

RESEARCH ARTICLE

Practice of HPV Vaccine and Associated Factors among School Girls in Melaka, Malaysia

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Abstract

Objective: The objective of this study is to determine the practice and associated factors of HPV vaccine among school girls in Melaka, Malaysia. **Methodology:** A total number of 612 secondary school girls participated in this study. The questionnaire consists of 38 questions which included 3 sections. The first section is about socio-demography. The Second section is about knowledge and awareness of HPV vaccines. The third section is about practices with associated barriers of HPV vaccination. Verbal consent was obtained from all participants, and data were analyzed using SPSS 13. **Results:** A total number of 612 secondary school girl students participated in this study. The mean age was $13.93 \pm SD (1.09)$; minimum age was 13 years old and maximum was 17 years old. The majority of them was Malay, from rural areas and had a family monthly income of RM 3000 or less (91.8%, 53.1%, 69.6%; respectively). The majority of the parents of the school girls were with secondary education level (56.4%). The majority of the participants did not have a family history of cervical cancer (99.0%). The prevalence of HPV vaccination was 77.9% among school girls in Melaka. The majority of the participants were vaccinated in their schools (77.0%). About 69% knew about cervical cancer and 77.6% had ever heard about HPV vaccine. Regarding the factors that influence the practice of uptake HPV vaccine, they were age, race, income, parents' education, knowledge about cervical cancer, heard about HPV vaccine and place of getting the vaccine ($p < 0.001$). **Conclusion:** The prevalence of HPV vaccine among school girls is high. Age, race, income, parents' education, knowledge about cervical cancer, heard about HPV vaccine and place of getting the vaccine were the significant factors that influence the practice of uptake HPV vaccine among school girls.

Keywords: HPV vaccine - practice - associated factors

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Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection and is often acquired soon after onset of sexual intercourse (Adams et al., 2007; Dunne et al., 2007). Therefore, it is advisable to vaccinate people at risk prior to their first sexual intercourse (Seo et al., 2008). Regarding adolescent; HPV is one of the most common sexually transmitted infections in sexually active girls and young women (Richardson et al, 2003; Syrjänen et al, 2005; Kitchener et al, 2006; Dunne et al., 2007). Approximately 70% of cervical cancer cases are HPV types 18 and 16 (Bosch and Sanjose, 2003). HPV 11 and 6 cause 90% of genital warts.

Internationally, cervical cancer is the second leading cause of death, being the second top cancer affecting females in Malaysia after breast cancers (Ferlay et al., 2004; Kim 2009). Preventive HPV vaccines, such as the quadrivalent Gardasil (Merck and Co, Inc, NJ) and bivalent Cervarix (GlaxoSmithKline Biologicals,

Rixensart, Belgium), have been developed and are approved by the US Food and Drug Administration (FDA). Studies showed that HPV vaccine (Gardasil1, Merck & Co., Inc.) have 99% protection against HPV 16 and 18-associated CIN 2/3 and adenocarcinoma in situ in HPV women who received the complete vaccine regimen. The same vaccine also showed 100% efficacy against genital warts (Ault 2007; Garland et al., 2007). The other HPV 16/ 18 L1 virus-like-particle candidate vaccine developed for the prevention of persistent HPV infection Types 16 and 18 (Cervarix1, GlaxoSmithKline Biologicals, Plc.) has shown 93.3% clinical efficacy against the combined incidence of HPV 16/18 related CIN21 after 15 months of follow-up (Paavonen et al., 2007). In 2006, the US Food and Drug Administration (FDA) approved the quadrivalent human papillomavirus (HPV, types 6/11/16 and 18) L1 virus-like particle vaccine. This prophylactic vaccine prevents cervical, vaginal, vulvar, and perianal neoplasias, including anogenital condylomata (Villa et al., 2005; Garland et al., 2007).

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These vaccines are being used in more than 100 countries, including those in Europe and the Americas, as well as in Australia, Korea, India, Thailand, and Malaysia (Adams et al., 2007, Seo et al., 2008, Madhivanan et al., 2009; Songthap et al., 2009). Some countries have implemented HPV vaccination as part of a national routine immunization program; however, this has not yet occurred in Malaysia.

Monitoring HPV vaccine uptake allows public health practitioners to identify unvaccinated populations and to develop targeted interventions to increase vaccine coverage. Depending on uptake patterns, HPV vaccine has the potential to reduce existing disparities in cervical cancer, including a higher incidence and mortality. Delayed vaccination may result in girls missing to receive timely protection against cervical cancer before they become sexually active, and providers should stress to parents the importance of vaccinating their daughters while in the target age range (Rosenthal et al., 2008; Caskey et al., 2009).

In Malaysia, cervical cancer is the second most common cancer in women which constituted 12.9% of total female cancers as reported in the Second Report of the National Cancer Registry of Cancer Incidence in Malaysia (Lim et al., 2004). The death rate due to cervical cancer in Malaysia from 1996 to 2000 ranged from 0.29% to 0.41% (Social Statistics Bulletin, 2005). Several studies conducted among different population in Malaysia regarding HPV vaccination (Al-Naggar et al., 2010; Al-Naggar and Bobryshev, 2011; Al-Naggar 2012). However, there is no previous study about the Practice of HPV vaccine and associated factors among school girls in Malaysia. Therefore the objective of this study is to determine the practice and associated factors of HPV vaccine among school girls in Melaka, Malaysia.

Materials and Methods

Procedure

A total number of 612 students participated in this study during the period from 20th July-20th August 2011. The range age of the participants was 14 to 17 years old. This study focused on school girls to identify their knowledge, practices, and awareness with associated barriers of HPV Vaccination.

Schools were randomly selected from 3 districts areas in Melaka namely: Melaka Tengah, Jasin and Alor Gajah; six schools were chosen randomly. A teacher took all the questionnaires to be filled by school girls randomly. The time given to fill all questionnaires was about 3-5 days in each school but there are 2 schools that took about 2 weeks to be finished. A total number of 612 secondary school girls were randomly selected from the six secondary schools which were also selected randomly namely : SMK Bukit Katil, SMK Durian Tunggal, SMK Tinggi Perempuan Melaka, SMK (A) Sharifah Rodziah, SM Sains Muzaffar Shah, SBP Integrasi Selandar; participated in this study.

Instrument

The questionnaire used in this study consists of

38 questions which included three sections; socio-demographic such as age, race, residency, income, parents' education, and family history of cervical cancer. The Second section is about knowledge and awareness of HPV vaccines such as heard about HPV virus, know about cervical cancer. The third section is practices with associated barriers of HPV vaccination such as ever been vaccinated, reason for uptake HPV vaccine.

Ethics

The proposal of this study was approved by the ethics committee of the Management and Science University (MSU); Malaysia. Permission from the Ministry of Education was also obtained to conduct this study among secondary school girls in Malacca. Permission from the schools was also obtained; then verbal consent was obtained from all participants.

Data analysis

Data were analyzed using SPSS 13. T-test and ANOVA test were used to determine the relationships between vaccine uptake and factors associated with HPV vaccine uptake.

Results

A total number of 612 secondary school girl students participated in this study. The mean age was 13.93±SD (1.09); minimum age was 13 years old and maximum was 17 years old. The majority of them were Malay, from rural areas and had a family monthly income of RM 3000 (1000 US\$) or less (91.8%, 53.1%, 69.6%; respectively). The majority of the parents of the school girls were with a secondary education level (56.4%). The majority of the participants did not have a family history of cervical cancer (99.0%).

The prevalence of HPV vaccination was 77.9% among school girls in Melaka (Figure 1). The majority of the participants vaccinated in their schools were (77.0%). About 69% knew about cervical cancer and 77.6% had ever heard about HPV vaccine. Regarding the factors that influenced the practice of uptake HPV vaccine, they were age, race, income, parents' education, knowledge about cervical cancer, heard about HPV vaccine and place of getting the vaccine (Table 1).

Regarding the reason for uptaking HPV vaccine among school girls, they were encouragement of both health care workers and teachers (49.3%), followed by parents encouragement (28.6%), then friends encouragement (0.2%) (Table 2).

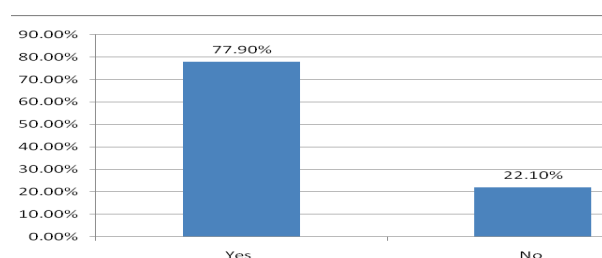


Figure 1. Ever been Vaccinated with HPV Vaccine (n=612).

Table 1. Socio-Demographic Characteristics and Factors Associated with HPV Vaccine Practice Among Secondary School Girls in Melaka, Malaysia (n=612)

Variable	Categories	N	(%)	p-value
Age	13	256	(41.8%)	< 0.001
	14	246	(40.2%)	
	15	39	(6.4%)	
	16	40	(6.5%)	
	17	31	(5.1%)	
Race	Malay	562	(91.8%)	< 0.001
	Chinese	19	(3.1%)	
	Indian	27	(4.4%)	
	Others	4	(0.7%)	
Residency	Urban	287	(46.9%)	0.519
	Rural	325	(53.1%)	
Income	≤3000	426	(69.6%)	< 0.001
	>3000	186	(30.4%)	
Parents' education				
	Primary	50	(8.2%)	< 0.001
	Secondary	345	(56.4%)	
	Tertiary	217	(35.5%)	
Family history of cervical cancer				
	Yes	6	(1.0%)	0.504
	No	606	(99.0%)	
Know about cervical cancer				
	Yes	422	(69.0%)	< 0.001
	No	190	(31.0%)	
Ever heard about HPV virus				
	Yes	475	(77.6%)	< 0.001
	No	137	(22.4%)	
Place of getting the vaccine				
	Government hospital	4	(0.7%)	< 0.001
	Private hospital	3	(0.5%)	
	School	471	(77.0%)	
	Never been vaccinated	134	(21.9%)	

Table 2. Recommendations/Reasons for Uptake HPV Vaccine

	No.	%
Parents' encouragement	175	28.60%
Health care workers'/school teachers' advice	302	49.30%
Friend encouragement	1	0.20%

Discussion

This study aimed to determine the practice and associated factors of HPV vaccine among school girls in Melaka. International guidelines recommended vaccination of girls aged 11-12 years, and in Malaysia, it is free of charge for girls aged 13 years only.

In this study, the prevalence of HPV vaccination was 77.9% among school girls in Melaka. This high percentage is due to the government now offering a free vaccine for secondary school girls aged 13 years. Another possible reason is that the government in the recent years has heavily promoted the vaccine in the media and public campaigns. Previous Malaysian study among general population showed that the prevalence of HPV vaccination was low 51.5% (Al-Naggar and Bobryshev, 2011). The difference may be due to the different populations of the studies. In this study; age significantly influenced the practice of HPV vaccine among secondary school girls. Bynum et al. (2011) reported that that age is significantly

associated with HPV vaccine uptake. A similar study among general Malaysian population showed that age significantly influenced the practice of HPV vaccine (Al-Naggar and Bobryshev, 2011).

In this study the race significantly influenced the practice of HPV vaccine among school girls. These findings are consistent with other studies; Neubrand et al. (2009) showed that Hispanics were 60% less likely than whites to complete vaccination. Widdice and colleagues (2011) showed that blacks and publicly insured patients were 50% and 24% less likely than whites and privately insured patients, respectively, to complete vaccination. Cook et al. (2010) showed that blacks were 44% less likely than whites to complete vaccination. A similar study found that significant disparities were observed in completion of HPV vaccination by ethnicity and poverty after adjusting for other variables known to be associated with vaccination (Niccolai et al., 2011). In two large studies (Cook et al., 2010; Chao et al., 2010) Black and Asian girls were significantly less likely to initiate the vaccination program compared with Caucasian and Hispanic girls. However, in one study (Dempsey et al., 2010) Black and Caucasian girls were more likely to initiate the vaccination program than other girls, and in a second study Hispanic girls were significantly more likely to refuse the HPV vaccination than Caucasian girls. In contrast, several studies showed no significant differences in rates of vaccine initiation based on ethnicity or race (Allen et al., 2010; Pruitt and Shootman, 2010; Reiter et al., 2010; Roberts et al., 2011).

In this study income showed a significant influence on practice of HPV among secondary school girls. In a previous study by Al-Naggar and Bobryshev (2011), it was shown that a monthly family income also significantly influenced the practice of HPV vaccine among Malaysian in general population. In another study, cost reported as a barrier towards HPV practice (Al Dubai et al., 2010). This finding is similar to a Canadian study which reported that most young women would accept HPV vaccine if it is free of charge (Sauvageau et al., 2007). The recommended 3-dose course costs approximately US\$360 (Malaysian Ringgit 1200) in the private sector in Malaysia and is unaffordable for lower socioeconomic status women. To ensure wide coverage, the vaccine may need to be incorporated into the vaccination program in Malaysia (Wong et al., 2009). Daley et al. (2006) also reported that the cost of the HPV vaccine is a major obstacle to uptake the HPV vaccine. In previous studies, women mentioned cost as a reason for not being vaccinated (Jain et al., 2009; Zimet et al., 2010). Cost was also a barrier reported by college women who had chosen not to receive the vaccine (Jain et al., 2009). Cost has been shown to be an important barrier to HPV vaccine use (Sauvageau et al., 2007; Habel et al., 2009). Another study reported that girls in the lowest income quintile were the least likely to complete the recommended three-dose regimen, suggesting that program delivery should be modified to improve series completion in vulnerable populations (Smith et al., 2011). It is worth mentioning that cost issues are more complex than simple coverage for cost of vaccine provided by private insurers or VFC, as there may be additional out

of pocket expenses for patients, and gaps in vaccine financing have been shown to exist for other vaccines (Lee et al., 2007). Further, broader system-level factors (e.g., accessibility and acceptability of care) are known to play an important role in receipt of other vaccines and access to health care more generally (McLaughlin and Wyszewianski, 2002; Nelson 2002). These factors need to be better understood for completion of the relatively new HPV vaccine. Previous studies reported that lower parental income was found to be a significant predictor of vaccine initiation (CDC 2010, Pruitt and Schootman 2010).

In this study, parents' education significantly influenced the practice of school girls towards HPV vaccine. Similar findings were reported by Wong (2008) in which parents with less than high school education were significantly more likely to vaccinate their daughter than parents who are high school graduates. Several studies reported that parents with lower levels of education were more likely to accept HPV vaccination for their daughters (Brewer and Fazekas, 2007; Constantine and Jerman, 2007; Rosenthal et al., 2008). These are encouraging findings because increased poverty and lower education level have been associated with greater incidence of cervical cancer (Benard et al., 2008). In addition, some national surveys have found higher HPV vaccine uptake to be among those below the poverty Line (National, state, and local area vaccination 2009: 2010). A similar study reported that mothers who had less than a high school degree would not mind three shots and were more likely to prefer their daughter being vaccinated (Rosenthal et al., 2008). One study (Brewer et al., 2011) found higher vaccine uptake in girls of parents with a college education than in high school education. However, in another study (Ogilvie et al., 2010), it is found that higher uptake levels were associated with lower parental education levels.

In contrast several studies reported that no significant correlation between parental income and vaccine initiation (Rosenthal et al., 2008; Caskey et al., 2009; Gerend et al., 2009; Allen et al., 2010; Pruitt and Schootman, 2010; Reiter et al., 2010; Yeganeh et al., 2010).

Knowledge about HPV vaccine significantly influences the practice of HPV vaccine among secondary school girls. A similar finding reported that knowledge about HPV is significantly associated with HPV vaccine uptake (Bynum et al., 2011). There is evidence that acceptance of HPV vaccination is increased when parents or young women were well informed about the risks and benefits (Kahn et al., 2003; Davis et al., 2004). Girls who had been vaccinated had a significantly higher knowledge score about HPV, HPV-vaccination and cervical cancer compared to non-vaccinated girls in three studies (Caskey et al., 2009; Agius et al., 2010; Mathur et al., 2010).

The majority of the participants heard about HPV vaccine (77.6%). Less percentage was reported among Canadian women where only 39.8% had heard of the HPV vaccine (Lenehan et al., 2008). In this study, the majority of the participants (49.3%) mentioned that the reason for HPV vaccine uptake is due to encouragement of health care workers and school teachers. Therefore the role of health care workers and teachers is vital. Several studies

reported that Attitudes among health care providers are important for successful HPV vaccine implementation (Kahn et al., 2005; Riedesel et al., 2005; Zimet et al., 2006). A study by Rosenthal et al. (2008) indicates that mothers who had been counseled by a physician had more positive attitudes toward the vaccination. Similar studies reported that the doctor recommendations have been associated with greater vaccine initiation for influenza and hepatitis B vaccination (Bigham et al., 2006; Lyn-Cook et al., 2007; Shahrabani et al., 2009). An HPV vaccine acceptability research found that believing a physician would recommend the vaccine increased acceptability and perceived barriers, including cost and vaccine safety, and lowered acceptability (Brewer and Fazekas, 2007).

In conclusion, the prevalence of HPV vaccine among school girls is high. Age, race, income, parents' education, knowledge about cervical cancer, heard about HPV vaccine and place of getting the vaccine were the significant factors that influence the practice of uptake HPV vaccine among school girls. School teachers have an influencing role to convince the students to uptake HPV vaccine. A national study to determine the factors that influence the HPV vaccination among school girls is needed. Vaccine should be part of the routine free vaccination in Malaysia. The government should provide the vaccine at the school for girls will increase the uptake of HPV vaccine because it is a convenient place for students.

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