

## RESEARCH ARTICLE

# Human papillomavirus Infection and its Vaccines: Knowledge and Attitudes of Primary Health Clinic Nurses in Kelantan, Malaysia

K Jeyachelvi<sup>1</sup>, S Juwita<sup>1\*</sup>, D Norwati<sup>2</sup>

### Abstract

**Background:** Cervical cancer though preventable is still the leading cause of cancer death among women secondary to breast cancer. Persistent infection with HPV has been causally linked to the disease. A school based HPV vaccination program was introduced in late 2010 in Malaysia and nurse support is essential for its success. **Objectives:** To determine nurses knowledge and attitudes about HPV infection and its vaccines, and factors associated with their knowledge. **Materials and Methods:** This cross-sectional study was conducted among nurses working at primary health clinics in Kelantan from mid-June till the end of July 2014. Its involved 330 nurses selected through multistage random sampling. A validated self-administered questionnaire consisting of 11 items for the knowledge domain and eight items for the attitude domain was used. **Results:** The response rate of the study was 93.7%. The mean knowledge and mean attitude (SD) scores were 5.37 (1.76) and 29.8 (3.51) respectively. Only 24% knew that HPV is the most common sexually transmitted infection and 67% correctly answered that Gardasil vaccine can protect against four types of HPV. Nearly 60% of participants wrongly answered that HPV vaccines cannot be offered to sexually active women. Likewise, 70.9% participants were not aware that HPV vaccine may be appropriate for females aged 9 through 26 years. Though 90% of participants believed that the vaccine is safe, nearly half of them were unsure about efficacy. From multiple linear regression analysis, among the factors tested only participant's level of education showed a statistically significant association with the HPV knowledge score ( $p < 0.001$ ). **Conclusions:** This study indicates nurses have favorable attitudes towards HPV vaccination; however they have significant knowledge deficit and major misunderstanding in critical knowledge items. Among the factors tested, nursing qualification is the only factor that is significantly associated with the nurses knowledge score.

**Keywords:** HPV vaccination - primary health clinic - awareness - cervical cancer - Kelantan, Malaysia

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### Introduction

Despite cervical cancer is a highly preventable gynecological cancer, it still takes many women's live around the world. An estimated 80% of cervical cancer deaths take place in the developing countries, including Malaysia (Al-Dubai et al., 2010).

Compared with the major races in Malaysia, Chinese women had the highest incidence of cervical cancer followed by Indian and Malay. Malaysia has 11.4 million women aged 15 years and above who are at risk of developing cervical cancer. Cervical cancer is ranked second most frequent cancer after breast cancer among women between 15 - 44 years of age. Compared to other cancer, the incidence rate is 14.8 in all woman with the age-specific rate of 8.3 per 100 000 population per year. Cervical cancer ranked as 5th cause of female cancer death and 4th leading cause of cancer death among women

age 15 - 44 years of age (ICO HPV Report, 2016). In Kelantan, a state in the East Coast of Malaysia where the population is predominantly ethnic Malay, cervical cancer is the sixth leading cancer after breast and other cancer among women for the period of 2007-2011. It accounted for 5.7% of all female cancers with the age-standardized rate of 3.8 per 100,000 population per year (Kelantan cancer registry 3/2014).

Human papillomavirus is the primary etiology of cervical cancer. Although most people get infected with HPV at some point in their life, most of them do not show any signs or symptoms (Baseman and Koutsky, 2005). Quek et al. (2013) reported HPV 16 was the most commonly HPV subtype followed by HPV 18, 52 and 45 among women with invasive cervical cancer and high grade precancerous lesion. HPV 16 and HPV 18 are estimated to account for 88% of cervical carcinoma among Malaysian women (Zaridah, 2014).

<sup>1</sup>Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, <sup>2</sup>Faculty of Medicine and Health Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia \*For correspondence: juwita@usm.my

The development of highly effective HPV vaccines is an important breakthrough as it offers great potential to reduce the incidence of cervical cancer. The quadrivalent HPV vaccine is mixture of four HPV-type specific and can be given to girls as early as 9 years old (Markowitz et al., 2007). Success in controlling cervical cancer will only be achieved if the vaccine has good uptake. Studies have confirmed that health care provider's knowledge and attitudes have an impact on the public acceptability of the vaccine (Ogilvie et al., 2010; Gerend and Shepherd, 2011). Nurses are the most visible frontline personnel providing health education to patients and the general population (Nganwai et al., 2007).

In Malaysia, the vaccines are delivered as part of the comprehensive school-based vaccination program and all three doses are being given free of charge to the girls in their age of thirteen. Health clinic nurses exclusively run the vaccination program, so they are going to be the trustable source of information about HPV vaccine to the parents and the adolescents. Therefore, this study aims to determine primary care nurse's knowledge and attitudes about HPV infection and its vaccine; and factors associated with their knowledge. This study will provide valuable information regarding the educational needs of the nurses working in Primary Health Clinics.

## Materials and Methods

This study was a cross-sectional study conducted among nurses working at Primary Health Clinics (PHC) in Kelantan from mid-June till the end of July 2014. There are 10 districts in Kelantan and 4 – 12 PHC for each district. The total number of nurses working in 56 PHC was 958. Out of 958 nurses, 449 of them are Staff Nurses and 509 are Community Nurses.

Inclusion criteria were all female nurses' working in health clinics of the selected district during the study period. Nurses that involved in administrative work for more than 12 months are excluded.

The study participants were selected through multistage random sampling. Initially, seven out of ten districts were randomly selected and from those seven districts, 25 PHC were randomly selected to select the study participants. The total number of study participants was selected proportionally from each clinic via random sampling. More participants were recruited in a clinic with higher number of staffs and vice versa. Total calculated sample size based on single mean proportion was 370 which include 10% of dropped out using standard deviation of mean attitude score (from pilot study), delta was assumed to be around 0.6, and multiplied by 2 to consider the cluster effect.

A validated self-administered questionnaire consists of 19 items; 11 items for knowledge domain and eight items for attitude domain. The Cronbach's alpha coefficients were 0.67 for knowledge domain and 0.70 for attitude domain. The knowledge items cover general information about Human papillomavirus infection and its vaccine. A 'True, False or Not Sure' scale was used. To discourage guessing, participants were instructed to choose "not

sure" if they were not sure about the correct answer. A knowledge score was computed by assigning one point for each correct response and zero points for incorrect and "not sure" responses. The total possible score ranged from 0 to 11, with the higher scores reflecting higher levels of knowledge.

The attitude domain scored on a 5-point Likert scale. Positive statements were coded as (strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5). Negative statements were reverse coded as (strongly disagree = 5, disagree = 4, neutral = 3, agree = 2, strongly agree = 1). Those participants who answered 'agree' and 'strongly agree' for a positive item and 'disagree' or 'strongly disagree' for a negative item in attitude domain were considered to have favorable attitude. Whereas if participants answered 'agree' and 'strongly agree' to a negative item and 'disagree' or 'strongly disagree' for a positive item in attitude domain were considered to have an unfavourable attitude towards that item. Subscale means score was obtained by summing and averaging the items.

The total score was calculated for each knowledge and attitude items. Each, total raw score was transformed into 'percentage score' by dividing the score by the maximum score and multiplied by 100. Higher total score indicates

**Table 1. Characteristics of the Study Participants**

Characteristic	Median (IQR)	Frequency (%)
Age (Years)	37 (8)*	
Family income	3000 (2500)	
Work experience ( Years)	12 (6)	
Race		
Malay		327(99.1)
Non-Malay		3(0.9)
Marital status		
Married		324(98.2)
never married		6(1.8)
Having children in age group 13 - 26		
No		198(60.0)
Yes		132(40.0)
Having daughters HPV vaccinated		
No		251(76.1)
Yes		79(23.9)
Work unit		
MCH		223(67.6)
OPD and other		107(32.4)
Nursing qualification		
Diploma		144(43.6)
Degree		11(3.3)
Nursing certificate		175(53.0)
Involved in HPV vaccination school team		
No		210(63.6)
Yes		120(36.4)
Attended HPV conference		
No		282(85.5)
Yes		48(14.5)
Source of HPV information update		
Internet		8(2.4)
Co- worker		11(3.3)
Brochures in clinic		119 (36.1)
CME		12(3.6)
More than one source		180(54.5)

\*Mean (SD)

**Table 2. Participants' Knowledge on Human Papillomavirus (HPV) Infection and Vaccination**

Knowledge	Frequency N%	
	Correct	Incorrect
HPV is the most common sexually transmitted infection (T).	81(24.5)	249 (75.5)
A person with genital HPV infection may never show symptoms or sign of infection (T).	178(53.9)	152(46.1)
Cervical cancer is caused by persistent HPV infection (T).	273 (82.7)	57 (17.3)
There are specific HPV genotypes responsible for most anogenital warts (T).	194 (58.8)	136 (41.2)
External anogenital warts increase the risk of cancer at the same site where the warts are located*(F).	35 (10.6)	295 (89.4)
Treatment of cervical cancer permanently eliminates the causative infection*(F).	77(23.3)	253(76.7)
Gardasil vaccine can protect against four types of HPV (T).	221 (67.0)	109 (33.0)
Females who are sexually active cannot receive HPV vaccine *(F).	97(40.3)	233 (59.7)
Patient should receive her third injection at six months from his first injection (T).	288 (87.3)	42 (12.7)
Treatment of external anogenital warts permanently eliminates the causative infection*(F)	133(40.3)	197(59.7)
HPV Vaccine can be offered to female ages 9 through 26 years (T).	96(29.1)	234(70.9)

The correct answer was "true" for all but \*items

**Table 3. Participants' Attitude Scores on HPV Infection and its Vaccine**

Attitude	Frequency (%)		
	Favorable	Neutral	Unfavorable
I am not sure about the efficacy of the vaccine.*&	120(36.3)	62(18.8)	148(44.8)
I am sure the vaccine is safe.	297(90)	27(8.2)	6(1.8)
I am not comfortable talking about STI with patient.*&	262 (79.4)	35(10.6)	3(1.0)
I will recommend HPV vaccine if only "Halal" certified	265(80.3)	30(9.1)	35(10.6)
HPV vaccination will reduce the number of Pap test visit*&	250(75.5)	19(5.8)	61(18.5)
Getting yearly Pap test better than receiving HPV vaccine*&	194(58.8)	44(13.3)	92(27.9)
HPV vaccine can promote risky sexual behaviors among teenagers*&	268(81.2)	10(3.0)	52(15.7)
In general HPV vaccine is very useful.	304(92.1)	19(5.8)	7(2.1)

\*Reverse coded items as (strongly disagree =5, disagree =4, neutral = 3, agree = 2, strongly agree = 1), Other items were coded as (strongly disagree=1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5, & Negatively worded questions has been positively worded here

higher knowledge and attitude of the participants.

The master list of nurses was obtained from the head nurse at each clinic, and the required number of participants met eligibility criteria was randomly selected. A set of self-administered questionnaires was distributed by the researcher to the participants. A brief introduction was given to the participants, and any question/clarification from the participants was answered. They were informed that participation in the survey was voluntary, and those who do not want to participate can return their questionnaires as blank. Research information sheet was distributed. Written informed consent and Material Publication Consent Form was obtained from all study participants prior to the survey. The date was used (instead of signature) to consent in order to ensure participants privacy. During the process of completion of the questionnaire, participants were asked to avoid having a conversation with each other to minimize sharing answer. The questionnaires were collected after 30 minutes, and its completeness were checked right away.

All collected data were analyzed using the SPSS software for Windows version 22. Data checking and cleaning were performed before analysis. Categorical variables were expressed using percentage, and numerical variables were expressed using mean (SD) and median (IQR). Categorical variables that have more than two groups were collapsed into one group to analysis in linear regression. Simple and multiple linear regressions were used to determine the associated factors influence the knowledge score. The dependent variable was knowledge score and the independent variable included in multivariate analysis were: Age, work experience, having children in age 13-26, having daughters received

HPV vaccination, part of school HPV vaccination team, attended HPV conference, source of HPV information and nursing qualification.

## Results

Out of 352 study participants, only 330 participants returned the completed questionnaire given the response rate was 93.7%. Majority of them were Malays, with mean (SD) age was 38.6 (6.8) years. About 67.6% of participants worked in Maternal Child Health unit but only 36.4% of them took part in the HPV vaccination. The details of the demographic are shown in Table 1.

The mean knowledge (SD) score was 5.37 (1.76) with min score of 0 and max score of 9.0. The percentage of correct answers to the knowledge questions varied from 10.6% to 87.3%. The vast majority of participants (75.5%) didn't know that HPV is the most common sexually transmitted infection. Only 67% correctly answered that Gardasil vaccine can protect against four types of HPV. The details of participants' knowledge are shown in Table 2.

The mean attitude (SD) score was 29.8 (3.51) with minimum score of 21 and maximum score of 40, indicating a relatively favorable attitude towards the HPV vaccine. Though 90% of participants believed that the vaccine is safe, nearly half of them were unsure about the efficacy of the vaccine. Ten percent of participants recommended the vaccine even without a "Halal logo" and nearly ten percent being ambivalence in this regard. Similarly majority did not agree that HPV vaccine will affect the number of Pap smear screening. The details of attitude among the participants are shown in Table 3.

From multiple linear regression analysis, among the factors tested only participant's level of education showed statistically significant association with HPV knowledge score ( $p < 0.001$ ). Those having nursing certificate scores have 0.7 (CI -1.12, -0.37) points lower knowledge items than those who have diploma and above.

## Discussion

To our knowledge, this is the first study in Kelantan intended to assess HPV infection and its vaccine related information among health clinics nurses. Adequate sample size and proper sample selection with a good response rate provide confidence that the sample is generally representative of registered nurses in the state of Kelantan. The data collection procedures on the same day to discourage participants to search information from other sources have also enhanced response validity.

Our study showed some knowledge deficit which exists among primary health clinic nurses regarding HPV infection and its vaccine. Our result was almost similar with the study by Nganwai P et al., (2007) among nurses working in hospital. Even though they have moderate level of knowledge regarding cervical cancer and HPV but most of them knew the cause of cervical cancer is HPV infection.

Our participant's knowledge score was also comparable with the study conducted among 125 registered school nurses in United Arab Emirates (UAE) (Ortash A et al., 2012). However, their knowledge about HPV as a sexual transmitted infection was significantly higher (80%) than our study participants score (24.5%). The better result seen in this study was most probably because their study participants were school nurses whereas only one-third of our study participants were involved in school-based vaccination program.

Compared to our study, an Iranian study showed a relatively low proportion of nurses (36.7%) who knew about the correlation between HPV infection and cervical cancer. Therefore only 4.5% of them knew HPV vaccination was for cervical cancer prevention (Mojahed S et al., 2013). Lack of education program was a reason for the low knowledge of their participants.

Our finding suggests that nurses in Kelantan have better knowledge of cervical cancer and its connection with HPV infection. Whereas their knowledge about HPV vaccination, knowledge related to genital warts and treatment to HPV were inadequate compared to studies conducted among health care providers in western countries (Duval et al., 2009; Henninger, 2009). The link between cervical cancer and HPV infection was well understood by our study participants probably due to their involvement in Pap screening program in PHC. However, considering the fact that HPV vaccination program was introduced to the country only four years ago and the program was run by Schools Health Unit (Public Health, Ministry of Health), the nurses who do not yet take part of school team has less interaction with the patients and are not familiar with patient's and parental expectation. As more than 60% of our study participants have not been part of the school vaccination program, this limited exposure

is likely the cause of lack of knowledge in HPV-related information compared to the knowledge of HPV relation to cervical cancer.

In addition, our study participants showed a misunderstanding on the target age of vaccination. The majority (70.9%) were not aware that HPV vaccine was approved from age 9 till age 26. On the contrary, 69.8% of nursing students in Turkey study correctly answered the age of vaccination (Uzunlar et al., 2013). Interestingly, Al-Dubai et al. (2010) found that 84.3% Malaysian women were unaware of the target age of HPV vaccination. This misunderstanding among nurses was probably caused by the fact that the school-based vaccination program was targeting only girls at the age 13 years. In addition, the HPV information pamphlets in health clinics was the common reading source of HPV information among our study participants and it only highlighted about the school-based vaccination age group.

This outcome should be considered seriously since this would negatively affect the purpose of HPV vaccination in prevention of cervical cancer. The older teenage groups who are more sexually active have been left unvaccinated. Girls in college and universities showed higher sexual activities than girls in high school (Marshall et al., 2007). Unfortunately, Malaysia doesn't have a nationwide catch-up HPV vaccination program for this age group similar to that in Australia and United Kingdom (Hilton et al., 2011). Therefore, it is the primary care team responsibility to promote parents who have daughters in the vaccination age group but not covered by school vaccination program to get their vaccine at private clinic.

Our study showed overall participants have a relatively favorable attitude towards HPV vaccination. Even though 99.1% of our participants were Malays, only 10% of participants agreed to recommend the vaccine even without a 'Halal logo' and 10% being ambivalent. About 90% of them agreed that the vaccine is safe compared to nurses in Thailand and Turkey which is only 46.4% and 41.9% respectively (Gerend MA and Shepherd JE. 2011; Yanikkerem E and Koker G 2014). This strong belief in the safety could be learned from their own experience as there was no reported adverse effect yet to date in the school-based vaccination program in Kelantan. Providers should be sure about the safety of the vaccine in order to answer patients' concerns as studies done in Asian and western countries showed that the concern of safety of the vaccine was a potential barrier to the participants unwillingness to be vaccinated (Ogilvie et al., 2010; Hyunjin, 2011).

Although our participants showed a favorable attitude towards the safety of the vaccine, but nearly half of them (44.8%) were not sure about its efficacy. Similarly Nganwai P et al., (2007) also reported 55.6% of his study participants were not sure about the efficacy of the vaccine. Since HPV vaccine is still new to the country so the long-term efficacy is not yet obvious to the participants as well as to the public (Chan et al., 2011).

HPV vaccination which could promote risky sexual behaviour was considered as a barrier to providing the vaccine particularly from the parental perspective (Uzunlar O et al., 2013). Few studies among the nurses showed more than 30% of their study participants who

would agree that HPV vaccination could promote sexual behaviour (Nganwai et al., 2007; Gerend and Shepherd, 2011). In contrast, our study showed roughly 15% of participants who agreed with this belief and most of them were comfortable in communicating about the sexually transmitted disease with the teenagers compare to other studies where providers were more hesitant to initiate talk about sexually transmitted infection (Tiro et al., 2007; Songthap et al., 2009). This is an encouraging finding in our study; nurses overcame the cultural barriers and shyness in order to play the given role successfully. In addition, they clearly see that vaccine is not a replacement for Pap smear test. This attitude is needed to ensure the success of the Pap smear screening program.

Nursing qualification is the only variable that was significantly associated with the participants' knowledge score which was consistent with other studies (Ruiz-Sternberg AM and Pinzon-Rondon AM, 2014; Yanikkerem E and Koker G, 2014; Strohl AE et al., 2015). Nurses in health clinics of Malaysia, can be primarily divided into three main categories based on their nursing education either certificate nursing courses, diploma or degree program (3 – 5 years of studies). Certificate courses usually focus on practical (60-70%) than theory (30-40%) whereas diploma and degree courses give equal importance to theory and clinical knowledge (45-55%) (Nursing Board of Malaysia, 2010). Most of our study participants were nursing certificate holders (53%) than diploma and degree holders (46.9%). The highest scored knowledge item in this study probably (87.2%) is a reflection of their practical knowledge. Though the difference in knowledge score was statistically significant between nursing certificate holders and nursing diploma/degree holders, the actual difference in score was small (0.75). Overall our participant's knowledge was inadequate and both groups should update their knowledge about HPV infection and its related matter.

Conclusion, Findings from this study indicate nurses have favorable attitudes towards HPV vaccination; however they have significant knowledge deficit and major misunderstanding in the critical component of knowledge items. Among the factors tested, nursing qualification is the only factor that is significantly associated with the nurses knowledge score. Our result indicate the need of similar studies to be conducted in other states, in order to have a broad estimation to make a nationally based education program to increase knowledge of nurses in this matter. In addition, nurses with certificates should be encouraged to upgrade their qualification.

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