

Knowledge about HPV, and the Attitudes Toward HPV Vaccination among Adult Women in Asian Countries: A Literature Review

Oh, Hyunjin

Part-time Lecturer, Department of Nursing, Daejeon University, Daejeon, Korea

Purpose: This literature review was conducted to provide a summary of the findings from research on knowledge and attitudes about human papilloma virus (HPV) and HPV vaccination, and studies of its actual uptake among women in Asian countries. **Methods:** The author searched the Pubmed, CINAHL, and KISS electronic databases to identify peer-reviewed articles published between 2006 and 2011. **Results:** Seventeen peer-reviewed studies met the inclusion criteria (13 quantitative, 4 qualitative). Findings from seven Asian countries that measured female adults' knowledge of HPV related issues and attitudes toward HPV vaccination were reviewed. Low level of knowledge about HPV and its related conditions, willingness to be vaccinated, and low uptake of vaccines were identified across the studies. Cultural barriers and social stigmatization about HPV vaccination were also discussed. **Conclusion:** Findings from this review indicate that adult women in Asian countries are in urgent need of improving HPV related knowledge and its actual vaccination. Policy makers, health care providers, and public health educators should take into account the cultural barriers and attitudes toward HPV vaccination in the process of developing and implementing educational programs and interventions for adult women in Asian countries.

Key Words: *Papillomavirus Vaccines, Knowledge, Attitude, Asia*

INTRODUCTION

Cervical cancer is one of the most common cancers in women worldwide, and known as a preventable cancer threatening female health.^{1,2)} Cervical cancer is not only the leading cause of death among middle-aged women worldwide, but also contributes about fifty percent of the world's total cervical cancer cases in Asia Pacific region.³⁾

Human papillomavirus (HPV), one of the most common sexually transmitted infections, is related to almost all cervical cancers.⁴⁾ HPV infection is temporary and asymptomatic, and it is resolved naturally with no treatment. However, some high-risk cases of HPV infection could develop chronically and become a cause of cervical cancer. Out of more than 100 types of HPVs, HPV-16 and HPV-18 are the most common high-risk genotypes, and are accountable for 70% of cervical cancers.^{3,5)} Therefore, controlling HPV infection is crucial to prevent sexually transmitted diseases (STDs) and cervical cancer for women's health.

There have been two prophylactic HPV vaccines available in many countries since 2006, including Gardasil[®], as a quadrivalent vaccine, and Cervarix[™], as a bivalent vaccine.^{4,6)} Gardasil[®] was approved by the US Food and Drug Administration (FDA) in 2006⁶⁾, and in South Korea, both Gardasil and Cervarix have been available since 2007. The Committee on Infectious Disease of the Korean Pediatric Society and the Korean Society of Gynecologic Oncology and Colposcopy recommended the immunization for Korean women, and their guidelines proposed over 15 yr of age as appropriate for vaccination considering the first sexual intercourse of Korean girls.^{7,8)}

Research has indicated that about 30-60% of sexually active adults are infected by HPV at some point in their lives,⁵⁾ and young adults are especially at risk of high prevalence of HPV infection.²⁾ Despite the effects and importance of HPV vaccination in preventing cervical cancer, women's knowledge of HPV vaccine and its uptake have been reported low worldwide.^{2,9)} In addition, statistics in Western countries reported that about 37-50% of adolescent had limited knowledge level about HPV and HPV vaccine.^{2,10,11)} Little is known about young women's knowledge of HPV in the South-East Asia region.²⁾

Recommendations for HPV vaccination vary across countries, but the general vaccine programs target girls and young women between

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Address reprint requests to: **Oh, Hyunjin**

Department of Nursing, Daejeon University, 96-3 Youngun-dong, Dong-gu, Daejeon 300-716, Korea

Tel: +82-70-7558-6964 Fax: +82-42-280-2785 E-mail: hyunjino@gmail.com

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ages of 9 and 19 yr.¹²⁾ Currently there are no clinical contraindications against vaccinating women older than the recommended age,¹³⁾ and clinical trial data demonstrated that HPV vaccine is safe and effective in older women up to the age of 55 yr.¹²⁾

Across studies conducted in the west, HPV vaccination acceptability was relatively positive. However, this could be different in Asian countries since cultural belief, family and social norm toward STDs and its prevention are different.¹⁴⁻¹⁶⁾ The purpose of this review is to provide a summary of findings from studies of attitudes and knowledge about HPV and HPV vaccination, and actual uptake studies that have been performed in Asian countries.

METHODS

The author mainly searched the Pubmed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Korean Information Service System (KISS) electronic databases to identify peer-reviewed articles published between 2006 and 2011. Broad search terms such as “HPV vaccines,” “attitude or knowledge,” and “Asia” were used to obtain the largest amount of HPV literature available.

The inclusion criteria for literature search included published articles written in English and Korean, and online access to the full text. Because the HPV vaccine was approved in the U.S. after 2006 and has been available since 2007 in South Korea, the search was limited to articles that have been published since 2006. The search was limited to studies with female participants. The title and abstracts were also reviewed to identify studies that met the inclusion criteria. An exhaustive database search and reference checking resulted in the identification of 17 published studies. Each of the articles was evaluated according to the following review points: (a) women’s knowledge of HPV and HPV vaccination; (b) attitudes toward HPV vaccination; and (c) actual uptake of HPV vaccines.

RESULTS

The selected articles (Table 1) represent seven Asian countries; Hong Kong, Malaysia, China, India, Korea, Taiwan, and Thailand. Among these studies, 4 of 17 studies were searched in KISS and written by Koreans. Most studies used retrospective cohort design and included quantitative (n = 13) and qualitative (n = 4) methodology; a majority of the studies employed convenience sampling. All of the quantitative studies were cross-sectional, with sample sizes ranging from 189 to 8008. Three qual-

itative studies entailed focus group discussion and one employed an in-depth interview; their sample sizes ranged from 25 to 49.

Five studies performed primary recruitments from universities.^{2,17-20)} Most studies measured knowledge of HPV related issues and awareness or attitudes toward HPV vaccination for adult women. One study was compared the knowledge level of clinical nurses who received HPV vaccine and those who did not, and their perception of relationship between HPV vaccination and cervical cancer.²¹⁾ Hsu et al. (2010) explored reasons that young adults and older women were vaccinated against HPV.²²⁾

1. Knowledge of HPV and HPV vaccination

Most studies that were reviewed explored adult women’s knowledge level about HPV and HPV vaccination (Table 2). Most of the subjects showed poor knowledge on HPV and its vaccine. A range of 53-90% of women in these studies had never heard of HPV.^{1,2,14,16,23,24)} Since most of the research participants showed a lack of knowledge in HPV, they also displayed poor knowledge about HPV vaccination and its preventable effects on cervical cancer.^{8,14,16,18,23-25)} Across six studies, only 6-48% of women knew that HPV can cause cervical cancer^{8,14,20,23,25,26)} and approximately 19-31.5% of participants were aware of the sexually transmitted nature of HPV infection and its connection to cervical cancer.^{8,16,25)}

Levels and measure of HPV and HPV vaccine varied greatly across the studies. Ten of thirteen quantitative studies measured the knowledge level of HPV and its related issues, and seven articles assessed knowledge as a dichotomized or categorized outcome. Only three studies measured level of knowledge of HPV using test questionnaire and evaluated mean scores,^{1,18,19)} while the other studies simply asked their participants whether they have heard of HPV and HPV vaccine. According to Lee and Park (2011), the mean knowledge score was 13.75 ± 2.41 (range 0-23) among female college students in Korea, representing 60 percent of correct answer rate.¹⁸⁾ Other two studies reported approximately 23.8-45.9% of correct answer rate about HPV knowledge.^{19,21)}

Qualitative studies showed similar findings from quantitative studies. Most participants in these studies severely lacked knowledge in HPV and HPV vaccine.^{1,20,27,28)} About ninety percent of them said that they had never heard of HPV and HPV vaccine, while 83% heard about cervical cancer.^{1,20,28)}

2. Attitude toward HPV vaccine

Most studies in this review evaluated attitudes toward HPV vaccination. Among the quantitative studies, 10 articles assessed the participants’

Table 1. Characteristics of Included Studies

Country	Authors (yr)	Language	Design	N (age)	Participants	Measures
China	Li et al. (2009)	English	Cross-sectional/non-randomized cluster sampling	N = 8,008 (14-59)	Adult women	Risk factor questionnaire, Questionnaire of knowledge and attitudes Gynecological examinations
Hong Kong	Lee et al. (2007) Kwan et al. (2008)	English English	Qualitative/7 focus group Cross-sectional/community based survey	N = 49 (18 +) N = 1,450 (18+)	Chinese adult women in Hong Kong Chinese adult women	HPV knowledge (6 items) Belief measure (8 items) Intention to be vaccinated
Korea	Kang et al. (2010) Kang and Moneyham (2010)	English English	Qualitative /7 focus group Cross-sectional descriptive design	N = 25 (21 -30) N = 1,359 (18-32)	Young adult women Female college students	Attitudes Intent to get vaccinated Intent to use condoms
	Lee and Park (2011)	Korean	Cross-sectional descriptive design	N = 777 (18-25)	Female university students	Knowledge of cervical cancer Health belief related to HPV Vaccination questionnaire
	Choi et al. (2008)	Korean	Cross-sectional descriptive design	N = 975 (19+)	Adult women	Awareness and attitudes toward HPV infection and vaccine Intention to be vaccinated
	Lee et al. (2011)	Korean	Cross-sectional descriptive design	N = 249 (21-41)	Clinical nurses	Knowledge about HPV Perception of cancer causes Acceptance of vaccine
	Oh et al. (2010)	English	Population based cross-sectional survey	N = 1,000 (20+)	Adult men and women	Awareness of HPV infection Acceptance of vaccination Factors associated with willingness to be vaccinated
Malaysia	Kim and Ahn (2007) Al-Dubai et al. (2010)	Korean English	Cross-sectional descriptive design Cross-sectional survey	N = 285 (19-29) N = 300 (18-48)	Female university students Adult women	Knowledge of HPV Attitudes toward HPV vaccination Barriers of being vaccinated
Thailand	Al-naggar et al. (2010) Charakorn et al. (2011)	English English	Qualitative indepth interview Cross-sectional survey	N = 30 (19-26) N = 764 (17+)	Female university students Adult women	Knowledge about pap smear, HPV, HPV vaccine Acceptability of vaccine
Taiwan	Hsu et al. (2010)	English	Cross-sectional/convenience sample	N = 189 (18+)	Adult women who initiated HPV vaccination	Health beliefs towards HPV vaccination Reasons for HPV vaccination
Multietnicity	Chow et al. (2010)	English	Descriptive, cross-sectional observational survey	N = 1,617 (mothers)	Adult women	Knowledge of and attitudes towards cervical cancer, and its prevention, HPV infections, HPV vaccination, communication between patient and physician about these issues
	Wong (2008) Wong and Sam (2010)	English English	Qualitative/7 focus group Cross-sectional/convenience sample	N = 40 (13-27) N = 1,083 (mean = 21.47)	Young adult women Female university students	Knowledge about HPV and genital ward, cervical screening, and cervical cancer risk factors Whether they heard of vaccine Attitudes toward the vaccine

Table 2. Knowledge, Awareness and Attitudes, and Actual uptake

Authors/year published	Knowledge (HPV and HPV vaccine)	Awareness/attitudes	Actual uptake
Quantitative studies			
Li et al. (2009)	15.5% have heard of HPV Knowledge differs by rural (9.3%), metropolitan area (21.6%), and by education Among women who had heard of HPV, specific knowledge about HPV was poor 48.2% knew that HPV is related to cervical cancer	84.6% were willing to vaccinated (31.9%-fear of getting genital warts; 56.6%- concern about being infected with HPV) Unwilling to be vaccinated (51.5%-doubts on the resource)	-
Kwan et al. (2008)	38% heard of HPV, and half of these women were aware of STD nature of the virus 50% heard of vaccination against cervical cancer One-third knew only certain HPV types caused cervical cancer	88% would likely to be vaccinated 73% believed that the sexually experience women should be vaccinated, 27% opposed vaccinating sexually naïve women Younger age perceived a negative impact of HPV infection and their partners' approval was related to a positive intention to be HPV vaccinated	-
Kang and Moneyham (2010)	-	Intention to receive HPV vaccine 3.04 (out of 5.0) Attitude toward HPV vaccine 2.84 (out of 5.0) Positive attitudes towards HPV vaccine were significantly related to the intention to get vaccinated	1.3%
Lee and Park (2011)	Mean knowledge score (cervical cancer, HPV, HPV vaccine): 13.75 (0-23)	Perceived benefit- 3.01; perceived seriousness-2.91; perceived barrier- 2.09; perceived susceptibility- 2.01	5.5%
Choi et al. (2008)	23.8% knew that cervical cancer is related to HPV infection	Perceived susceptibility-33.9%; perceived seriousness-30.8%;perceived benefit-78.3%; perceived barriers-53.7% (high cost)	-
Lee et al. (2011)	Mean knowledge score about HPV: Vaccinated (7.94) vs Not vaccinated (5.95)	Perception of cervical cancer causes: destiny and constitution	20.9%
Oh et al. (2010)	31.5% knew that STIs can cause cancer 19% knew that HPV infection is a risk factor for cervical cancer 12.1% knew that HPV infection could be prevented by vaccination	Perceived susceptibility-21.6%; perceived seriousness-39.5%; perceived benefits- 54.6%; perceived barriers-86% (high cost)	-
Kim and Ahn (2007)	Mean knowledge score about HPV: 9.18 ± 2.01 (0-20)	-	-
Al-Dubai et al. (2010)	26% heard about HPV 21.7% about vaccines 21.7% reported that HPV is transmitted through sexual intercourse 22% reported that HPV is one of the causes of cervical cancer among women 25.3% knew that HPV vaccination can protect women against cervical cancer	Marital status, level of education were related to awareness on HPV 53% had positive attitudes toward the vaccine Barriers about vaccination: 40% concerned about the side effects of vaccine, 27% afraid of needles, 23.7% concerned about the social stigma related to HPV vaccination.	-
Charakorn et al. (2011)	95.9% knew about pap smear 46.6% knew about HPV 38.5% heard of HPV vaccine	Acceptability of HPV vaccine was 77.2% Reason for acceptance-afraid of having cc (70.3%), medical practitioners' advice (23.2%), and safety of vaccine (16.9%) Reason for refusal-cost (32.5%), side effect (30.7%), no advice from clinician (28.4%), concerns about the efficacy of vaccine (19.4%)	0.009% (7/764)
Hsu et al. (2010)	-	Reason for seeking vaccination among young adults: recommendation from family (49%), health provider (26%) Adult women: self-awareness of high risk of HPV infection (42%), history of gynecologic disease (25%)	100% (subjects initiated HPV vaccination)
Chow et al. (2010)	98% heard of cervical cancer 19% heard of HPV 25% heard of HPV vaccine, but knew nothing about it 94% of women did not know that HPV is the cause of cervical cancer 100% Taiwanese, 75% Korean, 67% Thai, 14% Malay heard of pap smear 65% were not aware that HPV vaccine was available	73% reported their perceived risk of cervical cancer was low 1/3 answered that only promiscuous women need vaccine (negative attitudes and absence of perception) 54% answered that they consider the vaccination	8% (132/1617) 1% of Korean, 4% of Malay, 1% of Taiwanese, 0% of Thailand

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Table 2. (Continued from the previous page) Knowledge, Awareness and Attitudes, and Actual uptake

Authors/year published	Knowledge (HPV and HPV vaccine)	Awareness/attitudes	Actual uptake
Wong and Sam (2010)	21.7% heard of HPV 10.3% heard of HPV vaccine 44.8% of Chinese, 41.8% of Malay, 11.9% of Indian heard of vaccine 59.7% answered that vaccine is to protect against cervical cancer 72.8% were not sure that HPV is related to cervical cancer Mean knowledge score of HPV and genital warts: 0.62 out of 6 Mean knowledge score of cervical screening, cervical cancer risk factors: 2.63 out of 8 Mean total knowledge score 3.25 out of 14	48% indicated intention to receive HPV vaccine Reason for refusal: safety and efficacy of new vaccine (50.9%), perceived themselves as not at risk of HPV infection (41.5%), felt embarrassed about receiving STI vaccine (11.8%) Perceived embarrassment at receiving an STI vaccine was associated with knowledge of cervical cancer Intention to receive HPV vaccine was associated with the score for knowledge of HPV, warts, cervical cancer risk factors	-
Qualitative studies			
Lee et al. (2007)	A few heard of HPV, but "did not know what it was" 90% never heard of HPV	Reluctant to accept that some STDs could lead to cervical cancer Negative attitudes toward HPV infection "If HPV vaccine is used to prevent STD, then I do not see any need for it" Preventive effect of cervical cancer, most women welcomed HPV vaccine as "an additional protection" Concern about side effect	-
Kang et al. (2010)	-	General lack of awareness about vaccine Potential harmful effect of the vaccine Concern about vaccine: possible increase in unsafe sexual behavior and high cost of the vaccine	-
Al-naggar et al. (2010)	83% heard about cervical cancer 53.3% never heard of HPV 17% mentioned HPV is the cause of cervical cancer 33.3% did not know any causes 53.3% did not know the mode of HPV transmission	53.3% are willing to be vaccinated 17% refused to be vaccinated because of uncertain safety of vaccine and side effect	-
Wong (2008)	Majority were not aware of HPV or HPV infection 10% heard of HPV vaccine	80% considered vaccine acceptable Vaccine not needed, or participants perceived themselves not to be at risk; adverse effects; promote promiscuity; social stigma; parental barrier; halal; cost; physician recommendation; mandatory vaccination	-

willingness to be vaccinated. The majority of women reported positive attitudes toward HPV vaccination, and a range of 48-88% responded that they would like to be vaccinated.^{2,14,16,23-25} The reasons for the positive response were the fear of having genital warts (31.9%) and concern about being infected by HPV (56.6%).^{8,16,23} Two studies reported that younger age was identified as a factor for the positive intent to be vaccinated.^{8,16} In the study by Charakorn et al. (2011), the fear of cervical cancer and medical practitioners' advice were reported as reasons for acceptance of HPV vaccine. According to Hsu et al. (2010), young adults and adult women had different reasons to seek vaccination. Young adults sought for HPV vaccine by recommendation from family (49%) and their health providers (26%), while adult women expressed self-awareness of high risk of HPV infection (42%) and history of gynecologic disease (25%). Intention to receive HPV vaccine was positively related to the score for knowledge of HPV, warts, and cervical cancer risk factors.^{2,8,22}

Several causes for the participants' unwillingness to be vaccinated were

also identified across the studies. Concerns about possible side effects and issues of safety and efficacy were discussed as potential barriers for vaccination.^{2,20,23-25,27,28} High cost of HPV vaccine^{8,17,24,26,28} and the participants' perception of HPV as not being a risk^{2,14,16,28} were also identified as reasons for the concern. Several studies discussed social stigma and embarrassment to receive STD vaccine, and these factors might be the reasons for the negative attitude toward HPV vaccination.^{1,2,14,16,25,27,28}

3. Actual uptake of HPV vaccination

Most studies reviewed did not aim to investigate the actual uptake of HPV vaccine for adult women. Among the 17 studies examined, only 6 studies reported the uptake of HPV vaccine.^{14,17,18,21,22,24}

The actual uptake rate of HPV vaccination was very low. In a study that compared the knowledge level between vaccinated group and un-vaccinated group, the uptake rate was 20.9%.²¹ Except for Hsu et al.'s (2010) study which investigated the reason for seeking vaccination for women who

initiated HPV vaccination, and therefore reported an 100% uptake rate, the average uptake rate of HPV vaccine was 1.4%, ranging from 0.009% to 8%.^{14,17,18,24)}

DISCUSSION

The literature review was conducted in order to understand and analyze recent studies regarding the level of knowledge about HPV related conditions, attitudes toward HPV vaccine, and actual uptake of HPV vaccines among women Asian countries. In the findings, issues regarding low level of knowledge and awareness of HPV vaccine and cultural barriers of HPV vaccination were discussed.

The studies included in this review indicated a general lack of knowledge about HPV and HPV vaccine among Asian adult women. However, knowledge deficit about HPV is not the only issue for adult women in Asian countries. Other studies in Western countries, relatively well developed society, also showed similar deficiency in knowledge of HPV.²⁹⁾ Since the lack of knowledge could be one of the barriers for acceptance of HPV vaccine, the findings from existing research imply that there is an immediate and aggressive need for public education on HPV and its vaccines.

The concept and measurement of knowledge within this review was limited. Across studies, the concept of knowledge and knowledge level were ambiguous, and the wording of knowledge in HPV was used interchangeably to awareness of HPV. For example, some studies measured participant knowledge by asking the participants whether they had heard of HPV and HPV vaccine, while others quantified the level of knowledge scoring the correct answers of test-based questionnaires. Even though the measurement tool for assessing knowledge was different from investigating participant awareness of the disease, many researchers interchangeably used these concepts as the same one. This may not only cause confusion among researchers but may also limit the comparability of the studies. Developing standardized test-based questionnaires seems crucial to measure the baseline knowledge of HPV and monitor changes in subject knowledge after participating in educational and intervention program.

Despite the low level of knowledge and awareness about HPV and HPV vaccines, studies reported relatively high and positive attitudes toward HPV vaccination among adult women. Concerns about HPV infection, genital warts, fear of cervical cancer, and clinician's recommendations were the main reasons for women to have a positive intention for vacci-

nation. Along with positive intention, the reasons for their unwillingness for vaccination were also reported. In most cases, concerns about side effect and safety issues were identified as major barriers. Because of the STD nature of HPV infection, several studies discussed social stigma to receive STD vaccines and HPV vaccination could be the cultural barrier in Asian countries. Participants' belief and perception that proper or normal sexual relationship with a regular partner would not need HPV vaccination could be a critical cultural barrier among Asian women. Such negative attitude toward HPV vaccines may not only influence their own decisions, but also may have an effect on HPV awareness of their daughters and sons. Moral stigmatization issues surrounding HPV vaccination should be more actively discussed among policy makers and health care providers to increase the vaccine uptake in Asian countries.

Similar to studies in Western countries, high cost of vaccination was identified as a critical barrier for HPV vaccination.³⁰⁾ HPV vaccination costs approximately US \$360,²⁸⁾ making it unaffordable for many women. Even though many participants showed positive intention for the vaccination, high cost was identified as one of the main reasons for the low access to the preventive behaviors. As many studies recommended, governments may need to subsidize vaccines or include HPV vaccine as universal mass vaccination for public to increase access to the vaccination.^{18,26,28)} Along with educational program to increase knowledge of HPV and HPV vaccination, such efforts to reduce financial burden for vaccination could increase the rate of HPV uptake in Asian countries.

In conclusion, findings from this review indicate that adult women in Asian countries are in an urgent need of improvement of HPV and HPV knowledge. Despite the low knowledge level of HPV and awareness of HPV vaccination, the studies included in this review reveal that HPV vaccine acceptance is high among adult women in Asian countries. The studies identified several factors that may have resulted in positive and negative intent to receive the HPV vaccines. A sense of fear of cervical cancer, genital warts, STDs, and health care provider's recommendation are possible facilitators for the acceptance of HPV vaccines among Asian adult women. On the other hand, concerns about safety and efficacy of new vaccines, high cost for vaccination, social stigmatization of the nature of STD vaccines, and perception of HPV as not being a serious risk were discussed as potential reasons for the negative attitude towards STD.

Health care providers and nurses should focus on the need of education based on these findings. Since nurses take responsibility for providing information and education on health related issues, their duty and role are important to increase knowledge on HPV and HPV vaccina-

tions within their communities. Nurses in clinical settings, schools, and community should include education program and campaign about HPV knowledge and its vaccine to increase vaccine uptake and prevent cervical cancer. Future nursing research is needed to explore cultural facilitators and barriers for vaccination. Further policy makers, health care providers, and public health educators should also be aware of cultural barriers and attitudes toward HPV vaccination in developing and implementing educational program and interventions for adult women in Asian countries.

REFERENCE

1. Lee PW, Kwan TT, Tam KF, Chan KK, Young PM, Lo SS, et al. Beliefs about cervical cancer and human papillomavirus (HPV) and acceptability of HPV vaccination among Chinese women in Hong Kong. *Prev Med* 2007;45:130-4.
2. Wong LP, Sam IC. Ethnically diverse female university students' knowledge and attitudes toward human papillomavirus (HPV), HPV vaccination and cervical cancer. *Eur J Obstet Gynecol Reprod Biol* 2010;148:90-5.
3. Parkin DM, Louie KS, Clifford G. Burden and Trends of Type-specific Human Papillomavirus Infections and Related diseases in the Asia Pacific Region. *Vaccine* 2008;26 Suppl12:M1-16.
4. Huh WK. Human papillomavirus infection: a concise review of natural history. *Obstet Gynecol* 2009;114:139-43.
5. Bosch FX, Burchell AN, Schiffman M, Giuliano AR, de Sanjose S, Bruni L, et al. Epidemiology and natural history of human papillomavirus infections and type-specific implications in cervical neoplasia. *Vaccine* 2008;26 Suppl10:K1-16.
6. Adams M, Jasani B, Fiander A. Human papilloma virus (HPV) prophylactic vaccination: challenges for public health and implications for screening. *Vaccine* 2007;25:3007-13.
7. Kim BG, Lee NW, Kim SC, Kim YT, Kim YM, Kim CJ, et al. Recommendation guideline of Korean Society of Gynecologic Oncology and Colposcopy for quadrivalent human papillomavirus vaccine. *Korean J Gynecol Oncol* 2007;18:259-83.
8. Oh JK, Lim MK, Yun EH, Lee EH, Shin HR. Awareness of and attitude towards human papillomavirus infection and vaccination for cervical cancer prevention among adult males and females in Korea: a nationwide interview survey. *Vaccine* 2010;28:1854-60.
9. Lenselink C, Schmeink C, Melchers W, Massuger L, Hendriks J, Van Hamont D, et al. Young adults and acceptance of the human papillomavirus vaccine. *Public Health* 2008;122:1295-301.
10. Dorell C, Stokley S, Yankey D, Cohn A, Markowitz L. National, State, and Local Area Vaccination Coverage among Adolescents Aged 13-17 Years-United States, 2009. *MMWR Morb Mortal Wkly Rep* 2010;59:1018-21.
11. Bartlett JA, Peterson JA. Papillomavirus (HPV) Vaccine Among Adolescent Females in the United States: A Review of the Literature. *J Sch Nurs*. In press 2011.
12. Castellsagué X, Schneider A, Kaufmann AM, Bosch FX. HPV vaccination against cervical cancer in women above 25 years of age: key considerations and current perspectives. *Gynecol Oncol* 2009;115 Suppl 3:15-23.
13. Wright Jr TC, Huh WK, Monk BJ, Smith JS, Ault K, Herzog TJ. Age considerations when vaccinating against HPV. *Gynecol Oncol* 2008;109: Suppl 40-7.
14. Chow SN, Soon R, Park JS, Pancharoen C, Qiao YL, Basu P, et al. Knowledge, attitudes, and communication around human papillomavirus (HPV) vaccination amongst urban Asian mothers and physicians. *Vaccine* 2010;28:3809-17.
15. Kwan TTC, Chan KKL, Yip AMW, Tam K, Cheung ANY, Young P, et al. Barriers and facilitators to human papillomavirus vaccination among Chinese adolescent girls in Hong Kong: a qualitative-quantitative study. *Sex Transm Infect* 2008;84:227-32.
16. Kwan TT, Chan KK, Yip AM, Tam KF, Cheung AN, Lo SS, et al. Acceptability of human papillomavirus vaccination among Chinese women: concerns and implications. *BJOG* 2009;116:501-10.
17. Kang HS, Moneyham L. Attitudes toward and intention to receive the human papilloma virus (HPV) vaccination and intention to use condoms among female Korean college students. *Vaccine* 2010;28:811-6.
18. Lee EJ, Park JS. Knowledge about cervical cancer, health beliefs and human papillomavirus vaccination rate in female university student. *J Korean Oncol Nurs* 2011;11:65-73.
19. Kim HW AH. Study on the Knowledge of Human Papilloma Virus in Female University Students. *Korean J Women Health Nurs* 2007;13:13-20.
20. Al-Naggar RA, Al-Jashamy K, Chen R. Perceptions and opinions regarding human papilloma virus vaccination among young women in Malaysia. *Asian Pac J Cancer Preven* 2010;11:1515-21.
21. Lee MH, Lim EJ, Yu YH, Jun MH. Clinical nurses' HPV-related knowledge and perception of cancer causes: HPV vaccinated vs. not vaccinated. *Korean J Women Health Nurs* 2011;17:1-9.
22. Hsu YY, Hsu KF, Cheng YM, Fetzer SJ, Chou CY. Health beliefs of Taiwanese women seeking HPV vaccination. *Vaccine* 2010;28:4224-8.
23. Li J, Wang JB, Liang H, Qiao YL, Li LK, Ma JF, et al. Knowledge and attitudes about human papillomavirus (HPV) and HPV vaccines among women living in metropolitan and rural regions of China. *Vaccine* 2009;27:1210-5.
24. Charakorn C, Lertkhachonsuk AA, Thanappapasr D, Chittithaworn S, Wilailak S, Rattanasiri S. Knowledge of Pap smear, HPV and the HPV vaccine and the acceptability of the HPV vaccine by Thai women. *Asia Pac J Clin Oncol* 2011;7:160-7.
25. AlDubai SAR, Al-Naggar RA, Baobaid MF, Alshagga MA, Tuang CP, Aljashamy K, et al. Knowledge, attitudes and barriers for human papilloma virus (HPV) vaccines among Malaysian women. *Asian Pac J Cancer Preven* 2010;11:887-92.
26. Choi KA, Kim JH, Lee KS, Oh JK, Liu SN, Shin HR. Knowledge of human papillomavirus infection and acceptability of vaccination among adult women in Korea. *Korean J Obstet Gynecol* 2008;51:617-23.
27. Kang HS, Shin H, Hyun MS, Kim MJ. Human papilloma virus vaccination: perceptions of young Korean women. *J Adv Nurs* 2010;66:1946-52.
28. Wong LP. Young multiethnic women's attitudes toward the HPV vaccine and HPV vaccination. *Int J Gynecol Obstet* 2008;103:131-5.

29. Winkler JL, Wittet S, Bartolini RM, Creed-Kanashiro HM, Lazcano-Ponce E, Lewis-Bell K, et al. Determinants of human papillomavirus vaccine acceptability in Latin America and the Caribbean. *Vaccine* 2008; 26 Suppl 11:L73-L79.
30. Jones M, Cook R. Intent to receive an HPV vaccine among university men and women and implications for vaccine administration. *J Am Coll Health* 2008;57:23-32.