

## RESEARCH COMMUNICATION

# Awareness of Cervical Cancer and HPV Vaccination and Its Affordability among Rural Folks in Penang Malaysia

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### Abstract

**Introduction:** As the second most common cancer in women worldwide, cervical cancer causes major health and economic burdens. Recent introduction of HPV immunization program locally has been encouraging but vaccine uptake remains poor. In addition, no study has been conducted to explore the people's awareness and knowledge on cervical cancer, HPV and its vaccine in a rural setting in Malaysia after the inception of the HPV vaccination program. **Objective:** This study was conducted to determine the awareness of cervical cancer, HPV vaccination and its affordability among people in a rural area in Malaysia. **Method:** A cross-sectional study was conducted among 116 participants in a village in Penang. All consenting female villagers aged 13 years and above, and males who were married were interviewed using a questionnaire. **Results:** Most participants (88.8%) had heard of cervical cancer, however only 29.3% and 42.2% of them had heard of HPV and HPV vaccination respectively. Only 5.2% knew the actual market price for the vaccine. They were willing to pay an average of RM 96.7 (USD \$27.7) for the full course of vaccination if it is not given to them for free, whereas the market price is RM1200 (USD \$342.85). **Conclusion:** Awareness among the Malaysian population in a rural setting on HPV and HPV vaccination is low. Educating the public on the infection can help control the illness. Cost of the HPV vaccine is a serious barrier to the success of the vaccination program in Malaysia.

**Keywords:** Cervical cancer - awareness - HPV - costs - rural - Penang, Malaysia

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### Introduction

Cervical cancer is the second most common cancer in women worldwide after breast cancer. There are about 500,000 new cases and 250,000 deaths due to cervical cancer each year. Almost all cervical cancer cases (99%) are caused by human papillomavirus (HPV) infection (World Health Organization 2006). In Malaysia, the age standardized incidence rate (ASR) for cervical cancer is 19.7 per 100,000 women. This number is twofold of that in the United States of America (USA) (Chye & Yahaya 2003). The Ministry of Health Malaysia reported that there is an average of 2000 to 3000 hospital admissions of cervical cancer cases per year in the country, most of them presenting late into the disease (Al-Dubai et al 2010). The economic burden due to cervical cancer is enormous. It costs about RM312 million (USD \$76 million) to manage cervical cancer (from prevention to managing invasive diseases) annually in Malaysia. A big proportion (67%) of this is spent in managing invasive cancer cases (Puteh, Ng & Aljunid 2008)

In Malaysia the annual cervical cancer death rate is 5.6 per 100,000 (Cervical Cancer Incidence and Mortality Rates 2011). The mortality rate due to cervical cancer in Malaysia is more than two folds higher in comparison

to countries like The Netherlands, United Kingdom and Finland (Othman & Reboli 2009). Even with the introduction of screening programmes and immunization against cervical cancer, the mortality rate has not decreased to a desirable level.

In 2006, the U.S. Food and Drug Administration (FDA) approved the first HPV vaccine. The HPV vaccine contains protein subunits of the actual virus and may prevent infection with certain species of HPV associated with the development of cervical cancer, genital warts and some less common cancers. The HPV immunization program in Malaysia had been implemented in year 2010, where it is given free to Malaysian girls aged 13 years old either in schools or in clinics. However, the uptake of the vaccine has been low in Asian countries as compared to Europe and USA. A study showed that in 2008, less than 4% of eligible girls and women had been vaccinated in Korea, Taiwan and Malaysia (Maechler 2008). Where the vaccination programme is individually funded and voluntary, the uptake rate is low (Tay et al 2008). This raises the question of barriers towards its acceptability, one of them being the community's perception towards the vaccine. Perception against the HPV vaccine has an impact on its acceptability. Certain individuals associate taking it to implying that one has a sexually-transmitted infection

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or is sexually active (Wong 2009). In Malaysia the cost of vaccination of about RM1200 is another impeding factor (Department of Health 2009).The HPV vaccine selected by the Ministry of Health (MOH) Malaysia costs approximately RM 400 if an individual who does not qualify for the vaccination program wishes to obtain the vaccination in a private setting.

A number of local studies have been conducted since the introduction of the immunization program to assess its effectiveness. However most of them are conducted in hospitals, universities and urban areas. No study has been conducted to explore the awareness and knowledge on cervical cancer, HPV and its vaccine among the rural population who make up 28.7% of Malaysia’s population (Malaysia rural population 2011). The objective of this study was to determine the awareness of cervical cancer and HPV and the affordability of HPV vaccination among a rural community in Penang, Malaysia.

## Materials and Methods

### Setting and Study Design

This descriptive cross-sectional study was conducted among the 116 residents of a village located in the north western tip of Penang Island in Malaysia. Most of the residents here were fisherman or were working in tourist related industries. The study was conducted from March to April 2011.

### Sample

All consenting female villagers aged 13 years old and above, and males who were married were eligible to participate. Those who did not consent or were unable to communicate effectively were excluded.

### Instruments

A questionnaire was especially designed for this study. The questionnaire was divided into four parts. The first part contained question pertaining to socio-demographic profile as well as history of HPV vaccination among the females. The second part consisted of five questions assessing the awareness and knowledge of cervical cancer. Only if the participant answered yes to the first question “Have you heard of cervical cancer?”, then the remaining questions assessing the knowledge on cervical cancer were asked. The third part assessed the awareness and knowledge of HPV. Similarly if the participant had not heard of HPV then the remaining questions assessing the knowledge were not asked. The final part of the questionnaire was adopted from JR Cates’ study (Cates et al 2009) where a brief description of the HPV vaccine was given prior to assessing the awareness of the vaccine. Even if the participant had not heard of the vaccine, the remaining questions were still asked. The first question “Will you go for HPV vaccination?” was only applicable to the female participants.

### Analysis

Data analysis was performed using PASW (Predictive Analytic Software) statistic version 18.0. A descriptive

frequency analysis was done for all variables. Chi square test was used to analyse the relationship between the variables. A p value of <0.05 was considered statistically significant.

### Ethics

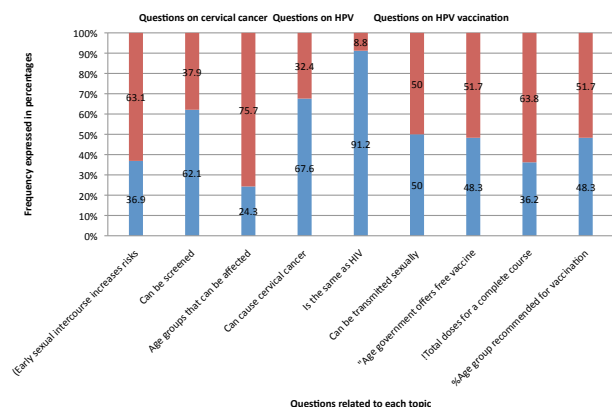
A verbal informed consent was obtained from the participants prior to commencing the interview. Participation was strictly voluntary and anonymity of the participants is assured. During the course of the study the participants could withdraw from the study at any point if they felt uncomfortable with the questions being asked.

## Results

The village comprised of 277 residents. Out of the 164 eligible villagers, 116 from 58 households participated. The main reason for non participation included male parents who were away from home during the period of the study. The mean age of the respondents was 40.7 years. Most were within the age group 20-59, female, Malays, married and with the highest level of education up to secondary school. The median household income of the participants was RM1700.00 (USD 1 equal to RM3.50). Most were in the income group of RM 721.00- RM 1500.00. The mean perceived household savings was RM181.64. Three out of the 116 participants were fully vaccinated with HPV vaccine. All were from the 10-19 years old age group.

A total of 103 respondents (88.8%) had heard of cervical cancer, 34 (29.3%) heard of HPV and 49 (42.2%) heard of HPV vaccination. Television was the main source of information for the participants on all the three topics, followed by peers vaccination and cervical cancer.

As shown in Figure 1 only 38 (36.9%) respondents associated early sexual intercourse with increased risk of getting cervical cancer and only 25 (24.3%) answered correctly with regards to age groups that can be affected while 39 (37.9%) did not know that cervical cancer can be screened. Most of them knew that HPV causes cervical cancer and were able to differentiate HPV as a separate entity from HIV. However half of them did not know that HPV could be transmitted sexually. Most answered wrongly for the recommended vaccination age group and



**Figure 1. Knowledge and Awareness on Cervical Cancer, HPV and HPV Vaccination. Orange, wrong, blue right answer**

**Table 1. Awareness on HPV, Cervical Cancer and HPV Vaccine According to Demographic Profile of Villagers**

Awareness	Heard of HPV?			Heard of cervical cancer?			Heard of HPV vaccine?		
	Yes	No	x <sup>2</sup> /p	Yes	No	x <sup>2</sup> /p	Yes	No	x <sup>2</sup> /p
	n=34	n=82		n=103	n=13		n=49	n=67	
<b>Sex</b>									
Male	7 (25.0)	22 (75.0)	0.499/0.480	24 (82.8)	5 (17.2)	1.415/0.234	6 (20.7)	23 (79.3)	7.361/0.007
Female	27 (31.0)	60 (69.0)		79 (90.8)	8 (9.2)		43 (49.4)	44 (50.6)	
<b>Age category</b>									
Adolescent (13-19)	7 (43.8)	9 (56.2)	2.493/0.287	13 (81.2)	3 (18.8)	5.368/0.068	8 (50.0)	8 (50.0)	1.200/0.549
Adult (20-59)	24 (28.6)	60 (71.4)		78 (92.9)	6 (7.1)		36 (42.9)	48 (57.1)	
Elderly (>60)	3 (18.8)	13 (81.2)		12 (75.0)	4 (25.0)		5 (31.3)	11 (68.8)	
<b>Marital status</b>									
Unmarried	11 (47.8)	12 (52.9)	6.336/0.175	20 (87.0)	3 (13.0)	3.827/0.430	13 (56.5)	10 (43.5)	3.809/0.433
Married	21 (26.9)	57 (73.1)		71 (91.0)	7 (9.0)		32 (41.0)	46 (59.0)	
Divorced, other	2 (13.3)	13 (86.7)		12 (80.0)	3 (20.0)		4 (26.7)	11 (73.3)	
<b>Race</b>									
Malay	32 (39.1)	78 (70.9)	1.658/0.436	99 (90.0)	11 (10.0)	3.950/0.139	47 (42.7)	63 (57.3)	1.572/0.456
Indian	2 (50.0)	2 (50.0)		3 (75.0)	1 (25.0)		2 (50.0)	2 (50.0)	
Immigrant	0 (0.0)	2 (100)		1 (50.0)	1 (50.0)		0 (0.0)	2 (100)	
<b>Religion</b>									
Islam	34 (29.6)	81(70.4)	0.418/0.518	103 (89.6)	12 (10.4)	7.992/0.005	49(42.6)	66 (57.4)	0.738/0.390
Christian	0 (0.0)	1(100.0)		0 (0.0)	1 (100)		0(0.0)	1 (100)	
<b>Education</b>									
None	0 (0.0)	4 (100.0)	3.148/0.369	3 (75.0)	1 (25.0)	3.248/0.355	0 (0.0)	4 (100)	7.996/0.046
Primary	9 (24.3)	28 (75.7)		31 (83.8)	6 (16.2)		12 (32.4)	25 (67.6)	
Secondary	24 (34.3)	46 (65.0)		65 (92.9)	5 (7.1)		33 (47.1)	37 (52.9)	
Tertiary	1 (20.0)	4 (80.0)		4 (80.0)	1 (20.0)		4 (80.0)	1 (20.0)	

the total doses needed and more than half did not know the age at which the Malaysian government is giving free HPV vaccination.

Only six out of the 116 (5.2%) participants were able to identify the cost for a complete course of vaccination. There were 52 participants (44.8%) who thought that it cost between RM100-RM500 and the same number of respondents thought that it cost less than RM100 [Figure 2]. In terms of affordability, the fee the respondents were willing to pay ranged from RM 5.00 to RM600.00. The mean fee that the participants were willing to pay for the complete vaccination was RM96.77. As shown in Figure 3, out of 113 participants who were not vaccinated, most were willing to pay RM50 or less, followed by RM51-RM100, RM151-RM200, more than RM200 and RM101-RM150. Only 7 participants (6.2%) were willing to pay more than RM 200 for a complete vaccination course.

More adolescents had heard of cervical cancer (p<0.05) and more females (p<0.05) had heard of HPV vaccination and the rates of those who had heard of HPV vaccination increased as the level of education increased (p<0.05). Most females were keen for the HPV vaccination and most married individuals were keen to send their daughter(s) for vaccination. Most of the participants did not think that it promotes promiscuity.

## Discussion

In this study, HPV and HPV vaccine awareness is still lacking although the awareness on cervical cancer is high. Other studies conducted in Malaysia similarly reported low levels of HPV awareness ranging from 21.7% (Wong et al 2009; Wong & Sam 2010) among female university students to 26% among outpatient clinic attendees (Al-Dubai et al 2010). Similarly studies abroad have reported

the awareness of HPV in Norway, South Africa, Brazil, and China as 20%, 29%, 37% and 30.2 % respectively (Rama et al 2010; Francis et al 2010; Kahn et al 2003; Li et al 2009). Closer to home a study conducted in Thailand amongst sex workers found that only 27.4% knew that HPV infection can be transmitted via sexual contact (Kietpeerakool et al 2009) which is much lower than the 50% reported in the present study. There is major contrast in terms of awareness compared to the United States where 84.3% of women heard of HPV and 78% of them heard of HPV vaccination (Jain et al 2009).

Ministry of Health Malaysia (MOHM) had launched a massive advertising effort in collaboration with non-governmental organizations such as the National Cancer Society and pharmaceutical companies to educate and make aware of the HPV vaccine since 2010. This could possibly explain the higher rates of awareness of HPV vaccines in the present study (42.2%) in comparison to other local studies conducted on earlier dates which ranged from 10.3% to 21.7% (Wong & Sam 2010; Al-Dubai et al 2010 ). However this higher awareness is not associated with an increase in HPV-related knowledge. This is likely due to the fact that Malaysians mostly rely on television advertisements, pamphlets, posters and newspapers for information. However most of the information provided are too purposeful and do not actually elaborate on how HPV infection can cause cervical cancer. Also rarely stressed is the importance of cervical screening after vaccination. This could possibly lead to the lack of knowledge of HPV infection and vaccination and lead to unfounded fears of the possible side effects, social stigma and the believe that the vaccination is not needed if one is not sexually active (Al-Dubai et al 2010; Francis et al 2010; Jain et al 2009). This is evident when in the present study there were respondents who would still refuse

vaccination even if it were given free of charge.

Empowering the community with comprehensive knowledge of the illness and its prevention can help reduce stigma and misconception about it. Research has shown that knowing that HPV is transmitted sexually increases stigma towards the disease itself but knowing how prevalent the disease is actually reduces the stigma (Waller, Marlow & Wardle 2007). Education on HPV and HPV vaccination should therefore include more information on HPV infection and its prevalence.

The introduction of widespread vaccination of females against HPV can potentially prevent 89% of cervical cancer cases at steady rate and could potentially lead to annual savings of over RM 45 million in terms of HPV-related treatment costs (Aljunid et al 2010). However the ultimate success of HPV vaccines in reducing the incidence of cervical cancer will be dictated by its uptake, which in turn will be dictated by its affordability. It is believed that uptake of about 80% is required for “herd immunity” - in other words 80% of girls in the target age range must be vaccinated to drive the eradication of HPV.

Low economic status has been shown to be an impediment to receiving healthcare (Waller, Marlow & Wardle 2007). Malaysia's per capita income has risen from USD \$ 3 843 in 2002 to USD\$ 7 734 in 2008 and it is projected to increase to USD\$ 15 340 in 2020. Despite the remarkable growth in the economy and the progress in poverty eradication in Malaysia (Miranda et al 2003), the economic status of those living in rural is still lagging behind. This could be because of the difficulty in finding jobs with fair wages in rural Malaysia. Rural areas are often economically disadvantaged due to lower levels of development and limited work opportunities. The median household monthly income in the present study population was RM1700.00. Their perceived savings per month was only RM 205.69. The cost of treatment for the full course of vaccine is RM1200 and per injection is estimated to cost RM400, which is equal to almost 25% of their monthly income. The problem arises when most participants were only willing to pay less than RM100 for the full course HPV vaccine if not given to them for free. This could potentially hamper the uptake rate of vaccination in this area and this could explain the reason behind the lower uptake rates, as compared to other countries.

In certain developed countries (HPV Vaccine 2011; Koulova et al 2008) the burden of vaccine financing is distributed across the private and public sector. Majority of its citizens have private insurance which cover the costs of the vaccination and there are various public immunization programs which offer immunization to those not covered by the national immunization program. Catch-up programs (Koulova et al 2008) are also available for females not covered within the primary population to boost vaccine coverage in these countries.

Overall, in the UK, 80.9% (Sheridan & White 2008) of females aged 12-13 years eligible to receive the HPV routinely complete the three-dose course. In Australia, the uptake rate in females aged 12-18 years old is 66.3%. This high uptake is due in part to full state funding of the vaccine. In the US (HPV Vaccine 2011) 87% of females aged 9-18 and 73% of females aged 19-26 have private

insurance. Private insurers typically follow the Advisory Committee on Immunization Practices ACIP guidelines and are likely to cover the vaccine, hence solving the issue of high vaccine prices and boost uptake rate in targeted population.

Unfortunately, due to the costs of HPV vaccination the Malaysian HPV immunization program will not be able to reach an ideal uptake rate. Governments around this region with the same predicament should consider alternative cost effective measures to control this dreadful illness, such as the Pap smear screening tool.

Pap smear screening alone is the single most cost-effective method of reducing cervical cancer mortality. HPV vaccination comes third after combined screening-vaccination in terms of cost-effectiveness (Ezat & Aljunid 2010). In Malaysia, Pap smear screening was shown to be ineffective due to the poor awareness and the fact that it is only done opportunistically on patients (Othman & Reboli 2009). For a screening program to be successful, the response rate must be above 70-80% of the population but in Malaysia, it is only 26% (Luiz & Sophie 2006). In UK, 56.2% of the annual cost for handling cervical cancer was allocated for Pap smear screening and other prevention strategies (Brown, Breugelmanns & Theodoratou 2006).

In Malaysia, only 10.3% (RM32 million) of the annual expenditure was allocated for Pap smear screening while 68% (RM167 million) were used for managing invasive cervical cancer (Miranda et al 2003). Prevention is always better than cure. The main bulk of effort in managing cervical cancer should be allocated into preventive strategies – mainly in screening, followed by combined screening-vaccination. The Malaysian government spends RM150 million annually to operate the nation's HPV immunization programme (Arukesamy 2009) but it takes only RM32 million to operate the Pap smear screening program. Introduction of a HPV immunisation programme in a country should be done alongside its screening program. The population should also be advised to undergo regular Pap smear check-up even if they are already vaccinated. There is a need for the government to realise that organizing and improving screening programs continues to be a priority for a country during the era of vaccination (Stockholm 2008). Considering the current state of Pap smear screening in Malaysia, more funds should be allocated to improve the current screening programme.

In conclusion, awareness among this rural community on HPV and HPV vaccination is low. Educating the public on the infection can help control the illness. Cost of the HPV vaccine is a serious barrier to vaccination coverage especially in the rural areas. Although the number of participants is small but the information gathered can be used to spur other larger studies.

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