RESEARCH ARTICLE

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Knowledge and Attitudes of Pregnant Women toward Cervical Cancer Screening during Pregnancy

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Abstract

Objective: To assess the knowledge and attitudes towards cervical cancer screening (CCS) during pregnancy among pregnant women. **Material and Methods:** This prospective cohort study was conducted at the antenatal clinic of Thammasat University Hospital, Pathum Thani, Thailand from February to September 2024. Participants were pregnant women aged 18 to 45 years old who attended their first antenatal visit at a gestational age of less than 20 weeks. After counseling, written informed consent was signed after well understood of the study. A self-administered questionnaire consisting of knowledge about cervical cancer, attitudes towards screening and interest in undergoing screening during pregnancy was used. **Results:** A total of 384 participants were recruited. The average maternal age was 30 years. Two-thirds (254/384) of the participants had at least a bachelor's degree, and over half (197/384) had a high salary. Only 42.7 (164/384) percent had previously undergone CCS with 70 (115/164) percent screened in the past 3 years. Knowledge scores averaged 8.9 out of 15 with many participants unaware of key facts, including the use of the Pap smear for screening. Although most participants (85.2-97.4%) had a positive attitude towards CCS during pregnancy, only 57(219/384) percent were interested in undergoing CCS during pregnancy. Factors such as prior screening and knowledge level were significant determinants of interest in CCS. **Conclusion:** Pregnant women had moderate knowledge and a good attitude towards cervical cancer and CCS. Less than half of pregnant women uninterested in CCS during pregnancy with the reason of prior CCS before pregnancy and inconvenience.

Keywords: Knowledge- Attitudes- Cervical Cancer Screening- Pregnancy

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Introduction

Cervical cancer (CC) remains a significant global health challenge, identified by the World Health Organization (WHO) as the fourth most common cancer among women worldwide. Alarmingly, 90 percent of CC-related deaths occur in low- to middle-income countries [1]. In Thailand, the 2022 hospital-based cancer registry reports that CC is the second most common cancer among newly diagnosed female patients, following breast cancer [2]. As early-stage CC is often asymptomatic, early detection in its pre-cancerous or initial stages is crucial for effective treatment and improved prognosis. Therefore, cervical cancer screening (CCS) plays a pivotal role in disease prevention.

In Japanese pregnant women, CC is the most frequently observed malignancy, accounting for 71.4 percent of all cancers detected during pregnancy. As many as 92 percent of cases are asymptomatic but are detected through CCS using the Pap smear method during early gestation [3]. Furthermore, study has found that in the general pregnant population, abnormal cervical cytology can be detected in up to 3 percent of cases during CCS, with 90 percent of these women undergoing their first screening during pregnancy [4].

Pregnancy may be the only time some women seek medical care, making it a critical opportunity to promote CCS. Therefore, assessing women's knowledge and attitudes towards CC and its screening is crucial. This helps them understand their risk of developing CC and other related conditions. Moreover, it can emphasize the importance of regular screening.

Furthermore, improving awareness can help dispel misconceptions about CCS, thereby encouraging preventive behavior. Promoting CCS during pregnancy not only facilitates early detection but also enables timely intervention in women who test positive, potentially reducing complications for both mother and

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baby. Consequently, CCS during pregnancy is critically important.

The Royal Thai College of Obstetricians and Gynecologists (RTCOG), in accordance with 2023 medical practice guidelines, recommended CCS for pregnant women who had not undergone screening in the past 3-5 years. However, data indicated that over half of pregnant women in Thailand had not undergone CCS prior to pregnancy [5, 6]. Additionally, abnormal cervical cytology was detected in 3.4 percent of pregnant women who underwent screening [5]. Furthermore, fewer than 50 percent of postpartum women returning for follow-up received this essential screening [6] These statistics underscore the prenatal period as a critical window for CCS.

Several factors hinder CCS among pregnant women, including insufficient awareness, limited knowledge, lack of support and cultural influences [7]. Some study had shown that negative attitudes toward CCS were prevalent, with concerns that screening could lead to complications during pregnancy such as miscarriage or preterm delivery [8]. Pain and discomfort were also cited as reason for avoiding CCS. Particularly in Thailand, significant obstacle to CCS in general women included embarrassment, lack of knowledge, the asymptomatic nature of the disease, time constraints and fear of pain [9].

Currently, there was limited research in Thailand regarding knowledge and attitudes toward CCS in pregnant women, which was an important issue. The knowledge and attitudes of individuals influenced their decision to undergo CCS during pregnancy. This study aimed to identify the knowledge, attitudes and interest in CCS of pregnancy women. The findings will inform the development of effective policies and strategies to promote screening among pregnant women in the future.

Materials and Methods

This prospective cohort study was approved by the Human Research Ethics Committee of Thammasat University (MTU-EC-OB-1-275/66) and conducted at the antenatal clinic and maternal and fetal medicine clinic, Department of Obstetrics and Gynecology, Thammasat University Hospital, Pathum Thani, Thailand between February and September 2024. The participants were pregnant women aged 18 to 45 years. They were at less than 20 weeks' gestation at the time of their first antenatal visit. All participants had proficiency in the Thai language. Exclusion criteria included pre-existing precancerous lesions or diagnosed CC, inability to make cognitive decision and refusal to participate in the study. After giving adequate information regarding the study, informed consent approved by the ethics committee were obtained from participants.

A total of 20 pregnant women participated in the pilot study. The proportion for accuracy for CC knowledge was 0.15. The sample size was calculated using the standard formula; $n = (Z\alpha)^2 P(1-P) / d^2$. Type 1 error and confidence interval were set at 0.05 and 95 percent, respectively. The estimated sample size was 349 cases. Considering an expected sample loss 20 percent, the final total of participant was 420 cases.

The questionnaire was created based on questionnaire from Kanjanawilai's, Abdul's, Yeo's and Monteiro's [6, 8, 10, 11] The validity of questionnaire was tested in the pilot study. The Cronbach's alpha coefficient was found to be 0.73. Data were collected general information and using a questionnaire assessed knowledge and attitudes towards CCS in pregnant women, as well as their interest in undergoing screening during pregnancy. The questionnaire consisted of 15 knowledge-based questions answered as either True or False; 12 attitude-based questions answered on a scale from strongly agree to strongly disagree; and questions about interest in CCS during pregnancy answered as either interested or not interested. After counseling, written informed consent was signed after well understood of the study. Self-filling questionnaire about CCS during pregnancy was applied.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 29 (SPSS inc., Singapore). Descriptive statistics, including frequency distribution and percentages, were used to summarize the data. Differences between groups interested and not interested in CCS during pregnancy were analyzed using the Chi-square test, with significance determined by a p-value of less than 0.05. Finally, multivariate analysis was performed to identify independent risk factors.

Results

Follow as Figure 1, 384 participants were recruited for the study, exhibiting a mean maternal age of 30 years. Most subjects (331/384) lived in Bangkok and perimeter. Two-thirds (254/384) had attained bachelor and post-baccalaureate education, and over half (197/384) reported a high salary. CCS history revealed that only 42.7 percent (164/384) had previously undergone screening, with 70 percent (115/164) having been screened within the past three years. Among the subgroup who had given birth, comprising half (168/384) of the study population. Only ten percent (18/168) had been screened during pregnancy, while half (84/168) had been screened after childbirth (Table 1).

Knowledge of participants on CC and CCS based on

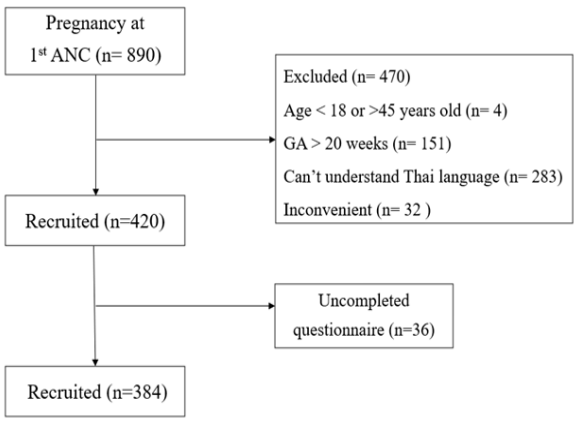

Figure 1. Flow Chart of Study. ANC, Antenatal care clinic

Table 1. Demographic and Logistic Regression Analysis to Determine Independents Associated Factor for Interested in CCS during Pregnancy of Participant (n=384)

		n (%)	Adj OR	95% CI	p-value
Age(year)*		30±5.3	1.006	0.962-1.053	0.784
Occupation					
	Private employee	124 (32.3)			0.281
	Government officer	74 (19.3)	1.106	1.106-0.580	0.761
	Contractor	49 (12.8)	0.57	0.570-0.273	0.134
	Health care provider	28 (7.3)	0.831	0.831-0.341	0.684
Education					
	Primary school or less	35 (9.1)			0.729
	High school	95 (24.7)	0.768	0.768-0.339	0.528
	Bachelor	229 (59.6)	0.647	0.647-0.277	0.314
	Post-baccalaureate	25 (6.5)	0.835	0.835-0.243	0.774
Income (USD/month)					
	<300	36 (9.4)			0.26
	300-600	151 (39.3)	1.231	0.561-2.700	0.604
	>600	197 (51.3)	1.711	0.763-3.839	0.193
Ever CCS		164 (42.7)	0.608	0.376-0.902	0.042
CCS within 3 years		115 (29.9)			
Multiparity		168 (43.7)			
	Ever ND	112 (66.7)	0.812	0.431-1.528	0.518
	CCS during pregnancy	18 (10.7)			
	CCS during postpartum	84 (50.0)			
Score CCK >10			1.733	1.074-2.796	0.024

1 USD, 33.33 Thai baht; CCS, cervical cancer screening; ND, natural delivery; CCK, cervical cancer knowledge; *mean± standard deviation (SD)

15 questions as shown in Table 2, The average participant score was 8.9, with only one-third (132/384) scoring more than 10 points. More than half (235/384) of the participants were unaware that women with multiple partners or those married to men with multiple partners are at an increased risk for CC. Additionally, approximately two-thirds (267/384) did not know that having children does not reduce the risk of CC. Only one-third (137/384) of subject aware that CCS is conducted using the Pap smear method. However most subject (356/384) knew that every women should regularly undergo CCS.

A substantial majority (85.2-97.4 percent) of participants had a positive attitude towards CCS and agreed that screening does not increase risks during pregnancy (Table 3), such as miscarriage, infection, birth defects, or preterm delivery. However, one-third (138/384) of participants still preferred to undergo CCS after giving birth rather than during pregnancy. This finding aligned the results in Table 4, which show that 43 percent (165/384) of participants were uninterested in undergoing CCS during pregnancy. Most reason for uninterest CCS during pregnancy were already CCS before (26.6%: 44/165) and inconvenient (10.9%: 18/165).

Upon conducting a logistic regression analysis to identify independent factors associated with interest in CCS during pregnancy, The study found that only two factors had a statistically significant impact, previous CCS and knowledge of CC. Women who had previously undergone CCS were less likely to be interested in CCS during pregnancy. The adjusted OR was 0.608 (95% CI: 0.376–0.902; p-value = 0.042). On the other hand, women with higher knowledge of CC, represented by a score greater than 10, showed increased interest in CCS

Table 2. The Number of Participants who Answered Correctly Regarding CCS Knowledge (n=384)

Questions	n (%)
CC is the second most common in Thailand	235 (61.2)
HPV is the cause of CC	195 (50.8)
Polygamous women are prone to CC	173 (45.1)
Marrying to polygamous men is the risk factor	149 (38.8)
Abnormal vaginal bleeding is the symptom of CC	181 (47.1)
Smoking is directly related to CC	190 (49.5)
Risk of having CC is reduced by having a child	117 (30.5)
Pap smear is a CCS method in Thailand	137 (35.7)
Women age 21-65 should get CCS	337 (87.8)
Every woman should get CCS	356 (92.7)
Every woman should get CCS every 5 years	268 (69.8)
Women without children should also get CCS	314 (81.8)
Pregnant women should get CCS	257 (66.9)
Vaccine for reducing CC incidence is available	221 (57.6)
Postpartum women should get CCS	300 (78.1)
Average score*	8.9±3.14
Score > 10	132 (34.4)

* mean± standard deviation (SD), CC, cervical cancer; CCS, cervical cancer screening

Table 3. The Number of Participants who Agreed with the Attitudes toward CCS (n=384).

	n (%)
The CCS procedure does not cause more pain than usual.	332 (86.5)
CCS during pregnancy	
is shameless.	372 (96.9)
not related to losing virginity.	360 (93.8)
is necessary and beneficial.	374 (97.4)
is worth the cost.	343 (89.8)
not waste time during the test.	349 (90.9)
not cause miscarriage.	327 (85.2)
not result in birth defects.	348 (89.9)
not lead to infections.	331 (86.2)
not affect the risk of preterm birth.	337 (87.8)
Pregnant women need to undergo CCS.	351 (91.4)
I prefer to undergo CCS during pregnancy rather than after giving birth.	246 (64.1)

CCS, cervical cancer screening

Table 4. Reason for Uninteresting to CCS during Pregnancy (n=384)

	n (%)
Uninteresting to CCS during pregnancy	165 (42.9)
Reason for uninterest to CCS during pregnancy	
Underwent CCS before	44 (26.6)
Afraid	2 (1.2)
Embarrassed	2 (1.2)
Concerned it might affect the baby	3 (1.8)
Cost	5 (3)
Regular screening every year	4 (2.4)
Want to have the screening after childbirth	13 (7.8)
Want more information	1 (0.6)
Inconvenient to get screened	18 (10.9)
No family history of cancer	1 (0.6)
Do not want to get screened	2 (1.2)

CCS, cervical cancer screening

during pregnancy, with an adjusted OR of 1.733 (95% CI: 1.074–2.796; p-value = 0.024)

Other demographic factors, including age, occupation, education, income, and history of childbirth, did not show significant associations with interest in CCS during pregnancy, as detailed in Table 1.

Discussion

The study found that the average age of the participants was 30 years, which is an appropriate age for CCS. Only 42.7 percent had ever undergone CCS. Among the 168 women who had given birth, only 50 percent had undergone postpartum screening. This finding was consistent with a study conducted in Thailand in 2022, which revealed that only 53.4 percent of pregnant women had ever undergone CCS, and just 46.6 percent of postpartum women returned for follow-up screening [6]. The rate of CCS has not significantly increased over the past five years. In addition, out of 168 women who have had children, only 10 percent have ever undergone CCS during pregnancy. Therefore, promoting screening during pregnancy could increase the number of women receiving CCS, as pregnancy is a time when women visit healthcare facilities. Healthcare providers can use this opportunity to offer guidance, raise awareness and emphasize the importance of CCS.

Identifying the knowledge and attitude that influencing the decision to undergo CCS during pregnancy was essential and represented the primary objective of the current study. The findings indicated that having higher knowledge about CC and CCS (score > 10) increased interest in CCS during pregnancy by 1.7 times compared to those with lower knowledge scores. Additionally, women who had previously undergone CCS were 40 percent less likely to be interested in CCS during pregnancy compared to those who had never been screened. Factors such as age, occupation, education level, income, number of childbirths and having vaginal delivery did not affect interest in CCS.

Despite the participants having higher education levels, their interest in CCS was contrary to expectations which contradicted findings by Dozie and colleagues from South-Eastern Nigeria [12]. Dozie's study reported that educational status had a significant positive influence on CCS among pregnant women attending antenatal care [12]. Additionally, a study in France found that a low education level contributed to a 1.2 times higher likelihood of missing CCS [13].

The differences in the research findings might be attributed to higher education levels accompanied by a limited understanding of CC and CCS leading to lower interest in screening. The results of the current study showed that knowledge was important and influenced interest in CCS. The results of the current study highlighted the importance of knowledge in influencing interest in CCS. Therefore, providing information and raising awareness about the importance of CCS could help increasing participation rates.

From Table2, only one-third (137/384) knew that Pap smear was a CCS method in Thailand. This finding revealed that many individuals did not know the available specific method for CCS. In clinical practice, using the term of CCS instead of Pap smear might facilitate the better communication to participants.

Although the participants in the current study had a positive attitude toward CCS, one-third expressed greater interest in postpartum screening than in CCS during pregnancy. Almost 50 percent expressed no interest in CCS during pregnancy. The primary reason for reducing interest was having undergone screening within the past 3 years. However, even after excluding this group, about one-third still did not want to be CCS during pregnancy. This suggested that a positive attitude did not necessarily translate into increased interest in CCS. A possible reason could be a misconception that they were too young to develop CC and did not need screening. This was similar

to findings from research in South-Eastern Nigeria, which focused on a population primarily aged 25-30 years, similar to the age range in the current study [12]. The limitations of the current study included its focus on a single study group from a tertiary hospital and an urban population, which might not represent the majority of the population, particularly those in rural areas.

In conclusion, promoting CCS during pregnancy could significantly increase the screening rate. In the current study found that only 10 percent of women who had given birth before had undergone CCS during pregnancy and 42.7 percent of pregnant women attending prenatal care had been screened previously, yet over 80 percent having a positive attitude toward CCS and acknowledged that it had no risk to the fetus. Therefore, implementing policies that promoted CCS during pregnancy such as offering free screenings could help raise the national screening rate. A key factor associated with increased participation in CCS were knowledge and understanding of CC with an odds ratio of 1.7(p-value=0.046). Consequently, policies aimed at improving awareness and providing accessible educational resources could significantly enhance the promotion of CCS. The research team envisioned that the current study could serve as a catalyst for future research initiatives focused on enhancing CCS rates, ultimately helping to reduce and potentially eliminate CC.

Author Contribution Statement

All authors contributed equally in this study.

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Conflict of interest

There was no conflict of interest in this study.

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