additional indication of an excellent fit was $\chi^2/df \leq 2$.

Results

Of the questionnaires distributed, 323 questionnaires were returned. A total of 132 college women were excluded because they: did not sign the inform consent; only answered the demographic questionnaire; failed to follow the directions for answering the questionnaire; had missing answers on a crucial item; reported either had HPV vaccination or were uncertain about their vaccination status. The data from 191 participants were used for the final analysis.

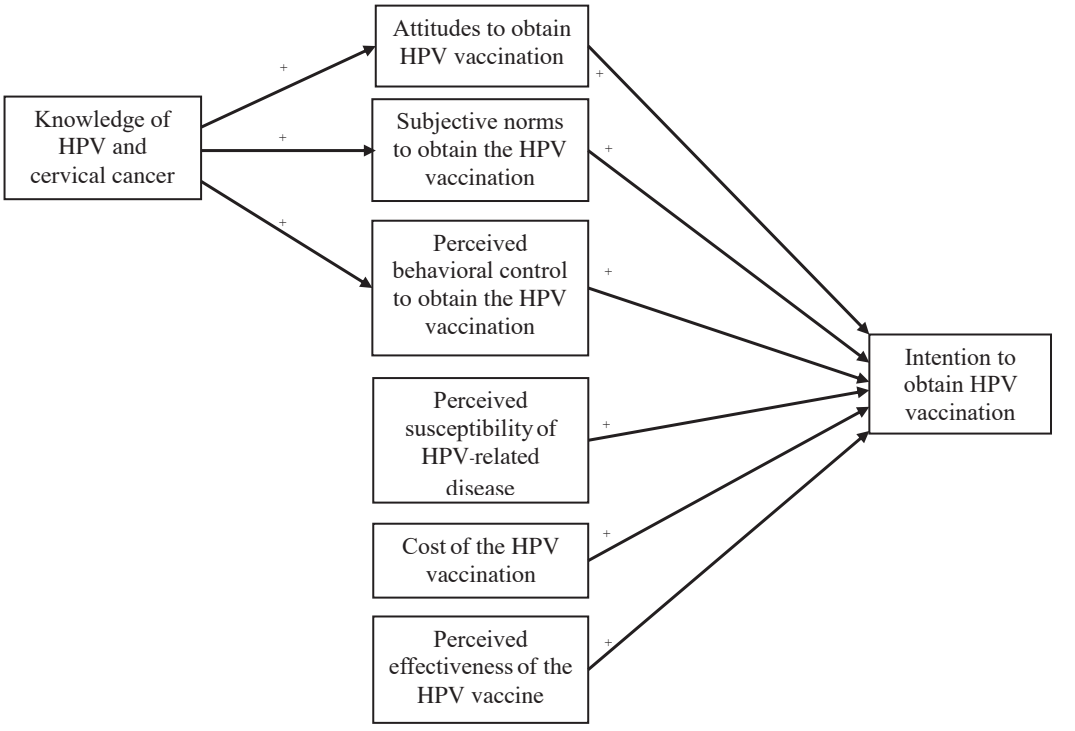
Participants' general characteristics: Of the 191 participants, the mean of their monthly allowance was 4,771.27 THB (115.92 USD). Of the 181 participants who stated their religion, more than half (n = 125, 65%) were Buddhist. A family monthly income of <15,000 THB (364.43 USD) was reported for the majority (n = 60, 32%). The father's occupation was mostly farmer or fisherman (n = 54, 30%), and the mother's occupation was mostly housewife (n = 53, 29%). Most reported that their fathers (n = 78, 43%) and mothers (n = 96, 52%) had graduated from senior high school. Over half had health insurance (n = 109, 57%), universal health coverage (n = 149, 78%) and university health coverage (n = 173, 91%). Almost all had no history of smoking (n = 187, 98%). More than half had heard about HPV (n = 112, 58.64%) and the HPV vaccine (n = 151, 79.06%). Only 18 of the 191 participants were sexually active (n = 9.42%) and, of these, their first experience of sexual intercourse occurred between 16 to 21 years (M = 18.88, SD = 1.41). Only 10 participants had ever used birth control pills (n = 55.56%), and 8 participants used condoms during sexual intercourse (n = 38.89%). None of them had ever had an STI.

Test of instruments' construct validity: Of the 191 participants, the number of participants included in this analysis was 172. Eleven multivariate outliers were detected on the Mahalanobis test ($\chi^2 > 11.07$, df = 5, p = 0.05). Moreover, ten influential cases were detected on the Cook's distance test ($Di \geq 4/n-(k+1)$, k= 5, n = 191). However, two cases detected on the Cook's distance test were also detected on the Mahalanobis test. In total there were 19 cases excluded. The KMO value of 0.85 indicated that the patterns of correlation were relatively compact and the Bartlett's test of sphericity indicated that the correlation matrix did not resemble the identity matrix ($\chi^2 = 4616.52$, df = 406, $p < 0.001$). The investigations of the scree-plot and the eigenvalue showed a seven-factor solution. The value of the seventh component was 1.06. The factor loadings on each item of the construct calculated using EFA are presented in **Table 2.**

Six attitudes about obtaining HPV vaccine items and one item of the subjective norms to obtain HPV vaccine aligned with factor 1. However, one item in the attitude and one in the subjective norm items had a loading factor less than 0.60, meaning that these items were not suitable questions for the factor 1. Therefore, these two items had to be discarded.

In relation to indices of fit of the CFA, the results were a RMSEA of 0.07 (90% CI 0.06, 0.07), and a CFI value of 0.95 and χ^2/df = 1.72. Calculating the AVE showed that each of the constructs had an AVE >50%. The composite reliability of all the constructs were greater than 0.80.

Test of the hypothetical model: The initial MHPVV-YW (**Figure 1**) showed a poor fit to the data with χ^2 = 186.45, p = .000, df = 13, GFI = 0.76, AGFI = 0.35, CFI = 0.48, PGFI = 0.28, NFI = 0.48, and RMSEA = 0.28). Therefore, the MHPVV-YW was modified, based on more suitable modifications and theoretical logic. As a result, the final model produced a good fit to the data.



Note. A positive (+) sign indicated a positive correlation

Figure 1 Conceptual framework of intention to obtain HPV vaccine combining health behavioral theories model

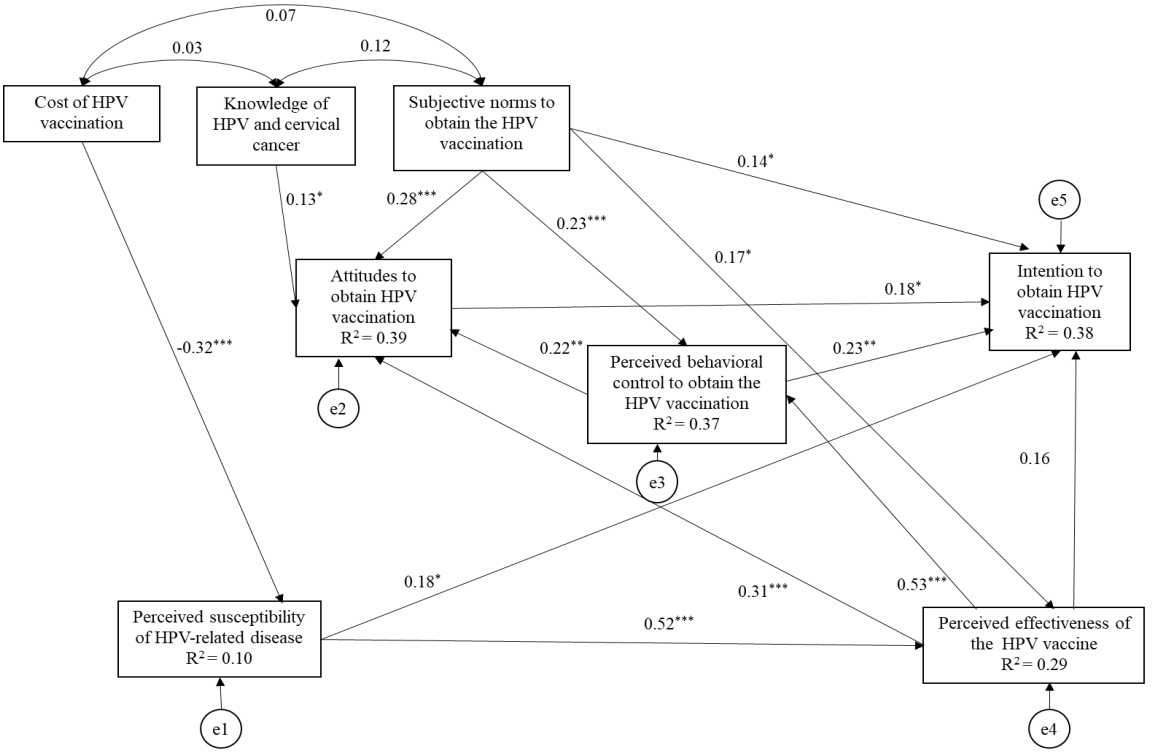
The result of Harman's single factor test showed that the variance of all the constructs in a single latent factor was 35.22%. The chi-square test of the comparison between the unconstrained and fully constrained latent factor model was not significant (difference χ^2 = 9.70; difference df = 6, p > 0.001), which meant that the bias was evenly distributed. SEM analysis confirmed that the chi-square was 15.45 (p = 0.16) and other indicators of fit were as follows: χ^2/df =1.41, GFI = 0.98, AGFI = 0.93, RMSEA = 0.05 (90% CI 0.00, 0.10), NFI = 0.96, TLI = 0.97, and CFI = 0.99. The direct, indirect and

total effects of the variables on the intention to obtain the HPV vaccine are shown in **Table 3.** This also shows, with respect to the intention, the attitudes, the subjective norms and the perceived susceptibility to be significant at less than the 0.05 level. There are eight variables as shown in **Figure 2.**

Table 3 Direct effect, indirect effect, and total effect in the modified MHPVV-YW (N = 172)

Independent variables	Direct Effect	Intention Indirect Effect	Total Effect
1. Attitudes to obtain HPV vaccination	0.18*	-	0.18*
2. Subjective norms to obtain the HPV vaccination	0.14*	0.17*	0.31*
3. Perceived behavioral control to obtain the HPV vaccination	0.23**	0.04**	0.27**
4. Perceived susceptibility of HPV-related disease	0.18*	0.18*	0.36*
5. Perceived effectiveness of the HPV vaccine	0.16	0.19	0.35
6. Cost of the HPV vaccination	-	-0.12***	-0.12***
7. Knowledge of HPV and cervical cancer	-	0.02*	0.02*

Note. *p < 0.05, ** p < 0.01, ***p < 0.001



Note. Standardized estimate on the effect of each variable are shown, *p < 0.05, **p < 0.01, ***p < 0.001

Figure 2 Path Diagram of the Best Fit Model of Human Papillomavirus Vaccination Intention Among Young Women

Discussion

The modified MHPVV-YW fitted with the empirical data, but only partially supported the hypothesis. Prior research suggested that attitudes, subjective norms and perceived behavioral control over HPV vaccination substantially predicted intention.[37] The results of the current study were supported by those mentioned in the prior study. This present study has also shown that perceived susceptibility was significantly and strongly related to the intention to obtain HPV vaccination. There are similarities between the results obtained in this study and those presented in several previous studies.[18,19,22]

Of the predictors in this study, perceived behavioral control had the strongest significant direct effect on the intention to obtain HPV vaccine. The TPB supported these current findings.[14] However, these results are different from those of previous research, which demonstrated that perceived behavioral control did not significantly affect intention to obtain the HPV vaccination.[18,20,30] College women have the confidence to be vaccinated. This might be the result of the characteristics of the participants. As part of their growing experience, college attendance frequently becomes the time they start to accept greater personal responsibility as part of Thai society. Experiencing less intense interaction with their parents would also possibly increase their control over their own decisions.

One possible explanation for the best fit model is the awareness of the participants about HPV and the HPV vaccine. This study confirmed that more than half of the participants were aware of HPV (59%) and the vaccine (75%). This awareness enhanced the importance of the role of perceived behavioral control as a significant direct predictor. According to the TPB, behavioral achievement could be directly predicted by perceived behavioral control and intention if a person is well informed and familiar with a situation.[14] Under such circumstances, perceived behavioral control is realistic and participants could have an accurate perception about the conditions, requirements and resources to get the HPV vaccine.

The findings show that greater perceived behavioral control is associated significantly with a more favorable attitude to obtaining the HPV vaccination. These results also strengthen the notion that perceived behavioral control acts as a mediator of the relationship between attitudes and the intention to obtain the HPV vaccine.[38] When someone is confident about executing a behavior, then the influence of attitude on intention would be stronger when describing behavioral intention. However, in contrast to an earlier finding,[38] our study shows no evidence to support the notion that perceived behavioral control would moderate the relationship between a subjective norm and intention to obtain the HPV vaccination.

In addition, this study has demonstrated that a higher subjective norm leads to better perceived behavioral control, which resulted in greater intention to obtain the vaccine. Subjective norms influence perceived behavioral control through compliance with social pressure. Another unexpected finding was that the subjective norm impacted on the attitude to obtain the HPV vaccine. A subjective norm has a direct effect on the sum of beliefs concerning getting the HPV vaccine through motivation to comply with the expectations of significant others. Furthermore, the construct of perceived susceptibility affected intention through the mediation of the perceived effectiveness of a vaccine. Focussing on the effectiveness of the HPV vaccine may increase a woman's vulnerability to HPV and HPV-related diseases.

In accordance with a statement by Ajzen[26] regarding the role of knowledge as a background factor for intention, the present results demonstrate that knowledge of HPV and cervical cancer is significantly associated with intention and indirectly through the mediation of attitudes. Thus, it is important that HPV prevention in health-education includes an understanding of the relationship between the knowledge of HPV and cervical cancer and the risk factors involving

cervical cancer. Interestingly, a high level of the perceived cost of HPV vaccination did not directly affect the intention to obtain HPV vaccination. In contrast, it had a significant indirect effect on intention through perceived susceptibility.

This study also showed that perceived effectiveness had non-significant direct effects on intention to obtain the HPV vaccine. Moreover, perceived effectiveness influences attitudes and perceived behavioral control, which, in turn, influences the intention of college women to obtain HPV vaccine. When a woman is sure that the HPV vaccine is actually effective, then she will feel that vaccination is something positive and be in full control about getting the vaccination. In turn, she will be motivated to satisfy her needs and will plan to get the vaccine.

In sum, the our findings show that all seven predictor variables explain 38% of variance in intention, which is lower than Bennett's study, which found an exploratory power of intention of 59%.[18] A possible explanation of this result is that the TPB, HBM and PMT were combined in the final MHPVV-YW, whereas the prior research only analyzed the direct relationship.[18] On the other hand, even though the explanatory power of this present study is relative low, this study appraised the direct, indirect and moderating effects for each relationship. This suggests that further research is needed to develop a comprehensive model with greater explanatory power. This study is also significant because it excluded health sciences students and was focused on a group that has less opportunity to obtain health-related information.

Limitations

This study was based on a cross-sectional design, which made it less suitable to draw definite conclusions about causal relationship. The self-reporting questionnaire used might lead to an over-estimation of the significance of the outcomes. The participants were recruited from only one province using convenience sampling; this limits generalizations to other college women in other parts of Thailand.

Conclusions and Implications for Nursing Practice

The significant predictors for intention to obtain HPV vaccines among college women were attitudes, subjective norms and perceived behavioral control to obtain HPV vaccination, and the perceived susceptibility of HPV-related diseases. Therefore, education and the promotion of HPV vaccine awareness should be implemented for all college women. It should focus on their confidence about obtaining the HPV vaccine. In nursing practice, nurses should take the initiative to teach them about HPV, vaccination and related diseases during their visits to student health care centers.

Nursing schools should promote positive attitudes towards HPV vaccination and empower college women to take control of their decision-making regarding vaccination. Significant others should encourage them to take the HPV vaccine. Nurses should explain to college women about HPV-related diseases that could affect them if they were not vaccinated.

Nursing research can provide opportunities to develop educational materials and to evaluate the role of the nurses in delivering these materials when HPV vaccination is undertaken. Further research that focuses on a broader range of participants could be a means of understanding the predictive capacity of the constructs that take cultural differences into account.

Acknowledgments

We are grateful to the participants in this study, and to Thailand's Education Hub for Southern Region of ASEAN Countries' (TEH-AC) scholarship (number TEH-AC 090/2016), and for funding for the research from the Graduate School Prince of Songkla University. We would like to thank Dr. Idsaratt Rinthaisong for assistance with the data analysis.

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แบบจำลองการทำนายความตั้งใจในการรับวัคซีนฮิวแมน แพปพิลโลมาไวรัสของสตรีวัยรุ่นในภาคใต้ของประเทศไทย

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บทคัดย่อ: มะเร็งปากมดลูกยังคงเป็นปัญหาสาธารณสุขที่พบได้ทั่วโลก อย่างไรก็ตามในประเทศไทยการได้รับวัคซีนเอชพีวียังค่อนข้างน้อยในสตรีวัยเรียนระดับมหาวิทยาลัย การศึกษาภาคตัดขวางและโมเดลสมการโครงสร้างได้พัฒนาขึ้นเพื่อทดสอบปัจจัยทำนายความตั้งใจในการรับวัคซีนเอชพีวีในสตรีวัยเรียนของประเทศไทย โดยเก็บข้อมูลในสตรีวัยเรียนที่ไม่ได้ศึกษาสาขาวิทยาศาสตร์สุขภาพ จำนวน 191 ที่มีอายุ 18-26 ปี จากมหาวิทยาลัย 2 แห่งในภาคใต้ เก็บข้อมูลโดยใช้แบบสอบถามที่มีโครงสร้างประกอบด้วย ข้อมูลส่วนบุคคล ความตระหนักต่อเชื้อเอชพีวีและวัคซีนเอชพีวี ทัศนคติ การคล้อยตามกลุ่มอ้างอิง การรับรู้การควบคุมพฤติกรรม การรับรู้โอกาสเสี่ยงของการรับวัคซีนเอชพีวีที่เกี่ยวกับการเป็นโรค การรับรู้ประสิทธิผล ค่าใช้จ่ายของการรับวัคซีนเอชพีวี ความรู้เกี่ยวกับเชื้อเอชพีวีและมะเร็งปากมดลูก และความตั้งใจในการรับวัคซีนเอชพีวี วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาและแบบจำลองสมการเชิงโครงสร้าง (SEM)

ผลการศึกษาพบว่า ปัจจัยทัศนคติ การคล้อยตามกลุ่มอ้างอิง การรับรู้การควบคุมพฤติกรรม การรับรู้โอกาสเสี่ยงของการรับวัคซีนเอชพีวีที่เกี่ยวกับการเป็นโรค มีอิทธิพลโดยตรงต่อความตั้งใจในการรับวัคซีนเอชพีวีอย่างมีนัยสำคัญทางสถิติ สามารถร่วมกันอธิบายความแปรปรวนของความตั้งใจได้ร้อยละ 38 โดยพบว่าทัศนคติเป็นตัวแปรกลางของความรู้เกี่ยวกับเชื้อเอชพีวีและมะเร็งปากมดลูก การคล้อยตามกลุ่มอ้างอิง การรับรู้การควบคุมพฤติกรรม และการรับรู้ประสิทธิผล ต่อความตั้งใจในการรับวัคซีน ดังนั้นพยาบาลควรมีบทบาทในการส่งเสริมให้สตรีวัยเรียนมีความคุ้นเคย มีทัศนคติที่ดีต่อวัคซีนเอชพีวี และช่วยเสริมพลังอำนาจให้สตรีวัยเรียนได้มีการตัดสินใจเลือกรับวัคซีนได้

Pacific Rim Int J Nurs Res 2021; 25(2) 298-311

คำสำคัญ: สตรีวัยเรียน เชื้อเอชพีวี วัคซีนเอชพีวี แบบแผนความเชื่อด้านสุขภาพ โมเดลสมการโครงสร้าง ทฤษฎีพฤติกรรมตามแผน ประเทศไทย

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