

REVIEW

HPV Vaccine Acceptance among Women in the Asian Pacific: A Systematic Review of the Literature

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Abstract

Objective: To inform human papillomavirus (HPV) vaccination programs in the Asian Pacific region by elucidating factors associated with women's intent to receive the vaccine. **Methods:** Quantitative and qualitative studies on female HPV vaccine acceptance within countries of the Asian Pacific region were systematically reviewed. Academic Search Premier, CINAHL, Medline, Psychology and Behavioral Sciences Collection, PsycINFO, and Sociological Collection were searched for original research articles exploring primary acceptance of the HPV vaccine among women published between January 1995 and February 2010. **Results:** Of the 60 studies yielded by the search, 18 met inclusion criteria (13 quantitative, 5 qualitative). All quantitative studies were cross-sectional and all but one assessed vaccination intent rather than actual uptake. Awareness and knowledge of HPV, HPV-related conditions, and HPV vaccination varied greatly among studies. Several studies found women's perceived susceptibility to HPV-related conditions to be positively associated with HPV vaccine intent. Across seven quantitative studies in five countries, women's concerns about the vaccine's safety and efficacy were associated with their intent to be vaccinated. Social consequences and support from social referents were also influential in many women's decisions. Qualitative research also revealed that many women were concerned that the vaccine would affect fertility. **Conclusion:** HPV vaccine campaigns should address gaps in knowledge regarding HPV, genital warts, and cervical cancer, and should attend to concerns about vaccine safety and efficacy. Strategies should also be undertaken to decrease social stigma surrounding receipt of the HPV vaccine and to foster familial and partner support of women's decision to be vaccinated.

Keywords: HPV vaccination - women's intent - knowledge - social stigma

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Introduction

Over half of the world's cervical cancer cases and deaths occur in the Asian Pacific region (Parkin et al., 2008). Among and within nations of the Asian Pacific region, substantial variations in cervical cancer incidence and mortality exist (Garland et al., 2008; Parkin et al., 2008). Cervical cancer incidence in Malaysia, Sri Lanka, Vietnam, Indonesia, and the Philippines is among the highest in the world (Ferlay et al., 2004). In Southeast Asian countries, vaccination of pre-adolescent females against HPV-16 and -18 has the potential to reduce lifetime risk of cervical cancer by up to 57% (Goldie et al., 2008). This estimate, however, is based on the contingency that 70% population coverage is achieved. The extent to which population coverage is achieved plays a significant role in determining the impact and cost-effectiveness of HPV vaccine initiatives in developing countries (Goldie et al., 2008).

The feasibility of achieving extensive population coverage will depend in part on cultural acceptability of the vaccine. In recent years, several studies have been undertaken to explore HPV vaccine acceptance within

countries of the Asian Pacific. As HPV vaccine programs are initiated across the region, policy makers, public health officials, and health practitioners could benefit from a synthesis of the findings relative to HPV vaccine acceptability in their respective populations. Accordingly, the purpose of this review is to provide a systematic summary of findings from female HPV vaccine acceptance studies that have been conducted within the Asian Pacific region.

Materials and Methods

Published manuscripts presenting quantitative and/or qualitative data on female HPV vaccine intention and/or acceptability were sought. Academic Search Premier, CINAHL, Medline, Psychology and Behavioral Sciences Collection, PsycINFO, and Sociological Collection were searched for original research articles exploring primary acceptance of the HPV vaccine among women. Studies assessing parental, physician, or policy-maker acceptance were excluded. The search was limited to English-language, peer-reviewed manuscripts published between January 1995 and February 2010. The search terms were

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HPV vaccine*; AND accept*, intent*, attitude*, belief*, perc*, or uptake; AND Australia, Bangladesh, Bhutan, Brunei, Cambodia, China, Fiji, Guam, India, Indonesia, Japan, Korea, Laos, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Thailand, Vanuatu, or Vietnam. The citations and abstracts identified in the original search were reviewed to identify studies which met the inclusion criteria. An abstraction form was created to summarize information from included studies regarding their research setting, sample characteristics and sampling technique, study design, measure of acceptability and findings on acceptability, as well as information on potential cognitive, attitudinal, social, behavioral, and structural correlates. The abstraction form also captured studies' findings, limitations, strengths, and implications for practice.

Results

Figure 1 describes the articles identified and the characteristics of those excluded. The original searches yielded an initial set of 60 citations and abstracts, 39 of which did not meet inclusion criteria. Of the remaining

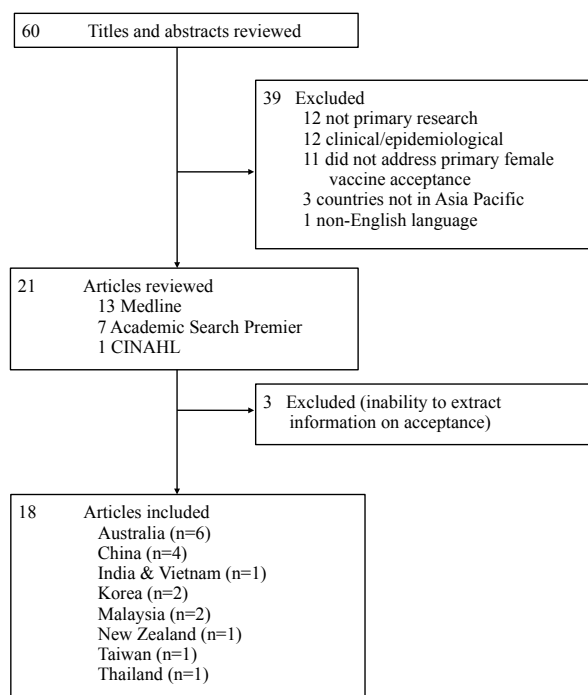


Figure 1. Review of Articles for Inclusion in Systematic Review

Table 1. Characteristics of Quantitative Studies of Awareness, Knowledge, and Attitudes Toward HPV, HPV-Related Conditions, and the HPV Vaccine in Asian-Pacific Countries

Country	Author (Year)	Year of study	Methods ^a	N	Age	Sample
Australia	Giles & Garland (2006)	-	SAQ	90	18-30	Convenience sample (30 from HPV vaccine trial, 30 from local university health clinic, 30 from cervical dysplasia clinic)
	Marshall et al. (2007)	2006	CATI	1021	18-75	Adult females from randomly selected households in metro and rural areas of South Australia
	McNair, Power, Carr (2009)	2007	SAQ	309	14-67	Convenience sample of women at a university, women at lesbian/gay community festival, from gay/lesbian support groups and email listservs
	Weisberg et al. (2009)	2008	SAQ	294	15-26	Convenience sample of clients under age 26 attending family planning clinic in metro area of New South Wales
China	Li et al. (2009)	2005-07	IAQ	6024	14-59	Non-randomized cluster sampling of diverse areas of China
	Kwan et al. (2008)	2007	SAQ	64	13-20	Purposive sampling of healthy adolescent girls from a community youth center and a secondary school
	Kwan et al. (2009)	2007	SAQ	1450	18-50+	Convenience sample of women over age 18 attending family planning association
Malaysia	Wong & Sam (2010)	2007	F2Fi	650	μ : 21.5	Convenience sample of university students in Kuala Lumpur
New Zealand	Chelimo & Wouldes (2009)	2008	SAQ	159	18-20+ μ : 20	Convenience sample undergraduate students in course taught by author
South Korea	Kang & Moneyham (2010)	2008	SAQ	1359	18-32	Convenience sample of students from 16 colleges in 16 regions of South Korea
	Oh et al. (2010)	2007	F2Fi	504	20-50+	Probability random sampling from 15 provinces, including urban, metro, and rural areas
Taiwan	Hsu et al. (2009)	2007-08	SAQ	845	17-36	Convenience sample of undergraduate students from 5 universities
Thailand	Nganwai et al. (2007)	2006	SAQ	133	21-56	Systematic random sample of nurses from university hospital

SAQ: Self-administered questionnaire, CATI : Computer-assisted telephone survey, IAQ: Interviewer-administered questionnaire, F2Fi : Face-to-face interviews, μ : mean; ^a All studies were cross-sectional

Table 2. Characteristics of Qualitative Studies of Awareness, Knowledge, and Attitudes Toward HPV, HPV-related Conditions, and the HPV Vaccine in Asian-Pacific Countries

Country	Author (Year)	Year of study	Methodology	N	Age	Sample
Australia	Rosenthal et al. (2007)	2005	5 FGDs	34	22-71	Convenience sample of (1) newly arrived women from Iraq, (2) women over age 50, (3) young mothers, (4) women attending technical education institution, (5) women's health nurses
	McClelland and Liamputtong (2006)	-	Face-to-face interviews	7	18-23	Snowball sampling of women ages 18-23 living in Melbourne
China	Lee et al. (2007)	2006	7 FGDs grouped by age	49	18-58	Purposive sampling; 6 FGDs from women's health clinic of family planning association and 1 FGD from community
Malaysia	Wong (2008)	-	7 FGDs grouped by ethnicity (3 Malay, 2 Chinese, 2 Indian)	40	13-27	Snowball, purposive sample of young unmarried women
India	Bingham, Drake, & LaMontagne (2009)	2007-08	26 FGDs	420	10-80	Purposive sampling of adolescent girls (ages 10-14), parents/guardians/relatives, community and religious leaders, education and health personnel, immunization experts, policymakers, and policy 'influencers' from the states of Andhra, Pradesh, and Gujarat.
Vietnam		2007-08	16 IDIs 8 FGDs			Purposive sampling of adolescent girls (ages 11-14), parents of adolescent girls, community leaders, immunization experts, health program managers, and education and health personnel

FGD: Focus group discussion; IDI: in-depth interviews

21 articles, three additional studies were excluded as one failed to distinguish between attitudes of mothers, fathers, men and women in its findings (Wong, 2009), one did not explicitly address vaccine acceptance (Power et al., 2009), and the other did not have an independent measure of women's personal acceptance of the vaccine (Pitts et al., 2009).

The 18 articles selected for inclusion in this review represent nine countries. Australia (n=6) and China (n=4) accounted for over half of the studies; India, Korea, Malaysia, New Zealand, Taiwan, Thailand, and Vietnam were also represented. Data from India and Vietnam were reported in one study (Bingham et al., 2009a), the methods of which were extracted from original reports of the data (PATH and NARI, 2008; PATH and NIHE, 2009; Bingham et al., 2009b). All of the quantitative studies were cross-sectional, with sample sizes ranging from 64 to 6024 (see Table 1). Four of the five qualitative studies entailed focus group discussions and one involved face-to-face interviews; sample sizes ranged from 7 to 420 (see Table 2). Overall, nine of the eighteen studies involved a convenience sample (Chelimo and Wouldes, 2009; Giles and Garland, 2006; Hsu et al., 2009; Kwan et al., 2009; McNair et al., 2009; Weisberg et al., 2009; Kang and Moneyham, 2010; Wong and Sam, 2010). The convenience samples were recruited primarily from universities (Chelimo and Wouldes, 2009; Hsu et al., 2009; Kang and Moneyham, 2010; Wong and Sam, 2010) or from clinic-based settings (Giles and Garland, 2006; Kwan et al., 2009; Weisberg et al., 2009). Three studies involved systematic random sampling, including one from South Australia (Marshall et al., 2007), one from 15 provinces of South Korea (Oh et al., 2010), and one from nurses in a university hospital in Thailand (Nganwai et

al., 2008). One study employed non-randomized cluster sampling to capture a sample of women representing diverse areas of China (Li et al., 2009). Qualitative studies relied primarily on purposive and snowball sampling (McClelland and Liamputtong, 2006; Lee et al., 2007; Wong, 2008; Bingham et al., 2009a).

Table 3. Awareness and Knowledge of HPV and HPV-related Conditions in Asian-Pacific Countries

Author (year)	Awareness %	Knowledge, %		
		STI	CC	GW
Quantitative studies				
Chelimo & Wouldes (2009)	64	36	--	--
Giles and Garland (2006)	73-100	83-90	33-73	70-100
Hsu et al (2009)	50	--	--	--
Kang & Moneyham (2010)	--	--	--	--
Kwan et al (2008)	0	--	--	--
Kwan et al (2009)	38	50 ^a	~33 ^a	--
Li et al (2009)	16	--	48 ^a	8 ^a
Marshall et al (2007)	--	--	2	--
McNair et al (2009)	68	56 ^a	43 ^a	--
Nganwai et al (2007)	--	72	82	--
Oh et al (2010)	--	--	19	--
Weisberg et al (2009)	--	--	--	--
Wong & Sam (2010)	22	10	27	--
Qualitative studies				
Bingham et al (2009a)	--	--	Low	--
Lee et al (2007)	10	0	Low	Low
McClelland and Liamputtong (2006)	Low	Low	Low	Low
Rosenthal et al (2007)	Low	--	Low	--
Wong (2008)	Low	--	Low	--

STI, is a sexually transmitted infection; CC, causes cervical cancer; GW, causes genital warts; ^aAmong participants who were aware of HPV

Awareness of HPV varied greatly among studies; and studies varied in which, if any, aspects of HPV knowledge they assessed (see Table 3). Across seven studies, awareness of HPV ranged from 0-100%. Six studies specifically assessed women's awareness that HPV could be sexually transmitted, revealing a range of 10-90% of women who were knowledgeable of this aspect of HPV. Across eight studies, 2-82% of women were aware that HPV causes cervical cancer. Only four studies assessed women's knowledge of the link between HPV and genital warts, revealing disparate levels of awareness (Giles and Garland, 2006; Li et al., 2009).

HPV vaccine awareness and acceptance

Though all studies assessed attitudes toward HPV vaccination, only eight quantitative studies assessed baseline awareness of the HPV vaccine (see Table 4). Between 10% and 83% of women were aware of the existence of the HPV vaccine (Weisberg et al, 2009; Wong and Sam, 2010). Intra-country variation in HPV vaccine awareness was also present, as within Australia awareness ranged from 33% to 83% (Giles and Garland, 2006; Weisberg et al., 2009). The variability in HPV vaccine awareness across studies can likely be attributed in part, to the year of data collection relative to the year of the countries' approval of the vaccine (see Table 1). In the three studies which conducted data collection most recently (in 2008), awareness of the HPV vaccine was higher on average (range: 57% - 83%) than was found across all studies (Chelimo and Woulde, 2009; Hsu et al., 2009; Weisberg et al., 2009; Kang and Moneyham, 2010). HPV vaccine awareness also varied according to the sample; in clinic-based samples awareness ranged from 33% to 83%, and in university-based samples ranged from 10% to 57%. The two community- and population-based studies found HPV vaccine awareness to be 54% and 55%, respectively (McNair et al., 2009; Oh et al., 2010).

Levels and measures of HPV vaccine acceptance also varied greatly across studies (see Tables 4 and 5). In qualitative studies, attitudes toward vaccination were relatively positive, though various concerns were expressed. Ten of the thirteen quantitative studies assessed acceptance as a dichotomized or categorized outcome, while one analyzed it as continuous with a 5-point Likert scale. Overall, seventeen of the eighteen studies assessed acceptance in terms of hypothetical intent to be vaccinated; only one study assessed actual uptake of the separate vaccine doses (Weisberg et al., 2009). Not all manuscripts explicitly described the wording of their acceptance measure. While some measures of acceptance were fairly ambiguous and neutral (i.e. "would consider having the vaccine", "willing to be vaccinated", "would like to have the vaccine", etc), others contained wording that qualified the meaning of acceptance and created nuances which may have influenced participants' responses. For example, the study by Kwan et al., (2009) which involved a clinic-based sample of Chinese women assessed acceptance with the following item: "A vaccine against cervical cancer is now available, how likely is it that you will take the vaccine?" (emphasis added). In this case, 88%

of women reported positive likelihood of receiving the vaccine (Kwan et al., 2009). Wording which circumvents the vaccine's sexually-related characteristics could elicit different responses than does wording which is explicit about sexual-transmission of HPV. Likewise, wording which assesses acceptance of a 'free' HPV vaccine, such as that used by Chelimo and Woulde (2009), could lead to quite different responses than a more ambiguous item that does not address cost. Two studies introduced the dimension of time into its measure of acceptance by asking women if they would get the vaccine 'as soon as possible' or 'now' (Giles and Garland, 2006; Kwan et al., 2008). Another study asked women, "Would you be vaccinated against HPV if HPV infection is preventable?" (Oh et al., 2010). The various qualifiers added to measures of acceptance may have contributed to the variation found in prevalence of acceptance across studies (range: 31% to 88%) (Giles and Garland, 2006; Chelimo and Woulde, 2009). In most cases, the percentage of women indicating awareness of the HPV vaccine did not differ drastically from the percentage indicating acceptance. In four studies, however, the prevalence of acceptance differed from that of awareness by more than 10%. In three of these four studies, more women indicated acceptance of the vaccine than did initial awareness (Chelimo and Woulde, 2009; Kwan et al., 2009; Wong and Sam, 2010). In the other study, the only one covered by this review that assessed actual vaccine uptake, HPV vaccine awareness and acceptance were discrepant in the reverse direction (83% and 57%, respectively) (Weisberg et al., 2009).

Factors associated with intent to be vaccinated

Most quantitative studies examined factors associated with vaccine acceptance through the use of descriptive statistics and bivariate tests. Four studies used logistic regression to examine factors which were independently associated with vaccine acceptance (Marshall et al., 2007; Hsu et al., 2009; Kwan et al., 2009; Oh et al., 2010). Four of the eight studies reporting factors related to vaccine acceptance identified younger age to be positively associated with intent (Marshall et al., 2007; Kwan et al., 2009; McNair et al., 2009; Oh et al., 2010). Certain aspects of sexual behavior were also found to be associated with increased acceptance. Women with sexual debut between the ages of 16 and 20 were found to have higher acceptance in the clinic-based study conducted by Kwan et al (2009). In the study by Hsu et al(2009), sexual experience was independently associated with vaccine acceptance, even after adjustment for other attitudinal and demographic factors. Similarly, the population-based study by Marshall et al(2007), found that women who indicated negative intent of receiving the vaccine were more likely to be monogamous than those who indicated positive intent.

Ten quantitative studies assessed some aspect of HPV knowledge and/or awareness (Table 3), however, only three studies explicitly listed knowledge as a factor positively associated with vaccine acceptance (Hsu et al., 2009; Oh et al., 2010; Wong and Sam, 2010) and only one listed insufficiency of information as associated with vaccine refusal (Weisberg et al., 2009). Attitudinal factors were more commonly associated with vaccine intent than

Table 4. Quantitative Studies on HPV Vaccine Awareness, Acceptance, and Factors Associated with Intent to be Vaccinated

	Awareness, %	Acceptance, %	Measure of Acceptance	Associated with acceptance/positive intent	Associated with negative intent/concerns about vaccination
Chelimo & Woulles (2009)	57	88	Would receive the HPV vaccine if it was free	--	--
Gilles and Garland (2006)	33	31	"If HPV vaccine was available would you get the vaccine as soon as possible?"	---	---
Hsu et al. (2009)	57	63	"What is your likelihood of obtaining the HPV vaccine?" (visual analogue scale dichotomized at the median)	Recommendation from others; perceived severity; vaccine cost/availability; awareness of HPV and the vaccine; sexual experience	--
Kang & Moneyham (2010)	--	3.04	Single item on 5-point Likert scale	Belief in the importance of the vaccine in preventing genital warts and cervical cancer; fewer safety concerns; higher perceived need for vaccine; belief that it would not lead to risky sexual behavior	On a 5-point scale (1 strongly agree, 5 strongly disagree): Fear of side effects: 2.5 Fear it has not been widely tested: 2.7 Concern about long term effects: 2.6 No personal need for vaccine: 2.9
Kwan et al. (2008)	< 50	51	"If this vaccine is available for you now, how likely is it that you will have it?" 4-point Likert scale	Attitudes toward vaccination (i.e. belief in its necessity, value, and perceived benefits); perceived family and peer support for vaccination	Costs; potential discomfort; adverse effects (in particular, on fertility and appearance); number of injections required; duration of effectiveness; sexual inexperience
Kwan et al. (2009)	50	88a	"A vaccine against cervical cancer is now available, how likely is it that you will take the vaccine?" (6-point Likert scale); acceptance: somewhat to very likely	Women less than 50 yrs old; age of sexual debut 16-20; belief that HPV may bring end to intimate relationship; perceived family/partner approval of vaccination	Negative intent was higher among those with higher income and those who held the belief that their partner would disapprove of vaccination against HPV
Li et al. (2009)	--	85	Willing to be vaccinated	Higher in rural women; fear of getting genital warts; concern about having been infected with HPV; recommendation from doctors, nurses, and hospital lectures	Among women with negative intent: 10% believed the vaccine causes risks 12% believed the vaccine does not work 15% believed they had no risk for HPV 50% were concerned about availability of resources

were knowledge and awareness. Perceived susceptibility to HPV and/or HPV-related conditions was positively associated with acceptance in four qualitative studies (McClelland and Liamputong, 2006; Lee et al., 2007; Rosenthal et al., 2007; Wong, 2008) and four quantitative studies (Hsu et al., 2009; Li et al., 2009; Kang and Moneyham, 2010; Oh et al., 2010) and was additionally found to be low among women with negative intent in three studies (Marshall et al., 2007; Nganwai et al., 2008; Wong and Sam, 2010). Perceived safety of the vaccine was also a salient factor in women's intent to be vaccinated. Safety concerns, including fear of side effects, fear of long term consequences, and fear that the vaccine had not been tested well, were associated with intent in eight quantitative studies across five countries (Marshall et al., 2007; Kwan et al., 2008; Nganwai et al., 2008; Li et al., 2009; Weisberg et al., 2009; Kang and Moneyham, 2010; Oh et al., 2010; Wong and Sam, 2010). Some reported concerns about safety and side effects (Lee et al., 2007; Rosenthal D et al., 2007; Wong LP, 2008; Bingham et al., 2009a); in three of the five studies, women specifically cited concern about the effects of vaccination on future fertility (Lee et al., 2007; Wong, 2008; Bingham et al., 2009a). Concern about vaccine efficacy were also commonly associated with intent across several studies (Kwan et al., 2008; Nganwai et al., 2008; Hsu et al., 2009; Li et al.,

Table 4 (continued). Quantitative Studies on HPV Vaccine Awareness, Acceptance, and Factors Associated with Intent to be Vaccinated

	Awareness, %	Acceptance, %	Measure of Acceptance	Associated with acceptance/positive intent	Associated with negative intent/concerns about vaccination
McNair, Power, & Carr (2009)	54	61	Would consider having the vaccine	Younger age	-
Nganwai et al. (2007)	-	66	Would like to have the vaccine	-	Among women with negative intent: 56% were concerned about efficacy 29% were concerned about side effects 44% low perceived susceptibility
Marshall et al. (2007)	-	73	Agreed that they would personally receive the vaccine	Younger age; acceptors were more concerned about side effects than non-acceptors. Women indicated that they would be more willing to receive the vaccine if it also protected against genital warts.	Women who were least disadvantaged socioeconomically, married, monogamous, elderly, and/or not sexually active were more likely to have negative intent. Women with negative intent cited low perceived susceptibility rather than concern about side effects as a reason.
Oh et al. (2010)	55	55	“Would you be vaccinated against HPV if HPV infection is preventable?” (yes/no/uncertain)	Younger age; aware of HPV and of vaccine; perceived susceptibility to HPV	Concerns: 86% cost; 17% vaccine effectiveness; 8% need for 3 doses; 1% adverse effects
Weisberg et al. (2009)	83	58	Actual uptake of at least one dose	-	Reasons for not receiving all 3 doses of the vaccine included negative reaction to the vaccine, forgetting about subsequent doses, and having no time to return for doses. Other reasons cited for refusal of vaccine include insufficient information, dislike of injections, concern about side effects, and non-belief in vaccination in general.
Wong and Sam (2010)	10	48	Dichotomous item (agree/disagree) regarding personal willingness to receive vaccine	Knowledge about HPV, genital warts, cervical cancer, and cervical cancer risk factors	Among women with negative intent: 51% were concerned about safety/efficacy 42% had low perceived susceptibility 11% were embarrassed or afraid of stigmatization

Table 5. Qualitative Studies on HPV Vaccine Awareness, Acceptance, and Factors Associated with Intent to be Vaccinated

	HPV Vaccine Acceptance	HPV Vaccination Concerns					Other
		Side effects/safety	Effect on fertility	Encourage sexual promiscuity	Cost/access	Unsure about necessity	
Bingham, Drake, & LaMontagne (2009)	“Passive acceptance of vaccination at the household and community levels is likely to be the norm unless there are active objections owing to external factors such as cost, access, or cultural constraints such as parental, religious, or social objections” (p458)	●	●	Rare	●		That the HPV vaccine came from “rich” countries aroused suspicion and many wanted assurance that vaccine was not a form of population control.
Lee et al. (2007)	Participants accepted the vaccine as ‘additional protection against cervical cancer,’ but advised that the fact that HPV is sexually transmitted not be over-publicized.	● ^a	●		●	●	
McClelland & Liamputtong (2006)	Majority indicated that vaccination was a positive act, regardless of the nature of the infection.				●	● ^b	No clear connection between knowledge of HPV and vaccine acceptance.
Rosenthal et al. (2007)	Reservations regarding vaccination were primarily related to the sexually-transmitted nature of the virus and its being marketed toward pre-adolescent females. Participants advised that the fact that HPV is sexually transmitted not be over-publicized.	●		Somewhat		●	Desired more information about requirements for subsequent pap testing.
Wong (2008)	10% were aware of the HPV vaccine, yet 80% indicated that it was acceptable.	●	●	Rare	●	●	Women were concerned that private doctors would encourage vaccination merely to increase profits. Muslim women were interested in whether vaccine was certified as being halal.

^a Particularly those affecting appearance, fertility, and health; ^b Perceived susceptibility to HPV was the most influential factor in women’s vaccine acceptance and was influenced by participants’ previous history of STI or HPV diagnosis as well as family history of cervical cancer.

2009; Oh et al., 2010; Wong and Sam, 2010).

Many women cited concerns about social consequences of HPV vaccination. For example, in the study by Wong and Sam (2010) conducted in Malaysia, 11% of women with negative intent indicated that they were embarrassed about receiving a vaccine associated with a sexually transmitted infection. The study by Kwan et al. (2009) found that among a clinic-based sample of Chinese women, the belief that HPV infection would bring an end to an intimate relationship was positively associated with intent to be vaccinated. Similarly, a study by Lee et al (2007) of women in Hong Kong reported that women believed that infection with HPV would undermine sexual and other significant relationships. The study revealed significant stigma surrounding HPV infection, and women were shocked and in disbelief about the association between HPV and cervical cancer. In a hypothetical sense, women indicated a tendency to blame male partners and a desire to keep HPV infection secret (Lee et al., 2007). Seven studies found that vaccine recommendation and approval by social referents and/or health providers were associated with women’s intent to receive the vaccine (Lee

et al., 2007; Rosenthal et al., 2007; Kwan et al., 2008; Bingham et al., 2009a; Hsu et al., 2009; Kwan et al., 2009; Li et al., 2009). Though vaccine cost and availability of resources are likely underlying factors in many women’s decision to be vaccinated, only four quantitative studies specifically cited them as factors associated with intent (Kwan et al., 2008; Hsu et al., 2009; Li et al., 2009; Oh et al., 2010). Interestingly, two studies found that higher socioeconomic status was associated with negative intent (Marshall et al., 2007; Kwan et al., 2009).

As mentioned previously, seventeen of the eighteen studies included in this review assessed hypothetical intent or acceptance; only one assessed actual uptake of the vaccine as an outcome (Weisberg et al., 2009). For this reason, the study by Weisberg and colleagues (2009) warrants special attention. In this clinic-based study of Australian women, 58% had received at least one dose of the HPV vaccine and 27% had received all three required doses. Of the women who had not yet completed the 3-dose course of vaccination, 38% indicated that they were unlikely to complete it. Women who were unlikely to complete the vaccine series cited negative reaction to

the vaccine, forgetting to return for doses, and having no time to return for subsequent doses as reasons for their negative intent (Weisberg et al., 2009). These factors are interesting given that vaccine acceptance studies which use hypothetical intent as the outcome rarely include items associated with uptake of multiple doses. In this review, only two other studies questioned women about their attitudes toward receiving multiple doses of the vaccine (Kwan et al., 2008; Oh et al., 2010).

Discussion

Overall, findings from studies in this review indicate that HPV awareness and knowledge, as well as HPV vaccine awareness and acceptance vary greatly among countries within the Asian Pacific. Some factors, such as perceived susceptibility to HPV and perceived vaccine safety/efficacy, were associated fairly consistently with acceptance across studies. Age, sexual behavior, vaccine cost, and knowledge and awareness of HPV also arose as factors associated with intent across multiple studies and countries. The studies included in this review, however, had limitations in their design, sampling, and analytic methods, thus limiting generalizability.

All of the studies included in this review were cross-sectional and only one assessed actual vaccine uptake. Cross-sectional studies are limited in that they cannot take into account the dimension of time. For example, cross-sectional studies are unable to account for changing trends in vaccine marketing or in shifting social norms surrounding vaccination. Moreover, the knowledge generated by studies which assess hypothetical intent to be vaccinated as a measure of vaccine acceptance may not be transferrable to understandings of actual vaccine uptake.

The generalizability of the studies included in this review is also limited due to sampling techniques and target populations. Thirteen of the eighteen studies involved a convenience or purposive sample, four of which involved recruitment from universities (Chelimo and Woules, 2009; Hsu et al., 2009; Kang and Moneyham, 2010; Wong and Sam, 2010) and three of which involved clinic-based samples (Giles and Garland, 2006; Kwan et al., 2009; Weisberg et al., 2009). While these settings offer excellent access to the populations and age groups for which the HPV vaccine is intended, clinic- and university-based sampling may produce data that is not generalizable to the larger community. Clinic-based samples, in particular, may differ from the general population in terms of their care-seeking behavior, health status, and attitudes toward healthcare professionals, all of which could differentially impact their vaccine acceptance.

The comparability of studies within this review is also limited in that each study assessed vaccine acceptance differently. Moreover, not all manuscripts revealed the precise wording of their acceptance measure. While the wording of some acceptance measures was fairly ambiguous, others contained qualifiers that changed, to varying degrees, the meaning and characteristics of acceptance. Vaguely worded items which do not address cost or introduce a timeframe may create undue variance in responses, as interpretation of the item is

likely to vary from respondent to respondent. Therefore, unambiguous wording of the vaccine acceptance measure is critical to standardizing participants' responses within a study. However, when the qualifiers placed on vaccine acceptance measures vary significantly across studies, cross-study comparability becomes much more difficult. In turn, future HPV vaccine acceptance studies should disclose the precise wording of their acceptance measure in manuscripts, should move away from the one-item measure of acceptance, and should assess intent in terms of various prices, timeframes, and other contingencies.

The studies included in this review also varied in terms of the correlates that they assessed. Only three of the eighteen studies included in this review were theory- or model-based, two of which were based on the Health Belief Model (Hsu et al., 2009; Oh et al., 2010) and one on the ecological model (Bingham et al., 2009a). The Health Belief Model (HBM) (Becker, 1974) has demonstrated applicability to understandings of HPV vaccine acceptance, as revealed by a systematic review of the HPV vaccine acceptance literature in the US (Brewer and Fazekas, 2007). While qualitative studies are more exploratory in nature, quantitative studies typically involve a pre-determined set of factors to be examined. In the latter case, a theory-grounded approach can be critical to improving not only the thoroughness of assessment, but also consistency and comparability across studies.

In addition to improving assessment of correlates to vaccine acceptance, future quantitative vaccine acceptance studies could also benefit from inclusion of more multivariate analytic techniques. In this review, only four studies used multivariate analysis to examine factors which were independently associated with vaccine acceptance (Marshall et al., 2007; Hsu et al., 2009; Kwan et al., 2009; Oh et al., 2010). Given the large sample sizes of studies included in this review (range: 90-6024), one would expect greater use of multivariate analyses. Descriptive and bivariate analyses are unlikely to fully elucidate the individual factors that play a role in vaccine acceptance, as confounding and interacting relationships are likely to exist between the attitudinal, social, and sociodemographic factors involved with acceptance. In turn, future vaccine acceptance studies would benefit from utilizing multivariate analysis, when possible.

In conclusion, Despite limitations, the studies included in this review reveal that HPV vaccine acceptance and awareness are highly variable among and within countries of the Asian Pacific region. The studies illuminate a multiplicity of demographic, attitudinal, and social factors that are involved with women's intent to receive the HPV vaccine. HPV vaccine campaigns should not only address gaps in knowledge regarding HPV, genital warts, and cervical cancer, but should also attend to women's concerns about vaccine safety and efficacy. Strategies should also be undertaken to decrease social stigma surrounding receipt of the HPV vaccine. Public health practitioners involved in the promotion of the HPV vaccine must not overlook the influence of women's families, partners, and healthcare providers in women's decision to be vaccinated. Accordingly, vaccination and

education campaigns should be broad in target, addressing familial and social concerns, as well as those of the intended recipients of the vaccine. Future research is needed to further explore these factors as marketing and approval of the vaccine becomes more widespread in the region. Notably, only nine of the twenty-seven countries of the Asian Pacific were represented in the studies included in this review, indicating a dire need for future research in those countries which are disproportionately affected by cervical cancer in the region.

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