


REVIEW



Factors involved in human papillomavirus (HPV) vaccine hesitancy among women in the South-East Asian Region (SEAR) and Western Pacific Region (WPR): A scoping review

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ABSTRACT

A scoping review was performed to identify factors that may lead to human papillomavirus (HPV) vaccine hesitancy among women in low- and middle-income countries in South East Asian Region (SEAR) and Western Pacific Region (WPR). A systematic search of English and non-English articles using Pubmed, EMBASE, PsycINFO, Cochrane, MEDLINE, and CINAHL plus was conducted. Only 63 studies conducted in SEAR and WPR were included from inception until December 2016. Results of these studies have shown that poor awareness and knowledge of practices on cervical cancer prevention was evident in both SEAR and WPR. Concerns on safety and efficacy of the vaccine, and costs in getting vaccinated were significant barriers. Most women stated that they needed more information, and strongly welcomed a physician's recommendation in both geographical regions. Women also felt they have a low risk of acquiring HPV infection and cervical cancer. Most women in SEAR and WPR were unable to decide on whether to accept HPV vaccination.

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Introduction

Cervical cancer accounts for an estimated 528,000 of female deaths per year, with more than 85% of the global burden occurring in less developed regions of the world.^{1,2} To date, Africa and certain parts of South America have the highest incidence rates in cervical cancer, followed by the South East Asia (SEAR) and Western Pacific (WPR) regions with an age-standardised rate (ASR) of 21.99 (per 100,000) in India, and 34.51 (per 100,000) in Papua New Guinea.¹

The human papillomavirus (HPV) is one of the most common sexually-transmitted infections worldwide, with an estimated 290 million women being infected.³ It has been acknowledged as the causative agent for the development of cervical cancer, with subtypes 16 and 18 consistently linked to 70% of cervical cancer cases globally, while subtypes 31, 33, 45, 52, and 58 responsible for another 20% of cervical cancer cases.⁴⁻⁶

The licensure of the HPV vaccine provided a major step forward in reducing the global burden of both cervical cancer and HPV infection. Three vaccines have been approved by the FDA: the bivalent vaccine, Cervarix[®] and the quadrivalent vaccine, Gardasil[®] in 2006 with the more recent 9-valent vaccine, Gardasil[®] 9 in 2014.⁶ From June 2006 to October 2014, around 118 million women have been targeted for HPV vaccination worldwide.⁷ Generally, the target population for HPV

immunisation are young adolescent girls between nine to 14 years of age, ideally before sexual debut.⁸ According to WHO, older women (aged ≥ 15 years old), immunocompromised or HIV infected women are also recommended to undergo HPV vaccination.⁹

HPV immunisation programs and educational campaigns differ markedly across countries, and there have been concerns on rates of vaccination uptake since its licensure in 2006.⁷ Countries of the SEA and WP regions are mostly made up of low- to middle-income countries (LMIC), hence, representing a population highly at risk of cervical cancer. In addition to this, although the HPV vaccine has been approved and is commercially available in these countries (except China), uptake among the targeted population in these countries is expected to be low.^{7,10-18} Up until October 2014, 47 million girls (aged between 10–20 years old) have received the full dose of the HPV vaccine, and 59 million have received at least one dose, but only 2.7 million of these females were from less developed regions.^{7,16} This leaves a large population from less-developed countries largely unprotected from HPV infection and cervical cancer.^{7,16}

Since 2006, there has been a proliferation of studies examining factors predicting vaccine acceptability and decision-making among different key stakeholders, which includes the women themselves, their parents, and healthcare professionals.

Hence, the objectives of this review are to: 1) systematically review all influencing factors predicting HPV vaccine acceptability among women in SEAR and WPR; 2) provide a summarised literature of evidence on these factors; and 3) suggest recommendations that can improve HPV vaccine acceptability and diffuse any barriers identified in this review.

Methods

Review protocol

To ensure that the scoping review methods are reproducible, transparent, and devoid of bias in selective outcome reporting, a review protocol was developed *a priori*. The protocol, and inclusion and exclusion criteria are available from the University of York Centre for Reviews and Dissemination at the following website: http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42016035749.

Search strategy

Highly relevant studies were identified by systematically searching electronic databases and scanning the reference lists of articles. The databases utilised for screening of primary literature from inception until December 2016 were Pubmed, EMBASE (Ovid), PsycINFO (Ovid), Cochrane, MEDLINE (EBSCOhost), and CINAHL Plus (EBSCOhost). To ensure all relevant influential factors were captured in the search strategy, a broad search was conducted in PubMed with the following MesH terms “papillomavirus infections” and “female”, “papillomavirus vaccines” and “health knowledge OR attitudes OR practice”. The search strategies in the other remaining databases are available in S1 Table.

Inclusion criteria

A study was considered eligible for inclusion if it had the following study and reporting characteristics:

- Types of studies*: Research investigations assessing the influencing factors in HPV vaccine acceptability. This includes studies determining the awareness, knowledge, attitudes and beliefs, perceptions, opinions, and practices towards HPV vaccination. No language or publication date restrictions were imposed. Non-English articles were included if sufficient information was available in the abstract section. Only peer-reviewed articles conducted in World Health Organization (WHO) SEAR and WPR, were eligible for review and inclusion.
- Types of participants*: Targeted populations for HPV vaccination programs which include young adolescent girls between nine to 14 years of age, women aged ≥ 15 years old, and HIV infected or immunocompromised women. Third party individuals who may influence a woman’s decision in taking the vaccine, such as healthcare workers and female parents, were also considered.
- Types of outcome measures*: Description of either awareness, knowledge, attitudes, beliefs, perceptions, concerns and/or practices of a women with regard to HPV-related issues.

Study selection

Articles returned from the initial search strategy were screened by reading the title and abstracts. Studies considered eligible for inclusion were then reviewed by reading the full-text articles before final inclusion in the review. Disagreements and uncertainties about study inclusion were resolved by discussion by three reviewers (DS, YYY and CPY). If no agreement could be reached, the remaining two reviewers (TK and PSS) were consulted in order to reach consensus. The final number of included studies were determined by three reviewers (DS, TK and PSS). Articles included in the review were saved into End-Note reference manager software, version X7 and duplicates were removed.

Data extraction

Each quantitative study was subjected to data extraction using a pre-defined data extraction form. The extraction form was developed in an Excel spreadsheet, and piloted from two trial reports beforehand to ensure suitability for use. Information was extracted from each included study on:

- Study characteristics*: Study country, objectives of the research, recruitment site, study design and research period, respondents, measurement tool(s), outcomes measured, and conclusions.
- Participant characteristics*: sample size, respondent’s age (mean/range), place of residence, socioeconomic background, marital status, number of children, sexual debut, sexual history and HPV vaccination and/or Pap Smear status.
- Results*: History of Pap Smear (normal and abnormal), components of awareness, knowledge, attitudes and beliefs assessed, willingness to vaccinate, source(s) of information, factors influencing decision to consider or reject vaccination, and additional comments.

Three reviewers (DS, YYY and CPY) extracted the relevant data from each included study, and two review authors checked the extracted data (TK and PSS). Authors TK and PSS independently appraised the paper and were consulted to reach consensus. No attempt was made to seek additional information from the included primary studies. The data extraction form with details extracted from each included study is available in S2 Table.

Data analysis

Synthesis of literature findings was conducted by reading full-text articles of included studies, identifying influencing factors in HPV vaccine acceptance, recognising similarities and differences between studies, and pooling together similar reporting measures and outcomes across studies. All relevant influencing factors were thematically categorised and presented using a descriptive approach.

Results

A total of 63 primary research studies were included for review, with over 90% of the articles in English (57/63) and five in

Korean,¹⁹⁻²³ Hong Kong,^{14,24-31} Korea,^{17,19-23,32-35} and Malaysia^{15,35-42} contributed to 44% (28/63) of the studies, while the remaining studies were fairly distributed over other countries such as Taiwan,^{12,35,43-47} Australia,^{4,48-52} China,^{10,53-57} India,^{13,58,59} Japan,⁶⁰⁻⁶² Singapore,^{18,63} Philippines, Cambodia, Nepal, and Vietnam.^{5,64-66} Publication dates ranged between 2006 and 2016 (Fig. 1), with publications on factors that influence women in making an informed decision on HPV vaccination more commonly seen between year 2010 and 2011.

Study respondents were mostly targeted populations for HPV immunisation, which includes young girls between nine to 14 years of age, and women aged 15 years and older. All were healthy except for one study that recruited women with physical disabilities.⁴³ The respondents were recruited from a variety of settings: healthcare which includes obstetrics and gynaecology clinics,^{4,15,20,24,38,43,46,58,60} women's clinic⁵⁷ university health centres,^{25,41,54,59,67} community or social settings,^{10,14,19,21,26,28,30-32,35,37,39,45,48-52,55,56,61,62,64-66,68} and educational settings which includes colleges,^{17,44,47} schools^{17,27,28,40,69,70} and universities.^{11-13,18,33,36,42,71}

About 90% (57/63) of the studies utilised descriptive, cross-sectional surveys, while other studies used a qualitative approach.^{30,32,42,68} and mixed-methods approach.^{28,66} Questionnaires (53/63) were largely employed for reporting measures; while the remaining studies used face-to-face interviews^{35,36,63} computer-assisted telephone interviews,^{26,50,51,63} focus group discussions,³² or a combination of interviews and discussions.^{30,68} The total sample size for all included studies was 62,296, with response rates ranging from 34.3% to 99.3%.

The majority of included articles examined (41/63) attitudes and beliefs towards vaccination, and awareness and knowledge levels related to practices and preventive measures of HPV infection, as shown in Table 1. Knowledge level toward HPV vaccination was assessed in about 15 studies details of which are described in Table 1.

Awareness

Awareness among women on HPV infection, HPV vaccine, and cervical cancer

Respondents' awareness to HPV related issues were investigated in 46% of included studies, in which 83% assessed awareness of HPV infection,^{5,10,24,30,33,38,39,41-43,46,47,51-58,63,65,67,69} 38% on HPV vaccine,^{23,38,41,46,53-55,57,59,62,69} 31% on cervical cancer,^{24,35,42,53-55,58,59,65} and one study on awareness of genital warts.⁴¹ In summary, poor awareness levels on aspects of HPV was identified across studies, with awareness ranging between 10% and 40% among study respondents.

Women's awareness on cervical cancer was generally better compared to HPV infection and vaccine,^{35,42,53-55,58,59,65} where more women had heard of cervical cancer compared to its vaccination or causative agent. In addition, female university students were twice as likely to have heard of HPV infection, HPV vaccine, and cervical cancer^{23,33,42,46,54} compared to women recruited from healthcare^{30,38,67} or community settings.^{5,53,55,63} Awareness levels were similar among women recruited from healthcare, community, and school settings. Only one study reported that women

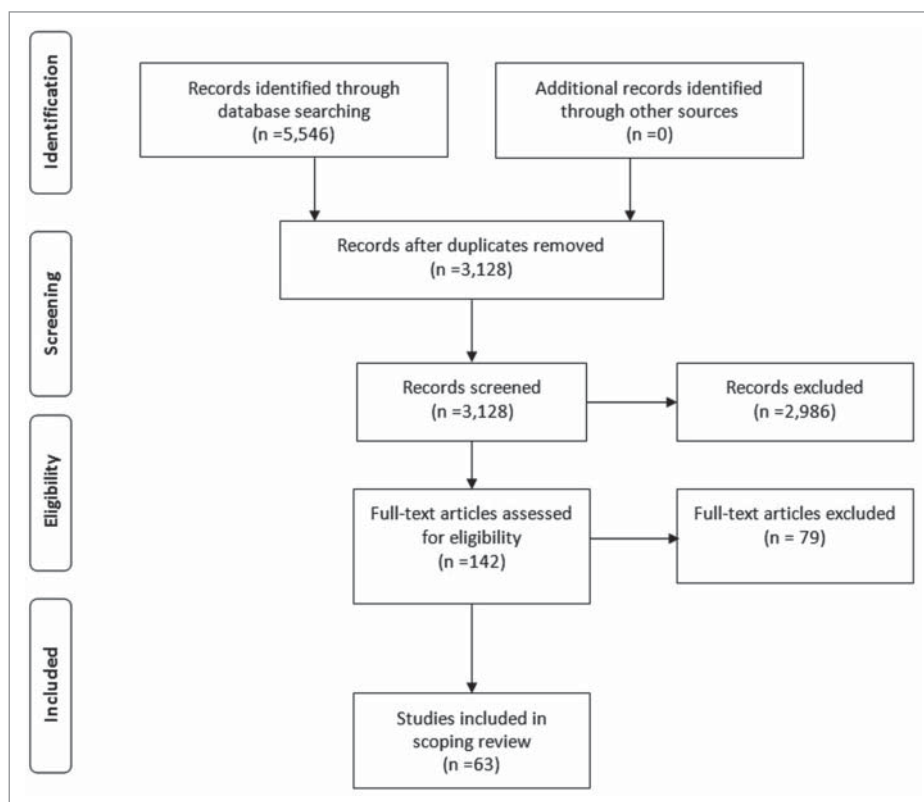


Figure 1. PRISMA Flowchart for identification and inclusion of articles in scoping review.

Table 1. Outcomes measured in included studies.

Study	Country	Outcomes measured		
		Awareness	Knowledge	Attitudes and beliefs
Abudukadeer A et al., 2015 ⁵⁴	China	✓	✓	
Al-Dubai SAR et al., 2010 ³⁷	Malaysia		✓	✓
Al-Naggar RA et al., 2010 ⁴¹	Malaysia	✓	✓	
Al-Naggar RA et al., 2011 ³⁸	Malaysia	✓	✓	
Bang KS et al., 2011 ¹⁸	Korea		✓	
Chan KKL et al., 2012 ²⁷	Hong Kong			✓
Charakorn C, 2011 ⁶⁶	Thailand	✓	✓	
Choi HCW et al., 2014 ¹³	Hong Kong			✓
Chow S-N et al., 2010 ³⁴	Korea, Malaysia, Taiwan and Thailand	✓	✓	✓
Egawa-Takata T et al., 2015 ⁶⁰	Japan		✓	✓
Egawa-Takata T et al., 2016 ⁵⁹	Japan			✓
Ezat SWP et al., 2013 ¹⁴	Malaysia		✓	
Feng S et al., 2012 ⁵⁶	China		✓	✓
Giles M, 2006 ⁵¹	Australia	✓	✓	
Gu C et al., 2015 ⁵³	China	✓	✓	✓
Hong Y et al., 2013 ⁵²	China	✓	✓	
Hsu Y-Y et al., 2009 ¹¹	Taiwan	✓		
Hsu Y-Y et al., 2010 ⁴⁵	Taiwan			✓
Johnson DC et al., 2014 ⁶⁴	Nepal	✓	✓	
Juntasopeepun P et al., 2011 ⁷⁰	Thailand			✓
Juntasopeepun P et al., 2012 ⁷¹	Thailand		✓	✓
Juntasopeepun P et al., 2012 ¹⁰	Thailand		✓	✓
Kang H-Y et al., 2011 ³²	Korea		✓	✓
Kang HS et al., 2010 ¹⁶	Korea			✓
Kang HS et al., 2010 ³¹	Korea			✓
Kang HS et al., 2011 ³³	Korea			✓
Kim H-W et al., 2012 ¹⁹	Korea		✓	✓
Kruiroongroj S et al., 2014 ⁶⁹	Thailand		✓	
Kuo PF et al., 2014 ⁴³	Taiwan			✓
Kwan TTC et al., 2008 ²³	Hong Kong		✓	✓
Kwan TTC et al., 2016 ²⁷	Hong Kong		✓	✓
Kyu E et al., 2014 ²⁰	Korea			✓
Lan Y-L et al., 2013 ⁴⁴	Taiwan			✓
Lee A et al., 2014 ⁴⁶	Hong Kong		✓	
Lee E-J et al., 2011 ²¹	Korea		✓	✓
Lee PWH et al., 2007 ²⁹	Hong Kong		✓	✓
Li J et al., 2009 ⁵⁵	China		✓	✓
Li SL et al., 2013 ⁶⁸	Hong Kong			✓
McNair R et al., 2008 ⁴⁸	Australia		✓	✓
Miyagi E et al., 2014 ⁶¹	Japan		✓	
Montgomery MP et al., 2015 ⁵⁷	India	✓	✓	
Park J-S et al., 2011 ²²	Korea	✓	✓	✓
Paul P et al., 2012 ⁶⁵	Vietnam		✓	✓
Pitts M et al., 2009 ⁶²	Singapore	✓	✓	✓
Pitts M et al., 2007 ⁵⁰	Australia	✓	✓	✓
Rashid S et al., 2016 ¹²	India	✓	✓	✓
Sam I-C et al., 2009 ⁴⁰	Malaysia	✓	✓	✓
Siddhartar J et al., 2014 ⁵⁸	India	✓	✓	
Siu JY-M, 2014 ⁶⁷	Hong Kong			✓
Tu Y-C et al., 2015 ⁴⁶	Taiwan		✓	✓
Tung ILY et al., 2016 ⁴⁷	Australia		✓	✓
Wadhwa P et al., 2014 ⁵	Cambodia		✓	
Wang LDL et al., 2015 ²⁵	Hong Kong			✓
Weisberg E, 2009 ⁹	Australia	✓	✓	✓
Wong LP et al., 2010 ³⁵	Malaysia	✓	✓	✓
Wong LP, 2011 ³⁶	Malaysia		✓	✓
Wong LP et al., 2016 ³⁹	Malaysia		✓	✓
Wong WCW et al., 2009 ²⁴	Hong Kong		✓	✓
Yen CF et al., 2011 ⁴²	Taiwan	✓		
Young AM et al., 2010 ⁶³	Philippines			✓
Yu Y et al., 2016 ⁹	China	✓	✓	
Zhuang QY et al., 2016 ¹⁷	Singapore		✓	✓

recruited online showed better awareness, compared to women attending a healthcare facility, household recruitment, or an institution of higher learning.⁶² Those with university education or higher were 16% more likely to be aware of HPV infection and vaccine in one study.⁴³ Those with higher monthly household incomes also had better

awareness on HPV infection and vaccine by 12% in one study.⁴³

Awareness levels of female sex workers were similar^{5,53} compared to women visiting obstetrics and gynaecology clinics,^{30,38,41,59,67} women attending college,^{33,47} school girls,⁶⁹ mothers of school girls,¹⁰ and women from community

settings.^{58,63} It was also found that Australian women recruited from healthcare settings had a better awareness (51% to 83%) compared to women from neighbouring countries.^{51,52} Noticeable differences on awareness were also identified between women residing in urban and rural areas, with women residing in townships or cities being more aware of HPV infection, HPV vaccine, and cervical cancer compared to women recruited from rural settings.^{35,39,56,57,65} Respondents who were in a relationship or married were more likely to have heard of the HPV vaccine than those not in a relationship.^{36,37}

Source of information on HPV infection and HPV vaccine

Most respondents recruited from healthcare settings and universities largely heard of HPV infection and vaccine from mass media sources, which includes television^{4,26,27,33,36,45,55} magazine,^{4,27,36,51,33,36} and newspapers.^{26,27,36,51} In addition, university students disclosed their respective universities as a source of information about HPV and its vaccination.^{11,23,25} However, among school-going adolescent girls or college girls aware of HPV infection and vaccine, approximately half of them heard about it from doctors^{40,44} and teachers.^{40,44} Women recruited from community settings either heard about it from friends^{18,37,63} or media sources,^{35,37,51,58,63} while friends were cited as the main source of information for women residing in rural areas in one study.³⁷ The channelling of information from media sources and school, was found to lead to an increased level of knowledge in one study.²⁷

Knowledge

Knowledge level of practices and preventive actions of HPV infection and cervical cancer

Knowledge of practices and preventive measures of HPV infection and cervical cancer was examined in most included studies (48/63), however, assessment of knowledge and reporting measures on knowledge level markedly varied across these studies. Despite good awareness levels among women in six studies,^{27,42,49,54,62,67} knowledge levels among respondents were reported to be inadequate. By collectively examining the descriptive statistics on questionnaire items (which included percentages, median score, mean, and standard deviation) or qualitative synthesis, most studies reported knowledge deficits and misconceptions among women.^{10,13,15,19,22,24,27,28,33,36,38,40-42,47,49,53-57,62,63,65,66,70,72} Many studies reported that most women (40–94% of study respondents) did not know the link between HPV and cervical cancer,^{13,24-26,28,30,33,37,38,40-42,45,47,49,53-55,57,58,65,66,70} and the transmission route of HPV.^{13,24,36-38,40,41,47,53,57,70}

Similar to awareness levels, knowledge levels among female sex workers^{5,53} were similar to women recruited from other settings.^{41,55,59,63,72} Women with lower educational backgrounds had less knowledge of HPV infection, HPV vaccine, and cervical cancer compared to women with higher educational levels (undergraduate degree or higher).^{10,15,36,37,43,55-57,63,65,67} Two studies demonstrated that women unaware of HPV infection or vaccine were less knowledgeable than women aware of HPV infection or vaccine.^{11,49} Overall, the unemployed/house wives,

and skilled women/artisans seemed to have less knowledge than professionals or those in managerial positions.^{10,40} Having children,^{15,18} and a history of regular pap smear testing^{43,49,53,57} also influenced the level of knowledge in women. Two studies^{10,27} showed no association between the household income level of respondents or their parents with knowledge level, whereas with one study demonstrated improved knowledge with higher income status.⁵⁷ The knowledge levels of women who were vaccinated relative to women who weren't vaccinated against HPV were mixed, with two studies reporting significant differences,^{19,66} while one study reported otherwise.²⁴ Age of respondents was observed to be associated with knowledge levels, however, age groups differed markedly across studies, causing difficulty in comparing and contrasting between studies.^{11,27,37,38,43,53,55,57,67,73}

Readiness for HPV vaccination

Recommendations/ opinions from others to receive HPV vaccination

Influence from others such as partners/husbands,^{57,64} family members and friends,^{18,40,44,48,64} and healthcare providers such as a physician^{4,37,64,73} were seen as facilitators to a woman's intention to receive the vaccine. Indeed women who received support and encouragement from family/friends,^{18,26,28,44,48,64} and recommendations from doctors^{17,26,32,34,48,64} were more likely to receive the vaccine. One study reported that recommendations from doctors or friends and family are a more common reason to initiate HPV vaccination in younger women compared to older women.⁴⁶ However, most women stated that doctors rarely discussed HPV vaccination with them,^{4,26,34} and the same was applied to discussions with family and friends.^{26,48,51}

Cost and reluctance to pay out-of-pocket for HPV vaccination

In terms of cost, very few women were reluctant to pay for the full course of the vaccine at market price,^{14,27-29,32,34,43,64,69,70} with participants with lower educational levels,^{41,43} lower monthly household incomes^{41,43,69} living in rural areas,⁴¹ and no history of Pap Smear testing⁴³ being less agreeable to pay for it. Those who were unaware of the HPV vaccine were also less likely to pay for it compared to those who were aware of it.⁴³ The cost of the vaccine was not a barrier to women who were offered fully-subsidized HPV immunisations, such as in Australia.⁴⁸

Concerns about HPV vaccination

Concerns on the adverse effects of vaccination were highlighted in 14 of the included studies.^{10,17,25,27,31,32,36-38,41,42,48,60,68,69} This issue was raised among 12% to 69% of respondents who opposed HPV vaccination. It was the major concern in five studies^{25,32,36,48,60} second^{27,38,41} or third most common reason cited^{10,31,68,69} in seven studies, while respondents in three studies were least concerned about this issue.^{17,37,42} Women who had doubts on the efficacy of the vaccine made up 28% to 55%

of study respondents.^{32,36,37,41,44,57} Both of these concerns were associated with education level in one study.^{31,44}

Some studies have reported shyness among 21% to 30% of women to receive the cervical cancer vaccine.^{36,37,54} Perceived embarrassment of receiving the vaccine was significantly associated with knowledge of cervical cancer and risk factors in one study.³⁶ Education level and monthly income was not associated with shame of receiving the vaccine in one study.²⁰

Fear of getting vaccinated or dislike towards the injection^{4,28,38,54,64} was reported by 21% to 28% of women when they refused HPV vaccination. Five studies reported the issue of risky sexual behaviours or premarital sex, although it was present only in 5% to 33% of respondents.^{32,34,41,48,68}

Perceives themselves or their daughters as low risk of acquiring HPV infection

In summary, women in SEAR and WPR appear unable to make informed decisions on HPV vaccination due to severe low risk of acquiring HPV infection and cervical cancer as identified in 12 of the included studies, regardless of the study country and type of respondents.^{10,22,28,29,35,40,41,48,49,54,58,60,68,69,73} Only 6% to 30% of women recruited from schools, community, and universities^{10,27,35,37,53,64,70} felt themselves at risk of getting HPV or cervical cancer, and were also of the opinion that their daughters were too young to receive vaccination. In addition, these studies did not explore the reasons why women thought they or their daughters had a low risk of HPV infection or cervical cancer. One study reported that older women were more likely to perceive themselves as being at risk of getting HPV compared to their younger peers.⁴⁶

Discussion

This scoping review maps all evidence on influencing factors that may lead to HPV vaccine hesitancy among women in SEA and WP. In a region with a high mortality rate of cervical cancer,^{1,7} an insight into the common reasons why women refuse HPV vaccination will help inform the development of strategies to improve vaccine uptake in LMICs. As echoed by findings from international literature, the decision-making process of a woman is influenced by a myriad of factors and is discussed below.^{8,74-76}

There were more publications studying factors that influence women in making an informed decision on HPV vaccination between year 2010 to 2011, and this may be due to low vaccine uptake which may have then triggered an assessment on what hinders women in taking the HPV vaccine since its licensure in 2006.^{17,19,22,23,33,37,39,43,67,71} Having said so, it could also be a foundation to develop HPV immunisation programs in their countries by understanding people's concerns and perceptions. Irrespective of a country's income status, cervical cancer mortality rates, and HPV immunisation programs; the influencing factors that arise when a woman decides to obtain the vaccine were similar in both SEAR and WPR, as well as other countries at an international level. Themes on knowledge, awareness, safety and efficacy of the vaccine, effect on sexual behaviour, and cost of vaccination, also appeared in four systematic reviews in which three of it was a review on high-

income countries (HIC) (mostly studies in USA, with a smaller proportion in UK, Canada, Australia, and some European countries) and one on a low-income country (Africa).^{8,77-79}

Our review reports that the cost of the HPV vaccine is a significant barrier among women in both SEAR and WPR, as demonstrated by the reluctance of most women to pay for it themselves. As expected, financial concerns were a more profound barrier in women from poor families or rural residence due to the lower socioeconomic status of these populations. This barrier did not appear in Australian studies, where a nationally-funded HPV immunisation program resulted in a coverage rate of 73.4% for females aged 15 years, with 82.7% having received at least one dose.⁸⁰ Cost of the vaccine was also a reported barrier among women in HIC such as USA, where a review by Kessels SJM et al. found that girls without health insurance were less likely to get vaccinated.⁸ Systematic reviews of studies involving young women and US adolescents by Holman DM et al. and Ferrer HB et al., concluded that cost was a barrier in the uninsured,⁷⁴ families with lower household incomes,⁷⁸ ethnic minorities,⁷⁸ and immigrant women.⁷⁸ This further cements the fact that financial liabilities would be a barrier to women of lower socioeconomic status. Government subsidies, donation programs, and insurance coverage for HPV vaccination would be useful to curb the costs associated with the vaccination.

Another factor that influences a woman's decision to obtain or oppose HPV vaccination is the concern on the side-effects of the vaccine. This concern was prevalent in both this review and international literature. In SEAR and WPR, regardless of study setting and geography, women had concerns on the side effects of the vaccine, which stemmed from doubts about its safety and efficacy.^{10,17,25,27,31,32,36-38,41,42,48,60,68,69} No particular side-effect was reported by respondents in the included studies, except the study by Chan KKL et al. where women were concerned with the duration of side-effects and whether it would affect their appearance.³¹ In a study by Cunningham MS et al. in the African region, 37% of parents brought up concerns on adverse effects and safety.⁸¹ This concern was also cited in a study by Holman DM et al. in the US, but it was not mentioned how common or important this concern was among US parents. Similar to other available vaccines, the side-effects of the HPV vaccine related to injection site are pain, erythema, and swelling, whereas the common systemic adverse effects are headache, pyrexia, nausea, dizziness, and fatigue.⁸² It may be possible that parents and the women themselves have the perception that the occurrence of side-effects is frequent. However, studies have shown that allergic reactions are actually extremely rare, and only affect 3 out of a million people.⁸³ In addition, a study by Joura EA et al. reported that less than 0.1% of its study participants (n = 14,149) dropped-out from their study because of injection site-related and systemic side effects.⁸² Fear of needles and syringes also seems to arise from the psychology of the person receiving it, further enhancing a reason for vaccine hesitancy.

In general, irrespective of the participant's sociodemographic and geographic background, most included studies reported that women's knowledge of HPV, and awareness of its symptoms and prevention were cursory in SEAR and WPR. In addition, women's awareness on HPV infection, HPV

vaccination, and cervical cancer does not warrant a good knowledge on these aspects. From previous studies, it was observed that respondents do have an awareness of HPV infection, HPV vaccination, and cervical cancer,^{27,42,49,54,62,67} however, most are unaware of the cause of cervical cancer,^{13,24-26,28,30,33,37,38,40-42,45,47,49,53-55,57,58,65,66,70} the route of transmission of HPV infection^{13,24,36-38,40,41,47,53,57,70} and some did not know three doses of the vaccine were needed for full-effect.⁵⁰ Most women, adults and parents alike who were recruited from community and university settings, received HPV-related information from media sources, largely from television, newspapers, and magazines. Adolescent girls on the other hand received HPV-related information from their respective schools or teachers. Hence, to improve the health literacy levels on HPV infection and vaccination, a school-based education program for HPV will help improve awareness and knowledge among young adolescent girls. In comparison, mediums such as television, magazines, and newspapers will be effective in promoting knowledge on HPV infection to the general public. Poor health literacy levels on HPV-related aspects did not appear in international literature, although knowledge level was linked with vaccine acceptance. A comprehensive report of US studies by Brewer NT et al. before HPV vaccination licensure, reported that studies showed mixed findings between HPV knowledge and vaccine acceptability.⁸⁴ Similar findings were apparent in countries in Africa, where the association between knowledge level of Pap Smear test with vaccine acceptability was mixed.⁸¹

Physicians' recommendations were mostly requested by young women and parents themselves in both SEAR and WPR alike when deciding on HPV vaccination. Healthcare providers as a trusted source of information, were consistently cited when parents and young women were asked whom they trusted for more information on HPV vaccination. This need was similar to parents and women in other countries. A review by Kessels SJM et al. reported that a doctor's recommendation, or having discussed the vaccine with a healthcare provider, was a positive predictor for initiating the HPV-vaccine course.^{8,78} Recommendation from a healthcare provider was an important cue for acceptance for parents in Africa, although some stated they did not trust doctors.⁸¹ Higher uptake was also found if the source of information were family and friends in HIC, while acknowledgment that members of their communities and others held favourable attitudes towards the vaccine was found to be important in African societies.^{8,81} It is recommended that pamphlets on HPV vaccination be available in clinics and hospitals to help motivate the public to make enquiries on HPV vaccination. Physicians and other healthcare professionals should also be prepared to provide strong recommendations to their patients on the benefits of HPV vaccination, and assure the public that the side-effects are treatable. In addition, health promotion programs for HPV vaccination conducted in schools and universities/colleges can be delivered to improve the health literacy levels of the targeted population (i.e. young adolescent girls and young women) to enable them to make informed decisions.

A low perception of contracting HPV infection and cervical cancer was evident among young women and female

parents in both SEAR and WPR, resulting in a lack of urgency to receive HPV vaccination. It is possible that these women do not understand the risks factors that can lead to HPV infection. Studies in Africa had mixed reports, where parents perceived the risk for HPV infection and cervical cancer as high (41% to 78%) whereas those in universities felt the risk was low (6% to 7%).⁸¹

In summary, women in SEAR and WPR are unable to make informed decisions due to severe knowledge deficits on HPV-related aspects. This is evident from their request for more information, poor knowledge and awareness, low perceived risk of acquiring cervical cancer, and a preoccupation with the occurrence of side-effects with HPV vaccination. Lack of communication between healthcare providers and young women or parents on HPV vaccination could also explain the low uptake of the vaccine in the targeted population. Cost of the HPV vaccine is also a significant barrier among women in settings where they have to pay for the vaccine themselves.

Strength and limitations of this review

A systematic search of multiple databases resulted in the identification of all relevant literature on the decision-making process with regard to HPV vaccination. Studies were not excluded on the basis of research methods used or publication dates, but were selectively confined to women in WHO SEAR and WPR, providing a good reflection on vaccine refusal in LMICs. However, there were some limitations. There was a paucity of studies on this topic in some countries in SEAR and WPR, hence, the state of HPV vaccine uptake and the influencing factors in the decision making processes has yet to be established in some of these countries.

The findings from this review cannot be generalised to all low-income countries as there may be pilot schemes or GAVI projects which make vaccine refusal not applicable in these settings. Lack of sufficient English data in the abstract, and the exclusion of non-English research papers from this review could have introduced bias. Furthermore, not many of the included studies were conducted in rural settings or recruited ethnic minorities, causing some concerns such as issues of access to a healthcare facility, omitted from this review. Further research is needed to understand barriers in obtaining HPV vaccination in women residing in rural areas or ethnic minorities. Finally, there was a pronounced lack of standardisation in the measurement tools used, causing difficulty in comparison and contrasting of evidence.

Conclusion

Our findings show that the decision-making process of women in obtaining the HPV vaccine is governed by the perception of the women themselves, and the views of a third party, such as family, friends, and healthcare professionals. Future development of health promotion programs for HPV vaccination should highlight the benefits of the HPV vaccine, and how it outweighs the risks involved in vaccination. More cost-effective and culturally-appropriate strategies are also needed to improve access to the HPV vaccine.

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