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Effects of cervical cancer prevention education in middle-school girls in Korea: A mixed-method study

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ABSTRACT

Purpose: The aim of this study was to determine the effects of cervical cancer prevention education (CCPE) among Korean middle-school girls in terms of whether it provided them with a positive perception of the Papanicolaou test (Pap test) and encouraged them to undergo Pap testing in adulthood.
Methods: A mixed-method design was used to only one group of 15 people, which combined a one-group pretest-posttest design with a qualitative study and a focus group interview (FGI). The CCPE was provided to 15 girls, after which they participated in the FGI. The changes between pretest and posttest were analyzed using the Wilcoxon signed-rank test. The findings of the FGI were analyzed using content analysis.
Results: After being provided CCPE, the girls showed a significant increase in their awareness of the importance of cervical cancer prevention ($Z = -3.10$, $p = 0.002$), but there were no significant changes in the perceived importance of their body, their emotional response to the Pap test, their confidence in cervical cancer prevention, or their intention to undergo Pap testing. In the FGI, the girls expressed negative emotions about the Pap test and were aware of the necessity of CCPE.
Conclusion: This is the first study to develop CCPE focused on the Pap test targeting Korean middle-school girls. We found that the CCPE was partially effective, in terms of increasing their awareness of the importance of cervical cancer prevention.

1. Introduction

1.1. Cervical cancer prevention education for adolescents

Cervical cancer is the third most common type of cancer among women aged 15–34 years old in Korea (Jung et al., 2015). A study of HPV prevalence among female college students in Korea suggests that prevention of cervical cancer in young women is extremely important because the prevalence of HPV infection is increasing faster than that of Western countries after initial sexual intercourse (Shin et al., 2004). The average onset of South Korean teenager's engaging in sexual intercourse is decreasing. It was reported that the lowest age of first sexual intercourse among middle-school girls in Korea decreased from 12.2 years in 2005 to 11.1 years in 2015 (Korea Centers for Disease Control and Prevention [KCDC], 2015). It was also confirmed that the incidence of sexually transmitted infections increased when the age of first sexual intercourse decreased (Lee et al., 2015). Therefore, it can be assumed that the higher probability of HPV infection could be linked to cervical cancer among Korean adolescent girls in Korea. It is crucial to provide appropriate information about HPV and gynecological examinations in terms of cervical cancer prevention because of the younger the teenagers are when they are infected with HPV, the higher the rate of later being diagnosed with cervical cancer (Moscicki, 2005).

Research suggested that CCPE for adolescents needs to include information about the Pap test and vaccination against HPV (World Health Organization [WHO], 2015). According to a study analyzing the Korea National Health and Nutrition Examination Survey (2010–2012), the cervical cancer screening rate of women aged 15–29 is 15.3%, which is lower than that of women aged 30–39, which is 73.3%.There, it is necessary to develop CCPE focused on cervical cancer screening for youth and teenagers (Chang et al., 2017). Previous studies involving Korean adolescents have focused on promoting vaccination (Kang and Moneyham, 2011; Kim, 2015). There were no studies on cervical cancer prevention education focusing on the Pap test and awareness of gynecologic

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screening for middle-school girls. This study developed CCPE focusing on Pap testing for Korean middle-school girls.

Factors influencing the prevalence of Pap test include not only negative emotional responses, but also the lack of knowledge about this test (Waller et al., 2009; Wong et al., 2008). Asian women have lower cervical cancer screening rates than Western women because of the lack of knowledge about gynecologic tests, emotional barriers such as fear or social stigma, social barriers such as lack of support from family or friends, cultural barriers such as taboos regarding sexual issues (Lu et al., 2012).

According to the Korean guidelines for cervical cancer screening, it is recommended that every three years asymptomatic women aged 20 and over should receive cervical cancer screenings through either the Papanicolaou test (Pap test) or a liquid-based cytology test (National Cancer Information Center [NCIC], 2015). Although there are no guidelines for adolescents, when adolescents are experiencing abnormal gynecologic signs and symptoms, such as dysmenorrhea or abnormal uterine bleeding, they must get a proper screening at the gynecological clinic (Braverman and Breech, 2010). The more awareness and knowledge of HPV and cervical cancer, the higher the HPV vaccination status and intent of female teenagers (Choi and Cheon, 2015). Therefore, if knowledge about the Pap test were to increase, then the intention to perform and the actual performance rate will increase (Kim, 2009; Kim et al., 2015; Marek et al., 2012).

Often times, differing from the western society, Asian females tend to be reluctant to regularly visit the clinic for gynecologic screenings, which leads to delayed treatments of cervical cancer and other related detrimental diseases (Gor et al., 2011). Most of the time, South Korean females feel embarrassed or humiliated when they have to reveal their genitalia in front of a male physician at the obstetrics/gynecology (OBGYN) clinic, and these kinds of negative emotions interfere with regular gynecological checkups (Lee, 2015; Park et al., 2005, 2006). According to a study of 452 female middle and high school students in Seoul (Choi and Cheon, 2015), the proportion of female middle and high school students who had visited OBGYN clinics was 15.0%, which was lower than that of female college students (26.7%) (Kim and Ahn, 2007). Some of the main reasons that they avoid visiting the OBGYN clinic are that they have no signs or symptoms that are related to gynecological problems, are unmarried, or are afraid of what others may think about the visit to the clinic (Kim and Ahn, 2007). Emotional and cultural barriers regarding to age are one of the factors that make regular gynecological screening difficult for female teenagers, including the Pap test.

Receiving thorough cervical cancer prevention education (CCPE) about proper examinations, starting with adolescents who are going through puberty, will likely lead to the appropriate health promoting behaviors, and will also increase the chances of them getting regular Pap tests when they become 20 years of age or older. Hereby, it is expected that the cervical cancer prevalence rate will be decreased among South Korean females.

1.2. Hypothesis

The aim of this pilot study was to measure the effectiveness of The CCPE, focused on a Pap test, and to explore the emotions experienced by girls using focus-group interview (FGI) about cervical cancer prevention including the Pap test.

This study investigated the following hypotheses: providing Korean middle-school girls with CCPE will (1) increase their perception of the importance of preventing cervical cancer, (2) decrease their negative emotional response to the Pap test, (3) increase their confidence about preventing cervical cancer prevention, and (4) increase their intention to undergo Pap testing.

1.3. Theoretical framework

The information motivation behavioral skills (IMB) model was applied in the present study. The IMB model has been found to be useful as a theoretical framework in previous studies about HPV education (Kim et al., 2015). For the present study, the IMB model was incorporated in the development of CCPE for middle-school girls as follows:

1. Information ("I" in the IMB) was given to the girls about how to prevent cervical cancer, including the Pap test, which could lead to an increased awareness of cervical cancer prevention (Kim, 2014, 2015).
2. The girls were motivated ("M" in the IMB) to decrease their negative emotional response to the Pap test and to improve their self-confidence in preventing cervical cancer.
3. The behavioral skills ("B" in the IMB) were replaced with the behavioral intention of the girls to undergo Pap testing (Fig. 1).

2. Materials and methods

2.1. Research design

This pilot study used a mixed-method design, which combined a pretest-posttest design with a qualitative study using an FGI with one group. Questionnaire surveys were used to determine the effects of CCPE, and interviews were conducted to explore emotional responses toward the Pap test.

2.2. Ethical considerations

All of the protocols used in the research were approved by the Seoul National University Institutional Review Board (Approval NO. 1410001005). Before conducting the research, all of the participants and their parents were informed that their participation was voluntary and they had the right to withdraw from the study at any time. The students who participated in this study and their parents then submitted informed-consent forms. All questionnaires were completed anonymously and confidentially using nicknames for the participants.

2.3. Setting and sample

Convenience sampling was employed to recruit the study participants. The study included all ninth-grade students from a single middle school located in Seoul, Korea. Prior to recruitment, permission to access the students was obtained from the school principal and the school health teacher. The students who wanted to participate in the research were recruited. Fifteen middle-school girls were recruited by the school health teacher from December 8 to December 19, 2014. The sample size was determined based on the smallest number of participants considered acceptable for an FGI, which was from six to ten (Morgan, 1996). For this study, considering the possibility of dropouts, 15 participants from the same class were chosen in order to create a natural and comfortable environment for the study procedures.

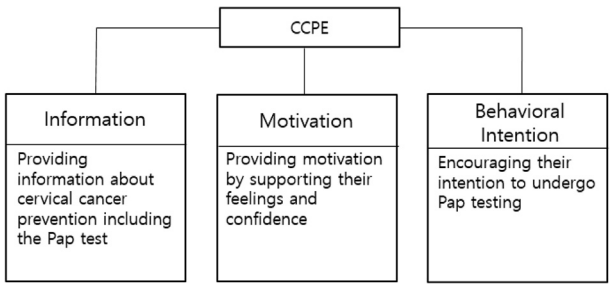

Fig. 1. Applied IMB model for the cervical cancer prevention education (CCPE).

2.4. Method 1: quantitative phase

2.4.1. Intervention for cervical cancer prevention education

CCPE was delivered through a lecture method using a PowerPoint (PPT) presentation and a model of the pelvis. Before providing the education, the relevance of the contents and the methodologies of the program were evaluated by two nursing experts on women's health and two health teachers. The following contents were included in the lecture that utilized PPT presentation: anatomy of the genitalia, causes of cervical cancer, the purpose and benefits of the Pap test, how to perform the Pap test, the purposes and benefits of the HPV vaccination, and the early prevention of cervical cancer caused by HPV. The current study utilized a physical pelvic model because this model facilitates understanding about both the female reproductive anatomy and the procedure of Pap testing through visual observations. There has not been advance research done regarding Pap test education for adolescents using a pelvic model. However, a previous study involving Swedish middle-aged women (with a median age of 42 years) found that utilizing a pelvic model to provide education about the pelvic exam and simulation before the exam increased the positive emotional response toward, confidence in, and intention to undergo Pap testing (Siwe et al., 2013). After the lecture, a demonstration was conducted using the pelvic model. The model used in this study allowed the students to understand the female external reproductive organs by visually and physically examining them.

Students were also invited to ask any questions during the education session, which lasted for 1 hour and was delivered by the research team.

2.4.2. Measure and data collection

This research questionnaire was developed by the researcher to apply to the middle-school students based on the instrument that measured the awareness, attitude, emotion, and intention of the Pap test, which was used in a previous study (Kim, 2014). The contents and constructs of the structured questionnaire were validated by three experts in HPV research and sex education on a four-point scale ranging from 1 (not necessary at all) to 4 (essential), finally, all items were confirmed as being essential. The data were collected using self-administered questionnaires on December 23, 2014 in a multimedia classroom before and after providing the CCPE.

The awareness of the importance of cervical cancer prevention was measured using two items: “How important is cervical cancer prevention in your life?” and “How important is your physical body?” The girls answered these questions with scores from 0 (“not at all”) to 10 (“very much”), with a higher score indicating that they perceived a greater importance of cervical cancer prevention in their life and their body.

The negative emotional response toward the Pap test was measured with three items related to how they imagine they would feel when undergoing the Pap test: “How much embarrassment would you feel?,” “How much shame about the exposure would you feel?,” and “How much negative attention from others would you feel?” The participants answered these questions on a 5-point Likert scale ranging from 1 (“not at all”) to 5 (“very much”), with a higher score in each part indicating greater embarrassment, shame, and awareness of the negative attention from others.

The confidence in preventing cervical cancer was measured using a 5-point Likert scale ranging from 1 (“not at all”) to 5 (“very much”), with a higher score indicating a greater confidence in their own ability to prevent cervical cancer.

The intention to undergo Pap testing was answered with a score ranging from 0 (“not at all”) to 10 (“very much”) with a higher score indicating a greater intention to undergo Pap testing in the future, if necessary.

2.4.3. Data analysis

The data were analyzed using SPSS (version 20.0, IBM). Demographic and cervical cancer-related characteristics were analyzed using frequencies and percentages. The Wilcoxon signed-rank test was used to analyze pretest and posttest differences between the main variables.

2.5. Method 2: qualitative phase

2.5.1. Data collection

The researcher verbally explained the reason and objective of the interview to the focus group immediately after the CCPE.

An FGI was used in this study to determine the thoughts of the girls, because such interviews facilitate free discussions about the Pap test and allow the participants to express their honest feelings or emotions (Morgan, 1996). FGI method was effective to deal with personal and sensitive topics rather than individual interview (Guest et al., 2017).

All 15 participants agreed to participate in the interview. The participants sat in a circle with name tags displaying their nicknames. A free discussion occurred, which was audio recorded. The FGI lasted for approximately an hour. One researcher served as the facilitator during the interview. Another researcher involved in the study observed and recorded important data, such as the atmosphere of the interview, and the subject's expressions, gesture, and tone.

After the interview, the participants received a small gift worth approximately US$ 20 for successfully completing the study.

2.5.2. Measurements

Participations answered four open-ended questions:

1. “What are your impressions about the Pap test and a pelvic examination?”
2. “How important is cervical cancer prevention to protect your body?”
3. “What difficulties to you anticipate in seeing an obstetrics doctor or having a gynecological examination?”
4. “How do the media, family, and friends influence the practices of unmarried women wanting to prevent cervical cancer?”

2.5.3. Data analysis

FGI data were analyzed using content analysis. After the recorded interviews were written in the language of the participants, the research team involved in this study attempted to understand the experiences of the participants by listening repeatedly to the recorded interview and by becoming familiar with the data after reading all of the transcribed discussions. As the researcher repeatedly read and wrote down the researcher's main ideas and concepts in meaningful words, sentences, and phrases. As we continue this process, the named and analyzed codes were analyzed and classified into similar codes. Considering the hierarchical structure of the data, it was classified into concepts and grouped into concepts, abstracts were compared and classified into subcategories for naming and grouped subcategories into a category with increased abstraction respectively.

To ensure credibility, we used audio recording, transcription, and observation records. We tried to show all possible experiences of participants. We described the general characteristics of participants to improve the fittingness of the research results. By recording the data collection and analysis process in detail, we tried to have auditability. To ensure confirmability, we tried to exclude any prejudices and interpret participants' meanings as is.

3. Results

3.1. Quantitative phase

3.1.1. General characteristics

The 15 girls enrolled in this education program were aged 14–16 years. Regarding their awareness of HPV, 80% ($n = 12$) of the girls said that they had heard about cervical cancer and the HPV vaccine, but only 26.7% ($n = 4$) of them considered HPV to be the cause of cervical cancer. Half of the participants and 20% ($n = 3$) of them had talked to their mothers and their friends, respectively, about cervical cancer, 40% ($n =$

6) had heard about the Pap test or cervical cancer screening, and 33.3% ($n = 5$) of them had already been vaccinated against HPV (Table 1).

3.1.2. Effects of cervical cancer prevention education

The results for the effects of CCPE are presented in Table 2. The girls showed a significant increase in score only for the item related to the importance of cervical cancer prevention in their life ($Z = -3.10$, $p = 0.002$), which is a variable of the awareness of the importance of cervical cancer prevention. And there was no change in their awareness of the importance of their bodies. There was no difference in negative emotional response to the Pap test, confidence in preventing cervical cancer and intention to undergo Pap test. Although there was no significant difference between before and after CCPE, mean values of 'how important is your physical body', 'how much embarrassment would you feel?', 'confidence in preventing cervical cancer', and 'intention to undergo Pap testing' were increased and mean values of 'how much shame about the exposure would you feel?' and 'how much negative attention from others would you feel?' items were decreased.

3.2. Qualitative phase

3.2.1. Negative responses about the Pap test: embarrassment and fear

When the researcher asked the girls to look at and touch the pelvic model during both the lecture and interview, they tended to not want to look closely at the models and laughed while touching it with their fingers. While one girl was watching the model and another girl was talking about preventing cervical cancer, many of them seemed to be shy and tried to avoid looking at the model. Even though all of the participants had known each other before the study, they expressed awkwardness and were reluctant to share their thoughts. The girls' verbal and nonverbal responses indicated that they were embarrassed about the Pap test. Moreover, when they were asked about their feelings or impressions about the Pap test, the dominant responses were the fear and pain associated with the Pap test. Examples of their verbal responses are as follows:

Table 1
Demographic and cervical cancer related characteristics ($N = 15$).

Charac Characteristic	Categories	*n*	%
Age (years)	14	2	13.3
	15	11	73.3
	16	2	13.3
Number of sisters	0	8	53.3
	1	7	46.7
Religion	No	7	46.7
	Yes	8	53.3
Academic records	Unsatisfactory	1	6.7
	Average	12	80.0
	Good	2	13.3
Economic status of parents	Moderate	12	80.0
	High	3	20.0
Heard about cervical cancer	No	3	20.0
	Yes	12	80.0
Heard about the HPV vaccination	No	3	20.0
	Yes	12	80.0
Heard about HPV	No	11	73.3
	Yes	4	26.7
Heard about the Pap test	No	9	60.0
	Yes	6	40.0
Talked about cervical cancer with mother	No	7	46.7
	Yes	8	53.3
Talked about cervical cancer with friends (including the vaccine)	No	12	80.0
	Yes	3	20.0
Have a family member with cervical cancer	No	13	86.7
	Yes	2	13.3
Know about cervical cancer prevention	No	9	60.0
	Yes	6	40.0
Have received the HPV vaccination	No	10	66.7
	Yes	5	33.3

Table 2
Comparison of measurement variables between before (pretest) and after (posttest) receiving CCPE ($N = 15$).

Charac Characteristic (minimum–maximum score)	Pre test	Post test	*Z* (*p*)
	Mean ± SD	Mean ± SD	
Awareness of the importance of cervical cancer prevention			
How important is cervical cancer prevention in your life? (0–10)	5.87 ± 1.25	7.93 ± 1.71	–3.10 (0.002) **
How important is your physical body? (0–10)	9.80 ± 0.56	9.93 ± 0.26	–1.41 (0.157)
Negative emotional response toward the Pap test (pretest: $n = 13$, posttest: $n = 15$			
How much embarrassment would you feel? (1–5)	3.08 ± 0.86	3.27 ± 1.10	–0.27 (0.785)
How much shame about the exposure would you feel? (1–5)	3.15 ± 0.80	3.13 ± 1.06	–0.82 (0.414)
How much negative attention from others would you feel? (1–5)	2.46 ± 0.78	2.27 ± 0.88	–1.13 (0.257)
Confidence in preventing cervical cancer (1–5) (pretest: $n = 13$, posttest: $n = 15$)	3.00 ± 0.57	3.53 ± 0.64	–1.93 (0.053)
Intention to undergo Pap testing (0–10)	5.00 ± 1.36	5.89 ± 2.83	–1.35 (0.178)

"Scary." "Um...(laugh) inserting (giggle). Oh, but it's scary. Really. It seems very painful." (A)

"It seems to feel weird." "The inserting is scary." (B)

"Phew…well…it's embarrassing to mention…but, I think the exam itself would hurt." (C)

3.2.2. Girls are not provided with education about preventing early cervical cancer

The girls were fully aware of the necessity of CCPE, and most of them expressed the opinion that this education should be provided within their families. However, only one of the girls, whose mother was a doctor, had heard about CCPE before the research. One girl who was vaccinated against HPV mentioned that she did not receive any detailed information about the HPV vaccination in the hospital. These girls were not offered CCPE anywhere, including schools and hospitals or homes. Another girl noticed that the media does not play an effective role in cervical cancer prevention since cervical cancer is not an interesting issue for girls, as exemplified by the following comments.

"The vaccination or the exams…uh…if you promote it to people, and… and then, unmarried women could prevent cervical cancer…" "I've never seen it." (D)

"(Shaking her head) I didn't watch it. I just went there to get the shot and left." (E)

"For me, first, advertising it via media…I don't think it's effective because in this era, people don't really pay attention to what the media advertises, but they just get as much information as they need/want as possible, skipping other ads. So I think it's ineffective to put ads on it, but have a serious conversation when you…well, you have to talk to your family. Because…nobody would take it seriously in the family and it could just go in one ear and out the other when you don't talk about it in a serious mood." (F)

4. Discussion

This is the first study to develop CCPE focused on Pap test based on the IMB model targeting Korean middle-school girls. We expected that CCPE based on the IMB model would increase the awareness of cervical cancer prevention, motivate feelings about the Pap test and confidence in preventing cervical cancer, and increase the intention to undergo Pap testing. However, the effect of CCPE was only partially confirmed among

the study subjects, in terms of their awareness of the importance of cervical cancer. And the effect of CCPE on changes in the negative emotional response to the Pap test, confidence in preventing cervical cancer, and intention to undergo Pap testing were scarcely apparent in this study. This was quite similar to the results of an advanced research done in Sweden, which was about a short, school-based CCPE that lasted about an hour, and was done for high school students (median age of 16 years). The results were as follows: participants in the experimental group's knowledge about HPV increased tremendously, but the attitude toward the ideas of getting condom use and Pap test had not changed (Gottvall et al., 2010). This means that it would not be sufficient to induce students to change their behavior in a short time of one hour.

A particularly noticeable finding was that the negative emotional response to the Pap test was still present after providing education. Although insignificant, embarrassment for Pap test increased after education. This reaction was unexpected. The relevance of the pelvic model in CCPE needs to be considered. Pelvic model was adopted in order to help the girls recognize the importance of their body and the prevention of cervical cancer, including the use of Pap testing, to reduce their negative emotional response and increase their self-confidence about the Pap test by providing visual information that clearly illustrated how the Pap test is performed. At the beginning of the study, we were expecting participants to be more aware and receptive to their body structures by teaching them with more vivid external genital models (Park et al., 2010). In Swedish studies, the effectiveness of the pelvic model has been proven (Siwe et al., 2013). In contrast, in the present study, it was found that the pelvic model may have caused negative effects on the participants, because they were surprised when first viewing the model, avoided looking at it, appeared uncomfortable, and even expressed shock responses. The results were completely opposite from what was expected. The discrepancies between these two studies may have been attributable to the difference in the ages of the subjects and also to cultural differences between Korea and Sweden. And the posttest was conducted right after the education program, so the participants were more likely to have fresh memories and diverse emotions toward the pelvic model. With conducting the posttest with these vivid feelings right after the education program, it is a little challenging to accurately show the effectiveness of the education. It is necessary to measure the long-term effect (Choi and Choi, 2013; Kim, 2009). Subsequent studies need to confirm the appropriateness of the use of the pelvic model in relation to the effects of the IMB model and motivation and behavioral intentions.

In this study, interview using the FGI method because FGI could better reveal sensitive topics and be active in peer interactions, but there was also a prior study that showed a difference between in depth personal interviews and FGI results (Guest et al., 2017). Therefore, individual in depth interviews needs to be used in further studies.

The school-based health education currently provided in Korea does not include information about cervical cancer prevention for adolescents. The students expressed needs for education on cervical cancer prevention through interviews. We have confirmed the need for school-based CCPE, as also suggested in previous studies (Kim, 2012, 2015). In Korea, cervical cancer prevention education is not mandatory for students, and each school is free to perform according to the capacity of the school health teacher. According to a survey of health teachers, only 20% of the respondents said that they conducted HPV education (Kim, 2012). Therefore, it is meaningful that this is a short school based CCPE program, as it can set an example and a guideline for future cervical cancer prevention education programs in schools, which is meaningful and valuable. The study results indicate that CCPE for adolescent girls was currently provided by their mothers. Half of the participants in the present study mentioned talking to their mothers about cervical cancer, but only one girl had received actual information from her mother, who was a doctor. Thus, most of the mothers were not performing the role of the educator for cervical cancer prevention. Mothers who are continually getting regular Pap tests and/or have knowledge about HPV, are more likely to have their daughters get actively involved in cancer prevention activities, such as getting vaccinations for cervical cancer (Lefevere et al., 2011). Therefore, schools and communities in Korea should encourage mothers to play an active role in education and motivate them to provide CCPE for their daughters as well as increasing their own cervical cancer prevention behavior.

There has to be a consideration of the role of health professionals in hospitals regarding cervical cancer prevention. One of the participants in this study who was vaccinated against HPV had not received information about cervical cancer and HPV in the hospital; health professionals should actually be emphasizing the importance of cervical cancer prevention, including HPV, when they vaccinate adolescents. Furthermore, other significant finding was that the participants indicated in the FGI that they were not interested in media playing a role in CCPE. Other methods, therefore should be considered for providing this education, such as via smart phone, since most Korean adolescents use these devices, and there is demonstrated effectiveness of providing CCPE via social network service (SNS) messages to adolescents (Guse et al., 2012; Lai et al., 2015). We therefore recommend the development of CCPE programs that are tailored to the lifestyle and preferences of Korean adolescents.

4.1. Clinical implication

One of the strengths of this study is that this is the very first study that is related to school based programs conducted for Korean middle-school girls, which has a positive influence on them and allows them to acknowledge the importance of cervical cancer prevention. Even though this was a short 1-hour education program, it is meaningful in the sense that it is encouraging the community and the schools to get involved in providing feasible CCPE. Additionally, it is expected that, in the future, CCPE might be able to contribute effective sources for the national health extension program to cervical cancer prevention.

4.2. Limitations

There was a limit to the recruitment of students because they had to obtain the consent of the school officials, students and parents. Due to the limitations of the recruitment, there was only an experimental group, which did not go through a random selection process, for the one-group pretest-posttest design. As a result, potential selection bias should not be overlooked. This study used a simplified tool developed by the researcher for middle-school girls. For future studies, it is necessary to develop more measurement instruments and test their validity and reliability. Also, when conducting the next study, it would be better to use a measurement tool that is better suited to the subject. In order to reaffirm the CCPE, it is necessary to supplement the research design and carry out repeated studies.

5. Conclusion

This pilot study explored the partial effectiveness of CCPE based on the IMB model and illustrated the importance of cervical cancer prevention in Korean middle-school girls. The FGI revealed the negative responses that the study participants expressed about the Pap test and the necessity of CCPE. We expect that the current result will provide momentum for the active development of CCPE for adolescents.

In the future, more research will be needed to reconfirm the effectiveness of the CCPE developed in this study for adolescents, and the crucial need to find methods for reducing the negative emotions that Korean middle-school girls experience about the Pap test.

Declarations

Author contribution statement

Hae won Kim: Conceived and designed the experiments; Performed

the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Young Jin Lee, Da Bit Lee: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Eun Ju Lee: Analyzed and interpreted the data; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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