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Field Epidemiology Training Program, Division of Epidemiology
Department of Disease Control, Ministry of Public Health, Thailand
Tel: +6625903894, Fax: +6625903845, Email: osireditor@osirjournal.net, http://www.osirjournal.net

# Factors Associated with Knowledge and Practice of Healthcare Workers in Cervical Cancer Screening in Ratchaburi Province, Thailand

Chalo Sansilapin[1]*, Nipapan Saritapirak[1], Suleeporn Sangrajrang[2]

1 Division of Epidemiology, Department of Disease Control, Ministry of Public Health, Thailand

2 National Cancer Institute, Department of Medical Services, Ministry of Public Health, Thailand

*Corresponding author, email address: chalochalala@gmail.com

**Abstract**

Thailand's 2010-2014 national program for cervical cancer screening guidelines recommends that women aged 30-60 years should be screened every five years with the Papanicolau smear (Pap smear) method or visual inspection with acetic acid and that coverage should be at least 80%. However, from 2010-2014, the national coverage of cervical cancer screening was only 53.9%. We therefore evaluated healthcare workers' knowledge of the guidelines and their practices regarding cervical cancer screening by Pap smear. We collected data using a structured questionnaire from 258 healthcare workers who had ordered or conducted cervical cancer screening for at least one year. Most (74.8%) healthcare workers knew that Pap smears should be done every five years among women aged 30 to 60 years. General practitioners and gynecologists had lower knowledge of the age criteria compared to nurses and technicians. Knowledge of the target age criteria was significantly associated with type of healthcare worker, workplace, gender and recent training (within the previous 3 years). The screening practice was significantly associated with type of healthcare worker and workplace. Providing up-to-date training on the national cervical cancer screening guidelines is necessary for all public hospital healthcare workers.

**Keywords:** cervical cancer, cancer screening, Papanicolau smear

## Introduction

In Thailand cervical cancer is one of the five most common cancers among women.[1] Since 2005 the Thailand national cervical cancer screening programme, developed by the National Health Security Office and the Ministry of Public Health, recommended 5-yearly cervical cancer screening with a Papanicolau smear (Pap smear) for women aged 35-60 years.[2,3] This programme was evaluated and the coverage of screening increased from 25% (before establishing the screening programme) to 68% during 2005-2009.[2,4]

Updated national guidelines were developed for 2010-2014 with the recommendations of screening for women aged 30-60 years with Pap smear or visual inspection with acetic acid.[3,5,6] The target for coverage of screening in the target population was 80%.[3,6] However, an evaluation of the 2010-2014 programme found that national coverage for cervical cancer screening among women aged 30-60 years was 53.9%.[3] This finding included data from women screened at public hospitals only and did not include university or private hospitals.[3]

Previous studies found that less than optimal screening rates may be due to low knowledge among healthcare workers about the national guideline's recommendations.[7] In the 2009 fiscal year, 9.8% of the healthcare workers in Nong Bua Lamphu Province in the northeastern region of Thailand had medium to high levels of knowledge of cervical cancer screening.[8] The coverage of cervical cancer screening in the target population was 56.9%.[8]

Between 2010 and 2014, Ratchaburi Province in the central-western region of Thailand had a coverage of cervical cancer screening in the target population of 56.5%, which was slightly higher than the national level but similar to that in Nong Bua Lamphu Province.[8,9] We hypothesized that knowledge of cervical cancer screening among healthcare workers in Ratchaburi Province was similar to the coverage in

Nong Bua Lamphu Province. Hence, we conducted the study to evaluate the knowledge of healthcare workers in Ratchaburi Province, Thailand, about the 2010-2014 national screening guidelines for cervical cancer, their practice of recommending cervical cancer screening and associated factors of knowledge and practice of healthcare workers in cervical cancer screening.

The findings from this study could be used by policy makers to determine the need for national campaigns to encourage the target groups to be screened. Findings could also be used by implementers to improve the next 5-year guidelines (2020-2024).

## Methods

### Study Design and Setting

A facility-based cross-sectional study was conducted in public hospitals of Ratchaburi Province, Thailand in 2016. Ratchaburi is one of the rural provinces of Thailand with a population of 850,000. All of the Ministry of Public Health hospitals, including community, provincial or general hospitals and health promoting hospitals were included in the study.

### Study Population

All healthcare workers, including nurses, public health officers, general practitioners and gynecologists, who had been involved in conducting or ordering cervical cancer screening were eligible for the study. Exclusion criteria were those healthcare workers who worked less than one year in these public hospitals.

### Data Collection

We collected data using a questionnaire adapted from the US National Survey of Primary Care Physicians' Cancer Screening Recommendations and Practices: Breast and Cervical Cancer Screening Questionnaire.[10] The questionnaire was pretested and reviewed by ten public health technical officers and experts at the Division of Epidemiology. Information regarding the type of healthcare worker (public health technician, nurse, general practitioner, gynecologist), and their age, gender, work experience, time since last training (years), work location, and knowledge and practice of cervical cancer screening was elicited. Knowledge regarding cervical cancer screening was assessed based on their responses to questions on cervical cancer screening criteria and age group of the target population. A healthcare worker's knowledge on cervical cancer screening criteria was tested using six scenarios on the recommended test or combination of tests for women of various ages. (Table 1)

**Table 1 Scenarios and recommendations for healthcare workers involved in cervical cancer screening in public hospitals, Thailand**

| Scenarios | Recommendation from guideline |
|---|---|
| 18-year-old woman, no sexual intercourse, 1st OPD gynecology visit | No screening |
| 18-year-old woman, sexual intercourse 1 month ago, 1st OPD gynecology visit | No screening |
| 18-year-old woman, sexual intercourse 3 years ago, 1st OPD gynecology visit | No screening |
| 33-year-old woman, no sexual intercourse with a new partner in the past 5 years, normal Pap smear in past year | Screening |
| 55-year-old woman, no sexual intercourse with a new partner in the past 5 years, normal Pap smear result 3 times | Screening |
| 65-year-old woman, no sexual intercourse with a new partner in the past 5 years, normal Pap smear result 3 times | No screening |

### Data analysis

The data were coded, cleaned, and analyzed using Epi Info version 7.1. For the descriptive part of the study, frequencies with percentages, and means with standard deviations were used to summarize the results. Average scores and standard deviations were calculated to summarize the response of the six criteria on the recommended test. For the analytic part of the study, univariate analysis was performed. Associated factors of knowledge and practice of healthcare workers in cervical cancer screening for the provincial level were determined using prevalence ratios with 95% confidence intervals. A healthcare worker's practice on cervical cancer screening criteria was categorized as 'good' if they advised more than 10 women per month to have a Pap smear.

**Table 2 Demographic characteristics of healthcare workers involved in cervical cancer screening in public hospitals of Ratchaburi Province, Thailand 2016 (n=258)**

| Variable | Type of healthcare workers | | | | Total |
|---|---|---|---|---|---|
| | Public health technician officers | Nurses | General practitioners | Gynecologists | |
| **Sex** | | | | | |
| Male | 49 | 169 | 9 | 11 | 238 |
| Female | 2 | 2 | 10 | 6 | 20 |
| **Age in years (Mean ± SD)** | 43.7 ± 9.2 | 43.9 ± 7.4 | 29.7 ± 7.4 | 43.8 ± 8.0 | 42.8 ± 8.6 |
| **Training in cervical cancer screening** | | | | | |
| < 3 years ago | 30 (23.4%) | 81 (63.3%) | 9 (7.0%) | 8 (6.3%) | 128 |
| 3-6 years ago | 14 (19.2%) | 47 (64.4%) | 5 (6.8%) | 7 (9.6%) | 73 |
| 6-10 years ago | 3 (17.6%) | 14 (82.4%) | 0 | 0 | 17 |
| > 10 years ago | 3 (7.9%) | 28 (73.7%) | 5 (13.1%) | 2 (5.3%) | 38 |
| **Place of work** | | | | | |
| Health promoting hospital | 48 (31.0%) | 107 (69.0%) | 0 | 0 | 155 |
| Community hospital | 3 (4.8%) | 41 (66.1%) | 18 (29.0%) | 0 | 62 |
| Provincial and general hospital | 0 | 23 (56.1%) | 1 (2.4%) | 17 (41.5%) | 41 |

### Ethical considerations

All public health workers in the study provided informed written consent. The study was reviewed and approved by the ethical review committee of the Department of Disease Control, Ministry of Public Health, Nonthaburi, Thailand (FWA 00013622).

**Table 3 Knowledge regarding target population and criteria among healthcare workers involved in cervical cancer screening in public hospitals of Ratchaburi Province, Thailand 2016 (n=258)**

| Item | Type of healthcare worker | | | | Total |
|---|---|---|---|---|---|
| | Public health technician officers | Nurses | General practitioners | Gynecologists | |
| Percentage who knew that Pap smear should be done every five years for women aged 30-60 years | 88.2% | 81.3% | 21.0% | 29.4% | 74.8% |
| Mean ± SD (score) of criteria of cervical cancer screening | 3.8 ±0 .2 | 3.9 ± 0.1 | 3.3 ± 0.3 | 2.8 ± 0.3 | 3.7 ± 0.8 |

## Results

### Demographic Data

A total of 283 healthcare workers from 11 Ministry of Public Health hospitals and 162 health promoting hospitals were approached. Of these, 277 questionnaires were returned for a response rate of 98%. We analyzed 258 complete questionnaires. (Table 2)

Health care workers included public health technician officers (n=51, 19.8%), nurses (n=171, 66.3%), general practitioners (n=19, 7.3%) and gynecologists (n=17, 6.6%). Of these, 155 (60.1%) worked at health promoting hospitals, 62 (24.0%) at community hospitals, and 41 (15.9%) at provincial/general hospitals. Approximately 92% were female. The mean age was 43 years. Almost half of them had trained in cervical cancer screening within the last three years. (Table 2)

### Knowledge Related to Cervical Cancer Screening

Awareness of the 2010-2014 national cervical cancer screening guidelines was stated by 87.2% (225/258) of participants. Knowledge that a Pap smear should be done every five years for women aged between 30 and 60 years was mentioned by 74.8% (193/258) of the participants. Gynecologists (29.4%) and general practitioners (21.1%) had lower knowledge of the target age group for cervical cancer screening compared to public health technician officers (88.2%) and nurses (81.3%). The mean (SD) knowledge score in criteria of cervical cancer screening was 3.7 (0.8). The mean scores of gynecologists and general practitioners were lower than those of public health technician officers and nurses. (Table 3)

### Practice Related to Cervical Cancer Screening

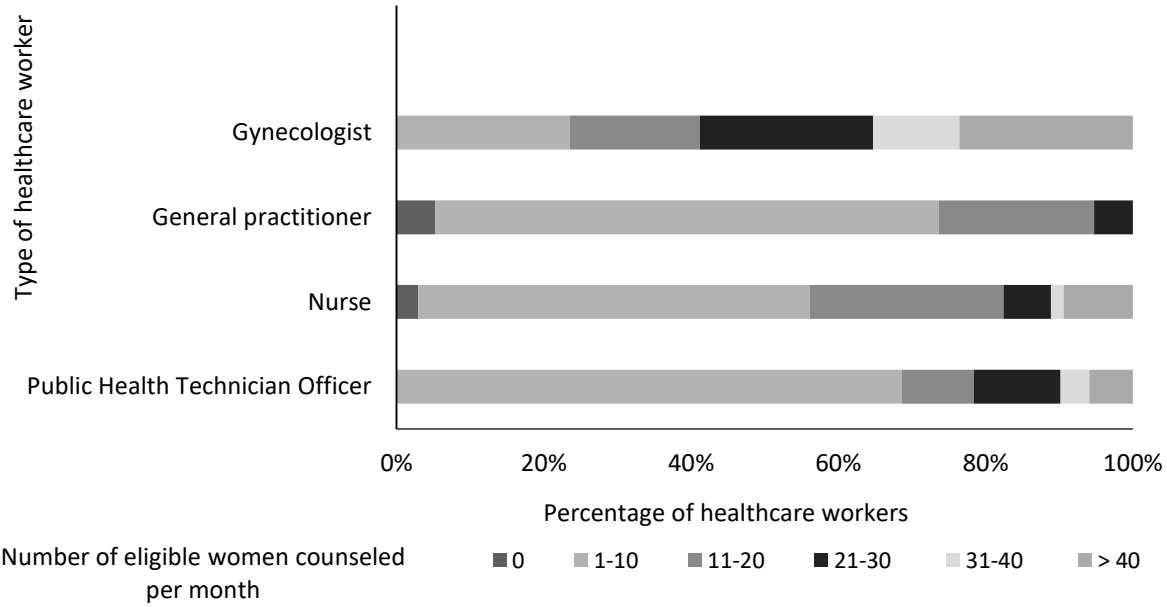
Almost all healthcare workers (97.7%) advised the target population to undergo cervical cancer screening. Approximately 55% advised 1-10 women/month and gynecologists tended to advise more eligible women to be screened than the other healthcare workers (Figure 1). The popular methods of advice were direct communication (89.1%), providing brochures (67.3%) and posting letters (43.3%). Telephone (79.2%) was the most preferred way to convey the screening results to the women.

### Factors Associated with Knowledge and Practice of Cervical Cancer Screening

Table 4 shows factors associated with knowledge and practice of cervical cancer screening among the study participants using a prevalence ratio (PR) with 95% confidence interval (CI) to compare the categories within each factor. The prevalence of healthcare workers who knew the appropriate target age to screen women for cervical cancer among those who had recent (within the previous 3 years) training was 1.16 times higher (95% CI 1.01–1.34) than that

among those who did not. Workplace and type of healthcare worker were also significantly associated with knowledge. Screening practice was significantly associated with type of healthcare worker and workplace. Gynecologists had a significantly higher prevalence of screening than general practitioners (PR 2.90, 95% CI 1.31–6.45) while healthcare workers from health promoting hospitals (PR 0.60, 95% CI 0.45–0.81) and community hospitals (PR 0.50, 95% CI 0.32–0.75) each had a significantly lower prevalence compared to those from provincial and general hospitals.

**Figure 1 Frequency of cervical cancer screening (per month) in public hospitals of Ratchaburi Province, Thailand 2016 classified by type of healthcare worker (n=258)**




## Discussion

Approximately 75% of healthcare workers in Ratchaburi Province had correct knowledge of the target age for cervical cancer screening according to the 2010-2014 national guidelines. The majority of healthcare workers advised the target population to undergo cervical cancer screening and approximately half advised between 1 and 10 women per month to be screened. Workplace, worker type, gender and recent training were all associated with knowledge while only workplace and worker type were associated with screening practice.

In the study setting, most (75%) of the healthcare workers had correct knowledge of the national cervical cancer guidelines. However, correct knowledge of the criteria was found in a low percentage of general practitioners (21%) and gynecologists (29%). This could be because there are several cervical cancer screening guidelines such as those published by the American College of Obstetricians and Gynecologists and the American Cancer Society.[5] Some medical doctors may use these guidelines in their practice rather than the one published by Thailand's National Health Security Office. Having little or no information or encouragement from healthcare workers has been highlighted as a reason for poor uptake of Pap smear.[11-14]

We found that the majority of healthcare workers advised the target population to undergo cervical cancer screening. The positive effect of doctors' recommendation on cancer screening uptake is well highlighted by previous studies.[13,15-17] In our study, the majority of gynecologists recommended, among the target population, more than 10 women/month to undergo cervical cancer screening. Better performance in cervical cancer screening will improve the cervical screening uptake in Ratchaburi province, resulting in an improvement to the cervical cancer screening coverage.

We found that healthcare workers from health promoting hospitals had significantly higher knowledge of the target age criteria compared to those from provincial and general hospitals.

Health promoting hospitals had the highest proportion of workers compared to other health facilities. A possible explanation may be that most public health technician officers who were responsible for health promotion worked at health promoting hospitals.

There are some limitations in this study which should be acknowledged. Almost one third (n=77) of our study participants were not available for interview and thus self-completed the questionnaire. These participants did not have any chance for clarification if they could not understand any of the questions.

**Table 4 Association between key study variables and knowledge and practice of cervical cancer screening among healthcare providers in public hospitals, Ratchaburi Province, Thailand 2016 (n=258)**

| Study variable | Knowledge of target age | Practice of recommending cervical cancer screening |
|---|---|---|
| **Types of healthcare worker** | | |
| Public Health Technician Officer (n=51) | 88.2% (45/51) | 30.8% (16/52) |
| Prevalence Ratio (95% CI) | 4.20 (1.75-10.07)* | 1.17 (0.50-2.75) |
| Nurse (n=171) | 81.3% (139/171) | 43.9% (75/171) |
| Prevalence Ratio (95% CI) | 3.90 (1.61-9.25)* | 1.67 (0.77-3.60) |
| Gynecologist (n=17) | 29.4% (5/17) | 76.5% (13/17) |
| Prevalence Ratio (95% CI) | 1.40 (0.45-4.37) | 2.90 (1.31-6.45)* |
| General practitioner (n=19) | 21.1% (4/19) | 26.3% (5/19) |
| Reference | | |
| **Workplaces** | | |
| Health promoting hospitals (n=155) | 91.6% (142/155) | 40.0% (62/155) |
| Prevalence Ratio (95% CI) | 1.90 (1.37-2.58)* | 0.60 (0.45-0.81)* |
| Community hospitals (n=62) | 50.0% (31/62) | 32.3% (20/62) |
| Prevalence Ratio (95% CI) | 1.00 (0.69-1.53) | 0.50 (0.32-0.75)* |
| Provincial and general hospitals (n=41) | 48.8% (20/41) | 65.9% (27/41) |
| Reference | | |

*Note *statistically significant association*

**Table 4 Association between key study variables and knowledge and practice of cervical cancer screening among healthcare providers in public hospitals, Ratchaburi Province, Thailand 2016 (n=258) (con't)**

| Study variable | Knowledge of target age | Practice of recommending cervical cancer screening |
|---|---|---|
| **Sex** | | |
| Female (n=238) | 78.2% (186/238) | 43.3% (103/238) |
| Prevalence ratio (95% CI) | 2.23 (1.22-4.07)* | 1.44 (0.73-2.76) |
| Male (n=20) | 35.0% (7/20) | 30.0% (6/20) |
| Reference | | |
| **Training** | | |
| < 3 years ago (n=128) | 80.5% (103/128) | 44.9% (57/128) |
| Prevalence ratio (95% CI) | 1.16 (1.01-1.34)* | 1.08 (0.81-1.43) |
| ≥ 3 years ago (n=130) | 69.2% (90/130) | 41.6% (52/130) |
| Reference | | |

*Note *statistically significant association*

## Conclusion

In conclusion, most healthcare workers knew the 2010-2014 cervical cancer screening guidelines and followed the guidelines in their workplace. Gynecologists advised more women to undergo cervical cancer screening than other workers. To improve the cervical cancer screening program, we recommended that the Ratchaburi Provincial Health Office should train healthcare workers to become more familiar with the cervical cancer screening guideline, especially among those whose training was more than three years ago. In addition, the cervical cancer screening guidelines should be displayed in all examination rooms to encourage more healthcare workers to follow the guidelines.

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