

# Effects of a Peer Cervical Cancer Prevention Education Program on Korean Female College Students' Knowledge, Attitude, Self-efficacy, and Intention

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**Purpose:** The purpose of this study was to evaluate the effectiveness of a peer cervical cancer prevention education program on Korean female college students' knowledge, attitude, self-efficacy, and intention. **Methods:** A quasi-experimental pretest-posttest design with a non-equivalent control group was used. The participants were 58 female college students in a metropolitan city in Korea. The sample consisted of an intervention group (n=28) that participated in a peer education program and a control group (n=30). Data were measured using self-administered questionnaires at two time points: prior to the intervention and after the intervention. **Results:** Compared to the control group, the experimental group reported significantly positive changes for knowledge, attitude, self-efficacy, and intent to practice cervical cancer prevention behaviors. **Conclusion:** The findings of this study indicated that a peer education program developed for Korean female college students was a useful and effective intervention strategy to promote cervical cancer prevention behaviors in Korean sociocultural contexts.

**Key Words:** Cervical cancer, Prevention, Health behavior, Peer group, Health education

## 서 론

### 1. 연구의 필요성

Cervical cancer is one of the most common types of cancer among women worldwide, and the number of cases is growing annually. It is the second leading cause of cancer death in women worldwide (Centers for Disease Control and Prevention [CDC], 2013) and the sixth leading cause of cancer death in Korean women (Statistics Korea, 2012). A significant cause of cervical cancer is the human papillomavirus (HPV), a sexually transmitted disease (STD) that affects 10.4% of Korean women. HPV infection can occur in all age groups, but, as in other countries, the highest rate of infection occurs among Korean women in their 20s (18.9%), when they are the most sexually active (Oh et al., 2009).

Because cervical cancer rarely presents with early

symptoms, prevention of cervical cancer may offer fewer risks and more benefits. According to cervical cancer prevention guidelines from the American Cancer Society (2012), cervical cancer screening should begin at age 21, and regular screenings are even more critical for sexually active women. Over the past 20 years, the recommendation of the Pap test as a cervical cancer prevention behavior has significantly lowered the occurrence rate (Kim, Park, & Park, 2010). In 2007, a vaccine against HPV was developed and licensed by the Korea Food and Drug Administration for females aged 9~26 years (Rhee et al., 2010). Currently, this vaccine has been found to be the most effective known method in preventing cervical cancer among women who have not previously been exposed to HPV (CDC, 2013).

HPV infection is a critical cause of cervical cancer and an STD that has high prevalence among individuals in their 20s (CDC, 2013). Although the prevalence of cervical cancer is high in women in their 40s and 50s, the

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risk of getting cervical cancer in the future starts in their 20s, a time during which they may have an increased likelihood of risky sexual behaviors. However, Korean women in their 20s and 30s are relatively less aware than women in their 40s and 50s of cervical cancer's severity and the importance of early check-ups for cervical cancer, placing these age groups in a blind spot for cervical cancer check-ups (Han, 2011). Previous Korean studies have demonstrated low rates of condom use (Han, 2011; Kim, 2009), Pap testing (Kim, 2009), and HPV vaccinations (Kang & Moneyham, 2010; Kang & Kim, 2011) among Korean female college students.

It has been suggested that a lack of knowledge about HPV and its link to cervical cancer had an impact on female college students' cervical cancer prevention behaviors (Brewer & Fazekas, 2007). Previous studies have reported that educational interventions significantly increase knowledge about HPV and the acceptability of cervical cancer prevention behaviors (Chapman et al., 2010; Saha, Chaudhury, Bhowmik, & Chatterjee, 2010). Chapman et al. (2010) identified a video-based educational intervention as significantly increasing HPV awareness and HPV vaccine acceptability in women of younger age groups. Educational interventions can potentially influence cervical cancer prevention behaviors by affecting behaviour change mediators such as knowledge, attitudes, and self-efficacy (Shepherd, Frampton, & Harris, 2011). Therefore, providing HPV education could be an important first step in promoting cervical cancer prevention behaviors. Moreover, a recent Korean study (Kang & Kim, 2011) reported that 85.5% of female college students expressed interest in receiving HPV prevention education.

Although many structurally diverse educational programs are promising, peer-led education can be a good approach for sexual health education in college students because most college students share sexual knowledge with their peers and are influenced by their peers' sexual behaviors (Kim & Free, 2008). Previous studies demonstrated that peer sex education programs for young women or college students increased sexual health knowledge and decreased risky sexual behaviors (Davey-Rothwell, Tobin, Yang, Sun, & Latkin, 2011; Kim & Free, 2008).

Although there have been several peer education intervention studies of HIV/STD prevention, few peer education intervention studies on cervical cancer have been conducted (Ferrara, Langiano, & De Vito, 2012; McKeever, 2008). McKeever (2008) provided a peer education intervention for female college students to reduce be-

haviors associated with cervical cancer risk. The results of this study revealed that female college students in the experimental group reported reduced participation in high-risk sexual behaviors one month post-test, demonstrating that peer education intervention among female college students was an effective method to reduce risky sexual behaviors. However, this study focused on reducing high-risk sexual behaviors rather than increasing cervical cancer prevention behaviors. No known Korean study has been published to identify the effect of a peer education intervention program on cervical cancer prevention behaviors. The findings from previous studies may have limited generalizability to Korean female college students who have different cultural beliefs, and family and social norms; therefore a study conducted in a Korean sociocultural context is necessary.

Based on the theoretical framework of the Health Belief Model (HBM) (Rosenstock, Strecher, & Becker, 1988, 1994), this study was conducted to evaluate the effects of peer cervical cancer prevention education program on Korean female college students' knowledge, attitude, self-efficacy, and intention. Specifically, four hypotheses were tested in the present study. Compared with the control group, the students who participated in the peer education program were expected to show positive changes in 1) knowledge about cervical cancer prevention behaviors, 2) attitude towards cervical cancer prevention behaviors, 3) self-efficacy for cervical cancer prevention behaviors, and 4) the intent to practice cervical cancer prevention behaviors.

## METHODS

### 1. Design and Sample

A pretest-posttest design with a non-equivalent control group was used in this study. The participants were 58 female college students attending two 4-year nursing colleges in G metropolitan city, Korea. To avoid cross-contamination of information between the groups, the subjects in each group were recruited from two different colleges. The following inclusion criteria were applied: female gender,  $\geq 18$  years of age, college freshman or sophomore, and not a recipient of the HPV vaccine.

The calculated sample size using the G\*Power 3.0 program was 27 in each group to achieve a power of .80, a large effect size of 0.78, and a significance level of .05. An effect size was calculated from Kim (2009)'s study which evaluated the effect of a cervical cancer prevention education program on the intention of fe-

male college students to receive the HPV vaccination. In anticipation of a 20% drop-out rate, a recruitment goal of 34 participants each for the experimental and control groups was set. However, because of difficulties in recruiting participants, only 30 female college students for the experimental group and 31 for the control group were recruited. Eventually, 2 participants from the experimental group and 1 from the control group dropped out for personal reasons, and the final number of participants was 28 in the experimental group and 30 in the control group.

## 2. Measures

A structured, self-administered questionnaire was used consisting of participants' characteristics, knowledge, attitudes, self-efficacy for cervical cancer prevention behaviors, and intent to practice cervical cancer prevention behaviors. All of the questions were developed or modified for this study by the researchers based on previous relevant studies and literature review. The participants' characteristics included age, economic status, smoking, alcohol consumption, sexual experiences, HPV vaccination recommendations, and desire for cervical cancer education.

To determine the content validity of the questionnaire, a panel of experts including an Obstetric/Gynecologic (Ob/Gyn) nurse, an Ob/Gyn doctor, and three nursing professors was asked to advise on the accuracy and comprehensiveness, relevance of the scale items and readability of the questionnaire. All of the included items showed a content validity index (CVI) value  $> .80$  with five experts. Moreover, a pilot study was conducted using 20 nursing students to check the comprehension level and time required to complete the questionnaires, and no specific problems were identified.

### 1) Knowledge about cervical cancer prevention behaviors

A questionnaire was developed based on previous studies (Kang & Kim, 2011; Lee & Park, 2011) and a literature review. The knowledge scale included 27 true or false items: 13 on HPV, 7 on cervical cancer, 5 on HPV vaccination, and 2 on condom use. The responses were coded so that each correct answer received a score of one, and each 'incorrect' or 'unsure' answer received a score of zero. The knowledge score was calculated by adding the scores for the correct answers. The total possible score ranged from 0 to 27, with the higher scores reflecting higher levels of knowledge about cervical cancer prevention behaviors. The Kuder-Richardson

Formula 20 (KR-20) of the measure in this study was .85.

### 2) Attitude toward cervical cancer prevention behaviors

Attitude was assessed using a questionnaire based on previous studies (Hsu et al., 2009; Kang & Kim, 2011) and HBM subscales. The questionnaire included 16 items on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree): 2 on perceived susceptibility to cervical cancer, 3 on perceived seriousness, 3 on perceived benefits, 4 on perceived barriers, and 4 on cue to action. Subscale mean scores were obtained by summing and averaging the items (range 1-5). The possible total score range was 16-80, and a higher score indicated a more positive attitude toward cervical cancer prevention behaviors. Cronbach's  $\alpha$  of the measure in this study ranged from .61 (perceived barriers) to .91 (perceived susceptibility).

### 3) Self-efficacy for cervical cancer prevention behaviors

A self-efficacy scale was developed based on the HBM and a literature review. In this study, self-efficacy refers to personal evaluations of the ability to successfully practice cervical cancer prevention behaviors. The scale included 8 items on a 5-point Likert scale ranging from 1 (very doubtful) to 5 (very confident): 3 on condom use, 2 on Pap tests, 1 on HPV vaccination, and 2 on safe sexual relationships. The possible score range was 8-40, and a higher score indicated greater self-efficacy for cervical cancer prevention behaviors. Cronbach's  $\alpha$  of the measure in this study was .89.

### 4) Intent to practice cervical cancer prevention behaviors

Intent was measured using a visual analog scale (VAS) that included 3 items: One each on condom use, Pap tests, and HPV vaccination. For each question, the participants were instructed to mark a 10 cm (100 mm) horizontal VAS. An answer of "0 cm" indicated "no intention," and "10 cm" indicated "strongest intention" to practice cervical cancer behaviors. Cronbach's  $\alpha$  of the measure in this study was .76.

## 3. Description of Intervention

The peer education program, developed by the researchers and a peer sex education instructor, was based on previous studies (Davey-Rothwell et al., 2011; Kim & Free, 2008; McKeever, 2008), a peer sex education program developed by Korean Red Cross (KRC, 2007), and the results of a focus group interview conducted for this study. The focus group interview was conducted with 7

female college students to analyze the demand for peer education programs promoting cervical cancer prevention behaviors among female college students and to select teaching strategies. The researcher and a peer sex education instructor led a discussion of open-ended questions for approximately 60 minutes. In the focus group interview, the subjects were asked about the extent and practice of their knowledge about cervical cancer, STDs, HPV and HPV vaccination, safe sex, condom use, and Pap tests as well as what and how they wanted to learn. The important categories determined by the focus group interview were the lack of knowledge, the lack of coping skills caused by that lack of knowledge, and the information expected from cervical cancer prevention programs.

Peer education was chosen as the preferred educational method. The educational content was structured around activities that were unburden some and enjoyable for both the peer education program participants and the instructor. The educational media used were Power Point (PPT) presentations, video clips, activities, role-play, drawing, case studies, games, quizzes and debates.

The content validity of the developed peer education program was evaluated by a group of experts that included an Ob/Gyn nurse, an Ob/Gyn doctor, and three nursing professors. Content validity was evaluated for the five items related to program content to achieve the goal of this intervention and for the five items related to teaching materials. A 4-point Likert scale was used ranging from 1 (strongly disagree) to 4 (strongly agree). The results of this appraisal yielded a CVI of .95.

#### 4. Implementation of the Peer Education Program

The peer education intervention was led by three female college students who had received a 40-hour "Peer Led Sexual Education" training course and certificates from KRC, one of whom was selected as a peer education leader. The other two were peer assistants to operate the program smoothly. The peer education leader participated in the development process for the peer education program for the present study and led a PPT lecture of the key concepts of HPV/STD, cervical cancer, and condom use, and the two peer assistants led the activity modules for each concept.

Before session 1, a pre-test was conducted for the experimental group. The peer education program for the experimental group consisted of two sessions with a one-week interval. After session 2, a post-test was con-

ducted for the experimental group. On the same day with the experimental group, a pre-test and a post-test were also conducted for the control group by a research assistant. The first session lasted four hours, and the second session lasted two hours. The content details are presented in Table 1.

#### 5. Data Collection and Ethical Considerations

Data were collected using a self-administered questionnaire. The questionnaire took approximately 15 minutes to complete. Data were collected at two points: prior to and after the intervention. For both groups, data were collected in September 2011.

Approval to conduct this study was obtained from the Institutional Review Board at C University (IRB-13-001). Permission to collect data was obtained after the researcher explained the research purposes and procedures to the head of each college. The participants were informed of the purposes of the study and the associated risks and benefits of participation. Written informed consent was obtained from each participant. They were also informed that their decision to participate in the research would not affect their status and that they could withdraw from the study at any time during the intervention. To preserve the integrity of responses and personal privacy, the subjects secured their anonymity with a password or symbol known only to the participant. Upon completing the program and questionnaire, each participant in both groups received a gift certificate as compensation for participating. The control group received PPT educational materials after this study was completed.

#### 6. Data Analysis

The data were analyzed using SPSS (v. 17.0; SPSS Inc., Chicago). Chi-square, Fisher's exact probability, and t-tests were used to test the homogeneity of the characteristics between the groups. T-tests were used to test the homogeneity of the outcome variables between the groups and to test the hypotheses.

## RESULTS

### 1. Baseline Participant Characteristics

The results of the homogeneity test for characteristics between groups revealed that there were no statistically significant differences at baseline (Table 2). Moreover, the results of the homogeneity test for knowledge, atti-

**Table 1.** Peer Education Program to Promote Cervical Cancer Preventive Behaviors

Session	Topic	Contents	Activity/method
1	Introduction	<ul style="list-style-type: none"> <li>· Explain educational objectives</li> <li>· Build rapport between the peer educators and participants</li> </ul>	<ul style="list-style-type: none"> <li>· Pretest</li> <li>· Ice-breaking</li> </ul>
	Growth and development	<ul style="list-style-type: none"> <li>· Raise issues of cervical cancer</li> <li>· Changes of body and mind</li> <li>· Protect our bodies: gynecological examinations</li> </ul>	<ul style="list-style-type: none"> <li>· Activity 1: 6 Questions</li> <li>· Activity 2: Sexual slang</li> <li>· Activity 3: We are changing/discussion, group contest</li> </ul>
	Sexual rights and responsibilities	<ul style="list-style-type: none"> <li>· Sexual morals and values</li> <li>· Respect different values in others</li> </ul>	<ul style="list-style-type: none"> <li>· Activity 4: Pros and cons</li> </ul>
	Condom use	<ul style="list-style-type: none"> <li>· How to use condoms</li> <li>· The effects of alcohol on our bodies</li> <li>· Negotiation strategies for condom use at refusal</li> <li>· Importance of standing by sexual decisions</li> </ul>	<ul style="list-style-type: none"> <li>· Activity 5: Condom bomb</li> <li>· Activity 6: Condom wrapping</li> <li>· Activity 7: Role-playing/PPT, Q&amp;A, discussion</li> </ul>
	Sexual culture	<ul style="list-style-type: none"> <li>· Keep yourself safe in sexual culture</li> </ul>	<ul style="list-style-type: none"> <li>· Activity 8: Stop motion-play</li> </ul>
	HPV infection	<ul style="list-style-type: none"> <li>· HPV/STD</li> <li>· HPV infection</li> </ul>	<ul style="list-style-type: none"> <li>· Activity 9: STD mission</li> <li>· PPT</li> </ul>
	Finish	<ul style="list-style-type: none"> <li>· Summary &amp; evaluation</li> </ul>	<ul style="list-style-type: none"> <li>· Quiz, Q &amp; A</li> </ul>
2	Introduction	<ul style="list-style-type: none"> <li>· Review</li> <li>· Build rapport</li> </ul>	<ul style="list-style-type: none"> <li>· Ice-breaking, Q &amp; A</li> </ul>
	Cervical cancer	<ul style="list-style-type: none"> <li>· Cervical cancer facts</li> <li>· STD examination and treatment</li> <li>· Preventive behaviors for cervical cancer: condom use, pap tests, HPV vaccine</li> </ul>	<ul style="list-style-type: none"> <li>· Activity 10: Speed quiz</li> <li>· Activity 11: Telling examples activity/PPT, video, discussion</li> </ul>
	Safe/unsafe sexual behaviors	<ul style="list-style-type: none"> <li>· Strategies to decrease unsafe sexual behaviors</li> </ul>	<ul style="list-style-type: none"> <li>· Activity 12: HPV/Infection of STD</li> </ul>
	Role of peers	<ul style="list-style-type: none"> <li>· Importance of preventive behaviors of cervical cancer</li> <li>· Help and support each other to practice cervical cancer preventive behaviors</li> </ul>	<ul style="list-style-type: none"> <li>· Activity 13: Keeping on story</li> <li>· Activity 14: Our role</li> </ul>
	Finish	<ul style="list-style-type: none"> <li>· Summary &amp; evaluation</li> </ul>	<ul style="list-style-type: none"> <li>· Q &amp; A</li> <li>· Post-test</li> </ul>

tude, self-efficacy, and intent to practice cervical cancer prevention behaviors revealed that there were no statistically significant differences between the experimental and control groups at baseline (Table 3).

## 2. Hypothesis Testing

The four hypotheses in this study were supported. There were statistically significant differences between the groups in knowledge ( $t=4.32$ ,  $p<.001$ ), attitude ( $t=4.01$ ,  $p<.001$ ), self-efficacy ( $t=7.24$ ,  $p<.001$ ), and intent to practice cervical cancer prevention behaviors ( $t=7.06$ ,  $p<.001$ ). Moreover, all of the subcategories for

attitude (except cues to action) showed statistically significant differences between the two groups. The difference of cues to action between the two groups was not statistically significant ( $t=1.72$ ,  $p=.090$ ). All of the subcategories for intent to practice cervical cancer prevention behaviors showed statistically significant differences between the two groups (Table 4).

## DISCUSSION

In this study, a peer education program developed to promote cervical cancer preventive behaviors was effective at improving knowledge levels about cervical can-

**Table 2.** Homogeneity Test for Characteristics between Groups

(N=58)

Characteristics	Categories	Exp. (n=28)	Cont. (n=30)	$\chi^2$ or t	p
		n (%) or M±SD	n (%) or M±SD		
Age (year)		19.3±0.66	19.3±0.66	-0.28	.785
Economic status	< Middle school	3 (10.7)	10 (33.3)	4.80	.091
	Middle school	22 (78.6)	16 (53.3)		
	≥ Middle school	3 (10.7)	4 (13.3)		
Smoking <sup>†</sup>	Yes	2 (7.1)	3 (10.0)		.999
	No	26 (92.9)	27 (90.0)		
Alcohol <sup>†</sup>	Yes	26 (92.9)	27 (90.0)		.999
	No	2 (7.1)	3 (10.0)		
Sexual experience <sup>†</sup>	Yes	3 (3.6)	4 (13.3)		.999
	No	25 (96.4)	26 (86.7)		
Suggested HPV vaccination?	Yes	17 (60.7)	14 (46.7)	1.15	.284
	No	11 (39.3)	16 (53.3)		
Educational need <sup>†</sup>	Yes	27 (96.4)	27 (90.0)		.612
	No	1 (3.6)	3 (10.0)		

Exp.=experimental group; Cont.=control group.

<sup>†</sup>Fisher's exact probability test.**Table 3.** Homogeneity Test for Outcome Variables between Groups at Baseline

(N=58)

Variables	Exp. (n=28)	Cont. (n=30)	t	p
	M±SD	M±SD		
Knowledge	12.25±5.18	12.30±5.73	-0.04	.972
Attitude	55.07±7.38	53.76±7.16	0.68	.497
Self-efficacy	26.46±4.20	26.80±4.78	-0.28	.778
Intent to practice prevention behaviors	218.92±44.83	216.00±46.65	0.24	.809

Exp.=experimental group; Cont.=control group.

cer prevention behaviors among female college students in Korea. This finding was consistent with those from a previous study on a peer health education program that reported an increase in adolescents' primary prevention knowledge about HPV (Ferrara et al., 2012). Previous studies reported that increased knowledge was associated with improved cervical cancer prevention behaviors, such as condom use, Pap tests (Saha et al., 2010), and the intent to practice cervical cancer prevention behaviors (Hsu et al., 2009; Kang & Kim, 2011). The participants in this study reported pre-intervention knowledge levels of 45.4% for the experimental group and 45.5% for the control group, neither reaching 50%. This was consistent with the findings from previous studies of female college students' low knowledge of Pap tests (Head, Crosby, & Moore, 2009; Kim, 2009), HPV and HPV vaccination (Kang & Kim, 2011; Kim & Park, 2009).

Previous Korean studies found that female college students in the nursing major reported significantly higher knowledge than those in other majors because they learned about cervical cancer from courses in their major (Kang & Kim, 2011; Kim & Park, 2009). However, knowledge about cervical cancer prevention behaviors in this study's participants was similarly low to that of other female college students and is consistent with the results of Kim and Ahn's study (2007). As Kim and Ahn (2007) discussed in their study, it may related to one of inclusion criteria for this study, college freshman or sophomore nursing students, who have not yet learned about cervical cancer from courses in their major. Because previous studies have reported that knowledge deficiency adversely affects cervical cancer preventive behaviors (Kang & Moneyham, 2010; Kang & Kim, 2011), further educational interventions for female col-

**Table 4.** Effects of a Peer Education Program

(N=58)

Variables	Groups	Pretest	Posttest	MD of post-pre	t	p
		M±SD	M±SD	M±SD		
Knowledge	Exp.	12.25±5.18	19.79±14.33	7.54±4.89	4.32	< .001
	Cont.	12.30±5.74	14.33±4.21	2.03±4.81		
Attitude	Exp.	55.07±7.38	62.71±5.37	7.64±7.29	4.01	< .001
	Cont.	53.76±7.16	52.57±7.38	-1.20±9.42		
Susceptibility	Exp.	2.80±0.90	3.99±0.81	1.19±0.80	5.26	< .001
	Cont.	2.60±0.75	2.73±0.85	0.13±0.72		
Severity	Exp.	3.86±0.65	4.59±0.50	0.73±0.64	3.11	.003
	Cont.	3.64±0.72	3.63±0.76	-0.01±1.10		
Benefit	Exp.	3.20±0.66	4.64±0.59	1.44±0.85	7.68	< .011
	Cont.	3.32±0.72	3.18±0.47	-0.14±0.72		
Barrier	Exp.	3.42±0.76	2.82±0.71	-0.60±0.96	-2.27	.027
	Cont.	3.52±0.81	3.43±0.67	-0.09±0.74		
Cues to action	Exp.	3.65±0.83	3.95±0.70	0.30±0.98	1.72	.090
	Cont.	3.40±0.74	3.24±0.74	-0.16±1.12		
Self-efficacy	Exp.	26.46±4.20	34.65±4.12	8.19±4.21	7.24	< .001
	Cont.	26.80±4.78	25.70±4.65	-1.10±5.42		
Intention	Exp.	218.93±44.80	277.32±20.48	58.39±40.34	7.06	< .001
	Cont.	216.00±46.65	210.33±51.09	-5.66±27.00		
Condom use	Exp.	93.21±12.78	99.29±3.78	6.07±11.97	3.67	.001
	Cont.	92.00±12.14	88.67±13.32	-3.33±7.11		
Pap test	Exp.	59.28±20.17	85.72±12.60	26.43±16.82	5.89	< .001
	Cont.	62.33±20.28	60.67±24.77	-1.67±19.31		
HPV vaccine	Exp.	66.42±23.12	92.32±11.18	25.90±22.90	5.60	< .001
	Cont.	61.66±24.64	61.00±25.78	-0.66±12.01		

Exp.=experimental group; Cont.=control group; MD of post-pre=mean difference of posttest-pretest.

lege students to increase knowledge about cervical cancer prevention behaviors are warranted to promote behaviors that prevent cervical cancer.

A peer education program developed to promote cervical cancer preventive behaviors for female college students had effects on the positive changes of attitudes toward cervical cancer prevention behaviors. These results were consistent with those from previous studies, which demonstrated that peer-led sex education for teens had positive effects in changing the participants' attitudes (Davey-Rothwell et al., 2011; Ferrara et al., 2012; Kim & Free, 2008).

In this study, participants' perceptions of the severity of HPV and cervical cancer were high, but their perceived susceptibility was relatively low. This finding was similar to those from previous studies in which female college students failed to recognize that they could contract HPV and cervical cancer (Kang & Kim, 2011; Lopez

& McMahan, 2007; McKeever, 2008). Lopez and McMahan (2007) reported that a majority of 172 college women (83.1%) perceived an HPV infection and cervical cancer to be severe events, but only 15.6% of participants felt susceptible to HPV infection. One might think that the perceived severity of HPV and cervical cancer may have been high because the participants of this study were nursing students. However, a Korean study (Kang & Kim, 2011) that included female college students with other majors also identified a perception that the severity of HPV and cervical cancer was relatively high but that the susceptibility was relatively low. Moreover, participants in this study were college freshman or sophomore nursing students, who had not yet learned about cervical cancer from courses in their major or had not had clinical practice at hospitals. Given that sexual experience is significantly related to the intent to practice cervical cancer prevention behaviors among adolescents or young

women (Hsu et al., 2009; Read, Joseph, Polishchuk, & Suss, 2010), participants' low level of perceived susceptibility in this study may result from the study's inclusion criteria. Almost 90% of the participants in this study had no sexual experience and therefore may or may not have perceived a low level of HPV infection or cervical cancer.

At baseline, participants in both groups perceived the benefits of the HPV vaccine to prevent cervical cancer, but they did not perceived the benefits of the HPV vaccine to prevent genital warts and HPV infection. This may related to HPV vaccine marketing in Korea. Similar to the marketing in other Asian countries (Hsu et al., 2009; Pitts et al., 2009), the HPV vaccine in Korea has been marketed as an anticancer vaccine and not a vaccine against an STD caused by HPV infection (Kang & Kim, 2011). Therefore, female college students in Korea have not perceived benefits of the HPV vaccine to prevent genital warts and HPV and do not considered themselves targets for HPV vaccination. However, participants' perception of the benefits of the HPV vaccine to prevent genital warts and HPV in experimental groups was significantly increased by attending a peer educational program. To increase the HPV vaccine's acceptability among female college women in Korea, the HPV vaccine should be marketed as a vaccine against an STD caused by HPV infection. Moreover, health educators should emphasize that, ideally, young women should get the vaccine before they become sexually active and exposed to HPV (CDC, 2013).

The barriers to cervical cancer preventive behaviors had statistically significant differences between the two groups. Previous studies revealed that the barriers to cervical cancer preventive behaviors were significantly related to the intent to practice these behaviors (Kim, 2009; Waller, Bartoszek, Marlow, & Wardle, 2009). Several barriers to condom use have been reported, such as embarrassment, cost, moral values, ethnic and religious factors, gender inequality, and the lack of a dialogue between partners (Moore et al., 2008; Sarkar, 2008). Barriers to Pap tests include anxiety, embarrassment, and pain (Al-Naggar et al., 2010). Barriers to HPV vaccination include the high cost of the vaccine, anxiety about the vaccine's side effects, and pain (Kwan et al., 2008; Waller et al., 2009). Participants in this study identified the cost of HPV vaccine as a major barrier to intention to accept HPV vaccines. Currently, in Korea, HPV vaccines are provided upon request and at the recipients' own expense because they are not covered by health insurance. To increase HPV vaccine accept-

ability, more efforts must be made to decrease the cost burden of the HPV vaccine, such as lower costs by group purchase, coverage by a national health insurance system, or a school-based, government funded HPV vaccination program. Continuous efforts are necessary to reduce and/or eliminate the barriers to cervical cancer prevention behaviors.

Contrary to expectation, the peer educational program developed for this study was ineffective to change cues to action among female college students. One possible explanation is that peer educational intervention programs may not be sufficient to change cues to action. Sriranganathan et al. (2010) identified disadvantages of peer education, and one was that peer educators do not possess the same academic knowledge or professional experience as health educators. Moreover, female college students in this study perceived that recommendations from health care providers or their mothers had greater impacts on their decision making for HPV vaccine uptake than peers or mass media. Intervention strategies to increase cues to action for female college students need to be developed to prompt HPV vaccine acceptability. In addition to peer education, health care providers' or mothers' recommendations can be helpful to promote HPV vaccine acceptability. In Korea, mothers' recommendations are very important for female college students' decisions to accept the HPV vaccine, because their parents usually pay for the vaccine in Korean culture.

According to HBM (Rosenstock et al., 1988, 1994), self-efficacy is considered an important predictor of health behavior. Maddux, Bradley, and Boykin (1995) suggested that self-efficacy affects both the initiation and the continuance of health behavior. The peer education program developed for female college students in this study was effective in increasing self-efficacy for cervical cancer prevention behaviors. This finding is in line with previous studies of education programs that promoted cervical cancer prevention behaviors and HIV prevention and were effective in increasing participants' self-efficacy for related behaviors (Kaponda et al., 2011). Moreover, previous studies reported that college students' self-efficacy for condom use was a strong predictive factor for the intent to use condoms (Lee, 2010; Xiao, 2012). However, even after intervention, participants' confidence about communication with their partners about safer sex and condom negotiation strategies (e.g., refusal of sex without a condom) in this study was relative lower than other abilities to successfully practice cervical cancer prevention behaviors. Previous

studies reported that negotiation strategies about condom use are important factors in increasing self-efficacy for condom use (French & Holland, 2013). Therefore, useful strategies including condom negotiation strategies should be developed for female college students to increase self-efficacy for cervical cancer preventive behaviors.

The peer education program developed for female college students in this study was effective at increasing the intent to practice cervical cancer prevention behaviors. These results were similar to the findings from previous studies on HPV educational interventions that reported increases in the intention to get Pap tests and HPV vaccinations (Kim, 2009; Lee & Kim, 2011). Therefore, additional peer education programs must be developed and evaluated to promote cervical cancer preventive behaviors for female college students.

Korean society tends to be more sexually conservative, and their openness about sexuality with others is lower than in Western culture ("Adolescent sexuality," 2013). For example, premarital sex is generally stigmatized as unacceptable behavior according to Korean cultural norms. A previous study (Wong, 2008) reported that young Asian women were concerned that obtaining the HPV vaccine may give others the impression that they were sexually active. Therefore, young Korean women may have a greater reluctance about obtaining the HPV vaccine to prevent STDs or about receiving pap testing. However, recommendations for HPV vaccination have been primarily targeted at young women prior to sexual debut (CDC, 2013). Culturally acceptable educational strategies to increase cervical cancer prevention behaviors among Korean female college students are necessary. First, sociocultural barriers to accepting cervical cancer prevention behaviors should be eliminated with scientific knowledge about cervical cancer and HPV. School-based vaccination programs may also help reduce the stigma of requesting vaccines for STDs. Even in sexually conservative Korean cultures, college students share sexual information with their peers and are influenced by their peers' sexual behaviors. Therefore, peer-led education can be a more effective strategy for cervical cancer prevention education in the Korean sociocultural context.

This study had some limitations, so these results should be viewed with caution. First, the participants in this study were selected from nursing students attending two universities in a metropolitan city using convenience sampling. Therefore, possible selection bias cannot be ignored and may reduce the generalizability of the results.

Second, this study only assessed the intent to practice cervical cancer prevention behaviors rather than their actual practice. Because intention does not always reliably predict actual healthy behaviors practice (Albarra-cin, Johnson, Fishbein, & Muellerleile, 2001), future studies should focus on revealing the actual practice of behaviors. Moreover, actual sexual risk behaviors were not measured in this study. Further studies should measure actual sexual risk behaviors and identify the effects of the level of sexual risk behaviors on actual initiation of the HPV vaccine. Finally, although the control group in this study was designated as the one that did not receive educational intervention, other instructional methods, such as traditional lectures, should be compared with a peer education intervention to verify the effects of peer education intervention.

## CONCLUSIONS

The peer education program for promoting cervical cancer prevention behaviors developed in this study was effective in increasing knowledge, attitude, self-efficacy, and intent to practice cervical cancer prevention behaviors among Korean female college students. Based on the results of this study, the following suggestions are provided regarding nursing research, education, practice, and policies for promoting cervical cancer prevention behaviors for female college students.

First, more diverse education programs that are appropriate to the sociocultural context in Korea should continuously be developed and evaluated to promote cervical cancer prevention behaviors of female college students.

Second, peer education programs should be actively implemented to increase female college students' cervical cancer prevention behaviors, and follow-up studies should use scientifically rigorous designs to better evaluate their effects.

Third, the long-term effects of peer education programs that promote cervical cancer prevention behaviors should be evaluated.

Finally, in addition to personal efforts, national, school-based, and sociopolitical efforts are essential to promote cervical cancer prevention behaviors in female college students.

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