

## Factors associated with cervical cancer screening uptake among women in Myanmar: A public health concern

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### ABSTRACT

**Background:** Cervical cancer remains a major health challenge globally, with Myanmar bearing one of Southeast Asia's highest incidence and mortality rates, despite a National Cervical Cancer Prevention and Control Program. Prior studies have highlighted barriers to cervical cancer screening among Myanmar women, but limited information exists on specific screening uptake determinants.

**Objectives:** This study aims to identify the factors associated with cervical cancer screening uptake (CCSU) among women in Myanmar.

**Methods:** A cross-sectional analytical study, using validated structured questionnaires, was conducted from November 2024 to January 2025 in three townships in Yangon, enrolling 439 women. Descriptive statistics characterized the samples and CCSU status, while inferential statistics and multiple logistic regression identified factors linked to CCSU, reporting Adjusted Odds Ratios (AORs), 95% Confidence Intervals (CIs), and P-values, with significance set at <0.05.

**Results:** Participants' mean age was 44.1 ( $\pm 9.12$ ) years, with Bamar ethnicity predominant (86.56%). Only 10.71% (95% CI: 8.13-13.97%) had undergone cervical cancer screening, mostly via Pap smear (65.96%). In multivariable analysis, living in semi-urban/rural areas was associated with higher screening odds (AOR=2.45, 95% CI: 1.34-5.25). Presence of a chronic illness (AOR=4.25, 95% CI: 2.15-8.41); prior receipt of cervical cancer information (AOR=2.75, 95% CI: 1.28-5.85); Human Papilloma Virus (HPV) vaccination (AOR=2.16, 95% CI: 1.10-4.27); and reported service availability (AOR=2.07, 95% CI: 1.05-4.10) were also significant factors.

**Conclusion:** CCSU among Myanmar women is critically lower than the global and regional expectations. Key determinants of CCSU include place of residence, chronic illness, health information, HPV vaccination, and accessible services. Integrated screening in chronic disease programs, targeted education, expanded service coverage for equitable access, and comprehensive national strategies are strongly recommended to improve screening rates and reduce cervical cancer burden in Myanmar.

**Keywords:** Cervical cancer screening, HPV, Health system, Geographical disparities

## 1. Introduction

Cervical cancer represents a significant global health challenge, ranking as the fourth leading cause of death among reproductive-age women. The World Health Organization reported approximately 660,000 new cases and 350,000 deaths in 2022, with 90% of mortality occurring in low- and middle-income countries [1]. The disease burden is particularly pronounced in Southeast Asia, where it remains the leading cause of cancer death in multiple countries [2]. Myanmar exhibits one of the highest incidence and mortality rates in the region, with cervical cancer ranking as the third most common cancer among women (7,129 new cases) and the fourth leading cause of cancer mortality (4,497 deaths) in 2020 [3].

The primary etiology of cervical cancer is persistent infection with high-risk human papillomavirus types, progressing slowly from precancerous lesions that can be detected through screening programs [1]. Beyond physical manifestations, cervical cancer has profound emotional, social, and economic implications for affected women and their families, compromising fertility, quality of life, and creating financial burdens [4, 5].

Cervical cancer screening substantially reduces the risk of developing invasive cervical

cancer [1]. Despite the implementation of the National Cervical Cancer Prevention and Control Program in Myanmar since 2019 [6], screening participation rates remain critically low which was below 10% compared to under 50% in some other countries [7]. Research has identified key barriers including deficient health literacy, limited accessibility to screening programs, and negative experiences with healthcare personnel [8]. Studies involving Myanmar women have highlighted additional determinants affecting screening uptake, including limited awareness, misconceptions, cultural beliefs, and sociodemographic factors [9].

However, the detailed determinants of cervical cancer screening uptake (CCSU) are still under explored in Myanmar. Therefore, this study aims to examine the factors associated with CCSU among women in Myanmar to inform strategies for improving preventive behaviors of cervical cancer in the Myanmar context.

## 2. Methods

### 2.1 Study Area

Yangon was selected as the study site due to its relatively well-developed healthcare infrastructure, making it a practical setting to assess cervical cancer screening strategies and generate insights for broader national

implementation. The study was conducted across three purposively selected townships in Yangon; Mayangone (urban), Insein (peri-urban), and Hlegu (rural). The chosen areas differ in population density, healthcare facility distribution, and community health engagement, offering meaningful contrasts in screening accessibility and awareness.

## 2.2 Study Design

A cross-sectional analytical study was implemented from November 2024 to January 2025. The study population comprised women aged 30 to 60 years at the time of data collection who demonstrated willingness to participate and possessed adequate cognitive capacity to comprehend the questionnaire and articulate their responses. Inclusion criteria encompassed residence in Myanmar for a minimum of 6 months, age between 30-60 years, history of sexual activity, proficient verbal command of the Burmese language, expressed willingness to participate in the research, no previous diagnosis of cervical cancer, and Myanmar nationality. Individuals presenting severe mental health conditions, those who were pregnant, and those suffering from severe debilitating illnesses necessitating bed confinement were excluded from participation in this investigation.

## 2.3 Sample Size and Sampling

Sample size was estimated using the multiple logistic regression formula by *Hsieh, Bloch, and Larsen (1998)* [10], based on prior data from a Thailand-Myanmar border study [9]. A total of 439 participants were required, assuming  $B = 0.18$ ,  $P_0 = 0.09$ ,  $P_1 = 0.32$ ,  $P = 0.13$ ,  $\rho^2 = 0.68$ ,  $Z_{1-\alpha/2} = 1.96$ , and  $Z_{1-\beta} = 0.84$ .

Participants were selected using multistage sampling: probability proportional to size sampling across townships, followed by random household selection. One eligible woman per household was selected by lottery when the household has more than one eligible potential participants. Data were collected via structured questionnaires administered by six trained female interviewers under daily supervision. The tool, based on literature and expert-validated, was translated and pre-tested with 30 participants. Cronbach's alpha values confirmed reliability: 0.76 (attitude), 0.92 (health literacy), and 0.84 (healthcare acceptability).

Private, in-home interviews were conducted after informed consent. Sexual exposure, an inclusion criterion, was assumed for married women and indirectly assessed for unmarried women. Culturally appropriate methods ensured ethical conduct and participant comfort.

The outcome variable was self-reported cervical cancer screening (Yes/No). No personal identifiers were collected, and participant confidentiality was maintained.

## 2.5 Data Analysis

Descriptive and inferential statistics were used. Data were coded in Excel and analyzed in Stata software, StataCorp, College Station, Texas 77845 USA, version 18 (licensed to Khon Kaen University). Categorical variables were summarized by frequencies and percentages; continuous variables by mean, SD, median, and range. Screening uptake prevalence was reported with 95% confidence intervals. Bivariate analysis via simple logistic regression generated crude odds ratio (COR), 95% CIs, and P-values. Variables with  $P < 0.25$  were entered into a multiple logistic regression [11]. Multicollinearity was assessed using variance inflation factor (VIF) [12] (mean VIF = 1.32). Backward elimination was used to adjust for confounding.

Significant factors were reported as adjusted odds ratio (AOR) with 95% confidence interval (CI) at  $P < 0.05$ .

## 3. Results

### 3.1 Sociodemographic characteristics of the participants

The mean age of participants was 44.1 ( $\pm 9.12$ ) years, with the highest proportion (37.81%) in the 30-39 years age group. The majority were Bamar (86.56%). Most participants (78.59%) were married, while 16.17% were widowed. Approximately one-third (34.17%) had completed high school as their highest educational attainment. The largest occupational category was dependent/housewife (45.56%), followed by those with their own businesses (31.21%). Monthly household income ranged from 47.62 to 1190.48 USD, with a mean of 239.78 ( $\pm 154.52$ ) USD. Monthly household expenses followed a similar distribution pattern, with a median of 190.48 USD (Table 1).

Table 1: Baseline characteristics of the participants (n=439).

Characteristics	Frequency (n)	Percentage (%)
<b>Sociodemographic characteristics</b>		
<b>Age (years)</b>		
30-39	166	37.81
40-49	133	30.30
50-59	140	31.89
Mean age ( $\pm$ SD)	44.10 ( $\pm 9.12$ )	
Median age (Min:Max)	44 (30:60)	
<b>Ethnicity</b>		
Bamar	380	86.56
Kayin	29	6.61
Rakhine	15	3.42
Mon	4	0.91



Characteristics	Frequency (n)	Percentage (%)
Chin	2	0.46
Kachin	1	0.23
Other	8	1.81
<b>Marital status</b>		
Married	345	78.59
Widow	71	16.17
Separated	12	2.73
Divorced	11	2.51
<b>Highest educational attainment</b>		
Illiterate	2	0.46
Primary school	101	23.01
Middle school	146	33.26
High school	150	34.17
Bachelor's degree	36	8.20
Master's and higher	4	0.90
<b>Occupation</b>		
Dependent/housewife	200	45.56
Own business	137	31.21
Agriculture and livestock	65	14.80
Manual labor	15	3.42
Private employee	12	2.73
Government staff	10	2.28
<b>Place of residence</b>		
Urban	277	63.10
Semi-urban	105	23.92
Rural	57	12.98
<b>Monthly household income (USD)<sup>†</sup> (n=432)</b>		
47.62 – 142.86	168	38.89
142.87 – 238.09	130	30.09
238.10 – 476.19	116	26.85
>476.19	18	4.16
Mean income (±SD)	239.78 (±154.52)	
Median income (Min:Max)	202.38 (47.62:1190.48)	
<b>Monthly household expenses (USD)<sup>†</sup> (n=433)</b>		
47.62 – 142.86	170	39.26
142.87 – 238.09	152	35.10
238.10 – 476.19	105	24.25
>476.19	6	1.39
Mean expense (±SD)	215.24 (±104.97)	
Median expenses (Min:Max)	190.48 (23.8:857.14)	

Note: <sup>†</sup>Collected as Myanmar Kyat (MMK) and converted into USD at the exchange rate of 2100 MMK for 1 USD.

### 3.2 Reproductive health factors and health status, health literacy, knowledge and attitude of participants

Majority of participants (62.41%) were premenopausal. The mean age at first sexual exposure was  $22.71 \pm 4.86$  years, and the mean age at first childbirth was  $24.58 \pm 5.17$

years. More than half of participants (59%) had 1-2 children. Most of them (93.85%) reported having had only one sexual partner. Most participants (82%) perceived themselves as healthy. The 24.60% responded as having chronic illness and 5.69% reported a family history of cervical cancer.

Health literacy assessment revealed that 51.94% had problematic health literacy, while only 11.85% demonstrated excellent health literacy. Knowledge about cervical

cancer was low in nearly half of the participants (49.43%). However, almost all of them (99.54%) had moderate to good levels of attitude (Table 2).

Table 2: Health literacy, knowledge and attitude of the participants (n=439).

Characteristics	Frequency (n)	Percentage (%)
<b>Reproductive health related factors</b>		
<b>Status of menstruation</b>		
Premenopausal	274	62.41
Postmenopausal	165	37.59
<b>Age at the time of first sexual exposure</b>		
Mean age (±SD)		22.71 (±4.86)
Median age (Min:Max)		22 (14:38)
<b>Age at the time of first childbirth (n=415)</b>		
Mean age (±SD)		24.58 (±5.17)
Median age (Min:Max)		24 (15:44)
<b>Number of children</b>		
No child	27	6.15
1-2	259	59.00
3-5	143	32.57
6-10	10	2.28
Mean (±SD)		2.20 (±1.37)
Median (Min: Max)		2 (0:8)
<b>Number of sexual partners till now</b>		
1	412	93.85
2	25	5.69
3	1	0.23
4	0	0
5	1	0.23
<b>Sexual partner has another sexual partner</b>		
No	411	93.62
Yes	19	4.33
Don't know	9	2.05
<b>Currently using contraceptives</b>		
No	299	68.11
Yes	140	31.89
<b>Physical health factors</b>		
<b>Perceived health status</b>		
Healthy	360	82.00
Unhealthy	79	18.00
<b>Acute illness</b>		
No	382	87.02
Yes	57	12.98
<b>Chronic illness</b>		
No	331	75.40
Yes	108	24.60
<b>Family history of cervical cancer</b>		
No	414	94.31
Yes	25	5.69
<b>Health literacy</b>		
Inadequate (0-25)	64	14.58

Characteristics	Frequency (n)	Percentage (%)
Problematic (>25 -33)	228	51.94
Adequate (>33-42)	95	21.64
Excellence (>42-50)	52	11.84
Mean scores (±SD)	33.07 (±7.34)	
Median scores (Min: Max)	33 (0:50)	
<b>Knowledge on cervical cancer</b>		
Low (<60%)	217	49.43
Average (60% - 79%)	132	30.07
High (≥ 80%)	90	20.50
Mean knowledge scores (±SD)	5.48 (±2.29)	
Median knowledge scores (Min:Max)	6 (0:10)	
<b>Attitude</b>		
Poor (<60%)	2	0.46
Moderate (60% - 79%)	220	50.11
Good (≥ 80%)	217	49.43
Mean attitude scores (±SD)	40.25 (±3.75)	
Median attitude scores (Min:Max)	39 (25:50)	

### 3.3 Healthcare related factors

Private clinics (53.30%) and drug stores (44.42%) were the most common places participants sought healthcare for mild to moderate illnesses. For critical illnesses, government health facilities (49.89%) were preferred. The most common sources of health information were YouTube (26.42%) and Facebook (25.06%). Only 56.95% had received information about cervical cancer and screening programs. Most participants (87.93%) found the opening hours of health facilities

convenient. Only 37.36% reported that cervical cancer screening was available at their nearest facility, and 34.62 reported availability of Human Papilloma Virus (HPV) vaccination. The medium waiting time at the health facilities was 30 minutes. Regarding affordability, 69.48% considered cervical cancer screening unaffordable, and 71.53% viewed HPV vaccination as unaffordable. Most participants (84.97%) found healthcare services highly acceptable (Table 3).

Table 3: Healthcare related factors (n=439).

Accessibility to the health care	Frequency (n)	Percentage (%)
<b>Common place of health services seeks for mild to moderate illness</b>		
Private clinic	234	53.30
Drug store	195	44.42
Government health facility	9	2.05
Charity clinic	1	0.23
<b>Common place of health services seeks for critical illness</b>		
Government health facility	219	49.89
Private clinic	212	48.29
Drug store	4	0.91
Non-government organization (NGO) clinic	3	0.68



Accessibility to the health care	Frequency (n)	Percentage (%)
Charity clinic	1	0.23
<b>Common sources of health information (n=428)</b>		
Youtube	116	26.42
Facebook	110	25.06
TV	73	16.63
Tiktok	53	12.07
Leaflet	25	5.69
Telegram	8	1.82
Radio	8	1.82
Magazine	5	1.14
Viber	2	0.46
Other	39	8.89
<b>Ever got information about cervical cancer and screening program</b>		
Yes	250	56.95
No	189	43.05
<b>Availability of nearest health facility</b>		
<b>Opening hour of health facility</b>		
Convenient	386	87.93
Inconvenient	53	12.07
<b>Availability of cervical cancer screening</b>		
Available	164	37.36
Unavailable	190	43.28
Don't know	85	19.36
<b>Availability of HPV vaccination</b>		
Available	152	34.63
Unavailable	188	42.82
Don't know	99	22.55
<b>Waiting hour at the facility</b>		
< 30 minutes	152	34.62
30 minutes to 1 hour	255	58.09
>1 hour	32	7.29
Mean ( $\pm$ SD)		36.39 ( $\pm$ 28.64)
Median (Min: Max)		30 (0:180)
<b>Accommodation of the nearest health facility</b>		
<b>Distance between home to nearest health facility (miles)</b>		
0-5	333	75.85
6-10	91	20.73
>10	15	3.42
Mean ( $\pm$ SD)		3.52 ( $\pm$ 4.52)
Median (Min: Max)		2 (0:32)
<b>Convenient to go health facility</b>		
Yes	410	93.39
No	29	6.61
<b>Presence of medical doctor</b>		
Yes	219	49.89
No	129	29.38
Don't know	91	20.73
<b>Acceptability</b>		
Highly acceptable	373	84.97
Moderate acceptable	63	14.35
Poorly acceptable	3	0.68
Mean scores ( $\pm$ SD)		17.15 ( $\pm$ 2.12)
Median scores (Min: Max)		16 (10:20)

Accessibility to the health care	Frequency (n)	Percentage (%)
<b>Affordability</b>		
<b>Cost for cervical cancer screening</b>		
Yes	304	69.25
No	76	17.31
Don't know	59	13.44
<b>Affordability for the cervical cancer screening</b>		
Unaffordable	305	69.48
Affordable	106	24.15
Don't know	28	6.37
<b>Affordability for the HPV vaccination</b>		
Unaffordable	314	71.53
Affordable	96	21.87
Don't know	29	6.60
<b>Cost for transportation to the health facility<sup>¶</sup> (USD)</b>		
≤4.76	284	64.69
4.77 – 23.81	150	34.17
>23.81	5	1.14

Note: <sup>¶</sup>Collected as Myanmar Kyat (MMK) and converted into USD at the exchange rate of 2100 MMK for 1 USD.

### 3.4 Cervical cancer screening uptake among women in Myanmar

Among 439 participants, only 10.71% (95% CI: 8.13-13.97) had undergone cervical cancer screening, while 89.29% remained un-screened. Among those screened, Papanicolaou (Pap) smear was the predominant method (65.96%), followed by Visual Inspection with Acetic acid (VIA) (8.51%), though 25.53% were unaware of the screening method used. Screening services were most frequently accessed at public hospitals

(36.17%) and private hospitals (31.91%), with fewer participants utilizing Non-Government Organization (NGO) clinics (14.89%), private clinics (12.77%), and charity clinics (4.26%). The overwhelming majority of screened participants (89.36%) were screened only once, with minimal instances of multiple screenings. The financial burden of screening varied considerably, with costs ranging from 0.95 to 238.1 USD (mean: 39.05 ±68.55); median: 14.29) (Table 4).

Table 4: Cervical cancer screening uptake among women in Myanmar (n=439).

Characteristics	Frequency	Percentage	95% CI
<b>Uptake of cervical cancer screening</b>			
Yes	47	10.71	8.13 – 13.97
No	392	89.29	86.03 – 91.87
<b>Method of cervical cancer screening (n=47)</b>			
Pap smear	31	65.96	51.04 – 78.26
VIA	4	8.51	3.15 – 21.04
Don't know	12	25.53	14.89 – 40.20
<b>Place of cervical cancer screening (n=47)</b>			
Private hospital	15	31.91	19.98 – 46.81
Public hospital	17	36.17	23.52 – 51.08
NGO clinic	7	14.89	7.13 – 28.53

Characteristics	Frequency	Percentage	95% CI
Charity clinic	2	4.26	1.03 – 15.99
Private clinic	6	12.77	5.72 – 26.08
<b>Frequency of cervical cancer screening (n=47)</b>			
1 time	42	89.36	76.42 – 95.61
2 times	1	2.13	0.28 – 14.26
3 times	3	6.38	2.01 – 18.48
4 times	1	2.13	0.28 – 14.26
<b>Cost for cervical cancer screening (USD)<sup>¶</sup></b>			
Mean cost (±SD)		39.05 (±68.55)	
Median cost (Min:Max)		14.29 (0.95: 238.10)	

Note: <sup>¶</sup>Collected as MMK and converted into USD at the exchange rate of 2100 MMK per 1 USD.

### 3.5 Factors associated with cervical cancer screening uptake among women in Myanmar

Several factors were significantly associated with cervical cancer screening utilization among the study participants. In the crude analysis, higher educational attainment showed a positive association with screening utilization, with women having high school education and above demonstrating 3.5 folds higher odds of screening (COR=3.53, 95% CI: 1.32-9.42) compared to women with primary education or illiteracy. Women who were not using contraceptives had higher screening rates than current users (COR=2.12, 95% CI: 0.99-4.51). Participants who perceived themselves as unhealthy were more likely to undergo screening compared to those perceiving themselves as healthy (COR=2.40, 95% CI: 1.23-4.69). Health literacy significantly influenced screening behavior. Affordability was also a determinant, with women who considered screening

affordable having higher utilization (COR=2.38, 95% CI: 1.27-4.46).

Following bivariate analysis, factors described in Table 3 with P-value < 0.25 were considered for multiple logistic regression, after checking multicollinearity between them. After adjustment for potential confounders, place of residence remained significantly associated with screening, with women from semi-urban and rural areas having 2.45 times higher odds of screening than urban residents (AOR=2.45, 95% CI: 1.34-5.25). The presence of chronic illness increased the likelihood of enhancing screening behavior (AOR=4.25, 95% CI: 2.15-8.41). Health system factors that remained significant in the adjusted analysis included having received information about cervical cancer (AOR=2.75, 95% CI: 1.28-5.85), prior HPV vaccination (AOR=2.16, 95% CI: 1.10-4.27), and reported availability of screening services (AOR=2.07, 95% CI: 1.05-4.10) (Table 5).

Table 5: Factors associated with uptake of cervical cancer screening by simple logistic regression (n=439).

Factors	Number of samples	CCSU		COR (95% CI)	P-value <sup>a</sup>	AOR (95% CI)	P-value <sup>b</sup>
		n	%				
<b>Sociodemographic characteristics</b>							
<b>Age (years)</b>							
30-39	166	16	9.64	1	0.850		
40-49	133	15	11.28	1.19			-
50-59	140	16	11.43	1.21 (0.58 – 2.52)			-
<b>Ethnicity</b>							
Bamar	380	40	10.53	1	0.760		
Other	59	7	11.86	1.14 (0.49 – 2.69)			-
<b>Marital status</b>							
Married	345	32	9.28	1	0.075		
Widow/separated/divorced	94	15	15.96	1.86 (0.96 – 3.59)			-
<b>Highest educational attainment</b>							
Illiterate & primary	103	5	4.85	1	0.013		
Middle school	146	13	8.90	1.92 (0.66 – 5.55)			-
High school & above	190	29	15.26	3.53 (1.32 – 9.42)			-
<b>Occupation</b>							
Other	102	10	9.80	1	0.520		
Dependent/housewife	200	25	12.50	1.31 (0.61 – 2.85)			-
Own business	137	12	8.76	0.88 (0.37 – 2.13)			-
<b>Place of residence</b>							
Urban	277	37	13.36	1	0.022	1	0.022
Semi-urban & rural	162	10	6.17	2.34 (1.13 – 4.85)			
<b>Monthly household income (n=432)</b>							
47.62 – 142.86	168	17	10.12	1	0.414		
142.87 – 238.09	130	11	8.46	0.82 (0.37 – 1.82)			-
>238.09	134	18	13.43	1.38 (0.68 – 2.79)			-
<b>Monthly household expense (n=433)</b>							
47.62 – 142.86	170	15	8.82	1	0.327		
142.87 – 238.09	152	15	9.87	1.13 (0.53 – 2.39)			-
>238.09	111	16	14.41	1.74 (0.82 – 3.68)			-
<b>Reproductive health related factors</b>							
<b>Status of menstruation</b>							
Premenopausal	274	26	9.49	1	0.292		
Postmenopausal	165	21	12.73	1.39 (0.76 – 2.56)			



Factors	Number of samples	CCSU		COR (95% CI)	P-value <sup>a</sup>	AOR (95% CI)	P-value <sup>b</sup>
		n	%				
<b>Age at the time of first sexual exposure (years)</b>	N/A	N/A	N/A	0.97 (0.90 – 1.03)	0.324	-	
<b>Age at the time of first childbirth</b>	N/A	N/A	N/A	0.98 (0.94 – 1.02)	0.334	-	
<b>Number of children</b>					0.653		
>2	153	15	9.80	1			
0-2	286	32	11.19	1.16 (0.61 – 2.21)		-	
<b>Currently using contraceptives</b>					0.039		
Yes	140	9	6.43	1			
No	299	38	12.71	2.12 (0.99 – 4.51)		-	
<b>Physical health factors</b>							
<b>Perceived health status</b>					0.014		
Healthy	360	32	8.89	1			
Unhealthy	79	15	18.99	2.40 (1.23 – 4.69)		-	
<b>Acute illness</b>					0.685		
No	382	40	10.47	1			
Yes	57	7	12.28	1.19 (0.51 – 2.82)		-	
<b>Chronic illness</b>					<0.001		<0.001
No	331	25	7.55	1		1	
Yes	108	22	20.37	3.13 (1.68 – 5.83)		4.25 (2.15 – 8.41)	
<b>Health literacy</b>					0.026		
Inadequate	64	2	3.12	1			
Problematic	228	31	13.60	4.88 (1.14 – 20.97)		-	
Adequate to excellence	147	14	9.52	3.26 (0.72 – 14.80)		-	
<b>Knowledge on cervical cancer</b>					0.768		
Low	217	21	9.68	1			
Average	132	16	12.12	1.29 (0.65 – 2.57)		-	
High	90	10	11.11	1.17 (0.53 – 2.59)		-	
<b>Attitude</b>					0.943		
Poor to moderate	222	24	10.81	1			
Good	217	23	10.60	0.98 (0.53 – 1.79)		-	
<b>Access to health care factors</b>							
<b>Accessibility</b>							
<b>Common place of health services seeks for mild to moderate illness</b>					0.785		
Drug store	195	20	10.26	1			
Health facilities	244	27	11.07	1.09 (0.59 – 2.01)		-	



Factors	Number of samples	CCSU		COR (95% CI)	P-value <sup>a</sup>	AOR (95% CI)	P-value <sup>b</sup>
		n	%				
<b>Common place of health services seeks for critical illness</b>					0.864		
Private clinic	220	23	10.45	1			
Government & other facilities	219	24	10.96	1.05 (0.58 – 1.93)		-	
<b>Ever got information about cervical cancer</b>					0.002		0.010
No	189	10	5.29	1		1	
Yes	250	37	14.80	3.11 (1.50 – 6.43)		2.75 (1.28 – 5.85)	
<b>Ever received HPV vaccination</b>							0.027
No	287	22	7.67	1		1	
Yes	152	25	16.45	2.37 (1.29 – 4.36)		2.16 (1.10 – 4.27)	
<b>Availability of nearest health facility</b>							
<b>Opening hours of health facility</b>					0.877		
Convenient	386	41	10.62	1			
Inconvenient	53	6	11.32	1.07 (0.43 – 2.27)		-	
<b>Availability of cervical cancer screening</b>					0.003		0.036
Unavailable and don't know	275	20	7.27	1		1	
Available	164	27	16.46	2.51 (1.36 – 4.64)		2.07 (1.05 – 4.10)	
<b>Waiting hour at the facility</b>					0.678		
< 30 minutes	152	15	9.87	1			
≥30 minutes	287	32	11.15	1.15 (0.59 – 2.19)		-	
<b>Accommodation of health services</b>							
<b>Distance between home to nearest health facility (miles)</b>					0.591		
0-5	333	34	10.21	1			
>5	106	13	12.26	1.23 (0.62 – 2.43)		-	
<b>Presence of medical doctor</b>					0.542		
No	129	12	9.30	1			
Yes	219	27	12.33	1.37 (0.67 – 2.81)		-	
Don't know	91	8	8.79	0.94 (0.37 – 2.40)		-	
<b>Acceptability to cervical cancer screening services</b>					0.639		
Poor to moderate	66	6	9.09	1			
High	373	41	10.99	1.24 (0.50 – 3.04)		-	
<b>Affordability</b>							
<b>Affordability for the cervical cancer screening</b>					0.007		
Unaffordable & don't know	333	28	8.41	1			
Affordable	106	19	17.92	2.38 (1.27 – 4.46)		-	

Factors	Number of samples	CCSU		COR (95% CI)	P-value <sup>a</sup>	AOR (95% CI)	P-value <sup>b</sup>
		n	%				
<b>Cost for transportation to the health facility (USD)</b>					0.604		
>4.76	155	15	9.68	1			
≤4.76	284	32	11.27	1.19		-	
				(0.62 – 2.26)			

Note: CCSU = Cervical cancer screening uptake, <sup>a</sup>P-value from simple logistic regression, <sup>b</sup>P-value from multiple logistic regression

#### 4. Discussion

This study identified key determinants of cervical cancer screening utilization (CCSU) among women in Yangon, highlighting missed opportunities for prevention in Myanmar. Screening prevalence was 10.71%, far below the WHO’s 70% target by 2030 [13], emphasizing a critical gap. The majority underwent Pap smears (65.96%), with low use of VIA (8.51%), possibly reflecting limited provider training, resources, or low community acceptance of alternatives. Over a quarter (25.53%) of screened women were unaware of their test type, revealing deficits in patient-provider communication and health literacy.

National cervical cancer screening was only introduced in Myanmar in 2019 [6] and rollout has been challenged by the COVID-19 pandemic and political instability, which reduced service availability and drove women to private or NGO facilities. Approximately 70% paid out of pocket for screening, with cost cited as a barrier. Despite high acceptability, 43% had no access to screening

or HPV vaccination at their closest facility. These structural barriers mirror those seen in other LMICs, where underfunding and inequitable health service delivery limit preventive care [7, 8].

Educational attainment was strongly linked with screening; women with at least high school education were 3.5 times more likely to participate, consistent with global trends [13]. In Myanmar, formal sexual health education is limited, and cultural taboos persist, so better-educated women likely have greater health literacy, system navigation skills, and confidence to access care. Less-educated women may lack awareness, face stigma, or defer preventive health due to family and social constraints. Public health interventions should therefore employ community-based peer educators and trusted female health workers to reach lower-education groups and address deeply rooted cultural barriers.

Geographical disparities were evident: despite the urban setting, many participants faced access barriers common in peri-urban or informal urban settlements [7, 8, 14, 15].



In Myanmar, even within urban centers, underserved informal settlements may have very limited health information or access to government campaigns. Simultaneously, peri-urban and rural programs occasionally benefit from targeted NGO or donor investment, particularly when linked to maternal or child health initiatives. Therefore, screening programs must expand beyond central hospitals to target urban poor and peripheral communities, using mobile clinics and community health workers. Women with chronic illness were significantly more likely to be screened, suggesting that routine contact with healthcare providers can facilitate preventive care. Women who had already seeking care for chronic conditions likely to have more frequent contact with health providers, increasing the opportunity for screening recommendations [16]. This highlights an actionable opportunity: integrating cervical cancer screening into chronic disease management (e.g., non-communicable diseases [NCD] clinics or regular medication review appointments) could capitalize on existing care pathways and health-seeking patterns, at little additional cost.

Health literacy was associated with cervical cancer screening uptake. Women with problematic but not inadequate health literacy had

nearly five times higher screening odds than those with very low literacy. Health literacy encompasses more than health knowledge [17]; it is linked to health outcomes [18, 19] and is influenced by knowledge and attitudes [20, 21]. In Myanmar, factors such as diverse languages and limited access to formal health education increase the risk of misunderstandings about reproductive health and screening, especially among marginalized groups. Misinformation from social networks and unfamiliar health campaign terminology can further impede understanding. Therefore, interventions should prioritize culturally relevant, linguistically tailored messaging through trusted channels like women's groups, radio, Facebook, or community leaders. Although health literacy was not significant in the adjusted model, its crude association suggests potential interaction with factors such as education and healthcare access.

Health system factors, particularly the receipt of cervical cancer information, strongly predicted screening uptake, reaffirming the power of provider communication and public awareness. Prior HPV vaccination was also associated with increased screening, possibly indicating higher engagement with preventive services or stronger provider recommendations, as supported by global meta-

analyses [22]. Availability of services further confirmed that infrastructure matters: even high motivation cannot translate into action without accessible facilities [27]. Notably, although affordability was no longer significant after adjustment, it remains an important contextual barrier: public-sector services may not be available, or women may perceive private care as higher quality, driving up out-of-pocket costs. All these suggest the need for sustainable service delivery in Myanmar even during instability and considering training to all levels of staff to deliver clear, consistent information about screening options.

This study identified key factors affecting cervical cancer screening in our population, with important implications for prevention. Integrating screening into chronic disease management could reach women with frequent healthcare visits who might otherwise miss screening. Targeted educational interventions addressing health literacy, especially for women with lower education, are needed to support informed preventive care choices. Policies should ensure equitable screening access, particularly in urban areas where utilization is unexpectedly low even though potential better health care access than rural or semi-urban areas. Addressing these factors through comprehensive

strategies can reduce screening barriers and help lower cervical cancer rates.

Our study was the first to examine CCSU determinants in Yangon and highlight pathways for future program development. Its limitations included a focus on Yangon, possible recall bias, and cross-sectional design precluding causal inference. Longitudinal studies and qualitative research are needed to further explore barriers and facilitators in diverse regions.

Despite these limitations, our results offer practical, culturally informed strategies for policy makers and public health practitioners aiming to improve cervical cancer prevention for Myanmar women.

## **5. Conclusion**

This study discovered critically low uptake of cervical cancer screening among Myanmar women compared to the global target, putting them at risk of cervical cancer and its consequences. The factors substantially linked with cervical cancer screening utilization included place of residency, chronic illness condition, receipt of health information about cervical cancer, HPV vaccination status, and availability of screening services. Implementing integrated screening within chronic disease management, developing targeted educational campaigns to improve health

literacy among vulnerable groups, expanding service availability for equitable access, and establishing a comprehensive national cervical cancer prevention strategy that addresses both systemic barriers and individual determinants may help increase screening coverage, reduce disease burden, and advance progress toward cervical cancer elimination in Myanmar

### Acknowledgement

We thank the Faculty of Public Health, Khon Kaen University for technical support and Community Partner International for scholarship.

### Author Contribution

SHL and WMT contributed to the study conception and design, data collection, data analysis, and manuscript drafting. CS contributed to study supervision, critical revision of the manuscript, and final approval

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of the version to be published. All authors read and approved the final manuscript.

### Declaration

### Ethics approval and consent to participate

This study was approved by the Khon Kaen University Ethics Committee (ref. HE672196). Participants were fully informed about the study and their rights, including voluntary participation and withdrawal without penalty. Informed consent was obtained, and confidentiality was strictly maintained with no personal identifiers in reports. Ethical principles protecting privacy, autonomy, and dignity were upheld throughout.

### Competing interests

There are no conflicts of interest in this study.

### Funding

Not applicable.

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Received 17/05/2025

Received in revised form 19/06/2025

Accepted 19/06/2025



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