

Short-Term Efficacy of the Educational Program to Enhance Behavioral Intentions to Prevent Cervical Cancer among Japanese Female High School Students

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Background: Cervical cancer is becoming a repressible disease since females can receive the human papillomavirus (HPV) vaccine and undergo regular cancer screenings. However, the rates of HPV vaccination and cervical cancer screening have been low for many years in Japan, which can be attributed to a low level of awareness among the Japanese. Actually, Japanese schools do not practice cancer prevention education in a systematic and systemic manner.

Objective: This study aimed to develop an educational program within the Japanese health curriculum to enhance behavioral intentions to prevent cervical cancer among female high school students and evaluate the educational program's short-term efficacy by assessing its processes and impact.

Methods: A pre-experimental study design was used. The participants were 95 female first-year students (mean age = 15.8; standard deviation: SD = .42) 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 efficacy, 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 behavioral intentions and its related components (five components).

Results: The program was completed without difficulty and rate of work sheet utilization was high. The participants were highly satisfied with the educational materials and the program. Additionally, the scores of behavioral intentions showed a statistically significant immediate increase, which was sustained even after three months. All related components of behavioral intentions after the program were statistically significantly higher than those before the program.

Conclusion: The educational program was effective in enhancing short-term behavioral intentions among female high school students in Japan.

Keywords: behavioral intentions, cervical cancer, health curriculum, cancer education, school-based program

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I. Introduction

Cervical cancer is becoming a repressible disease as females can receive the human papillomavirus (HPV) vaccine and undergo regular cancer screenings. However, the extremely low rate of HPV vaccination in Japan continues, amid continuing concerns about its adverse reactions¹⁾. Moreover, the average cervical cancer

screening rate in Japan has lingered around 20–30% for many years²⁾, and the screening rate is extremely low especially among those in the early 20s. In Japan, there has been a rapid increase in the number of cervical cancer cases among women in their 20s and 30s³⁾. Therefore, receiving regular screening for cervical cancer is of growing importance so that the disease can be detected and treated early.

The low screening rate can be attributed to a low level of awareness among the Japanese public; for example, many Japanese people do not adequately understand the severity of the disease and the importance of screening⁴. Japanese schools do not practice cancer prevention education in a systemic manner^{5,6}. In contrast, the United States has established cervical cancer prevention as part of its health education (HE) curriculum from a reproductive health perspective⁷⁻⁹. HPV infection is the most frequently occurring sexually transmitted infection. HPV, which is a cause of cervical cancer, can also affect males (e.g., warts and cancer of the mouth, pharynx, genitals, and anus¹⁰). High school students receive education regarding cervical cancer screening in the United Kingdom as well¹¹. These countries' cervical cancer screening rate (over 60%) is much higher than that of Japan².

As stated above, the current state of preventing cervical cancer is different between Japan and the Western countries. In fact, Japan has several complex problems concerning cervical cancer prevention from the health and educational perspectives. To resolve this issue in Japan, the author developed an educational program for cervical cancer prevention in cooperation with Health and Physical Education (H&PE) teachers, which can be implemented in high school HE classes. Cervical cancer screening begins at the age of 20 in Japan. Therefore, the author focused on the behavioral intentions that would facilitate the prediction of future cervical cancer preventative behavior. A previous study reported that behavioral intention was an important factor in the prediction of actual behavior; indeed stronger behavioral intentions can contribute to actual behavior¹². Moreover, the program set an educational goal to increase female high school students' behavioral intentions to prevent cervical cancer. The previous survey revealed that the behavioral intentions for preventing cervical cancer were low among female high school students¹³.

Consequently, the purpose of this study was to develop an educational program within the Japanese health curriculum to enhance behavioral intentions to prevent cervical cancer among female high school students and to evaluate the educational program's short-term efficacy by assessing its processes and impact.

II. Methods

1. The educational program development process

The educational program was developed based on a combined model¹³ of the Health Belief Model (HBM)^{14,15} and Theory of Reasoned Action (TRA)¹⁶. They explain individual behavior but are also effective when applied to interventions¹⁷. Numerous studies have reported that a combined model of these theories offers validity because of their common theoretical ground and effectiveness in the explanation of behavior and interventions^{18,19}. Moreover, a previous study revealed that behavioral intentions to prevent cervical cancer and five related factors were: 1) the awareness of the importance and effectiveness of cervical cancer screening (The importance and effectiveness of screening), 2) obstacles to cervical cancer preventative behavior (Obstacles to preventive behavior), 3) subjective norms for adopting cervical cancer preventative behavior (Subjective norms), 4) the behavior of someone close that encourages cervical cancer preventative behavior (The behavior of someone close), and 5) knowledge regarding cervical cancer (Knowledge) (Table 1)¹³. In addition, the author carefully considered the most optimal method of learning and the study contents for the educational program with H&PE teachers in high schools. In this process, the author and H&PE teachers confirmed that the educational program was not a departure from the health and physical education guidelines⁵.

2. Summary of the educational program

The goals of the educational program were that the students gain knowledge regarding cervical cancer prevention and enhance their consciousness toward preventing cervical cancer through autonomous and self-sustaining participation in the educational program (Table 2). The standard program comprised five 50-minute HE lessons, consisting of lectures and workshops. The contents of lectures included (1) basic knowledge focusing on cervical cancer including common cancer, sexually transmitted infection, and reproductive health/rights; and (2) the procedure of the program. Workshops were conducted with a few students per group who designed plans to promote cervical cancer prevention through the utilization of knowledge acquired from the lecture.

The author developed educational materials for

Table 1 The components and question items

Component question items (No.1~25)
<p>Behavioral intentions to prevent cervical cancer (Behavioral intentions)</p> <ol style="list-style-type: none"> 1. I will undergo regular cervical cancer screening. 2. On the day of the cervical cancer screening, I will make the screening a priority over other thing 3. I will visit the gynecologist as needed based on my own judgment. 4. I will decide for myself whether or not to undergo cervical cancer screening.
<p>The awareness of the importance and effectiveness of cervical cancer screening (The importance and effectiveness of screening)</p> <ol style="list-style-type: none"> 5. It is important to undergo regular cervical cancer screening. 6. It is important to visit the gynecologist as needed. 7. Undergoing regular cervical cancer screening is a good method for early detection and treatment of cervical cancer. 8. By undergoing regular cervical cancer screening, it is possible to discover changes before the onset of cervical cancer.
<p>Obstacles to cervical cancer preventative behavior (Obstacles to preventive behavior)</p> <ol style="list-style-type: none"> 9. If cervical cancer screening is expensive, I will not get it. 10. It is bothersome to have to schedule an appointment for cervical cancer screening. 11. Twenty-years-old is young; therefore, I will be fine even without getting cervical cancer screening. 12. If you have received the HPV vaccine, cervical cancer screenings are not necessary.
<p>Subjective norms for adopting cervical cancer preventative behavior (Subjective norms)</p> <ol style="list-style-type: none"> 13. Most people around me think I should undergo regular cervical cancer screening. 14. Most people around me think I should receive the HPV vaccine. 15. Most people around me think I should visit a gynecologist as needed based on my own judgment.
<p>The behavior of someone close that encourages cervical cancer preventative behavior (The behavior of someone close)</p> <ol style="list-style-type: none"> 16. If people close to me say so, I will undergo cervical cancer screening. 17. If people close to me have undergone cervical cancer screening, I will too. 18. If people close to me come with me, I will undergo cervical cancer screening.
<p>Knowledge regarding cervical cancer (Knowledge)</p> <ol style="list-style-type: none"> 19. HPV causes cervical cancer. 20. You will never get cervical cancer if you receive an HPV vaccine. 21. There has been an increase in the number of cervical cancer cases among women in their 20s and 30s. 22. Cervical cancer can be transmitted via sex 23. Approximately 80% of women contract HPV once in their lives 24. Cervical cancer screening commences from age 20 25. People who have had a large number of sexual partners are at greater risk of contracting cervical cancer.
<ul style="list-style-type: none"> • A four-point Likert scale was used for each item (excluding knowledge): “<i>I think so</i>,” “<i>inclined to think so</i>,” “<i>not inclined to think so</i>,” and “<i>hardly ever think so</i>” with higher scores indicating more positive perceptions. • Reverse item: No.9-12 (Obstacles to preventive behavior) • The items on knowledge were answered with a <i>yes</i> or <i>no</i>. The knowledge items were scored by giving 1 point for a correct answer and 0 for an incorrect answer.

Table 2 The learning contents and goals of the educational program

The goals of the educational program	
The students gain knowledge regarding cervical cancer prevention. They also enhance their consciousness toward preventing cervical cancer through autonomous and self-sustaining participation in the educational program.	
Phase	Goals and learning contents each phase
Lesson 1 Lecture on cervical cancer prevention	Students gain knowledge for cervical cancer prevention. <input type="checkbox"/> Basic knowledge for cancer, including sexual 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 the team planning	Each team explain vision and goal in the team clearly. <input type="checkbox"/> Discussion about vision and goal <input type="checkbox"/> Decision about vision and goal Each team fill out the plan clearly on the sheet. Students reflect on the work and identify problems.
Lesson 3 to first half of Lesson 5 Produce	Each team work 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 deliver the product to other teams <input type="checkbox"/> Each team explain 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 achievement of the goals and identify any problems.

One lesson is for 50 minutes.

students and supplementary reading material for H&PE teachers in cooperation with H&PE teachers, the designers at an art university, and medical doctors in the program. The educational material consisted of three worksheets and the textbooks. The worksheets addressed (1) project plan, (2) goal management, and (3) reflection; the textbooks addressed the contents of the lecture. Additionally, the supplementary reading material comprised a guidebook that described (1) the procedure of the program and (2) basic knowledge focusing on cervical cancer. These educational materials were created using Microsoft PowerPoint® so that H&PE teachers could project them on a screen for the class.

3. Validity of implementing the educational program in health classes

Cervical cancer frequently occurs in women between the ages of 20 and 40 years. It is a disease that may also affect those aged 50 years or older³⁾. Therefore, women should take preventive actions, including receiving regular screening for cervical cancer throughout their lives. However, cervical cancer screening is not an action required for high school students; rather, they require it a few years later. Hence, in the present study, we focused on behavioral intention. In other words, the goal of the program, which is designed to promote preventive behavioral intentions of high school students, is to cultivate preventive behavior for cervical cancer that will be required in their lifetime in the future. This goal can be considered as a strategy that we can adapt to cultivate future preventive behavior for cervical cancer in high school students.

Moreover, the educational program incorporates learning methods recommended by the education guidelines⁵⁾, thereby enabling independent health learning by the students. In addition, we were able to confirm that educational programs touched upon not only cervical cancer but also cancer in general, sexually transmitted diseases, and reproductive health rights.

On the other hand, the goal of HE in high school is defined as the “cultivation of the quality and ability, including the ability to think and make sound decisions to manage and improve lifetime health” in the education guidelines⁵⁾. In other words, to acquire knowledge and a mindset required for cervical cancer prevention and develop a foundation required for preventing cervical cancer over the course of one’s life through the program is in line with the goal of HE, that is, to cultivate the ability to think and make sound decisions for proper

management of lifetime health. Especially, the programs were strongly related to “modern society and health” and “lifetime health,” which are two of the three pillars of the education guidelines⁵⁾.

Therefore, we believe that it is appropriate that our program is implemented as not only a special course but also as part of HE.

4. Process of selection of high school and decision of teaching format

The school selection was as follows. The author made inquiries in two high schools about the program’s implementation. The reason they were selected was that the H&PE teachers who provided opinions in the basic survey¹³⁾ worked for these schools. As a result, it was decided that the school that had approved the educational program would be selected.

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. As a result, the selected high school opted to implement the program in their HE course for two reasons. The first reason being that after implementing the program, the teaching content required by the education guidelines⁵⁾ could be taught, as it had been included in a previous HE course without difficulty. The second reason was that in the selected high school, the final five classes of the first-year 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 that there would be no change in overall content of the health curriculum. Further, it was determined that the goal of the “cultivation of quality and ability, including the ability to think and make sound decisions to manage and improve lifetime health” in the education guidelines⁵⁾ would be enhanced. Thus, before implementing the program, the authors and the school had confirmed that it would be deployed in such a manner that it would not disadvantage students by omitting required learning content.

Regarding implementation, the author and the H&PE teachers explained in writing, the purpose, method,

and significance, among others, of incorporating the educational program into the HE course to the parents in advance. There was no objection by parents. After going through these processes, we implemented our program as an HE course.

5. Design

A pre-experimental study design was used (Figure 1). The hypothesis was that the female participants who were first-year high school students could enhance their behavioral intentions to prevent cervical cancer and other components related to behavioral intentions after program participation.

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 (Figure 1).

Experimental studies involving random assignment tests are effective for rigorously evaluating the effect of a program. However, it is not always possible to conduct such an experimental study²⁰. It is not feasible to assign school students randomly to intervention and control groups, owing to ethical issues and difficulty in conducting classes. As an effective alternative, the students were divided randomly by classroom or school.

In the present study, the author reviewed a study design in which first-year students would participate

in the program at different times after being divided by classroom. However, this study design was not able to implement because of the curriculum, school events, and ethical considerations. Therefore, the author decided to investigate the program efficacy in a single group, the study design using time series²⁰ (pre-post test design), which is limited in its ability to evaluate efficacy compared to methods involving a control group, whose validity as a quasi-experimental study has been demonstrated²⁰. This study design involving time series analysis is used when a control group, which is similar to the intervention group, cannot be secured²⁰. Measurements are performed on the intervention group prior to and after the program. Natural changes and the degree of change that occur in the group can be discerned before the intervention by conducting measurements over a certain period. If there is improvement, which is likely the effect of participating in the program, it can be considered as the effect of the program, although we may need to consider the influence of other factors²⁰.

For the second-year students of the same high school, a questionnaire survey was administered to grasp their preventive behavioral intentions for cervical cancer, the relevant factors, and their basic knowledge of cervical cancer that they had acquired after completing a two-year HE curriculum (in January 2014). However, because the second-year students were in a different grade than the participants, the author decided they could not be treated as a control group.

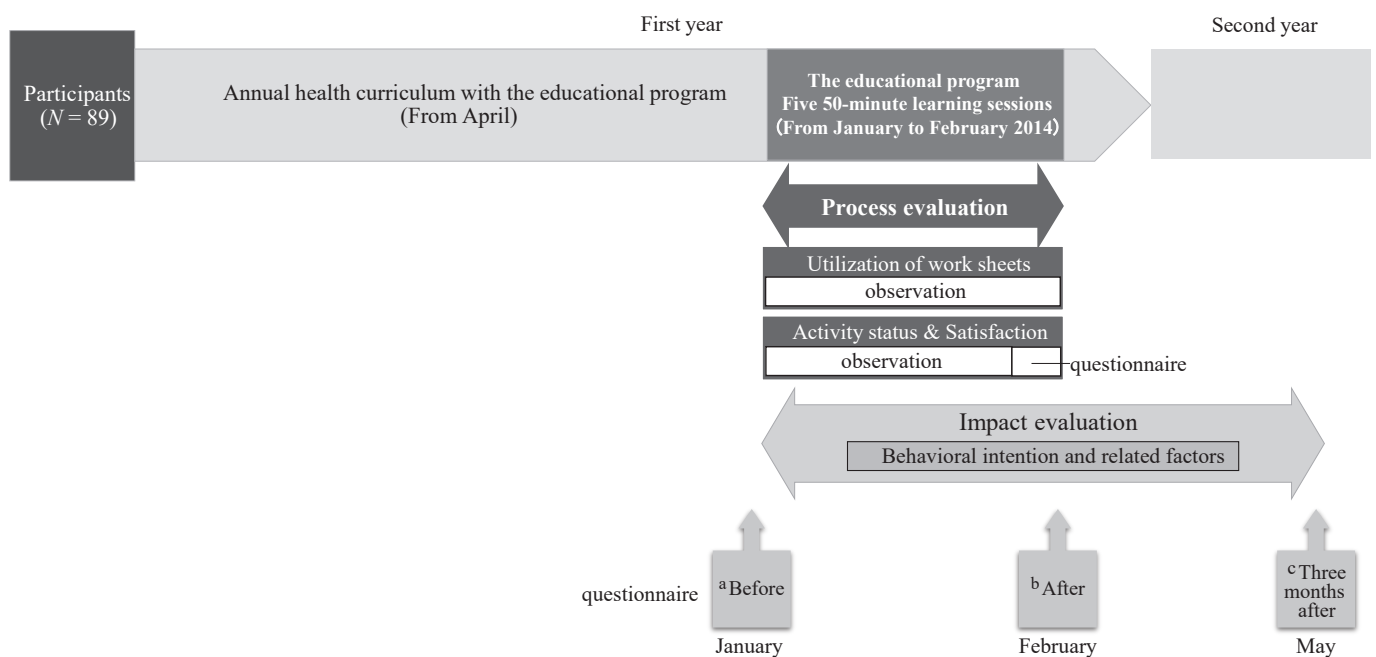


Figure 1 Design for evaluation of the program in health curriculum

6. Participants

The participants consisted of 95 first-year female high school students who participated in the educational program at a prefectural high school in Prefecture A. This high school had a high success rate of its graduates attending college and the male to female ratio was roughly 1:1. Eighty-nine first-year male high school students also participated in the program, because the author assumed that the program could be implemented in high school HE classes in the future.

The second-year students consisted of 105 females from the same high school who did not participate in the program.

7. Data collection

Data was collected from the beginning of January 2014, to the middle of May 2014 (**Figure 1**).

8. Survey content

The components and question items were as follows: age, grade, and whether the participants had received the HPV vaccine. The item on the HPV vaccine was answered with “*Received*” or “*Not received.*”

9. Process evaluation

The author investigated the utilization of worksheets with regard to (1) project plan, (2) goal management, and (3) reflection, immediately after the program (**Figure 1**). The worksheet for the project plan was also investigated regarding the contents of the description. In addition, the activity status and satisfaction were investigated by observation and a self-administered questionnaire survey. The questionnaire survey was conducted immediately after the program (**Figure 1**). Its components and items were as follows: activity status (one item), satisfaction with the educational materials (one item), and satisfaction with the program (four items). Each item was rated on a four-point scale: “*I think so,*” “*I am inclined to think so,*” “*I am not inclined to think so,*” and “*I hardly ever think so.*” Responses about program time were selected from the following options: “*too long,*” “*appropriate,*” and “*too short.*”

10. Impact evaluation

The components and question items were as follows:

“Behavioral intentions” (four items, 4–16 points), “The importance and effectiveness of screening” (four items, 4–16points), “Obstacles to preventative behavior” (four items, 4–16 points, reverse item), and “Subjective norms” (three items, 3–12 points), “The behavior of someone close” (three items, 3–12 points; **Table 1**). They were developed and validated in the previous study¹²⁾. A four-point Likert scale was used for each item: “*I think so,*” “*inclined to think so,*” “*not inclined to think so,*” and “*hardly ever think so*” with higher scores indicating more positive perceptions. Higher scores meant more positive perceptions. Cronbach’s alpha was used to assess internal consistency (range of .63–.87, **Table 3**).

For knowledge, seven items (**Table 1**) were developed based on previous studies²¹⁾. Several discussions with focus groups were held with researchers specializing in nursing to ensure item validity. 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.

11. Analysis

The subjects of analysis were only the female students in this study.

First, the simple totals of each of the questionnaire items for each component, knowledge, and the HPV vaccine status were calculated.

For process evaluation, the author calculated utilization of the worksheets. The ratios for goal management and reflection were calculated by all the subjects in order to make them fill in the results by themselves. On the other hand, the utilization of worksheets for the project plan was calculated by all groups in order to make each group fill in the necessary information. Descriptive contents of worksheets were also investigated.

For impact evaluation, after descriptive statistics, the author compared the scores on five components and knowledge. In particular, total scores of each component and knowledge were analyzed longitudinally at three time points in the experimental group (Tukey’s multiple comparison tests). The scores on five components and knowledge of the second-year students were compared to those of the participants three months after implementation of the program as a reference (*t*-test).

The rate of HPV immunization of 80 first-year (84.2%) and 95 second-year (90.5%) students in high school did not reveal statistical significance. Therefore, a statistical analysis was performed on all the effective respondents.

In each case, the author set a significance threshold of

Table 3 Cronbach's alpha in the components

	Participants (<i>n</i> = 89)			Second-year students (<i>n</i> = 105)
	^a Before	^b After	^c 3 months after	
Behavioral intention to prevent cervical cancer (Behavioral intentions) (4–16 points)	.72	.78	.74	.73
The awareness of the importance and effectiveness of cervical cancer screening (The importance and effectiveness of screening) (4–16 points)	.65	.73	.64	.70
Obstacles to cervical cancer preventative behavior (Obstacles to preventative behavior) (4–16 points)	.69	.63	.65	.64
Subjective norms for adopting cervical cancer preventative behavior (Subjective norms) (3–12 points)	.87	.78	.87	.85
The behavior of someone close that encourages cervical cancer preventative behavior (The behavior of someone close) (3–12 points)	.67	.81	.68	.71

^aBefore the program; ^bImmediately after the program; ^c 3 months after the program;

$p = .05$ and used IBM SPSS19.0 for Japanese and SPSS Amos Version 20.0 to conduct the statistical analysis. During the analysis process, supervision was received from a researcher specializing in quantitative analysis.

12. Ethical consideration

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

The information about the study was provided orally and in writing to the participants, the school principal, and the teachers. The contents were as follows: the 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-year 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-year students were given details of the study's objectives, the ethical considerations, the processes ensuring the protection of their personal information, and the release of the investigation results orally and in writing before the survey.

The author set up the collection box in the allocated areas of the school. This set-up allowed: (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-year students in order to provide them with a chance to receive education regarding cervical cancer prevention. In addition, we displayed the

products in the school so that students could view them freely.

III. Results

1. Implementation status of the educational program

The educational program was conducted as part of the HE lessons every two weeks, from January 2014 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.

2. Process evaluation

The author mainly gave a lecture to all first-year students jointly at the lecture hall in the school. The lecture included the educational materials, which were projected onto 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 some questions, they responded positively and expressed surprise. All the contents were covered as per the schedule. A workshop was held for each class. The students participated in the workshops using the educational materials. Eighty-nine female students completed the educational program (93.7%).

The author or the H&PE teachers responded whenever the students asked questions. Moreover, it was ensured that none of the students felt isolated and that there was

no delay in progress. Utilization ratios of worksheets were as follow: 89 students (100%) completed the goal management sheet, 35 teams (100%) completed the project plan sheet, and 84 students (94.4%) completed the reflection sheet.

Presentations during the fifth lesson were delivered by a few teams from each class owing to time constraints. The project contents were as follows: 11 teams (31.4%) designed a poster for a campaign to promote cervical cancer prevention; subsequently, 9 teams (25.7%) gave a presentation for a campaign (**Table 4**). The students had a lively exchange of views about their presentations and cervical cancer prevention. More than 90% of the students answered in the affirmative to questions concerning activity status and satisfaction with the educational materials and the program (**Table 5**). On the other hand, the top answers about program time were “too short” (47 students, 52.2%) and “appropriate” (37 students, 41.1%).

Table 4 The contents of project to promote cervical cancer prevention

Project	The number of teams (%)
Designed a poster	11 (31.4)
Gave a presentation	9 (25.7)
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 a questionnaire survey immediately after the program ($n = 90$)

		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.	40 (44.4)	44 (48.9)	5 (5.6)	1 (1.1)
Satisfaction with educational materials	The worksheet was easy for me to use.	39 (43.3)	45 (50.0)	6 (6.7)	0 (0)
Satisfaction with the program	The courses were easy for me to understand.	55 (61.1)	34 (37.8)	0 (0)	1 (1.1)
	The courses were interesting.	40 (44.4)	44 (48.9)	5 (5.6)	1 (1.1)
	The courses will be useful for me in the future.	64 (71.1)	25 (27.8)	1 (1.1)	0 (0)
	I intend to practice what I learned from the courses in my life.	59 (65.6)	30 (33.3)	1 (1.1)	0 (0)

Number (%)

3. Impact evaluation

(1) Score on behavioral intentions

Table 6 shows that the participants' behavioral intents (four items) immediately after completing the program were statistically significantly higher than that before the program ($p < .001$). Further, the same level of intent existed three months later ($p < .001$), though the scores were lower than those immediately after the program ($p = .009$). The score on behavioral intentions of the participants at three months after the program was statistically significantly higher than that of the second-year students ($p < .001$; t -test).

(2) Scores on the components related to behavioral intentions

Table 6 shows that the scores on each component after the program were statistically significantly higher than those before the program. Especially, the scores on "The importance and efficacy of screening," "Obstacles to preventative behavior," and "Knowledge" three months after the program were never statistically significantly lower than those recorded after the program. The scores on "Subjective norms" three months after the program were statistically significantly higher than those recorded before the program ($p = .031$), though the scores on "Subjective norms" three months after the program were statistically significantly lower than those recorded after the program ($p = .012$). The scores on "The behavior of someone close" three months after the program were statistically significantly lower than those recorded after the program ($p = .009$) and were not statistically significantly different from those recorded before the program (Turkey's multiple comparison tests).

All scores on the components (excluding behavioral intentions) and knowledge in the participants three months after the program were statistically significantly higher than those of the second-year students (**Table 6**, t -test).

IV. Discussion

The short-term efficacy of this program through process and impact evaluation was confirmed with the pre-experimental study. The program was completed without difficulty, and the participants were highly satisfied with the educational materials and program. Additionally, the results showed that the participants' behavioral intentions immediately after completing the program were statistically significantly higher and the same level of intentions existed three months later as

well. Therefore, the program's efficacy in increasing female high school students' behavioral intentions to prevent cervical cancer was demonstrated.

1. State of process evaluation

Process evaluation is an essential component of any impact or outcome evaluation, and it can be an evaluation in itself²²). Process evaluation examines whether the program is practiced in the most recommended state as confirmed by factors such as the program's reach, participants' satisfaction, and quality of materials²³).

The state of the program's reach was confirmed with three worksheets' utilization rate and contents and a questionnaire immediately after the program. The author had observed the participation situation; the students participated in the program actively. In addition, students' excellent participation was confirmed by the high utilization rate of worksheets and was also demonstrated in the results of the questionnaire. Therefore, the author could conclude that the contents of the program sufficiently reached many students.

In addition, the participants' satisfaction and quality of educational materials could be ensured because of the high evaluation regarding satisfaction with the program and materials through a questionnaire immediately after the program. These materials including supplementary reading materials were jointly developed with designers in an art college. The design could have led to the enhanced, easily viewable, and easy-to-use materials and elicited the students' interest in cervical cancer prevention. These collaborations could have affected satisfaction with the program and materials.

On the other hand, the answer of "too short" regarding program time accounted for over half the responses by participants and could be viewed as an issue related to the program's composition or operation. However, it is challenging and difficult to increase the program time because the program has already used five HE classes. Therefore, some explanation is required regarding actual examples so that students can conceptualize a practical design and plan for promoting cervical cancer prevention within the program.

2. State of impact evaluation

Every component score, including those of behavioral intentions, was significantly higher immediately after completing the program, which supported the hypothesis. In the process of this research, the author selected HBM

Table 6 Impact evaluation

	Mean score (SD)		Second-year students (n = 105)	p-value	
	Participants (n = 89) °Before °After	°3 months after		Participants (n = 89) °Before- °3 months after	°After- °3 months after
Behavioral intention to prevent cervical cancer (Behavioral intentions) (4–16 points)	10.5 (2.8)	13.2 (2.0)	11.2 (2.6)	< .001	.009
				< .001	< .001
The awareness of the importance and effectiveness of cervical cancer screening (The importance and effectiveness of screening) (4–16 points)	14.2 (1.9)	15.2 (1.5)	14.0 (1.7)	< .001	n.s.
				< .001	< .001
°Obstacles to cervical cancer preventative behavior (Obstacles to preventative behavior) (4–16 points)	12.5 (2.6)	13.7 (1.9)	12.5 (2.5)	.012	.0031
				.012	n.s.
Subjective norms for adopting cervical cancer preventative behavior (Subjective norms) (3–12 points)	8.3 (2.6)	9.8 (1.8)	8.6 (2.4)	< .001	.031
				< .001	.012
The behavior of someone close that encourages cervical cancer preventative behavior (The behavior of someone close) (3–12 points)	9.4 (1.9)	10.5 (1.4)	9.1 (1.8)	< .001	n.s.
				< .001	.009
Knowledge regarding cervical cancer (Knowledge) (0–7 points)	4.3 (1.2)	6.0 (0.7)	4.9 (0.9)	< .001	n.s.
				< .001	< .001

^aReverse item: Higher score denotes lower perceived obstacles; ^bBefore the program; ^cImmediately after the program; ^d3 months after the program; ^eParticipant (3 months after the program) –second-year students.

Higher score denotes better awareness/ attitude/ knowledge.

Turkey'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- year students. n.s.: no significance.

¹⁴⁾¹⁵⁾ and TRA¹⁶⁾ as the optimum health behavior theories for the program¹³⁾. Moreover, the author determined the contents and methods of the program based on the interpretation of the framework. These processes could have led to the development of an effective program. The National Cancer Institute²³⁾ revealed that it is critical to utilize theory during program development to increase coherence and impact.

The feature of this program is not only the lecture but also participatory learning methods, which lead to close, active learning with peers. The components that the author hoped to enhance through the workshops were especially “Subjective norms” and “The behavior of someone close.” The focus on these items could be interpreted as an attitude toward preventing cervical cancer. Ministry of Education, Culture, Sports, Science and Technology (MEXT)²⁴⁾ pointed out that attitude is said to be more difficult to acquire than knowledge. On the other hand, MEXT also revealed that active learning, group activity, and working cooperatively with peers are effective methods for students to foster attitudes. Based on this, workshops were designed not for individual work but group work. The reason why the scores on “Subjective norms” and “The behavior of someone close” increased was because effective learning methods were adopted corresponding to the objectives of the program.

Scores on “Knowledge” were sustained not only immediately after the program but also remained three months after the program concluded. Students’ knowledge could be established well because they participated in group work, utilizing the knowledge gained from the lecture. Thus, these results showed the importance of adopting both methods of the lecture and the workshop to increase “Behavioral intentions.”

Although an exact comparison is not possible, score on every evaluation indicator in the participants’ group was statistically significantly higher than those of the second-year students, although the program was conducted only in one school. Especially, all scores of the second-year students were almost as same low level as that of the previous survey conducted among female high school students in Japan¹³⁾, despite assessing immediately after completing 2-year Health curriculum. Therefore, these results indicated that this program could complement the learning content of HE classes because the present content is unsatisfactory and does not allow students to acquire the knowledge and attitudes for preventing cervical cancer in standard HE classes at high schools in Japan.

3. Issues in the assessment of program efficacy and applicability by process and efficacy evaluations

Although the programs were deemed effective at increasing female high school students’ behavioral intentions toward preventing cervical cancer, other issues require consideration.

The first issue is the efficacy of the program leaders. Although the high school teachers were involved throughout the program, mainly the author, a registered nurse, lectured on cervical cancer prevention. Consequently, one issue arising from this study is regarding the efficacy of high school teachers if they were to conduct the program independently. With a view to diffuse this program in the future, this study included numerous consultations with the teachers during the development stage and formulated teaching materials with the teacher as the program leader in mind. The benefits of developing the educational materials included reduced teacher load and standard program content/teaching methods, regardless of changes in teaching staff. Going forward with the program’s diffusion, support services will be provided to teachers, starting with training seminars and subsequent follow-ups. If such a support system is established, even teachers with little experience will be able to implement the program at a level similar to this study.

The second issue is the potential criticism that the program’s learning sessions are too long. This concern may come in the way of the program’s applicability for health courses. However, during this program’s development, the author and H&PE teachers established that it does not deviate from the course of study in HE and can be integrated into the annual health curriculum. This is a crucial factor in ensuring the program’s applicability. Moreover, while focusing on cervical cancer prevention, the subject matter is not restricted to this single theme. The program content fosters the absorption of knowledge and positive attitudes about health promotion, reproductive health, and cancer prevention. By participating in the program, high school students can acquire knowledge and positive attitudes for health maintenance and cancer prevention, which are lacking in the conventional curriculum. These benefits will form the foundations of lifelong cervical cancer prevention and healthy living. Thus, the implementation of this program is supremely important and represents a pioneering endeavor in Japan. It is essential that we carefully explain to the teachers the program’s

applicability for health courses and the many benefits it can impart to their classes.

Thus, incorporating the program into HE course demonstrates both its validity and significance. However, in some instances it may not be feasible to secure the number of hours required for the program, depending on the specific high school's year-long HE course curriculum. It is vital to avoid a situation in which the necessary content cannot be completed within the available teaching hours. In such cases, it may be possible to request implementation of the program in a special lesson.

As mentioned above, the results of this study demonstrated that the program developed was effective in heightening behavioral intentions among high school students. This study also enabled students to acquire knowledge and attitudes about cervical cancer prevention, which is lacking in the conventional two-year health curriculum. Further, having been developed on the basis of the course of study in HE, the program has been demonstrated applicability for high school health courses and is considered appropriate as part of the health curriculum. The results of this study will pave the path for cervical cancer prevention education in Japanese high schools.

4. Study limitations and future considerations

This study indicates two future considerations: the limits of predicting future behavior based on behavioral intentions and the maintenance of behavioral intentions.

This study did not verify the maintenance of behavioral intentions beyond the three months following its completion. To grasp the real efficacy of the program, a survey on whether the program leads the participants to undergo cervical cancer testing when they reach 20 years of age would be required. Hence, follow-up investigations are necessary for a conclusive assessment of the program's efficacy.

The decline in behavioral intention scores after three months following the study's completion can be linked to the decline in scores on "Subjective norms" and "The behavior of someone close." For this reason, the maintenance of positive attitudes after program completion becomes an issue. To achieve this, not only the individual high school student's awareness of cervical cancer prevention but also the cervical cancer prevention attitudes and behavior of people close to high school students play a significant role. Hence, it will be necessary to nurture high school students' positive

attitudes and sense of values concerning cervical cancer prevention by maintaining and diffusing the program. Likewise, HE for the parents of high school students, whose cervical cancer testing rates cannot be said to be high, is also of utmost importance. A social environment facilitating cervical cancer prevention would thus be required.

V. Conclusion

The results of this pre-experimental study's process and efficacy evaluations demonstrated that the educational program was successful in the short-term heightening behavioral intentions among high school students. Moreover, this study suggested that the program is applicable for high school health courses.

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References

- 1) Hanley SJ, Yoshioka E, Ito Y et al.: HPV vaccination crisis in Japan. *Lancet* 27: 385, 2009.
- 2) Organisation for Economic Co-operation and Development: Health care utilization screening. Available at: http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT. Accessed March 24, 2017
- 3) National Cancer Center for Cancer Control and Information Services: Cancer registry and statistics national estimated value for Regional Cancer Registry: Available at: <http://ganjoho.jp/professional/statistics/statistics.html>. Accessed October 15, 2017 (In Japanese).
- 4) Konno R (Eds.): Cervical cancer can be prevented (shikyukeigan wa yobou dekiru). 149-161, Nippon Hyoron sha, Tokyo, 2009 (In Japanese).
- 5) Ministry of Education, Culture, Sports, Science and Technology: High school course guidelines, health and physical education volume. Available at: http://www.mext.go.jp/component/a_menu/education/micro_detail/_icsFiles/afldfile/2011/01/19/1282000_7.pdf. Accessed March 24, 2017 (in Japanese)
- 6) Ministry of Education, Culture, Sports, Science and Technology: Junior high school course guidelines, health and physical education volume. Available at: http://www.mext.go.jp/component/a_menu/education/micro_detail/_icsFiles/afldfile/2011/01/21/1234912_009.pdf. Accessed March 24, 2017 (in Japanese)
- 7) Menzawa K: Recent trends in school health education in America and Japan (1): national health education standards

and HECAT. Bulletin of the Faculty of Education, Hirosaki University 103: 119–127, 2010 (In Japanese with English abstract).

- 8) Menzawa K: A comparative study on “sexual health” between Japanese health education curriculum and American HECAT. Bulletin of the Faculty of Education, Hirosaki University 108: 123–129, 2012 (In Japanese with English abstract).
- 9) Centers for Disease Control and Prevention: Adolescent and school health. Available at: <http://www.cdc.gov/healthyyouth/HECAT/>. Accessed March 24, 2017
- 10) American Society of Clinical Oncology: HPV and cancer. Available at: <http://www.cancer.net/navigating-cancer-care/prevention-and-healthy-living/hpv-and-cancer>. Accessed April 24, 2017
- 11) Ozawa N, Wada Y, Asano A et al.: The importance and challenges of “school education on HPV vaccines and screenings” to prevent cervical cancer. *Obstetrics & Gynecology* 109: 249–256, 2011 (In Japanese)
- 12) Adler NE, Susan MK, Charles EI et al.: Adolescent contraceptive behavior: an assessment of decision processes. *The Journal of Pediatrics* 116: 463–471, 1990
- 13) Shida J, Kuwana K, Takahashi K: The development of an educational program to increase female high school students’ behavioral intention to prevent cervical cancer. Available at: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/jjns.12205> Accessed April 24, 2018
- 14) Hochbaum GM: Public participation in medical screening programs: a socio-psychological study. Government Printing Office, Washington DC, USA, 1958
- 15) Rosenstock IM: Historical origins of the Health Belief Model. *Health Education Monographs* 2: 328–335, 1974
- 16) Fishbein M: Readings in attitude theory and measurement. Wiley, New York, USA, 1967
- 17) Glanz K, Rimer BK, Viswanath K (Eds): Health behavior and health education theory, research, and practice, 4th Edition. Jossey-Bass, a Wiley Imprint, San Francisco, USA, 2008
- 18) Poss JE: Factors associated with participation by Mexican migrant farmworkers in a tuberculosis screening program. *Nursing Research* 49: 20–28, 2000
- 19) Russell KM, Victoria LC: Health beliefs and social influence in home safety practices of mothers with preschool children. *Journal of Nursing Scholarship* 28: 59–64, 1996
- 20) Hawe P, Degeling D, Hall J: Evaluating Health Promotion. 118-123, MacLennan & Petty, Australia, 1990
- 21) Höglund AT, Tanja T, Anna KH et al.: Knowledge of human papillomavirus and attitudes to vaccination among Swedish high school students. *International Journal of STD & AIDS* 20: 102–107, 2009
- 22) Thorogood M, Coombes Y (Eds.): Evaluating health promotion practice and methods, 3rd ed. 34-35, Oxford University Press, Oxford, UK, 2010
- 23) National Cancer Institute: Theory at a glance: A guide for health promotion practice, 2nd ed. Department of Health and Human Services National Institutes of Health, Bethesda, USA, 2005
- 24) Ministry of Education, Culture, Sports, Science and Technology: Educational duties for human-rights—third report, 2008. Available at: http://www.mext.go.jp/b_menu/shingi/chousa/shotou/024. Accessed March 21, 2017 (In Japanese).



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