

Short-Term Efficacy of an Educational Program to Enhance Knowledge and Attitude for Preventing Cervical Cancer among Japanese Male High School Students

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Background: Human Papillomavirus (HPV), a cause of cervical cancer, is transmitted usually through sexual contact. Males, as well as females, need to gain knowledge about HPV and cervical cancer. However, Japanese schools do not provide cancer prevention education in a systematic and systemic manner.

Objective: This study aimed to evaluate the short-term efficacy of an educational program to enhance the knowledge and attitude for preventing cervical cancer among male high school students.

Methods: The participants were 83 male first grade students (mean age = 15.7) who participated in the educational program at a prefectural high school in Tohoku region's Prefecture "A" in Japan. The program consisted of five standard 50-minute learning sessions conducted in a lecture-and-workshop format as part of the school's health courses.

A self-administered questionnaire survey was conducted before and immediately after the program to examine its process and impact, and three months after the program to evaluate its short-term efficacy. The process evaluation investigated work sheet utilization, activity status, and satisfaction with educational materials and the program. The impact evaluation examined the knowledge and attitude for preventing cervical cancer.

Results: The rate of work sheet utilization was high in the program. The participants were highly satisfied with the educational materials and the program. Additionally, the scores of knowledge and attitude for preventing cervical cancer: "importance and effect of screening", and "subjective norms" after the program were higher and statistically significant than those before the program.

Conclusion: This educational program demonstrated a short-term efficacy of enhancing knowledge and attitudes regarding the prevention of cervical cancer among male high school students in Japan.

Keywords: cervical cancer, cancer education, reproductive health/rights, school-based program

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I. Introduction

Cervical cancer has become more controllable since the vaccination for the human papillomavirus (HPV) vaccine and the promotion of regular screening. However, in Japan, the percentage of those receiving the inoculation is insufficient since many fear its side effects¹⁾²⁾. The cervical cancer screening rate has fluctuated around 20–30% for many years³⁾. Further, the medical examination rate is low, particularly for women in their early 20s, and

the number of women with cervical cancer has increased in the past decade⁴⁾.

Lack of understanding about the seriousness of the disease and the importance of receiving medical examinations has been noted as a risk factor for the low cervical cancer medical examination rate; therefore, there is a need to educate young people to reduce these risks⁵⁾. However, a description about cervical cancer is not included in the guidelines for health education in junior high school and high school⁶⁾⁷⁾. That is, systematic

cervical cancer prevention education is not implemented in schools in Japan.

Consequently, the author of the current study developed an educational program to prevent cervical cancer, in collaboration with teachers in charge of high school health education (HE)⁸⁾. This nurse-developed educational program is applicable to the curriculum of high school HE, or may be provided as a special course. A prior study clarified that female high school students obtained the knowledge and attitudes required for cervical cancer prevention through this program, and that the program was effective for maintaining short-term attitude change⁸⁾.

Although cervical cancer prevention is essential for women's health, cervical cancer is not only a problem for women. HPV is transmitted usually through sexual contact⁹⁾. HPV, which is a cause of cervical cancer, can also affect males (e.g., warts and cancer of the mouth, pharynx, genitals, and anus⁹⁾). This indicates that cervical cancer prevention is a reproductive health/rights issue, regardless of sex or age¹⁰⁾. Of note, education about cancer, including HPV and cervical cancer, has been implemented in Europe and the United States¹¹⁾¹²⁾; therefore, in this study, the author implemented the aforementioned program with male high school students. The purpose was to evaluate the short-term efficacy of an educational program to enhance the knowledge and attitudes for preventing cervical cancer among male high school students.

II. Methods

1. Educational program development process

A previous study revealed the factors required for cervical cancer prevention based on a model¹³⁾ that combined the health belief model (HBM)¹⁴⁾¹⁵⁾ and theory of reasoned action (TRA)¹⁶⁾. The author discussed with health and physical education (H&PE) teachers in high schools the most optimal method of learning and the contents of the educational program. In this process, the author and H&PE teachers confirmed that the educational program was not a departure from health and physical education guidelines⁶⁾.

2. Educational program summary

The goals of the educational program are summarized in **Table 1**⁸⁾. The standard program comprised five 50-minute sessions, consisting of lectures and workshops.

Workshops were conducted with a few students per group who designed plans to promote cervical cancer prevention by utilizing the knowledge acquired from the lectures⁸⁾.

The author of this study developed educational materials for students and supplementary reading material for H&PE teachers in cooperation with H&PE teachers, designers at an art university, and medical doctors in the program. The educational materials consisted of three worksheets and textbooks: the worksheets addressed (1) the project plan, (2) goal management, and (3) reflection; the textbooks addressed (1) basic knowledge focusing on cervical cancer, including common cancer, sexually transmitted infection, and reproductive health/rights, and (2) the procedure of the program. Additionally, the supplementary reading material comprised a guidebook that described (1) the procedure of the program and (2) basic knowledge focusing on cervical cancer⁸⁾. The teaching and supplementary reading materials were checked by two doctors specialized in obstetrics, gynecology, and pathology, to secure content adequacy⁸⁾.

3. Validity of implementing the educational program in health classes

The contents of the educational program include the required knowledge and attitude for cervical cancer prevention, including reproductive health and rights. These contents should be taught to both female and male students in schools. Moreover, the educational program incorporates learning methods recommended by education guidelines⁶⁾, thereby enabling independent health learning by students. Therefore, the author believes that it is appropriate to implement the program not only as a special course but also as part of HE.

4. Design

A pre-experimental study design was used (**Figure 1**). The hypothesis was that the male participants, who were first grade high school students, could enhance their knowledge and attitude required for cervical cancer prevention after participating in the program.

5. Participants

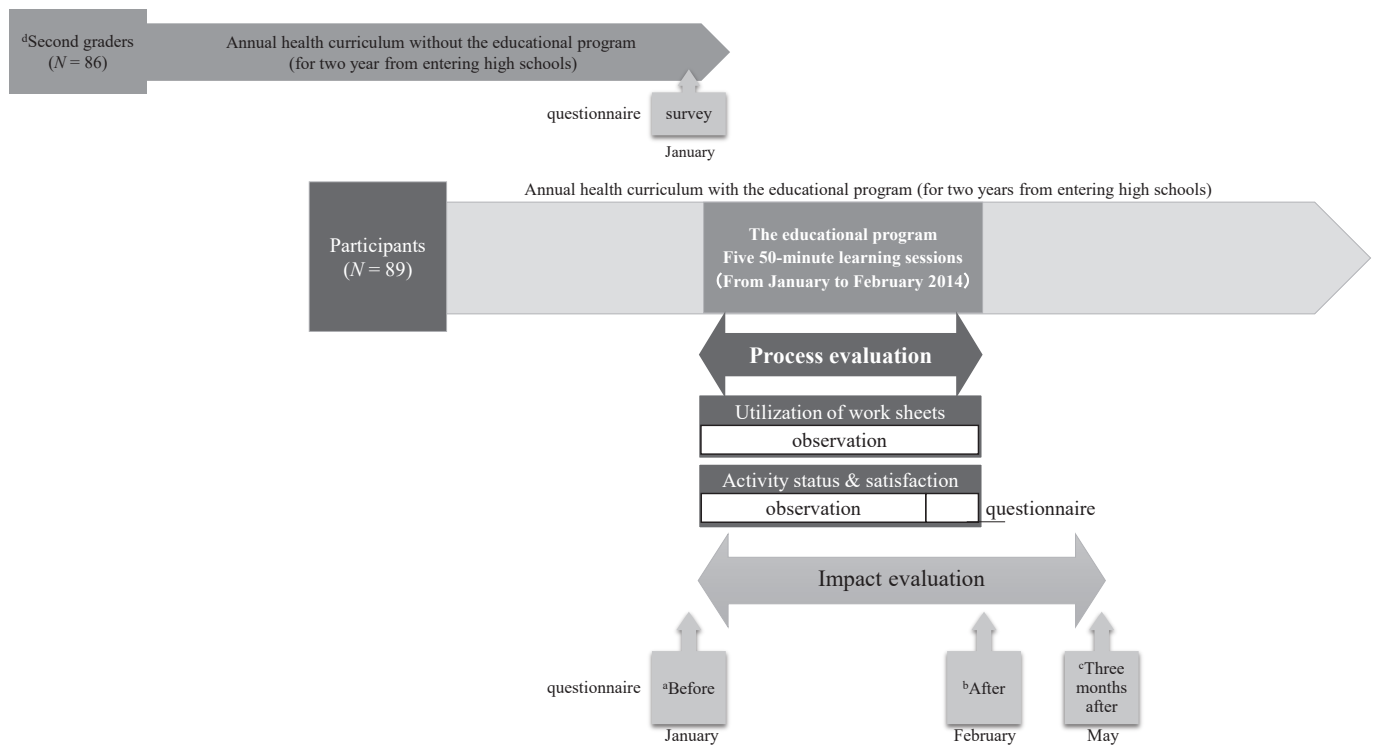
The participants consisted of 83 out of 89 (93.7%) first grade male high school students (mean age = 15.7 years, standard deviation [SD] = .45) who participated in the educational program at a prefectural high school

Table 1 The learning contents and goals of the educational program⁸⁾

The goals of the educational program	
The students gain knowledge regarding cervical cancer prevention. They also enhance their awareness of preventing cervical cancer through autonomous and self-sustaining participation in the educational program.	
Phase	Goals and learning contents of each phase
Lesson 1 Lecture on cervical cancer prevention	Students gain knowledge for cervical cancer prevention. <input type="checkbox"/> Basic knowledge for cancer, including sexually transmitted infections and reproductive health/rights.
First half of Lesson 2 Lecture on methods and evaluation criteria	Students understand the process of the program. <input type="checkbox"/> Subject: Preventing cervical cancer. <input type="checkbox"/> Process of this program, vision, goal, evaluation criteria. Vision: I do not want anyone to get cervical cancer. Goal: The Cervical Cancer Prevention Project for High School Students. It will protect me, and it will protect you.
Second half of Lesson 2 Decision about vision and goal in team planning	Each team clearly explains vision and goal in the team. <input type="checkbox"/> Discussion about vision and goal. <input type="checkbox"/> Decision about vision and goal. Each team fills out the plan clearly on the sheet. Students reflect on the work and identify problems.
Lesson 3 to first half of Lesson 5 Working together	Each team works well together based on the plan. Students reflect on the work and identify problems.
Second half of Lesson 5 Presentation Discussion Reflection by using evaluation criteria	Each team delivers the product to other teams <input type="checkbox"/> Each team explains the product to the other teams simply. <input type="checkbox"/> Students evaluate the presentation with each other. A review of past activities using the assessment criteria, program plan, goal sheet, and completed materials enables us to pinpoint the areas of progress, as well as areas needing improvement. <input type="checkbox"/> Past activities using the assessment criteria, program plan, goal sheet, and completed materials are reviewed. <input type="checkbox"/> The achievement levels are recorded on the self-assessment chart. <input type="checkbox"/> The items learned through the project and the achievement status are recorded on the goal sheet. <input type="checkbox"/> Students explain the achievement of the goals and identify any problems.

in Prefecture “A.” The program was implemented at a middle-to-high ranked high school with a male-to-female ratio of nearly 1:1. Since the author aims to develop the program in health curriculum in the future,

the author targeted all 95 first grade female students for its implementation. The second grade students consisted of 86 males (mean age = 16.7 years, SD = .45) from the same high school who did not participate in the program.



^aBefore: before implementing the program; ^bAfter: immediately after the program; ^cThree months after: three months after the program; ^dSecond graders: second grader students were treated as reference data, not as a control group. The questionnaire survey was administered after completing a two-year HE curriculum.

Figure 1 Design for evaluation of the program in health curriculum

To choose high schools, the author approached the two high schools at which the teachers the author consulted for preliminary investigation worked⁸⁾. One high school answered that it was able to implement the program and was chosen as the subject.

Prior to implementing the program, the author proposed the following two plans to the schools and discussed them with the H&PE teachers of the high schools: 1) implement the program as a special course, and 2) implement the program as an HE course. The selected high school opted to implement the program in their HE course. This was because in the selected high school, the final five classes of the first grader HE course were devoted to problem-solving learning. These classes could be replaced by the five classes that were developed for the educational program. The selected high school had organized the lessons to ensure that students learned necessary knowledge in the HE course before beginning the classes that involved problem-solving learning. For this reason, even after the introduction of the program, the author and P&HE teachers confirmed there would be no change in overall content of the health curriculum and that it would be deployed in such a manner that it would not disadvantage students by omitting required learning content⁸⁾.

Regarding implementation, the author and the H&PE teachers explained to the parents beforehand in writing, the purpose, method, and significance, among others, of incorporating the educational program into the HE course. The parents did not object to the program. After completing these processes, the program was implemented as an HE course⁸⁾.

6. Data collection

Data were collected from January to May 2014 (**Figure 1**). A self-administered questionnaire was presented to the participant group as a preliminary survey before implementing the program. Process and impact evaluations were obtained using a self-administered questionnaire immediately after completing the program. Furthermore, an impact evaluation by self-administered questionnaire was obtained three months after program completion (**Figure 1**).

For the second grade students of the same high school, a questionnaire survey was administered by which to understand their knowledge and attitude required for cervical cancer prevention after completing a two-year HE curriculum (in January 2014). However, because the second grade students were in a different grade than the

participants, the author decided that they could not be treated as a control group (**Figure 1**).

7. Survey content

Students' demographics, such as age and grade, were collected.

(1) Process evaluation

Immediately after the program, the author investigated the utilization of worksheets regarding the following: (1) project plan, (2) goal management, and (3) reflection. The worksheet for the project plan was also investigated regarding its description contents. In addition, a self-administered questionnaire survey was conducted immediately after the program. Its components and questionnaire items were as follows: activity status (1

item), satisfaction with the educational materials (1 item), and satisfaction with the program (2 items). Each item was rated on a four-point scale: *I think so, inclined to think so, inclined not to think so, and hardly ever think so*.

(2) Impact evaluation

The impact evaluation was performed before, immediately after, and three months after program implementation. The items were developed based on previous studies⁸⁾¹³⁾.

Knowledge regarding cervical cancer (knowledge; 7 items, 0–7 points). As shown in **Table 2**, answers were obtained as *yes* or *no*. One point was assigned for correct answers and zero points was assigned for incorrect answers. These items were determined based on a previous study¹⁷⁾ and have also been utilized

Table 2 Components and questionnaire items for male students

Component
Questionnaire items (No. 1–14)
Knowledge regarding cervical cancer (Knowledge)
1. HPV causes cervical cancer.
2. Women will never get cervical cancer if they receive an HPV vaccine.
3. There has been an increase in the number of cervical cancer cases among women in their 20s and 30s.
4. HPV can be transmitted via sex.
5. Approximately 80% of women contract HPV once in their lives.
6. Cervical cancer screening commences from age 20.
7. People who have had a large number of sexual partners are at greater risk of contracting cervical cancer.
The awareness of the importance and effectiveness of cervical cancer screening (The importance and effectiveness of screening)
8. It is important to undergo regular cervical cancer screening.
9. It is important to visit the gynecologist as needed.
10. Undergoing regular cervical cancer screening is a good method for early detection and treatment of cervical cancer.
11. By undergoing regular cervical cancer screening, it is possible to discover changes before the onset of cervical cancer.
Subjective norms for adopting cervical cancer prevention behavior (Subjective norms)
12. Most people around me think women should undergo regular cervical cancer screening.
13. Most people around me think women should receive the HPV vaccine.
14. Most people around me think women should visit a gynecologist as needed based on their own judgment.

- The items on knowledge were answered with a *yes* or *no*. The knowledge items were scored by giving 1 point for a correct answer and 0 for an incorrect answer.
- A four-point Likert scale was used for each item (excluding knowledge): *I think so, inclined to think so, not inclined to think so, and hardly ever think so* with higher scores indicating more positive perceptions.

in investigations that recruited female high school students⁸⁾¹³⁾.

The awareness of the importance and effectiveness of cervical cancer screening (importance and effectiveness of screening; 4 items, 4–16 points). These items are shown in Table 2. Higher scores indicate that the participants recognized the importance and effects of cervical cancer medical examinations and have more affirmative attitudes regarding said examinations. Cronbach's α in this study ranged from 0.63 to 0.93 (Table 3).

Subjective norms for adopting cervical cancer prevention behavior (subjective norms; 3 items, 3–12 points). These items are shown in Table 2. Higher scores indicate that the participants recognized the attitudes of surrounding people toward medical examinations more positively. Cronbach's α in this study ranged from 0.82 to 0.92 (Table 3).

8. Analysis

Regarding utilization of the worksheets used in the process evaluation, the author checked descriptions and calculated activity ratios. As individuals completed the goal sheet and reflection sheet, the activity ratio was obtained based on the total number of participants. Since the plans were completed by each team, the activity ratio was obtained based on the total number of teams. For the contents of the plans, the author investigated the titles and methods listed in the plans.

For the impact evaluation, scores were compared by descriptive statistics. Specifically, the total scores obtained at the three points were compared longitudinally for the participant group (Tukey's multiple comparison

test). The total scores between groups were compared three months later (t-test). Significance was set at $p < .05$ for both tests. For analyses, IBM SPSS 19.0 for Japanese, R version 2.8.1, and SPSS Amos Version 20.0 were used.

9. Ethical considerations

The author conducted the study after having received approval from the ethics committee of the university to which the author is affiliated (no. 2010014).

Information regarding the study was provided orally and in writing to the participants, the school principal, and the teachers. The information provided was as follows: program summary, purpose, methods, and the release of the investigation results. This information was also provided to students' parents in writing, based on discussions with the school. There were no opinions or inquiries from the parents.

All first grade students participated in the program because it was conducted as part of the HE classes. However, cooperation with the questionnaire survey and the submission of records were voluntary. The school ensured that the study had no discernible impact on the participants' academic results with regard to HE, regardless of students' cooperation and submission. The questionnaires and records were identified by numbers, through a method known as "consolidated impossible anonymous."

The second grade students were given details of the study's objectives, ethical considerations, the process by which their personal information was protected, and how investigation results would be released, orally and in writing before the survey.

The author set up a collection box in allocated areas

Table 3 Cronbach's alpha for the components

	Participants ($n = 83$)			Second grade students ^d ($n = 81$)
	Before ^a	After ^b	3 months after ^c	
The awareness of the importance and effectiveness of cervical cancer screening (The importance and effectiveness of screening; 4–16 points)	.67	.93	.63	.75
Subjective norms for adopting cervical cancer prevention behavior (Subjective norms; 3–12 points)	.82	.91	.87	.92

^aBefore implementing the program; ^bImmediately after the program; ^c3 months after the program; ^dafter completing a two-year HE curriculum.

of the school. This set-up allowed the following: (1) easy access to the collection box for subjects, (2) security against loss of the box and its contents, and (3) ensuring that teachers did not force participants to submit the questionnaires.

The author and teachers distributed the educational materials to the second grade students in order to provide them with a chance to receive education regarding cervical cancer prevention. In addition, the products were displayed in the school so that students could view them freely.

III. Results

1. Program implementation conditions

The educational program was conducted as part of the HE lessons every two weeks, from January to February 2014. There were 33–35 students in each class, and the workshop was held with 5–6 students per group (mixed sex, seven teams per class, and a total of 35 teams). The educational program was collaboratively conducted by the author and three H&PE teachers in the school. The author primarily delivered the lecture as the educational program's developer and a registered nurse. **Table 4** shows the contents of the cervical cancer prevention project.

2. Process evaluation

The author gave a lecture to all first grade students jointly in a lecture hall in the school. The lecture included the educational materials, which were projected on a screen. The students listened to the lesson while referencing the distributed educational materials. When

the author and H&PE teachers explained or asked the students questions, they responded positively and expressed surprise. All planned contents were taught within an hour. Workshops were performed in each class, and the students completed group work utilizing the teaching materials. Eighty-three male high school students participated in all classes.

The author and H&PE teachers responded to students' questions, and therefore, none of the students were isolated and the activity was collaborative in nature. Regarding worksheet use, 83 students (100%) used the goal sheet, 35 teams (100%) used the planning sheet, and 78 students (94.0%) used the reflection sheet. The students exchanged their opinions actively after the presentation. The opinions gathered immediately after the presentations were overwhelmingly positive; over 90% of the students expressed satisfaction with activities, teaching materials, and the program in general (**Table 5**).

3. Impact evaluation

Total scores significantly increased immediately after program implementation for “knowledge” ($p < .001$), “importance and effect of screening” ($p < .001$), and “subjective norms” ($p < .001$). Further, the scores of “knowledge” and “importance and effectiveness of screening” did not significantly decrease three months later. Although the score of “subjective norms” did significantly decrease three months later ($p < .001$), the score remained significantly higher than it was before implementation ($p < .001$; Tukey's multiple comparison tests in each case). Comparison with the scores of the second grade students revealed that the scores of the participant group were significantly higher for all items (**Table 6**; t-tests).

Table 4 The contents of the project to promote cervical cancer prevention

Project	Number of teams (%)
Designed a poster	11 (31.4)
Gave a presentation	9 (25.7)
Performed a drama	6 (17.1)
Planned a project	2 (5.7)
Developed a picture story show	2 (5.7)
Conducted a questionnaire survey	1 (2.9)
Performed a comedy skit	1 (2.9)
Produced a drama	1 (2.9)
Produced a commercial	1 (2.9)
Made a newspaper	1 (2.9)

Table 5 Process evaluation by questionnaire survey immediately after the program (n = 83)

		I think so	Inclined to think so	Inclined not to think so	Hardly ever think so
Activity status	I could proactively participate in the courses.	43 (51.8)	33 (39.8)	4 (4.8)	3 (3.6)
Satisfaction with educational materials	The worksheet was easy for me to use.	32 (38.6)	45 (54.2)	6 (7.2)	0 (0)
Satisfaction with the program	The courses were easy for me to understand.	49 (59.0)	30 (36.1)	0 (0)	4 (4.8)
	The courses were interesting.	39 (47.0)	37 (44.6)	5 (6.0)	2 (2.4)

Number (%).

Table 6 Impact evaluation

	Mean score (SD)				p-value			
	Participants (n = 83)			Second grade students ^d (n = 81)	Participants (n = 83)			Participants ^c (n = 83) – second grade students ^d (n = 81)
	Before ^a	After ^b	3 months after ^c		Before ^a -After ^b	Before ^a -3 months after ^c	After ^b -3 months after ^c	
Knowledge regarding cervical cancer (knowledge; 0–7 points)	4.2 (1.2)	5.7 (0.9)	5.8 (0.8)	4.9 (0.9)	< .001	< .001	n.s.	< .001
The awareness of the importance and effectiveness of cervical cancer screening (importance and effectiveness of screening; 4–16 points)	14.6 (1.7)	15.2 (1.8)	15.4 (1.0)	14.8 (1.7)	< .001	< .001	n.s.	< .001
Subjective norms for adopting cervical cancer prevention behavior (subjective norms; 3–12 points)	8.6 (1.7)	10.1 (2.3)	8.8 (2.2)	7.8 (2.7)	< .001	< .001	< .001	< .001

^aBefore implementing the program; ^bImmediately after the program; ^c3 months after the program; ^dafter completing a two-year HE curriculum; ^eParticipant (3 months after the program) – ^dsecond grade students.

Higher score denotes better awareness/attitude/knowledge.

Tukey's multiple comparison test was conducted to analyze longitudinal effects thrice in the participants. A *t*-test was conducted to compare the participants and the second grade students. n.s.: not significant.

IV. Discussion

This study verified the short-term efficacy of a cervical cancer prevention program, developed via process and impact evaluations, using a pre-experimental study design. The male high school students who participated were highly satisfied with the teaching materials and the program. Moreover, participants' knowledge and attitude scores regarding cervical cancer prevention increased after the program. The above results suggest that the program showed efficacy for promoting knowledge and appropriate attitudes regarding cervical cancer prevention among male high school students.

1. Process evaluation conditions

Since cervical cancer is typically seen as a disease affecting women, there was concern over whether male

students would benefit from this program. In fact, male students positively participated in the program, similar to female participants⁸⁾. Although the program was implemented in only one school, the results suggested no sex differences in participation in the program or satisfaction with the program. That is, the process evaluation supports the fact that the program was implemented under desirable conditions, even for male students.

One of the factors that promoted these results was that the students had been given basic knowledge about HPV and cancer, and it was explained during the first lecture that HPV and cancer are critical reproductive health topics, regardless of sex¹⁰⁾. The students learned that HPV is a common virus that can affect them, including the various diseases that may develop in boys/men. This made the students concerned about the disease and prompted feelings such as “I cannot ignore this disease”

or “It is important regardless of gender” and promoted their learning motivation. Furthermore, the author believe that the students will maintain their motivation to learn about the disease.

2. Impact evaluation conditions

Immediately after program implementation, the scores of recognition of importance and effectiveness of screening, subjective norms, and knowledge significantly increased. Although an exact comparison is not possible, the score on every evaluation indicator in the participant group was statistically significantly higher than those of the second grade students. In particular, all scores of the second grade students were almost at the same low level as in a previous survey conducted among female high school students in Japan⁸⁾, despite the assessment taking place immediately after completing the two-year health curriculum. Therefore, these results indicate that the current program could complement the content of HE classes because the present standard HE content in Japanese high schools is unsatisfactory because it does not allow students to acquire the knowledge and attitudes required to prevent cervical cancer.

Comparable results were obtained in a previous study with female students⁸⁾. One of the factors suggesting the efficacy of this program was the results of the process evaluation¹⁸⁾. Since knowledge scores were maintained three months after program implementation, the knowledge obtained from the lectures was likely fully utilized.

Moreover, the awareness of importance and effectiveness of screening were also maintained three months after program implementation, similar to the knowledge scores. A previous study performed with female students as participants reported that only the awareness of “importance and effectiveness of screening” was positively correlated with knowledge among the attitudes for cervical cancer prevention⁸⁾. This result among male students was similar to that of female students.

“Subjective norms” significantly increased immediately after program implementation, and these scores were significantly higher than those of the second grade students. This program incorporated not only lecture-type learning but also a participatory learning style, which allowed the students to learn with their friends independently at workshops. The program specifically aimed to enhance students’ subjective norms regarding cervical cancer prevention. While

attitude development is more difficult than knowledge acquisition¹⁹⁾, independent learning activity is considered effective for such development among female students⁸⁾ as well as male students.

However, scores decreased after three months, consistent with results⁸⁾ obtained with female students; therefore, regardless of gender, it is key to maintain the positive attitudes that are improved directly after program completion. However, recognition of subjective norms is not only a problem for students. Specifically, unless women typically receive cervical cancer screening at regular intervals and consult gynecologists as needed, high school students will not be able to recognize the subjective norms throughout the program.

In Japan, the cervical cancer screening rate is low for all generations, and young women tend to hesitate to visit a gynecologist²⁰⁾²¹⁾. To maintain the subjective norms of high school students regardless of gender, medical examinations and consultations should be promoted among adolescents in HE programs, thus ensuring a positive sense of values and attitudes for cervical cancer prevention, which will help continue and spread the program.

3. Limitations and future issues

This study did not confirm maintenance of students’ knowledge and attitude scores more than three months after program completion; therefore, to strictly verify the efficacy of the program, further research with longer follow-up periods is required. Moreover, the influence of academic ability must be considered. It is necessary to further analyze whether comparable results can be obtained in schools where students’ academic ability and other characteristics differ.

V. Conclusion

The results of this pre-experimental study revealed that the educational program developed had short-term efficacy for enhancing male high school students’ knowledge and attitude regarding the prevention of cervical cancer.

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- Junko S, Kakoyo K, Kazuko T: Behavioral intention to prevent cervical cancer and related factors among female high school students in Japan. *Japan Journal of Nursing Science* 15: 375-388, 2018

Membership in Learned Societies:

- Japanese Association of School Health
- Japan Academy of Nursing Science
- Japanese Society of Public Health
