Research Article

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Factors Associated with Mammograms and Pap Smears Screening: A National Survey in Thailand

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Abstract

During the COVID-19 epidemic, the accessibility of healthcare facility services was disrupted. This study examined factors associated with having mammograms and Pap smear screenings during the COVID-19 epidemic in Thailand. The study was based on the 2021 Health and Welfare Survey of the Thai National Statistical Office. Skilled interviewers systematically conducted population-based surveys. They polled 11,078,970 women aged 40 or older regarding mammographic screening for breast cancer and 13,460,390 women aged 30 or older about Pap screening for cervical cancer. The independent variables were age, religion, education, occupation, income, healthcare-cost coverage, geographic region, and domicile location. The two dependent variables were mammograms and Pap smears. Univariate and multiple binary logistic regression analyses were performed to identify the factors associated with mammograms for breast cancer and Pap smears for cervical cancer. Results found that cancer screening rates via mammograms and Pap smears decreased during COVID-19 in Thailand. The women who had mammograms and Pap smear screenings were 13.8% and 54.0%, respectively. The primary reason for not undergoing screening was the women's belief that they did not have any abnormalities in their breasts (64.5%) or cervix (53.1%). Some women were unaware that breast cancer could be screened via mammography (19.2%), while 22.7% believed that Pap smear screening for cervical cancer was unnecessary. Binary logistic regression analyses found that the factors associated with having mammograms and Pap smears were demographic, socioeconomic, geographic, healthcare-cost coverage, and economic status. The Thai government could conduct information campaigns to educate women about the need for breast

and cervical cancer screening via mammograms and Pap smears, especially among at-risk populations.

Keywords: Early detection of cancer, Health surveys, Mammography, Papanicolaou test, Thailand

What was Known

- Age, marital status, religion, education, occupation, income, healthcare-cost coverage, region, and residence are associated factors for mammograms and Pap smears screening.

What's New and Next

- The mammograms and Pap smears decreased during the COVID-19 epidemic in Thailand.
- Subjects living in rural areas were less likely to have had mammograms but more likely to have had Pap smears than women in urban areas.
- Women in the northern and northeastern regions were less likely to have had mammograms but more likely to have had Pap smears than those in Bangkok.
- Community hospitals should be engaged in active-case finding by taking the breast cancer screening service and provided with portable mammogram machines to women, especially those living in distant rural communities in the north and northeast regions.

Introduction

Among cancers in women in Thailand, breast cancer ranks first, while cervical cancer ranks second. A hospital-based cancer registry showed that among Thai women with all forms of cancer, the proportion of new patients with first-stage breast cancer declined from 13.6% in 2016 to 7.6% in 2020. The corresponding values for women with first-stage cervical cancer declined slowly from 27.9% to 23.1% [1,2]. Screening for breast and cervical cancers facilitates early detection, diagnosis, and treatment, affording patients long survival times. In the National Health Examination Survey IV, Thailand reported that 42.5% of women aged 15 to 59 years and only 4.5% of women aged 45 to 59 years underwent Pap smears and mammographies, respectively[3]. A previous reproductive health survey in 2009 found that subjects living in urban areas were 1.6-fold more likely to have undergone a mammogram than those living in rural areas.

Conversely, women in rural areas were 1.4 times more likely to have had Pap smears than those in urban areas[4]. Disruptions to cancer screening healthcare services have been experienced in most settings due to the COVID-19 epidemic. For example, it may have negatively influenced women's use of cancer screening services[5,7]. Additionally, the epidemic may have discouraged people from visiting hospitals to obtain services in different regions. A Taiwanese study reported that the decline in screening for cervical, breast, and colorectal cancers ranged between 15.0% and 40.0% [8]. Other research found that screening mammograms were canceled because of COVID-19-related restrictions, unspecified patient reasons, administrative issues, provider requests, and earlier appointment times becoming available[9]. The COVID-19 pandemic also impacted cancer deaths due to delays in conducting diagnostic investigations. Early cancer screening contributes to decrease in the morbidity and mortality of cancer. One study estimated that deaths within 5 years after breast cancer diagnoses rose by 7.9% to 9.6% due to the COVID-19 pandemic compared with pre-pandemic rates[10]. Cervical cancer screening should reduce the incidence and mortality of invasive cervical cancer by approximately 90.0%[11].

The COVID-19 epidemic in Thailand in 2020–2021 resulted in the country being locked down and tourism being highly restricted. Thai citizens were obliged to work from home, public activities were markedly reduced, people were encouraged to stay at home, and hospital services were limited. Many people became unemployed, leading to a national economic crisis. People feared contracting COVID-19 when visiting hospitals, which may have contributed to delays in screening for various diseases. This study examined accessibility and factors associated with having mammograms and Pap smear screenings during the COVID-19 epidemic in the Thai population.

Materials and Methods

Study design

The observational study, the secondary data for the study were sourced from the Thai National Statistical Office survey conducted in Thailand in 2021.

Data collection

The health welfare surveys collected samples with a stratified 2-stage sampling procedure. There are 76 provinces in Thailand, each of which is defined as a block/strata. Each

stratum was separated into two parts (municipal and nonmunicipal areas) according to the structure of the local administration. The municipal and nonmunicipal areas were set as the primary and secondary sampling units, respectively, and they included all households in each area. The health and welfare surveys were population-based and systematically carried out by skilled interviewers. They polled 11,078,970 women aged 40 or older regarding mammographic screening for breast cancer and 13,460,390 women aged 30 or older about Pap screening for cervical cancer. The available data were each woman's demographic profile, socioeconomic status, healthcare-cost coverage, breast cancer examinations, and cervical cancer screenings. The independent variables were age, religion, education, occupation, income, healthcare-cost coverage, geographic region, and domicile location (urban versus rural). The two dependent variables were mammograms and Pap smears. The questionnaire asked the following about breast cancer examinations among women aged 40 or older: "During the last 5 years, did you ever have a mammogram by health personnel?" For cervical cancer examinations among women aged 30 or older, the question was, "Have you ever had a Pap smear screening in the last 1 year and over (not any other screening for cervical cancer)?" If the response was negative to either of these 2 questions, the follow-up question was, "What are your main reasons for not having a mammogram/Pap smear screening?".

Statistical analysis

Univariate and multiple binary logistic regression analyses were performed to identify the factors associated with mammograms for breast cancer and Pap smears for cervical cancer. Data were analyzed using IBM SPSS Statistics for Windows, version 21.0 (IBM Corp, Armonk, NY, USA).

Result

The majority of the respondents were aged 50 and over (minimum age = 40 years old, maximum age = 98 years old, mean age = 57.8 years old, median age = 56.0 years old for mammograms, and minimum age = 30, maximum age = 98 years old, mean age = 53.9, median age = 53.0 for a pap smear). They had an elementary-level education, worked in their own business, were Buddhist, were married, and lived in a rural area. Overall, respondents who had mammograms and Pap smear screenings were 13.8% and 54%, respectively. The women had fewer mammograms than Pap smears, classified by age group, marital status, religion, education, occupation, income, healthcare coverage, region, and domicile location (Table 1).

Table 1 Characteristics of the sample ever had mammograms and pap smears screening

Variables	Mammogram n(%)	Pap smear n(%)
Age (years)		
≤50	581,105(16.7)	3,253,151(56.4)
>50	944,336(12.4)	4,014,488(52.2)
Mammograms: Min = 40, Max = 98, Mean = 57.8, SD.=11.4, Median = 56.0		
Pap smears: Min = 30, Max = 98, Mean = 53.9, SD. = 13.6, Median = 53.0		
Marital status		
Single	132,369(14.5)	458,543(32.7)
Married	1,049,947(15.6)	5,149,738(60.8)
Widowed, divorced, separated	343,125(10.0)	1,659,359(46.3)
Religion		
Buddhist	1,474,319(13.9)	6,992,367(54.6)
Muslim, Christian	51,122(10.5)	275,273(43.1)
Education		
No education	44,012(7.0)	278,598(40.0)
Elementary	772,063(10.8)	4,072,857(53.8)
Secondary	141,767(14.3)	795,943(52.6)
High school	231,445(18.6)	1,110,138(55.6)
Bachelor and higher	334,287(31.7)	1,005,753(60.9)
Occupation		
Employee	22,111(15.2)	100,780(60.5)
Own business	589,696(12.4)	3,338,649(59.1)
Government	141,689(31.5)	442,703(67.2)
Private sector	257,766(16.9)	1,215,782(49.6)
Income (Baht per month)		
0–15,000	382,487(9.5)	2,142,506(47.1)
15,001–30,000	257,076(16.9)	1,026,338(51.6)
30,001–50,000	125,950(20.7)	403,252(55.1)
>50,000	55,575(27.2)	172,953(72.0)
Healthcare-cost coverage		
Universal Coverage Scheme	156,804(11.6)	1,057,645(71.7)
Social Security Scheme	42,508(34.8)	125,593(70.1)
Civil Servant Medical Benefit Scheme	52,229(23.8)	183,731(75.9)
Private health insurance	18,728(36.0)	56,342(65.3)
Region		

Variables	Mammogram n(%)	Pap smear n(%)
Bangkok	287,157(23.3)	851,207(52.3)
Central	440,160(14.0)	1,840,070(45.6)
Northern	210,826(10.5)	1,419,891(60.7)
Northeastern	410,422(12.6)	2,264,512(61.7)
Southern	176,875(12.3)	891,960(49.8)
Domicile location		
Urban	777,752(16.4)	3,156,439(53.6)
Rural	747,689(11.8)	4,111,201(54.3)

Univariate and binary logistic regression analysis were performed to identify factors independently associated with mammograms and Pap smears. The relationships between mammographic and Pap screening and various demographic, socioeconomic, geographic, healthcare-cost coverage, and economic status factors are detailed in Tables 2 and 3.

Binary logistic regression analysis showed that subjects aged 50 or older were more likely to have had mammograms than those under age 50, with an OR (95% CI) of 1.4 (1.38-1.43). Married, widowed, divorced, and separated subjects were more likely to have had mammograms than those who were single, with an OR (95% CI) of 2.75 (2.66-2.83), and 4.56 (4.42-4.71), respectively. Additionally, Muslims and Christians were more likely to have had mammograms than Buddhists, with an OR (95% CI) of 2.36 (2.27-2.45). Respondents with elementary, secondary, high school, and bachelor's and higher education levels were more likely to have had mammograms than those without formal education, with an OR (95% CI) of 2.77 (2.64-2.91), 1.76 (1.67-1.87), 2.11 (1.99-2.23), and 3.72 (3.51-3.94), respectively. Subjects who worked in their own business and government were more likely to have had mammograms than those who worked in an employee group, with an OR (95% CI) of 1.29 (1.22-1.36) and 2.43 (2.29-2.58), respectively. Subjects who earned over 50,000 Baht per month were 4.66-fold more likely to have had mammograms than those whose income was under 15,000 Baht per month, with an OR (95% CI) of 4.66 (4.50-4.83). Respondents with Thailand's Social Security Scheme and private health insurance were more likely to have had mammograms than those with healthcare costs covered by universal health coverage, with an OR (95% CI) of 5.53 (5.37-5.69) and 1.57 (1.49-1.65), respectively. Women in the central and southern regions were more likely to have had mammograms than those in the capital city, Bangkok, with an OR (95% CI) of 1.39 (1.35-

1.44) and 1.94 (1.87–2.01), respectively. Subjects who lived in rural areas were less likely to have had mammograms than those in urban areas, with an OR (95% CI) of 0.75 (0.74–0.77). (Table 2)

Table 2 Relationships between mammographic screening and demographic, socioeconomic, geographic, healthcare-cost coverage, and economic status factors, using univariate and binary logistic regression

Variables	COR (95% CI)	*p*	AOR (95% CI)	*p*
Age (years)				
≤50	1		1	
>50	0.71(0.70–0.71)	<0.001	1.40(1.38–1.43)	<0.001
Marital status				
Single	1		1	
Married	1.09(1.08–1.09)	<0.001	2.75(2.66–2.83)	<0.001
Widowed, divorced, separated	0.66(0.65–0.66)	<0.001	4.56(4.42–4.71)	<0.001
Religion				
Buddhist	1		1	
Muslim, Christian	0.73(0.72–0.73)	<0.001	2.36(2.27–2.45)	<0.001
Education				
No education	1		1	
Elementary	1.62(1.60–1.64)	<0.001	2.77(2.64–2.91)	<0.001
Secondary	2.23(2.20–2.25)	<0.001	1.76(1.67–1.87)	<0.001
High school	3.06(3.03–3.09)	<0.001	2.11(1.99–2.23)	<0.001
Bachelor and higher	6.21(6.15–6.28)	<0.001	3.72(3.51–3.94)	<0.001
Occupation				
Employee	1		1	
Own business	0.79(0.78–0.80)	<0.001	1.29(1.22–1.36)	<0.001
Government	2.57(2.53–2.61)	<0.001	2.43(2.29–2.58)	<0.001
Private sector	1.13(1.12–1.15)	<0.001	1.02(0.96–1.08)	0.492
Income (Baht per month)				
0–15,000	1		1	
15,001–30,000	1.95(1.94–1.96)	<0.001	1.24(1.22–1.27)	<0.001
30,001–50,000	2.50(2.49–2.52)	<0.001	0.87(0.84–0.89)	<0.001
>50,000	3.58(3.54–3.62)	<0.001	4.66(4.50–4.83)	<0.001
Healthcare-cost coverage				
Universal Coverage Scheme	1		1	
Social Security Scheme	4.06(4.01–4.12)	<0.001	5.53(5.37–5.69)	<0.001

Variables	COR (95% CI)	*p*	AOR (95% CI)	*p*
Civil Servant Medical Benefit Scheme	2.38(2.36-2.41)	<0.001	0.84(0.81–0.87)	<0.001
Private health insurance	4.29(4.21-4.37)	<0.001	1.57(1.49–1.65)	<0.001
Region				
Bangkok	1		1	
Central	0.53(0.53-0.54)	<0.001	1.39(1.35–1.44)	<0.001
Northern	0.39(0.38-0.39)	<0.001	0.86(0.83–0.89)	<0.001
Northeastern	0.47(0.47-0.48)	<0.001	0.77(0.75–0.79)	<0.001
Southern	0.46(0.45-0.46)	<0.001	1.94(1.87–2.01)	<0.001
Domicile location				
Urban	1		1	
Rural	0.68(0.67-0.68)	<0.001	0.75(0.74–0.77)	<0.001

COR, Crude Odds Ratio; AOR, Adjusted Odds Ratio; CI, Confidence Interval

Binary logistic regression analysis showed that subjects aged 50 or older were less likely to have had Pap smears than those under age 50, with an OR (95% CI) of 0.41 (0.40-0.42). Married, widowed, divorced, and separated subjects were more likely to have had Pap smears than those who were single, with an OR (95% CI) of 3.27 (3.22-3.33), and 1.86 (1.82-1.89), respectively. Additionally, Muslims and Christians were more likely to have had Pap smears than Buddhists, with an OR (95% CI) of 1.55 (1.49-1.61). Respondents with elementary, secondary, high school, and bachelor's and higher education levels were more likely to have had Pap smears than those without formal education, with an OR (95% CI) of 3.77 (3.67-3.88), 1.45 (1.40-1.49), 3.08 (2.98-3.19), and 1.52 (1.46-1.57), respectively. Subjects who worked in government were more likely to have had Pap smears than those who worked in an employee group, with an OR (95% CI) of 1.13 (1.07-1.19). Subjects who earned over 50,000 Baht per month were 4.66-fold more likely to have had Pap smears than those whose income was under 15,000 Baht per month, with an OR (95% CI) of 8.08 (7.73-8.44). Respondents with Thailand's universal health coverage were more likely to have had Pap smears than those with healthcare costs covered by other groups. Women in the northern and northeastern regions were more likely to have had Pap smears than those in the capital city, Bangkok, with an OR (95% CI) of 1.09 (1.05-1.12) and 1.88 (1.82-1.93), respectively. Subjects who lived in rural areas were more likely to have had Pap smears than those in urban areas, with an OR (95% CI) of 1.08 (1.05–1.08). (Table 3)

Table 3 Relationships between Pap smear screening and demographic, socioeconomic, geographic, healthcare-cost coverage, and economic status factors, using univariate and multiple binary logistic regression

Variables	COR (95% CI)	*p*	AOR (95% CI)	*p*
Age (years)				
≤50	1		1	
>50	0.85(0.84-0.85)	<0.001	0.41(0.40–0.42)	<0.001
Marital status				
Single	1		1	
Married	3.18(3.17-3.19)	<0.001	3.27(3.22–3.33)	<0.001
Widowed, divorced, separated	1.77(1.76-1.78)	<0.001	1.86(1.82–1.89)	<0.001
Religion				
Buddhist	1		1	
Muslim, Christian	0.63(0.63-0.64)	<0.001	1.55(1.49–1.61)	<0.001
Education				
No education	1		1	
Elementary	1.75(1.74-1.76)	<0.001	3.77(3.67–3.88)	<0.001
Secondary	1.67(1.66-1.68)	<0.001	1.45(1.40–1.49)	<0.001
High school	1.88(1.87-1.89)	<0.001	3.08(2.98–3.19)	<0.001
Bachelor and higher	2.33(2.32-2.35)	<0.001	1.52 (1.46–1.57)	<0.001
Occupation				
Employee	1		1	
Own business	0.94(0.93-0.95)	<0.001	0.56(0.54–0.59)	<0.001
Government	1.34(1.33-1.36)	<0.001	1.13(1.07–1.19)	<0.001
Private sector	0.64(0.64-0.65)	<0.001	0.63(0.60–0.67)	<0.001
Income (Baht per month)				
0–15,000	1		1	
15,001–30,000	1.19(1.19-1.20)	<0.001	1.05(1.03–1.06)	<0.001
30,001–50,000	1.38(1.37-1.38)	<0.001	1.45(1.41–1.48)	<0.001
>50,000	2.89(2.87-2.92)	<0.001	8.08(7.73–8.44)	<0.001
Healthcare-cost coverage				
Universal Coverage Scheme	1		1	
Social Security Scheme	0.92(0.91-0.93)	<0.001	0.49(0.48–0.51)	<0.001
Civil Servant Medical Benefit Scheme	1.24(1.23-1.26)	<0.001	0.60(0.59–0.62)	<0.001
Private health insurance	0.74(0.73-0.75)	<0.001	0.23(0.22–0.24)	<0.001

Variables	COR (95% CI)	*p*	AOR (95% CI)	*p*
Region				
Bangkok	1		1	
Central	0.77(0.76-0.77)	<0.001	0.85(0.83–0.87)	<0.001
Northern	1.41(1.40-1.41)	<0.001	1.09(1.05–1.12)	<0.001
Northeastern	1.47(1.46-1.47)	<0.001	1.88(1.82–1.93)	<0.001
Southern	0.90(0.89-0.91)	<0.001	0.61(0.59–0.63)	<0.001
Domicile location				
Urban	1		1	
Rural	1.03(1.02-1.03)	<0.001	1.07(1.05–1.08)	<0.001

COR, Crude Odds Ratio; AOR, Adjusted Odds Ratio; CI, Confidence Interval

As shown in Table 4, the primary reason for not undergoing cancer screening was the women's belief that they did not have abnormalities in their breasts (64.5%) or cervix (53.1%). Some women were unaware that breast cancer could be screened via mammography (19.2%), while 22.7% believed regular Pap smear screening for cervical cancer was unnecessary.

Table 4 Reasons for not having cancer screening

Variables	Mammogram	Pap smear
	n(%)	n(%)
Think that it's unnecessary	161,269(3.2)	2,163,216(22.7)
Did not know about the examination	957,772(19.2)	1,157,451(12.2)
Expensive	186,895(3.7)	629,837(6.6)
No abnormalities	3,212,260(64.5)	5,058,465(53.1)
Felt shy	154,046(3.1)	80,941(0.8)
Afraid of pain	168,747(3.4)	217,279(2.3)
No time	79,829(1.6)	46,201(0.5)
Long distance to health center	33,883(0.7)	–
No healthcare-cost coverage	29,300(0.6)	60,193(0.6)
Afraid of disease	–	109,743(1.2)

Discussion

This study found that the rates of breast and cervical cancer screening via mammograms and Pap smears decreased during the COVID-19 epidemic in Thailand. Mammographic examinations declined markedly from 29% of the women surveyed in 2009 [4] to 13.8% in this study. Similarly, Pap smear examinations fell from a reported rate of 68.4% in

2009[4] to 54% in this study. These declines correspond with the rates for cancer screening obtained from the hospital's database. During the 5 years to 2021, 73.7% of women aged between 30 and 70 stated that they performed breast self-examination. Moreover, only 31.4% of women aged between 30 and 60 reported having had prior Pap smears[12]. The analysis of this study revealed that overall, respondents who had mammograms and Pap smear screenings were 13.8% and 54, respectively. The women had fewer mammograms than Pap smears, classified by age group, marital status, religion, education, occupation, income, healthcare coverage, region, and domicile location. The majority of respondents did not undergo mammographic or Pap smear screening because they did not have any symptoms of abnormalities in their breasts or cervix. Generally, women in risk groups should be screened for breast and cervical cancer despite not having any symptoms. Screening tests can detect cancers early, and early detection is critical to treating and overcoming these diseases. However, the women (19.2%) were unaware that breast cancer could be screened via mammography, and 22.7% incorrectly believed that cervical cancer screening via Pap smears was unnecessary. In agreement with another study, the current investigation found that barriers to mammographic screening were lack of knowledge, embarrassment, fear of a cancer diagnosis, the erroneous perception that breast screening is unnecessary, a lack of coping skills, and fear of pain during the procedure[13]. In 2020 and 2021, the epidemic produced major adverse socioeconomic effects in many areas of life in Thailand. These resulted from the national lockdown, severe restrictions on tourism, measures designed to encourage people to work from home and stay at home, various forced lifestyle changes, and unemployment. Moreover, Thai hospitals were obliged to introduce service and personal-healthcare limitations to ensure that adequate resources were available to treat patients with COVID-19. When coupled with fears of contracting the disease while visiting a hospital, the service limitations meant that the Thai public's use of healthcare services fell.

This study found that factors associated with mammograms and Pap smears were age, marital status, religion, educational level, occupation, income, healthcare-cost coverage, and domicile location. For example, subjects with a higher education level were more likely to have mammograms and Pap smears than those without formal education. Subjects earning more than 50,000 Baht per month were 4.6 times more likely to have mammograms than women with monthly incomes under 15,000 Baht. The difference in access to healthcare services was evident across the regions of Thailand. Subjects living in rural areas were less likely to have had

mammograms but more likely to have had Pap smears than women in urban areas. Women in the northern and northeastern regions of Thailand were less likely to have had mammograms but more likely to have had Pap smears than those in Bangkok in central Thailand. In general, having screening mammograms every 1 or 2 years is recommended for women aged 40 or older[14,15], while international guidelines advise that Pap smear screening be undertaken every 2–3 years for women aged 25 or 30 and over. However, we could adjust the frequency of pap smear screening to suitable areas, such as every screening for the high prevalence of cervical cancer areas[16,17]. However, a previous literature review found that financial constraints, a country' s resource status, health service capacity, and community awareness adversely affect mammography screening[18]. A correspondence with a previous study determined that the factors associated with mammographic screening were clinical breast examination, age, income, ethnicity, education level, understanding of the need for screening, and perceived susceptibility to breast cancer[13]. A study in China showed that age, education level, and income were significantly associated with a greater understanding of the need for screening. Education level was the only significant factor associated with a positive attitude toward cervical cancer screening[19]. As with other developing countries, Thailand has limited healthcare resources, and access to mammograms is not yet widely and readily available. For example, community hospitals do not provide mammography because the requisite equipment and radiologists are unavailable. People residing in remote rural areas, those with limited transportation options, and individuals with limited finances can find it challenging to access mammogram services. Some areas within Thailand have conducted campaigns to raise awareness of the need for mammographic screening and have reduced the cost of getting the testing. In the future, we should focus on improving the accessibility of the healthcare system and promoting self-examination with innovative technologies for Pap smear screening. Additionally, it is suggested that community hospitals throughout Thailand be provided with portable mammogram machines. With this resource, the hospitals could engage in active-case finding by offering breast cancer screening services to women, especially those living in distant rural communities in the north and northeast. This study showed that subjects who had social security scheme were more likely to have had a mammogram examination than a universal coverage scheme, whereas subjects who had a universal coverage scheme were more likely to have had a Pap smear than other groups. It can explain that the social security scheme can cover the cost of mammogram examinations.

The limitation of this study is that it is based on survey data, and the questions were pre-defined and sharply limited, without the possibility for further elaboration, and self-reported. The strength of the study was that it used national data so that the results could be represented by the overall population. Furthermore, the Thai government could conduct information campaigns to educate women about the need for breast and cervical cancer screening via mammograms and Pap smears, especially among at-risk populations.

Conclusion

The factors associated with having mammograms and Pap smears were demographic, socioeconomic, geographic, healthcare-cost coverage, and economic status. Overall, respondents had fewer mammograms than Pap smears. The government should increase the number of mammograms and Pap smear screenings for early detection of breast and cervical cancers through health education and screening campaigns, especially for risk groups population.

Ethical Approval Statement

The present study was approved by the Ethical Committee of the Faculty of Social Sciences and Humanities, Mahidol University, Institutional Review Board, number 2023/003.0901.

Author Contributions

SC designed the work, collecting, analyzing, and interpreting data, drafting the work, and approving the final version for publication.

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Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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