

RESEARCH ARTICLE

Sexually transmitted infections and cervical cancer: Knowledge and prevention awareness among female university students in Japan

Kimiko Kawata¹  | Hinako Koga²

¹Division of Nursing Sciences, Department of Health Sciences, Faculty of Medical Sciences, Kyushu University, Fukuoka, Japan

²Kobe city Nishi-Kobe Medical Center, Kobe, Japan

Correspondence

Kimiko Kawata, Division of Nursing Sciences, Department of Health Sciences, Faculty of Medical Sciences, Kyushu University, Fukuoka, Japan
Email: k-kawata@hs.med.kyushu-u.ac.jp

Abstract

Aim: To examine the possible association among knowledge regarding cervical cancer, its relationship with STIs and prevention awareness of STIs of female aged 20 years or older who were recommended regular screening for cervical cancer.

Design: A cross-sectional study using anonymous self-administered questionnaires.

Method: The subjects were 3rd- and 4th-year female university students. The association among knowledge about cervical cancer, cervical cancer screening behaviours and sexually transmitted diseases prevention behaviour awareness scale on university students (STDASUS) scores were examined using the Mann-Whitney *U* test and the chi-squared test. The data collection period was June-August, 2018.

Results: Two hundred sixty-one questionnaires were analysed as valid responses. The study indicated a possible association between understanding that cervical cancer occurs due to a viral infection and that the virus is spread through sexual intercourse and awareness of STI prevention behaviours. Appropriate education concerning the characteristics of cervical cancer, its correlation with STIs and the importance of the screening is essential.

KEYWORDS

cervical cancer knowledge, cervical cancer screening behaviour, female university students, prevention awareness, STIs

1 | INTRODUCTION

Cervical cancer occurs in the cervix, which is the entrance to the uterus. More than 90% of cervical cancers develop due to persistent infection of the human papillomavirus (HPV), which is most often transmitted through sexual intercourse. In Japan, the increasing occurrence of cervical cancer in women in their 20s and 30s has become a serious health issue (National Cancer Center, 2018) and currently, the disease is thought to particularly affect the lives of

women who are planning on pregnancy and childbirth. Cervical cancer has also become a global health concern among young women. The cervical cancer screening rate in major industrialized countries is high, with 85.0% of women in the United States and 75.0% in New Zealand being screened, while the rate in Japan is low at 22.2% (Ministry of Health, Labor, & Welfare, 2013). It is estimated that between 50%–80% of women who are or have been sexually active have been exposed to HPV at least once in their lifetime, meaning that women with sexual experience are at a higher risk of suffering

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from cervical cancer (Japan Society of Obstetrics & Gynecology, 2018).

Prophylactic HPV vaccination programmes form a major part of public health initiatives worldwide (Garland et al., 2016). However, the Japanese Government has created public distrust through broadcasts of the so-called adverse effects of the HPV vaccination. Consequently, Japan was recently shown to have a low HPV vaccination coverage rate (Sawada et al., 2018; Yamaguchi et al., 2018). Thus, cervical cancer screening is considered a major preventive action and one of the most important nationwide health initiatives. Coupons for a free cervical cancer screen have been distributed to 20-year-old women by Japanese Government for more than a decade (Ministry of Health, Labor, & Welfare, 2011a). At this age, many of these women are university students, which is why it is considered important for universities to educate women about cervical cancer and screening to improve the screening rate.

Similar to cervical cancer, the number of suffering from other sexually transmitted infections (STIs) has increased in recent years among young people, although it has decreased or have remained unchanged for the total population of Japan (Ministry of Health, Labor, & Welfare, 2017). A previous study has reported that even though university students have had education concerning STIs, they have a low consciousness concerning the prevention of STIs and do not engage in sufficient preventive behaviour (Tanemoto, Harada, Ohgomori, Abiko, & Nagai, 2013). Furthermore, suffering from an STI causes situations such as an interruption or discontinuation of academic work or studies, which indicates the necessity of enhancing sex education at universities (Onishi & Yamamoto, 2003).

2 | BACKGROUND

Existing studies concerning knowledge and preventive behaviour related to cervical cancer have assessed young women's attitudes towards cervical cancer screening by using the health belief model (Denny-Smith, Bairan, & Page, 2006) or the theory of planned behaviour (Kim, 2014). Additionally, a previous systematic review showed a positive link between health literacy and cervical cancer screening behaviour (Kim & Han, 2016). Many studies conducted in different regions have reported that women with more knowledge of cervical cancer have had more screenings (Budkaew & Chumworathayi, 2014; Coskun, Can, & Turan, 2013; Denny-Smith et al., 2006; Karabulutlu, 2013; Kim, 2014; Kim & Han, 2016; Onsuz, Hidiroglu, Sarioz, Metintas, & Karavus, 2014). However, there is still a gap in the literature concerning the association between awareness concerning STI prevention behaviour and knowledge of cervical cancer. We opine that obtaining more knowledge concerning STI aspect of cervical cancer will lead to improved awareness regarding general prevention behaviour concerning STIs and that awareness of prevention behaviour may affect cervical cancer screening behaviour.

Therefore, the aim of this study is to determine whether there is any association among knowledge regarding cervical cancer, its relationship with STIs and prevention awareness of STIs of female university students aged 20 years or older who are recommended regular cervical cancer screening.

3 | METHODS

3.1 | Design

A cross-sectional study was done through anonymous self-administered questionnaires.

3.2 | Study subjects

The subjects in this study were 3rd- and 4th-year unmarried female students at a university in Japan (the name and region of the university are being withheld to ensure the anonymity of the study subjects). Since a difference in knowledge was anticipated, students from the medical faculty were excluded. A predicted total number of female students are approximately 1,200 based on the data published by the university. In this population, the sample size required for a confidence level of 95% and a tolerance of 5% is calculated as 334. Generally, the response rate of a questionnaire survey is said to be approximately 30%. Therefore, to obtain an effective number of responses, it is necessary to distribute the questionnaire to more than 1,100 subjects. Consequently, we asked female students from 11 faculties in the university to participate in this study.

3.3 | Date collection

The distribution of the questionnaires was done from June to July 2018, and the collection deadline was August 2018.

3.4 | Study procedures

- We contacted the deans of the university by email, asking them to participate in this study and obtained consent from 9 faculties.
- Researchers visited the classrooms before and after regularly scheduled lectures and explained the purpose and outline of the study to the students. Next, those who agreed to participate in the study stayed behind and the questionnaires were distributed to them. In some faculties where there were no opportunities to meet with the respondents, a research cooperation request was posted in the lecture building and questionnaires were placed in the student affairs room.
- The participant's submission of the completed questionnaire was considered as their agreement to participate in the study.

TABLE 1 Basic attributes of respondents ($N = 261$)

Item	Option	Average (range)	N (%)
Age		20.9 (20–25)	
Family composition	Living alone		152 (58.2)
	Other		107 (41.0)
	Unselected		2 (0.8)
Health condition	Healthy		166 (63.6)
	Normal		88 (33.7)
	Feel bad		6 (2.3)
	No answer		1 (0.4)
University's routine health check-up	Every year		218 (83.5)
	Not always		42 (16.1)
	No answer		1 (0.4)
Experience of cervical cancer screening	Yes		31 (11.9)
	No		230 (88.1)
	No answer		0 (0.0)
Received the free coupon	Yes		72 (27.6)
	No		100 (38.3)
	Do not know		89 (34.1)

3.5 | Questionnaire items

The questionnaire items are based on the basic attributes, cervical cancer screening behaviour, knowledge regarding cervical cancer and the “sexually transmitted diseases prevention behaviour awareness scale on university students (STDASUS).”

STDASUS refers to the awareness scale concerning STI prevention behaviour. The scale was developed to measure the consciousness level of university students concerning the prevention of STIs. The α coefficient of each factor is .76–.88, and the scale is a convenient measure for the university students' level of awareness regarding the prevention of STIs from four perspectives (Amazaki & Shimizu, 2008). After obtained permission to use this scale from a developer, it consisted of 15 items with a four-point Likert scale. The range of the total score is from 0–45 points.

Ten questionnaire items on knowledge concerning cervical cancer were created based on data from the Ministry of Health, Labor, & Welfare (2011a, 2011b), and the validity of the questionnaire was confirmed by a professor of obstetrics. The questionnaire includes three STI-specific questions, “if you have a sexual intercourse experience even once, there is a risk of suffering from cervical cancer,” “cervical cancer is mostly a disease that is caused by a virus” and “the main cause of cervical cancer is infection through sexual intercourse.”

3.6 | Data analysis

All the questionnaire answers are numerical and were entered into the IBM SPSS Statistics for Windows (ver. 25) program. The descriptive statistics were summarized for each question item, after which the association among knowledge about cervical cancer,

STDASUS scores and cervical cancer screening behaviours was examined using the Mann–Whitney U test and the chi-squared test. For all the analyses, the significance level was set at 5% (two-tailed test).

3.7 | Ethical considerations

Researchers explained to the students that the participation is voluntary and that they did not need to answer questions that they did not want to answer. Furthermore, it was explained that cancelling their consent is possible before submitting the questionnaire, even after agreeing to participate. This study was conducted with the permission of the Clinical Research Ethics Review Board of the university that the researchers are affiliated with.

4 | RESULTS

4.1 | Respondents' characteristics

Two hundred sixty-two questionnaires were collected. After excluding one where the respondent reported being married, 261 were analysed as valid responses. The basic attributes of the respondents are shown in Table 1. Their ages ranged between 20–25 years, with an average of 20.9 years. As for the family composition, 152 (58.2%) were living alone. Concerning their general health, 166 (63.6%) responded that they were healthy and 218 (83.5%) responded that they make use of the annual health check-ups conducted at the university. Of the respondents, 31 (11.9%) had previously received a cervical cancer screening and 72 (27.6%) responded that they received the free coupon

for cancer screening. The average of the total scores of STDASUS was 6.9 with a standard deviation of 5.5 (Table 2).

4.2 | Cervical cancer knowledge

The correct answer rates for the questions are shown in Figure 1. The highest rate of correct answers per question was 205 (78.6%)

which refers to the ones who answered “no” to the question of “the number of people who are suffering from or have passed away due to cervical cancer has decreased in recent years.” On the other hand, the lowest rate of correct answers per question was 11 (4.2%) who answered “yes” to the question of “women who have experienced more childbirths tend to develop cervical cancer.” The correct answer rate for the three STI-specific questions was ranked 7th, 8th and 9th.

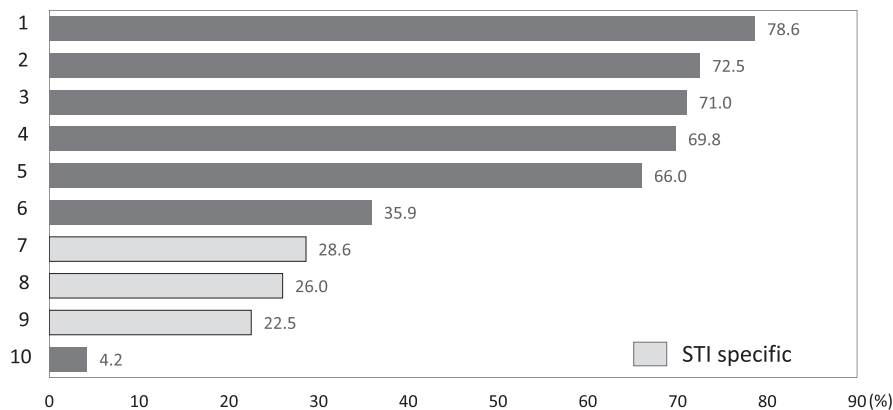
TABLE 2 STDASUS scores of respondents (N = 261)

STDASUS ^a	Range	Average (SD)	Median (interquartile range)
Total score	0–45	6.9 (5.5)	6 (2, 10)
Subscale 1	0–12	1.8 (2.2)	1 (0, 4)
Subscale 2	0–12	2.1 (2.7)	1 (0, 4)
Subscale 3	0–12	1.6 (2.5)	0 (0, 2)
Subscale 4	0–9	1.5 (1.6)	1 (0, 2)

^aSexually transmitted diseases prevention behaviour awareness scale on university students: Subscale 1: Situation-oriented thinking; Subscale 2: Sexual openness; Subscale 3: Prevention consciousness; Subscale 4: Optimistic thinking.

4.3 | STDASUS and STI-specific questions concerning cervical cancer knowledge

The STDASUS questions consisted of four subscales (situation-oriented thinking, sexual openness, prevention consciousness and optimistic thinking), and a higher score indicates a lower consciousness of STI preventative behaviour (Amazaki & Shimizu, 2008). The results concerning the STI-specific questions and the subscale scores of STDASUS are shown in Table 3. There was no correlation between the total score of STDASUS and the cervical cancer knowledge score. Of those who answered the question “if you have a sexual intercourse experience even once, there is a risk of suffering



1	The number of people who suffer from cervical cancers and/or die has decreased in recent years.
2	In the early stages of cervical cancer, symptoms such as genital bleeding can appear.
3	Hysterectomy is the basis of treatment for cervical cancer.
4	Cervical cancer occurs more frequently in young women, especially in 20s and 30s.
5	Cervical cancer is highly hereditary.
6	Smoking increases the risk of developing cervical cancer.
7	Experience of sexual intercourse, even once, increases the risk of suffering from cervical cancer.
8	Cervical cancer is a disease that is mostly caused by a virus.
9	The main cause of cervical cancer is infection through sexual intercourse.
10	Women who have experienced more pregnancies/childbirths tend to develop cervical cancer.

FIGURE 1 Correct answer rate of knowledge on cervical cancer (N = 261)

TABLE 3 The relationship between STDASUS scores and STI-specific knowledge of cervical cancer ($N = 261$)

	STI-specific questions of cervical cancer knowledge, Median (interquartile range)					p^*
	Once is a risk ^a			Caused by a virus ^b		
	Correct	Incorrect		Correct	Incorrect	
STDASUS total score						
Subscale 1				0.0 (0.0, 2.25)	1.0 (0.0, 4.0)	<.05
Subscale 2						
Subscale 3						
Subscale 4	0.0 (0.0, 2.0)	1.0 (0.0, 3.0)	<.01			

Note: There is no statistically significant difference in the blanks.

^aExperience of sexual intercourse even once, there is a risk of suffering from cervical cancer.

^bCervical cancer is a disease that is mostly caused by a virus.

*Mann-Whitney U test

TABLE 4 Comparison of STI-specific knowledge of cervical cancer with cervical cancer screening behaviour

Query/response	Screening ($N = 31$)	Non-screening ($N = 230$)	p^*
	N (%)		
Once is a risk ^a /yes	15 (48.4)	59 (25.7)	<.05
Caused by virus ^b /yes	10 (32.3)	49 (21.3)	n.s.
Infection through intercourse ^c /yes	10 (32.3)	58 (25.2)	n.s.

^aExperience of sexual intercourse, even once, increases the risk of suffering from cervical cancer.

^bCervical cancer is a disease that is mostly caused by a virus.

^cThe main cause of cervical cancer is infection through sexual intercourse.

*Chi-squared test.

from cervical cancer" correctly, the median of the optimistic thinking subscale score was significantly lower than that of the incorrect answer group ($p < .01$). Of those who answered the question "cervical cancer is mostly a disease that is caused by a virus" correctly, the median of the optimistic thinking subscale score was significantly lower than that of the incorrect answer group ($p < .05$). There was no correlation among the correct answer of the question of "the main cause of cervical cancer is infection through sexual intercourse" and the 4 subscale scores.

4.4 | The relationship between cervical cancer screening behaviour and STDASUS scores

The results concerning the above are shown in Table 4. Regarding the STI-specific question "if you have a sexual experience even once, there is a risk of suffering from cervical cancer," the correct answer rate was 48.4% in the screening group, whereas it was 25.7% in the non-screening group, which is statistically significant ($p < .05$). Concerning other questions—"Cervical cancer is a disease that is mostly caused by a virus" and "The main cause of cervical cancer is infection through sexual intercourse"—the correct answer rate of the screening group was higher than that of the non-screening group. However, it was still not statistically significant.

5 | DISCUSSION

This study aimed to examine the possible association between knowledge regarding cervical cancer and prevention consciousness of STIs among female university students. The main finding of this study was that there are significant relationships between the understanding that cervical cancer is caused by a virus and a low score for situation-oriented thinking, as well as between understanding that sexual intercourse increases the risk of cervical cancer and optimistic thinking scores.

The situation-oriented thinking subscale in STDASUS refers to not adopting preventative behaviour for STIs due to emotional factors and depending on situations. Within the context of this study, this means that they did not engage in STI prevention behaviour depending on their emotional situations. The optimistic thinking subscale refers to a momentary consciousness and neglect concerning the possibility of suffering from STIs. Optimistic thinking in this study reveals that they did not feel a sense of crisis due to suffering from STIs. From these results, we can surmise that there is a possible association between understanding that cervical cancer occurs due to a virus infection and that the virus is transmitted through sexual intercourse and women's awareness of STI prevention behaviours.

The result of this study also indicates that the respondents' knowledge of cervical cancer and its connection to STIs is insufficient. Regarding the respondents' knowledge of cervical cancer, the

accuracy rate of their answers to the questions “the number of sufferers is increasing” and “there are no subjective symptoms at the beginning” was relatively high. However, the correct answer rate for the STI-specific questions “Experience of sexual intercourse even once, there is a risk of suffering from cervical cancer,” “cervical cancer is a disease that is mostly caused by a virus” and “the main route of cervical cancer infection is through sexual intercourse” was low. It is therefore necessary to educate university students on the characteristics of cervical cancer and its connection to STIs. A previous study on sex education in junior high school reported that students' knowledge on sexual health has increased and that students' awareness of sexual behaviour can change along with the number of sex education classes they receive (Tomita, 2015), proving that sex education by the multiple lectures is necessary for all students to make university life fulfilling.

As the general health of the respondents in our study was reportedly good and the rate of regular medical check-ups at the university was high, it can be inferred that their interest in maintaining good health is satisfactory. Conversely, the overall cervical cancer screening rate of the respondents was 11.9%, which is substantially lower than the 22.2% result of the National Life Basic Survey conducted in 2013 (the survey's target age was 20–29; Ministry of Health, Labor, & Welfare, 2013). Additionally, the respondents seemed to know very little about the free coupon for cancer screening. A report stated that most Japanese university students changed their living environments when they entered university and more than half of them live alone (Japan Student Services Organization, 2016). Students' new living arrangements mean that there are fewer opportunities for them to obtain information as well as the free coupon. This may be one of the reasons that the free coupon distribution is not sufficient.

5.1 | Limitations

The sample size of this study did not reach the number necessary to obtain validity. Therefore, it is difficult to generalize the results. Also, the study ignored the respondents' line of study. It is important to further investigate influential factors such as students' background, their line of study and other personal factors. Moreover, since this was a cross-sectional study, it is necessary to develop an intervention study concerning health education at university level.

6 | CONCLUSION

This study sheds light on the possible association between understanding that cervical cancer occurs due to a viral infection and that the virus is spread through sexual intercourse and awareness of STI prevention behaviours. Additionally, this study indicated that the rate of experience of cervical cancer screening and knowledge of the STI aspect of cervical cancer is insufficient among female university

students. Appropriate education about cervical cancer and its connection to STIs is necessary for all students and should be emphasized to ensure that they recognize the risks and take responsibility for their own sexual health.

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CONFLICT OF INTERESTS

The authors declare that they have no competing interests.

ORCID

Kimiko Kawata  <https://orcid.org/0000-0002-1936-8505>

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