

## The knowledge of cervical cancer and screening adherence among nurses at a university-affiliated hospital in Japan

Yae Yoshino,<sup>1,2</sup> Hiroshi Ohta,<sup>3</sup> Masatoshi Kawashima,<sup>1</sup> Koji Wada,<sup>3</sup> Midori Shimizu,<sup>1</sup>  
Hiroko Sakaguchi,<sup>1</sup> Jun Okada,<sup>4</sup> Yoshiharu Aizawa<sup>3</sup>

<sup>1</sup> Department of Occupational Health, Graduate School of Medical Science, Kitasato University

<sup>2</sup> Kitasato University, School of Nursing

<sup>3</sup> Department of Public Health, Kitasato University School of Medicine

<sup>4</sup> Kitasato University Health Center

**Objective:** Screening is an effective method for preventing cervical cancer. However, Japan has lower screening rates compared with other developed countries. The objective of this study was to explore the relation between the knowledge of cervical cancer and screening adherence among nurses at a hospital in Japan.

**Methods:** In this cross-sectional study, a self-administered, anonymous questionnaire was distributed to 917 female nurses working at a university-affiliated hospital to assess their knowledge regarding cervical cancer and screening adherence.

**Results:** A total of 532 nurses (57.9%) completed the questionnaires. Overall, 13.7% of the nurses participated in cervical cancer screening in the last 2 years; however, only 9.6% of nurses  $\leq 29$  years old participated in the screening. Nonadherence was associated with knowledge deficit: Cervical cancer screening is recommended once every 2 years (odds ratio [OR], 2.93; 95% confidence interval [95% CI], 1.63-5.27); the incidence of cervical cancer increases in women in their 20s and 30s (OR, 2.77; 95% CI, 1.19-6.47); the lowered target age for cervical cancer screening is  $\geq 20$  years (OR, 2.07; 95% CI, 1.19-3.59); and human papillomavirus infection can cause cervical cancer (OR, 2.02; 95% CI, 1.08-3.75).

**Conclusions:** There was a significant association between knowledge about cervical cancer and screening adherence among Japanese nurses in Japan. These results provide a baseline for future research and suggest strategies to improve screening adherence.

**Key words:** cervical cancer, screening, knowledge, attitude, adherence

### Introduction

Because cervical cancer has few subjective symptoms, and progression to invasive cancer is slow, early detection of precancerous lesions by screening is important for prevention. It is globally acknowledged that the prevalence of cervical cancer screening as a secondary prevention is effective for reducing the incidence of cervical cancer and mortality.<sup>1-3</sup> However, adherence with the recommended screening guidelines for cervical cancer in Japan remains relatively low (24.5%) compared with other developed countries (70%-80%).<sup>4</sup> A report of the Japanese National Cancer Center estimates that there are approximately 8,500 new cases of cervical cancer each year, and approximately 2,500

women die from cervical cancer annually.<sup>5</sup>

Widespread screening of women for precancerous lesions and early detection can lead to a reduction in cervical cancer incidence and deaths especially among women of reproductive age.<sup>5,6</sup> The incidence of cervical cancer has been increasing in women in their 20s and 30s since 1990 due to earlier sexual debut and changing sexual behaviors.<sup>6-7</sup> Even after the introduction of a safe and effective human papillomavirus (HPV) vaccine, it will be important to promote a dual approach of immunization and screening.<sup>8-9</sup> Studies conducted in foreign countries have indicated that knowledge of cervical cancer is necessary to improve screening coverage. Such knowledge includes an understanding of the causes of cervical cancer, the utility and purpose of cervical cancer

Received 31 March 2011, accepted 11 August 2011

Correspondence to: Yae Yoshino, Department of Occupational Health, Graduate School of Medical Science, Kitasato University

1-15-1 Kitasato, Minami-ku, Sagami-hara, Kanagawa 252-0373, Japan

E-mail: yae.yoshino@nrs.kitasato-u.ac.jp

screening, test methods, and information on "when" and "where" screening is conducted, and the associated risk factors for cervical cancer.<sup>10-12</sup>

Because nurses play an integral role in educating women in prevention of diseases and health promotion, they influence cervical cancer screening adherence and health activities among most women.<sup>11,13</sup> Moreover, it has been shown that recommendation of cervical cancer screening to individuals by medical professionals, including nurses, effectively improves screening coverage among the general population.<sup>10-15</sup> Therefore, nurses should have current and accurate knowledge about HPV to promote informed decisions about cervical cancer screening. However, there are few studies on actual cervical cancer screening adherence of nurses. To our knowledge, no studies have specifically examined these variables among Japanese nurses in Japan. The objective of this study was to explore the association between the knowledge deficit of cervical cancer and screening adherence among Japanese nurses at a university-affiliated hospital in Japan.

### Subjects and Methods

A self-administered, anonymous questionnaire was distributed to 917 female nurses working at a university-affiliated hospital to gather information regarding knowledge of epidemiology, screening guidelines, risk factors for cervical cancer, and actual screening adherence during a routine health check-up at the workplace. The questionnaires, cover letters describing the importance and objective of the study, and return envelopes were distributed twice, before and on the day of the check-up. To increase the collection rate of the questionnaires, we requested submission before or on the day of the check-up, or 2 weeks after the check-up.

The questionnaire consisted of: 1. a sociodemographic characteristics section, such as age, academic background, marital status, and smoking habits; 2. an 18-item knowledge section, in which participants indicated whether they were "aware" or "unaware" of each stated fact related to epidemiology, screening procedures, and risk factors for cervical cancer; and 3. a screening adherence section, in which participants were asked to indicate how often they personally underwent cervical cancer screening (the six response options included: unknown, never, once a year, once every 2 years, once every 3 years, or once every 4 years or longer).

Data were analyzed to assess the association between the knowledge about cervical cancer and the status of screening adherence by univariate analysis and

multivariate analysis with logistic regression as applicable, using the Statistical Package for Social Sciences (SPSS) version 17. Likelihood ratio tests employing a step-wise procedure were used to select significantly associated items that were adjusted for age, marital status, and smoking habits. Test of significance was based on a 95% confidence interval (95% CI).

This study was conducted after review and approval of the Kitasato University Medical Ethics Committee.

### Results

We distributed the questionnaires to 917 female nurses working at a university-affiliated hospital and collected 532 responses (57.9% response rate). Table 1 shows the sociodemographic characteristics of 532 respondents. The median age of the women who participated in the study was 28.5 years (range, 22-65 years). More than half of the participants were between 20 and 29 years of age (52.6%), single (54.7%), and had no smoking history (76.9%).

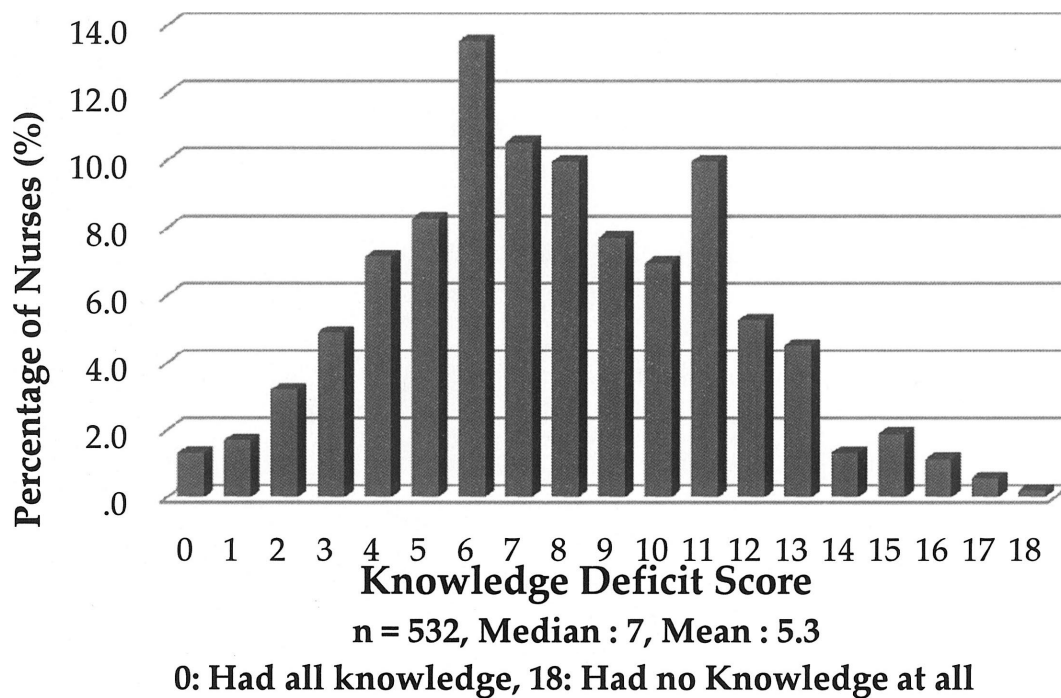
Table 2 shows the percentages of participants who reported being unaware of screening guidelines and risk factors for cervical cancer as supported by the Japanese National Cancer Center.<sup>9</sup> Overall, 87.8% of the participants were unaware of the fact that more than 2,500 women die from cervical cancer in Japan every year.<sup>5</sup> As much as 83.1% of the participants were unaware that prophylactic vaccines against cervical cancer have been

**Table 1.** Socio-demographic characteristics of the participants (N = 532)

Variables	n	%
Age		
20-29	280	52.6
30-39	132	24.8
40-49	77	14.5
50+	43	8.1
Marital status		
Single	291	54.7
Married or having a partner	221	41.5
Divorced or bereaved	20	3.7
Smoking habit		
Yes	85	15.9
No	409	76.9
Quit	38	7.1
Having undergone cervical cancer screening the last 2 years		
Yes	73	13.7
No	459	86.3

**Table 2.** Knowledge deficit of participants related to cervical cancer screening (N = 532)

Items	%
1. More than 2,000 women die from cervical cancer in Japan every year.	87.8
2. Prophylactic vaccines against cervical cancer have been approved in 85 countries, including Europe and the USA.	83.1
3. It is recommended to undergo cervical cancer screening once every 2 years.	79.7
4. Cervical cancer screening coverage is less than 20% in Japan.	73.7
5. The target age for beginning cervical cancer screening was lowered to 20 years old in 2004.	67.7
6. A weakened immune system increases susceptibility to cervical cancer.	47.9
7. Cervical cancer is diagnosed most frequently in women in their 30s and 40s.	44.2
8. The risk of cervical cancer increases in women who have a habit of smoking.	42.9
9. Human papillomavirus (HPV) infection is a cause of cervical cancer.	39.1
10. The risk of cervical cancer increases with a woman's number of pregnancies and parities.	38.3
11. The risk of cervical cancer is increased in women who have had an early sexual debut.	37.2
12. Women who have had sexual intercourse have a risk of cervical cancer.	36.3
13. The incidence of cervical cancer has been markedly and steadily increasing, in recent years in women in their 20s and 30s.	25.6
14. Subjective symptoms develop after cervical cancer progresses.	24.4
15. The risk of cervical cancer increases in women who have active sexual behavior or sexual intercourse with multiple partners.	22.0
16. Using a condom during sexual intercourse helps prevent HPV infection.	17.9
17. Cervical cancer can be detected early by undergoing regular examinations.	4.7
18. There are two types of uterine cancer: endometrial and cervical.	1.5



**Figure 1.** Distribution of knowledge deficit

Knowledge of cervical cancer and screening

**Table 3.** Knowledge deficit and nonadherence to screening

Knowledge deficit score	OR	(95% CI)
0-5	1	
6-7	1.26	(0.68-2.36)
8-10	1.78	(0.91-3.47)
11-18	3.84	(1.68-8.77)

OR, Odds Ratio; 95% CI, 95% Confidence Interval  
Possible Score Range: 0-18

0: Had complete knowledge, no knowledge deficit

18: Had no knowledge at all

**Table 4.** The association between sociodemographic characteristics cervical cancer screening adherence (N = 532)

Variables	Nonadherence	
	n	%
Age		
20-29	253	90.4
30-39	101	76.5
40-49	68	88.3
≥50	37	85
Marital status		
Single	270	92.8
Married or having a partner	172	77.8
Divorced or bereaved	17	85.0
Smoking habit		
Yes	75	88.2
No	353	86.3
Quit	31	81.6

Nonadherence: not having undergone cervical cancer screening in the last 2 years.

**Table 5.** Association between knowledge deficit of cervical cancer and screening nonadherence among nurses

Items	Awareness	
	Unaware	Aware
	Proportion of nonadherence (%)	
1. More than 2,000 women die from cervical cancer in Japan every year.	86.1	87.7
2. Prophylactic vaccines against cervical cancer have been approved in 85 countries including Europe and the USA.	86.4	85.6
3. It is recommended to undergo cervical cancer screening once every 2 years.	89.4	74.1
4. Cervical cancer screening coverage is less than 20% in Japan.	88.3	80.7
5. The target age for beginning cervical cancer screening was lowered to 20 years old in 2004.	89.7	79.1
6. A weakened immune system increases susceptibility to cervical cancer.	87.1	85.6
7. Cervical cancer is diagnosed most frequently in women in their 30s and 40s.	88.9	84.2
8. The risk of cervical cancer increases in women who have a habit of smoking.	84.6	87.5
9. Human papillomavirus (HPV) infection is a cause of cervical cancer.	92.3	82.4
10. The risk of cervical cancer increases with a woman's number of pregnancies and parities.	88.2	85.1
11. The risk of cervical cancer is increased in women who have had an early sexual debut.	88.9	84.7
12. Women who have had sexual intercourse have a risk of cervical cancer.	90.2	84.1
13. The incidence of cervical cancer has been markedly and steadily increasing, in recent years, in women in their 20s and 30s.	94.6	83.3
14. Subjective symptoms develop after cervical cancer progresses.	88.5	85.6
15. The risk of cervical cancer increases in women who have active sexual behavior or sexual intercourse with multiple partners.	90.6	85.1
16. Using a condom during sexual intercourse helps prevent HPV infection.	97.3	84.7
17. Cervical cancer can be detected early by undergoing regular examinations.	100.0	85.6
18. There are two types of uterine cancer: endometrial and cervical.	100.0	86.1

Nonadherence: not having participated in cervical cancer screening in the last 2 years.

available for many years. And 79.7% of the participants were unaware that it is recommended to undergo cervical cancer screening once every 2 years. Moreover, 67.7% of the participants were unaware that the target age for cervical cancer was lowered to women  $\geq 20$  years in 2004. But only 4.7% were unaware that cervical cancer can be detected early by regular examinations. Only one-third of the participants understood that smoking, increased number of pregnancies, early sexual debut, multiple partners, and failure to use a condom during sexual intercourse were all associated with an increased risk for cervical cancer.

Figure 1 shows the distribution of the knowledge deficit among nurses. The median knowledge deficit score was 7 of 18 knowledge items. Table 3 shows the association between the knowledge deficit and nonadherence to cervical cancer screening. Overall, 25% of nurses who scored  $\geq 11$  had not undergone screening in the last 2 years (OR, 3.841; 95% CI, 1.681-8.773). Knowledge deficit of cervical cancer was associated to nonadherence.

Table 4 shows the association between sociodemographic characteristics and actual cervical cancer screening adherences in the past 2 years. A majority of the participants (>90%), who did not undergo cervical cancer screening in the past 2 years, were single and between 20 and 29 years of age. There were no significant differences in smoking habits.

Table 5 shows the association between the knowledge deficit of cervical cancer and screening nonadherence among participants. Only 13.7% of the nurses in the

current study underwent screening for cervical cancer in the last 2 years. Failure to undergo cervical cancer screening was associated with the knowledge deficit related to: the incidence of cervical cancer has markedly increased in young women in their 20s and 30s in recent years (94.9%), HPV infection is a cause of cervical cancer (92.3%), the target age for cervical cancer screening to lowered to 20 years and older in 2004 (89.7%), and it is recommended that women undergo cervical cancer screening once every 2 years (89.4%).

Table 6 shows the results of the logistic regression analyses adjusted by age, marital status, and smoking habits. Knowledge deficit in four areas related to cervical cancer was associated with failure to undergo cervical cancer screening once every 2 years. It is recommended that women undergo cervical cancer screening once every 2 years (OR, 2.93; 95% CI, 1.63-5.27); the incidence of cervical cancer has been markedly increasing, in recent years, in young women in their 20s and 30s (OR, 2.77; 95% CI, 1.19-6.47); the target age for cervical cancer screening was lowered to 20 years and older in 2004 (OR, 2.07; 95% CI, 1.19-3.59); and HPV infection is a cause of cervical cancer (OR, 2.02; 95% CI, 1.08-3.75).

## Discussion

This is the first study to assess the knowledge of cervical cancer screening and its adherence among Japanese nurses. Nurses are both the largest professional health group and the frontline of patient care; they play unique roles as educators, supporters to the general population

**Table 6.** Logistic regression analyses showing the association between the areas of knowledge deficit and screening adherence

Variables	Crude		Adjusted*	
	OR	(95% CI)	OR	(95% CI)
It is recommended to undergo cervical cancer screening once every 2 years.				
Unaware	2.95	(1.74-5.01)	2.93	(1.63-5.27)
Aware	1		1	
The incidence of cervical cancer is markedly increasing in recent years in young women in their 20s and 30s.				
Unaware	3.69	(1.65-8.25)	2.77	(1.19-6.47)
Aware	1		1	
The target age for beginning cervical cancer screening was lowered to 20 years old in 2004.				
Unaware	2.31	(1.40-3.81)	2.07	(1.19-3.59)
Aware	1		1	
Human papillomavirus (HPV) infection is a cause of cervical cancer.				
Unaware	2.56	(1.43-4.60)	2.02	(1.08-3.75)
Aware	1		1	

OR, odds ratio; 95% CI, 95% confidence interval

\*Adjusted by age, marital status, and smoking habits

in primary healthcare settings and provide care for patients.<sup>16,17</sup> Due to their key roles as educators in disease prevention and health promotion, we thought that it would be interesting and important to explore the nurses' own knowledge and practices concerning cervical cancer screening, which may in turn indirectly influence their patients' understanding and practice of cervical cancer screening.

Our findings show that the cervical cancer screening coverage in a sample of 532 Japanese nurses from 2009 to 2011 was only 13.7%. This is lower than that compared with previous reports of 24.5% in a general population of Japanese women.<sup>4,5</sup> There was an association between the knowledge deficit related to cervical cancer and actual screening adherence among Japanese nurses in our sample. The majority had knowledge of the facts to answer most questions; however, even among the nurses, misconceptions about cervical cancer statistics, screening frequency, target age recommendation by the National Cancer Center, and some of the risk factors for cervical cancer were observed. These misconceptions must be corrected, because healthcare providers, nurses' knowledge, attitudes, and orientation are all important determinants of use of cancer screening programs in the general population.

The cervical cancer screening frequency had changed from every year to every 2 years, and also the target age to begin screening was lowered from 30 to 20 years old in 2004; however, 67.7% of the nurses were not aware of that fact. In addition to the lowered target age was the fact that the incidence of cervical cancer has been steadily increasing in women in their 20s and 30s since 1990 due to earlier sexual debut and changing sexual behaviors.<sup>6-7,18-19</sup>

If young women develop cervical cancer, it progresses rapidly and greatly affects their future fertility and quality of life. The knowledge deficit on the incidence of cervical cancer was observed as markedly increasing in women in their 20s and 30s and associated with nonadherence to screening. While the median age of this sample population was 28.5 years old, most of the nurses were not well aware of their own risk of getting the disease. While the rates of cervical cancer have increased among women in this age group in recent years, data from previous studies performed in the general population of women in Japan indicated that cervical screening coverage was also only 15% during the reproductive ages.<sup>5,6</sup> Screening coverage among Japanese women in their 20s is significantly lower than that in other developed countries.<sup>4,6</sup> As few Japanese women are willing to undergo screening at gynecologic clinics,<sup>18-19</sup> they have limited opportunities of receiving proper health education,

being provided with adequate feminine health information, and receiving individual or group counseling. They most often visit an obstetrician only after becoming pregnant. Therefore, most Japanese women do not know about female-specific diseases and their prevention.<sup>18-20</sup>

Moreover, there was a specific knowledge deficit of risk factors that the women had a higher chance of failing to undergo the cervical cancer screening.<sup>10,12,15</sup> Such knowledge deficit could explain why a significant number of women do not undergo cervical cancer screening. Hence, providing correct knowledge, including risk factors associated with cervical cancer, especially among young women, should be targeted and enhanced as a potential strategy for increasing screening coverage in this sub-group of women with increased risk of cervical cancer by virtue of their age and exposure to other risk factors, such as an active sexual lifestyle and multiple pregnancies (multigravida) and multiparities.

An increased effort must be made to recognize and encourage younger women to make an opportunity to have their first screening and to motivate them to continue undergoing regular screenings. As suggested in previous studies, a wide range of educational programs, especially for those women who missed screening or who were screened only infrequently, may improve this situation.<sup>11,15</sup> Therefore, it is important to disseminate information concerning the awareness of the benefits, objectives, and significance of screening that will have an impact on screening adherence.<sup>17,21-22</sup> Nurses should be provided detailed information on the basis of the screening and the benefits of using those results wisely.<sup>12-14</sup>

Furthermore, prevalence of correct knowledge regarding HPV infection, risks of developing cervical cancer, and proper screening needs to be increased through education and the mass media.<sup>6,9,10,14,15</sup> Our findings support an association between the knowledge deficit that HPV infection is a cause of cervical cancer and screening nonadherence procedures. Opportunities to be exposed to HPV through sexual intercourse increase due to earlier sexual debut, active sexual behavior, sexual intercourse with multiple partners, and a higher age of marriage. It is important to obtain basic and correct knowledge about the route of HPV infection and characteristics of the disease. It is necessary to disseminate comprehensive knowledge about HPV including vaccination objectives, indications, and utility. The Centers for Disease Control and Prevention of the United States recommends the following approaches concomitantly to improve cervical cancer screening coverage: promoting screening to individuals, providing

information to groups, and providing one-on-one health education.<sup>14</sup>

Studies of women in the general population in the United States suggested an association between the knowledge deficit of the purpose of cervical cancer screening and the risk factors of nonadherence. Another study, among nursing students in the United States, suggested an association between the lack of awareness of risky behaviors and low adherence.<sup>15</sup> Also studies in Australia, Malaysia, and the United Kingdom of women in the general population showed an association between the knowledge deficit of the risk factors and low screening adherence.<sup>23-25</sup> Hence, the knowledge deficit was an important factor of nonadherence. In Korea, health professional organizations and academic societies played important roles in informing and educating professionals and the general public regarding cervical cancer screening and prevention.<sup>6</sup> Cervical cancer screening coverage increased from 22.4% in 1998 to 39.1% in 2001 and then to 41.5% in 2005. Likewise, previous studies showed that efforts to re-educate healthcare providers about cancer contributed to improved screening coverage.<sup>6,10-15</sup> While the public relations divisions of local governments are organizing media campaigns, such as the cancer-screening-awareness week in Japan, cervical cancer screening coverage may be improved by enhancing awareness among nurses in the frontline.

Possible explanations of low screening adherence among nurses in this study were partly because of the nursing education. Little is taught regarding preventive medicine components, including cervical cancer screening and prevention, in the current nursing education in Japan.<sup>18</sup> The knowledge of cervical cancer and HPV in the general population and among healthcare professionals has been seen to have rather low to moderate levels in previous studies.<sup>15,27-28</sup> Also younger women, in general, tend to be poorly informed about cervical cancer and its screening and the risk factors, and they tend to have negative or inaccurate beliefs and negative attitudes towards them.<sup>23</sup> Age and marital status may have influenced the low adherence. As many as 52.6% of the nurses were in their 20s, and 54.7% were single in this sample population. Studies in Singapore and Nigeria suggested that being married and the gender of the doctor influenced the nurses attending screening.<sup>17,25-26</sup> Limited access to the healthcare services due to their irregular shift working hours, and cervical cancer screening, is neither included nor given as an option on the annual health checkup at their work places, may influence nonadherence as well. Factors other than knowledge, such as the improved convenience of screening, reduction

of cost burden, and considerations for privacy may result in improved screening coverage. In the future, it will be necessary to clarify the factors that influence screening adherence other than knowledge. The attitudes and orientation of healthcare providers are important determinants of the use of cervical cancer screening programs.<sup>10-15</sup> Nurses, to be functional and effective promoters of cervical cancer prevention through early detection, must possess the relevant knowledge as well as appropriate attitudes and beliefs concerning the disease.

### Study limitations

Limitations of this study are that it is a cross-sectional study among a convenient sample of all the nurses at a university-affiliated hospital where 63.5% of the nurses obtain a higher ratio of university degrees, compared to 10.8% in the national average, among which the average age is 32 years old, compared to 35.5 years old for the national average of nurses. Therefore, our sample population may potentially bias the generalizability of the findings. Moreover, the response rate was not ideal at 58%. Further studies are warranted to investigate larger samples of nurses, as well as women in the general population, to acquire knowledge about cervical cancer and the rate of screening adherence of a much larger population of women.

To our knowledge, there were no international standardized questionnaires on cervical cancer knowledge available. Pertinent to this study, to ask and talk about one's sexual life is quite challenging in the Japanese culture. These aspects may serve as limitations compared with other studies. Moreover, we would like to clarify factors associated with nonadherence to screening.

### Conclusions

This study reveals that there is an association between the knowledge of cervical cancer and screening adherence among Japanese nurses. Nurses themselves need to be properly informed about cervical cancer and screening because of their own needs of well being as women, and also to improve their professional competencies in providing health education to the women in the general population. Healthcare providers, including nurses' knowledge, attitudes, and orientation, are important determinants of use of cancer screening programs in the general population. Collectively educating nurses about cervical cancer and the utility of screening through continuing education and other opportunities may not only result in maintaining or improving health and

preventing HPV and cervical cancer among nurses but may also contribute to improved screening coverage among women in the general population. These findings provide a baseline for future research on cervical cancer and will likely prove helpful in the development of training materials for nurses.

## Acknowledgements

We thank all the nurses who participated in this study, and all the staff members of the Department of Preventive Medicine and Public Health, Kitasato University School of Medicine.

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