

## RESEARCH ARTICLE

# Screening attendance of breast or cervical cancers and its associated factors among 30–49 year old women in Gedeo zone, South Ethiopia: Cross-sectional study

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## Abstract

### Introduction

Breast and cervical cancers are the most frequent and fatal cancers among women. Thus, early detection is necessary to improve the prognosis of affected women. However, in Ethiopia, the rates of screening remain alarmingly low.

### Objective

To assess the magnitude of screening attendance for breast or cervical cancer, as well as the factors that predict it, among women aged 30–49 years old in Gedeo Zone, South Ethiopia, in 2023.

### Method

A community-based cross-sectional study was conducted using a multi-stage cluster sampling technique. Data were collected using pretested, structured questionnaires by trained interviewers. Univariate and multivariate logistic regression models were employed to identify factors associated with screening attendance.

following link: [https://figshare.com/articles/dataset/Dataset\\_sav/27885822?file=50697831](https://figshare.com/articles/dataset/Dataset_sav/27885822?file=50697831).

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## Results

A total of 554 women participated in the study. Of them, 132 (23.8%) were screened for breast or cervical cancer. Higher age of 40–44 versus 45–49 years (adjusted odds ratio [AOR] 4.18 [95% CI 1.59, 10.9]), higher education status ([AOR] 5.49 [95% CI 2.01, 13.1]), having family or a friend with history of breast or cervical cancer ([AOR] 5.55 [95% CI 2.47, 12.5]), short anticipated time to seek help ([AOR] 4.66 [1.31, 11.7]), adequate health literacy ([AOR] 6.98 [95% CI 2.82, 13.3]) and high self-efficacy ([AOR] 2.32 [95% CI 1.08, 4.96]) were positive factors with higher screening attendance. High response cost ([AOR] 0.19 [95% CI 0.08, 0.50]) was a negative factor and associated with lower screening attendance.

## Conclusion and recommendation

The study found that only one in four women attended breast or cervical cancer screening. Screening uptake was better in women with higher education, health literacy, self-efficacy, and older age—similar to factors associated with other health seeking behavior. Interestingly, history of breast or cervical cancer in a friend or relative was also associated with higher uptake. This indicates that in addition to awareness campaigns, personal testimonials of survivors could encourage women to visit screening facilities.

## Introduction

Globally, breast and cervical cancers (BCC) were the two most common cancers diagnosed in women [1]. In 2022, breast cancer was the first and cervical cancer the eighth most diagnosed cancers worldwide, with an estimated number of 2.3 million and 661,021 new cases, while in terms of mortality, these cancers ranked fourth and ninth, with 665,684 and 348,189 deaths in women, respectively [2]. Among African women, in 2020 BCC were the most commonly diagnosed and leading cause of cancer death, with an estimated number of 186,598 new cases and 85,787 deaths for breast cancer and 117,316 new cases and 76,745 deaths for cervical cancer [3]. In Ethiopia in 2019, the leading incident cases and cancer-related mortality in females were cervical cancer (6570 cases, 3870 deaths) and breast cancer (5450 cases, 3700 deaths) [4].

Cancer screening is a secondary prevention strategy that aims for early detection, diagnosis, and treatment. Studies show that early detection of breast cancer through screening activities combined with appropriate treatment may reduce mortality rates due to breast cancer by 25–30% [5], while visual inspection with acetic acid (VIA) reduced the incidence and mortality of cervical cancer by at least 25% [6]. The Ethiopian National Cancer Control Plan recommends clinical breast examinations for women over 18 visiting health institutions and emphasizes promoting breast self-awareness for women at risk. It also recommends population-based cervical cancer screening using VIA for all women aged 30–49 every 5 years [7].

Cancer screening rates are very low in developing countries [8]. Despite efforts to improve access to screening services from governmental and non-governmental organizations in Ethiopia, utilization has not been raised. The national median prevalence of cervical cancer screening was 14.79% [9] and the rate of breast cancer screening ranges between 6.9% [10] and 20.8% [11]. Different studies have documented factors associated with BCC screening utilization worldwide, including the age of the woman, risk perception, financial constraints, marital status, and parity, with a wide variability between studies [12, 13].

In Ethiopia, various studies have indicated low screening attendance, with rates reported at below 30%. These studies have also identified several factors that influence the rate of screening attendance [14–16]. None of these studies have investigated both cancers simultaneously and associated factors using protection motivation theory (PMT). PMT is a theory developed by Rogers in 1975 based on the theory of value expectation to explain: 1) the effects of fear on health attitudes and behaviors, and 2) the effects of fear motivation have a significant impact on behavior choice [17]. By incorporating this theory, our study aims to fill the current knowledge gap by examining factors influencing attendance of breast and cervical cancer screenings in the Gedeo zone, Southern Ethiopia.

This study is the first critical step to improve cancer early detection and aims to fill the gap by assessing the magnitude of screening attendance for breast and cervical cancer and their predictors among women aged 30–49 years old in Gedeo zone, South Ethiopia.

## Methods and materials

The study was conducted in the Gedeo zone, which is located in southern Ethiopia. The zone had eight districts and five towns, with Dilla town as the administrative capital, which is located 359 km from the capital city, Addis Ababa. In 2021, the total population of the zone was 1,247,812, with an estimated crude population density of 774 persons per square kilometer. Gedeo Zone has one teaching hospital, three primary hospitals, 38 health centers, and 146 health posts. Among the health institutions presented in the zones, eight (one teaching hospital, two primary hospitals, and five health centers) provided screening services (source: Gedeo Zonal Health Department).

## Study design, period and population

A community-based cross-sectional study was completed from 29/04/2023 to 28/05/2023. All women of 30–49 years of age living in the Gedeo zone were the source population. For this study, randomly selected women between 30–49 years of age living for at least 6 months in the selected catchment Kebele (neighborhood) with available screening service during the study period who were willing to participate were included in the study. Those who were unable to respond or diagnosed with BCC during the data collection period were excluded.

## Sample size and sampling technique

A single population proportion formula was used to calculate the sample size by considering the following assumptions: The population proportion of cervical cancer screening practice from a previously study would be 22.9% [18] with a 5% margin of error and a 95% confidence level.

Therefore, by using the formula,

$$n = (Z\alpha/2)^2 p(1 - p)/d^2$$

Where:  $n$  = sample size required;  $\alpha$  = level of significance (set at 0.05);  $Z\alpha/2$  = a standardized normal test with  $\alpha$  level of significance. It is equivalent to 1.96 with the corresponding 95% confidence interval;  $d$  = margin of error;  $p$  = proportion

Due to multistage sampling of study participants, a design effect of 1.5% and 10% non-response were considered, and the sample size was determined to be 596.

A multi stage cluster sampling technique was used to select the participants. Accordingly, all five-health centers that had screening services were taken as a cluster. Then, 30% of the catchment Kebele (the smallest administrative unit next to a district in Ethiopia) was selected

by a simple random sampling technique from each health center. We assumed that 30% would be a representative proportion. The sample was allocated proportionally, based on the number of households. To obtain the sampling interval (Kth-value), the number of households in each team was divided by the allocated sample for that specific Kebele. Then the starting household was selected randomly, and the next household was selected systematically for every Kth-value. Finally, an eligible participant from each household was interviewed. In households with more than one eligible participant, one was randomly selected using a lottery method. If an eligible participant was not available at the time of data collection, a revisit was made three times.

### Data collection

A structured questionnaire was adopted from different literature [9, 10, 19–23]. The questionnaire was first developed in English, then it was translated to Amharic and Gedeofa and re-translated back in to English by language experts to assure its consistency. Surveys were prepared in the Kobo Collect app. The tool had six parts, including socio-demographic factors (6 items), questions on BCC screening attendance (2 items), BCC health literacy (12 items), reproductive factors (3 items), behavioral factors (18 items), and protection motivation theory constructs (17 items). The validated tools were used to measure health literacy assessed by twelve (12) items using a five point Likert type scale [20]. The 15 items related to symptom knowledge of breast and cervical cancer had three response options (Yes, No, Don't Know). Finally, yes (correct response) was given "1" point and no/don't know (incorrect) was given "0" a maximum of 15 points could be scored [19], and sub constructs of protection motivation theory such as perceived risk by two items, perceived severity by three items, fear arousal by two items, response efficacy by three items, response cost by three items, and self-efficacy by four items [23]. Data was collected by face-to-face interviews. Before data collection, a two day training was given for data collectors by the principal investigator regarding the purpose of the study, contents of questionnaires, method of data collection, and confidentiality and privacy. Questionnaires were pre-tested among 30 participants (5% of total) to check that they were clear, understandable and interpreted as intended. During data collection time, close supervision and monitoring were carried out by the investigator to ensure the quality of the data. Daily evaluation of the data for completeness and any encountered difficulties at the time of data collection was recorded.

### Operational definitions

- Women who had been screened either for cervical cancer, breast cancer, or for both were considered to have "screening attendance" of BCC [24].
- Women who responded to the health literacy related question and scored the median value or above were considered to have adequate health literacy.
- From a total of 15 knowledge-related questions, participants responding less than 50% correct, were categorized as having poor knowledge and greater than 50% as having good knowledge.
- Women who reported seeking health care for potential symptoms of BCC for less than one week were considered to have a short anticipated time to seek help [25].
- Perceived risk refers to an individual's subjective judgment of the possibility of getting breast or cervical cancer. Perceived severity refers to personal subjective judgment of negative consequences from breast and cervical cancer. Fear arousal refers to an individual's

worry or concern about being affected by BCC. Response efficacy refers to an individual's judgment of the effectiveness of the early detection and treatment of BCC. Response cost referred to an individual's subjective assessment of the costs associated with participating in BCC screening. Self-efficacy refers to individuals' belief in their capabilities and confidence to engage in BCC screening. After a total score was computed for each sub-construct, subjects were dichotomized using the mean score into high (who scored mean or above) and low (who scored below mean) [23].

## Data analysis

IBM SPSS version 25.0 was used for statistical analysis. The data were imported to SPSS from the Kobo Collect app, then recoded, checked, and cleaned. Then, to categorize variables, the distribution was checked. The characteristics of categorical variables were described by a chart and frequency table with frequencies and percentages.

Univariate and multivariate logistic regression analyses were used to identify factors associated with screening attendance towards breast and cervical cancer. In univariate logistic regression analysis, variables fitted at  $p$ -value  $\leq 0.25$  were entered into multivariate logistic regression after multicollinearity was assessed using a histogram. Finally, multivariate logistic regression analysis was performed, and a  $p$ -value of less than 0.05 was considered a strong predictor variable for screening attendance of two female cancers. The model's fitness was checked using Hosmer-Lemeshow goodness-of-fit tests.

## Ethical issues

The study was approved by Hawassa University College of Medicine and Health Sciences Institutional Review Board (IRB) with reference number IRB/293/15. After discussion and explanation about the purpose of the study, written informed consent was obtained from individual study participants just for the actual data collection. They were notified there was no harm in their participation in this study, and they have the right to refuse or terminate at any point of the interview. Confidentiality was assured by making the data collection procedure anonymous.

## Results

### Socio demographic characteristics

Out of 596 selected households in the study, 554 eligible women participated, yielding a response rate of 92.9%. Of the study participants, 41.7% were between 30 and 34 years of age, and 67.5% were from urban areas. The majority of respondents (78.7%) were married. In terms of educational level, more than half of the participants (59.6%) had primary education or below. The majority of participants (41.9%) had an average family monthly income between 1501 and 3000 Ethiopian Birr ([Table 1](#)).

### Reproductive and behavioral characteristics

A total of 405 (73.1%) of participants responded that they visited health care facilities (pharmacy, clinic, or health center or hospital) with a duration of less than one week, while 3.8% responded that they never visit to seek help for a potential symptom of BCC. The remaining 23.1% responded that they visited a health care facility within a period of one week or greater. Regarding contraceptive usage, 79.8% of women had ever used contraceptives, and 11.4% had no children. Nearly half of participants (49.1%) rated their health status as good; 31% had a family or friend history of BCC ([Table 2](#)).

**Table 1. Socio-demographic characteristics of women in Gedeo zone, South Ethiopia, 2023 (N = 554).**

Variable	Total (N = 554)	Screening Attendance (%)	
		Yes	No
Age in years (%)			
30–34	231(41.7)	40(30.3%)	191 (45.3%)
35–39	135 (24.4)	22(16.7%)	113 (26.8%)
40–44	70 (12.6)	26(19.7%)	44 (10.4%)
45–49	118 (21.3)	44(33.3%)	74 (17.5%)
Residence (%)			
Urban	374 (67.5)	90 (68.2%)	284 (67.3%)
Rural	180 (32.5)	42 (31.8%)	138 (32.7%)
Marital status (%)			
Divorced/widowed	62 (11.2)	24 (18.2%)	38 (9%)
Single	56 (10.1)	16 (12.1%)	40 (9.5%)
Married	436 (78.7)	92 (69.7%)	344 (81.5%)
Education status (%)			
Primary education or below	330 (59.6)	32 (24.2)	298 (70.6%)
Secondary education	104 (18.8)	58 (48.3%)	62 (14.7%)
College and above	120 (21.7)	42 (31.8%)	62 (14.7%)
Employment status (%)			
Housewife	191 (34.5)	18 (13.6%)	173 (41%)
Daily labor	105 (19)	42 (31.8)	63 (14.9%)
Merchant	70 (12.6)	22 (16.7%)	48 (11.4%)
Private/non-government employee	101 (18.2)	7 (5.3%)	94 (22.3%)
Governmental-employee	87 (15.7)	43 (32.6%)	44 (10.4%)
Income (%)			
≤1500 Birr	141(25.5%)	10 (7.6%)	131(31%)
1501–3000 Birr	232 (41.9%)	37(28%)	195(46.2%)
≥3001 Birr	181(32.7%)	85(64.4%)	96(22.7%)

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### Knowledge related to symptom of BCC

Regarding their knowledge related symptom of BCC from 15 knowledge-related questions, only 30 (5.4%) of participants responded 50% or greater correct answers (had good knowledge), their mean level of knowledge was  $1.75 \pm 2.98$  with minimum and maximum values of 0 and 15, respectively. More than half of the study participants knew that persistent smelly vaginal discharge and only ten percent of participants knew that lumps or thickening in the breast were related to cervical and breast cancer symptoms, respectively (**Table 3**).

A total of 65.2% of participants used mass media (television or radio) as the most commonly used source of health-related information; others named health care providers (30.5%), relatives (6.3%), or friends (12.6%). Only 13.2% of participants named more than one source of information (**Fig 1**).

A total of 45.8% of study participants had a high perceived risk of BCC, and 314 (56.7%) of them had a high perceived severity. A total of 43% of participants had low self-efficacy, and about half of the study participants (50.9%) had a high response cost (**Table 4**).

### Screening attendance and associated factors

Among the total participants, only 132 (23.8%; 95% CI 20% to 27%) had screening attendance for the two-female cancers (screened either for breast or cervical or for both of them). This



**Table 2. Reproductive and behavioral characteristics of women in Gedeo zone, South Ethiopia, 2023 (N = 554).**

Variables	Total (N = 554)	Screening Attendance (%)	
		Yes	No
Number of children			
No	63 (11.4%)	27 (49.2%)	36 (57.1%)
1–2	164 (29.6%)	49 (29.9%)	115 (70.1%)
3–4	189 (34.1%)	28 (14.8%)	161 (81.9%)
>4	138 (24.9%)	28 (20.3%)	110 (79.7%)
Ever used contraceptive			
No	112 (20.2%)	24 (21.4%)	88 (78.6%)
Yes	442 (79.8%)	108(24.4%)	334 (75.6%)
Self-rated health status			
Poor	282 (50.9%)	36 (12.8%)	246 (87.2%)
Good	272 (49.1%)	176 (64.7%)	96 (35.3%)
Family/friend history of BC/CC			
No	382 (69%)	85 (22.3%)	297 (77.7%)
Yes	172 (31%)	125 (72.7%)	47 (27.3%)
Anticipated time to visit health facility			
Long	149 (26.9%)	7 (4.7%)	142 (95.3%)
Short	405 (73.1%)	125 (30.9%)	280 (69.1%)

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screening attendance was increased with age, in women having family or friend history of BCC, short anticipated time to seek help, women with adequate health literacy, high educational status, high self-efficacy, and low response cost (**Fig 2**).

The odds of screening attendance increased with age: odds were higher among women ages 45–49 years ([AOR] 4.18; [95% CI 1.59 to 10.9]) compared to women ages between 30–34 years. Women having college and above educational status reported higher attendance in comparison with those with primary education and below ([AOR] 5.49; [95% CI 2.01 to 13.1]). Women who had a family history or friend with breast or cervical cancer had higher odds ([AOR] 5.55; [95% CI 2.47 to 12.5]). Similarly, women who had a short anticipated time to seek help had higher odds of screening as compared to those with a long anticipated time ([AOR] 4.66; [95% CI 1.31 to 11.7]). Women who had adequate or sufficient health literacy and high self-efficacy had higher odds for screening attendance ([AOR 6.98]; [95% CI 2.82 to 13.3] and ([AOR] 2.32 [95% CI 1.08 to 4.96]) in comparison to those with inadequate and low self-efficacy, respectively.

Screening attendance decreased by 81% among women who had a higher response cost in comparison to those with low response cost ([AOR] 0.19; [95% CI 0.08 to 0.50]) (**Table 5**).

## Discussion

The aim of this community-based cross-sectional study was to assess screening attendance of breast or cervical cancer among women aged 30–49 years in Gedeo Zone, southern Ethiopia. The findings provide valuable insights into the current state of cancer screening behavior and identify factors associated with screening attendance.

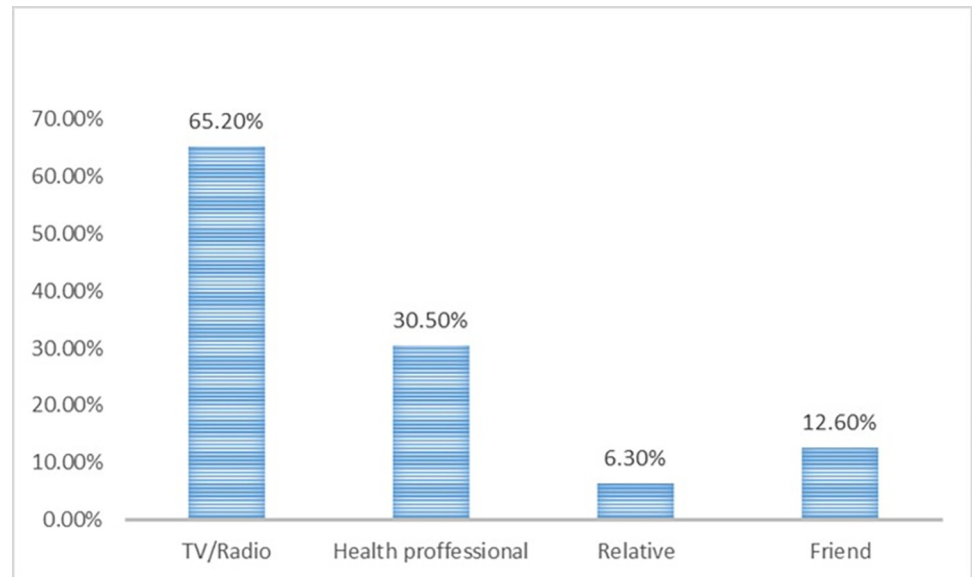
In the current study, the overall screening rate for at least one of the two most frequent female cancers (breast, cervical, or both) was 23.8%. This low screening attendance highlights the urgent need for information campaigns and educational initiatives to highlight the benefits of early detection. This finding is lower in comparison to studies conducted in China (two studies: 40.6%) [26] and 39.1% [24]). This might be due to the difference in screening program

Table 3. Frequency of knowledge related to symptoms of breast and cervical cancer among women in Gedeo zone, south Ethiopia 2023 (N = 554).

Symptoms of breast cancer	Category	Frequency	Percentage (%)
Change in the size of the nipple	Yes	112	20.2
	No	138	24.9
	I Don't know	304	54.9
Change in the shape of the nipple	Yes	102	18.4
	No	126	22.7
	I Don't know	326	58.8
Nipple rash	Yes	86	15.5
	No	141	25.5
	I Don't know	327	59
Discharge from the nipple	Yes	136	24.5
	No	139	25.1
	I Don't know	279	50.4
Bleeding from the nipple	Yes	157	28.3
	No	95	17.1
	I Don't know	302	54.5
Lump or thickening in the breast	Yes	54	9.7
	No	119	21.5
	I Don't know	381	68.8
Symptoms of cervical cancers	Category	Frequency	Percentage (%)
Vaginal bleeding between menstrual periods	Yes	30	5.4
	No	171	30.9
	I Don't know	353	63.7
Persistent lower back pain	Yes	14	2.5
	No	135	24.4
	I Don't know	405	73.1
Persistent smelly vaginal discharge	Yes	352	63.5
	No	86	15.5
	I Don't know	116	20.9
Discomfort or pain during sex	Yes	26	4.7
	No	161	29.1
	I Don't know	367	66.2
Menstrual periods that are longer or heavier than usual	Yes	18	3.2
	No	151	27.3
	I Don't know	385	69.5
Persistent lower abdominal or pelvic pain	Yes	32	5.8
	No	167	30.1
	I Don't know	355	64.1
Vaginal bleeding during or after sex	Yes	51	9.2
	No	118	21.3
	I Don't know	385	69.5
Unexplained weight loss	Yes	11	2
	No	219	39.5
	I Don't know	324	58.5
Itching in the vagina	Yes	26	4.7
	No	194	35
	I Don't know	334	60.3
Knowledge	Good	30	5.4
	Poor	524	94.6

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**Fig 1. Health related information source of women in Gedeo zone, south Ethiopia, 2023.**

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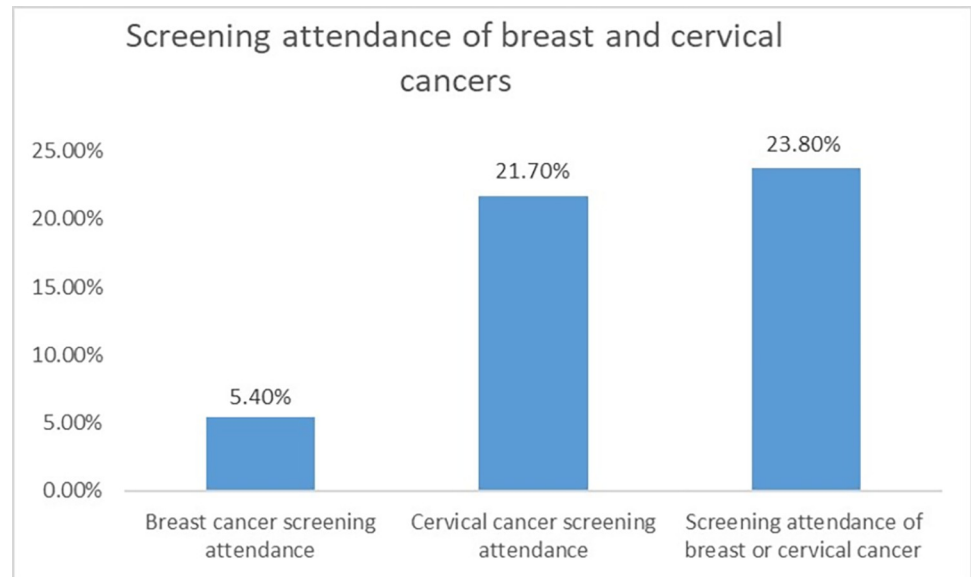
policy, in which there is an organized screening program for two female cancers in China. Organized screening programs may enable early detection of breast and cervical cancers. Therefore, in Ethiopia, integrating the existing national program of breast cancer screening with cervical cancer screening may be an approach worth exploring for implementation.

Age was found to be associated with BCC screening attendances, which revealed that 45–49 year old women had higher odds of screening attendance than those aged 30–34. This finding is supported by previously conducted studies in Ethiopia [15, 27]. The possible explanation for

**Table 4. Study participant response towards protection motivation theory sub constructs in Gedeo zone, South Ethiopia, 2023 (N = 554).**

Theory Sub construct	Mean ± SD	Total (%)	Screening attendance	
			Yes	No
<b>Perceived risk</b>	<b>6.5±2.8</b>			
Low		300 (54.2%)	97 (32.3%)	203 (67.7%)
High		254 (45.8%)	35 (13.8%)	219 (86.2%)
<b>Perceived severity</b>	<b>12.7±2.5</b>			
Low		240 (43.3%)	59 (24.6%)	181 (75.4%)
High		314 (56.7%)	73 (23.2%)	241 (76.8%)
<b>Fear arousal</b>	<b>5.9±3.34</b>			
Low		256 (46.2%)	88 (34.8%)	168 (65.6%)
High		298 (53.8%)	44 (14.6%)	254 (85.2%)
<b>Response efficacy</b>	<b>10.8±2.6</b>			
Low		187 (33.8%)	35 (18.7%)	152 (81.3%)
High		367 (66.2%)	97 (6.4%)	270 (73.6%)
<b>Response cost</b>	<b>8.9±4.5</b>			
Low		272 (49.1%)	118 (43.4%)	154 (56.6%)
High		282 (50.9%)	14 (5%)	268 (95%)
<b>Self-efficacy</b>	<b>14.5±4.5</b>			
Low		238 (43%)	41 (17.2%)	197 (82.8%)
High		316 (57%)	91 (28.8%)	225 (71.2%)

<https://doi.org/10.1371/journal.pone.0315891.t004>



**Fig 2. Breast and cervical cancer screening attendance of women in Gedeo zone, South Ethiopia, 2023 (N = 554).**

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this could be that Ethiopian National Cancer Control Plan guidelines support the beginning of screenings at an earlier age [7]. In addition to this, it might be that as age advances, women are believed to have increased risk factors and are more likely to approach health care facilities for different types of reproductive morbidities, which is a practice called opportunistic screening.

This study found that women with higher educational levels had higher screening attendance for BCC. Participants with college and above education levels had five times higher odds of screening attendance compared to those with primary education and below. The finding was consistent with previously conducted studies in other parts of Ethiopia [11, 14] or other countries such as China [26]. Similarly, analysis of WHO studies also showed that higher educational levels significantly improve screening rates in low and middle income countries [28]. Educated women are more likely to have a good understanding of the burden of cancer related disease and its early detection methods.

The study revealed that women with high response costs were less likely to attend screenings of BCC. This indicates that a reduced response cost could facilitate women's engagement in screening and align with a study conducted in Iran [29]. Thus, effective measures should be taken to reduce women's response costs for screening, such as protecting their privacy and giving appropriate advice regarding the two female cancer health practices to reduce their negative feelings.

Having family or friends with breast or cervical cancer increased screening attendance for these female cancers. Previously conducted studies in other parts of Ethiopia and China reported similar associations [11, 23]. A family or friend history of breast or cervical cancer increases awareness and knowledge of the risk of female cancers and accordingly improves their health-seeking behavior. Awareness campaigns can include survivors or relatives giving testimonials to showcase individual stories, encouraging a population that usually considers cancer a death sentence.

Participants who had a short anticipated time to seek help were more likely to have increased odds of screening attendance. In our study, 73.1% of participants had short anticipated time to seek help for possible breast and cervical cancer symptoms; however, only 5.4% of them had good knowledge regarding cancer symptoms. This finding may indicate that to

Table 5. Factors associated with screening attendance of breast and cervical cancer among women in Gedeo zone, South Ethiopia, 2023 (N = 554).

Variables	Screening attendance		COR	AOR
	Yes	No		
<b>Age</b>				
30–34	40(30.3%)	191(45.3%)	1	1
35–39	22(16.7%)	113(26.8%)	0.93(0.53,1.64)	0.68(0.29,1.6)
40–44	26(19.7%)	44(10.4%)	<b>2.82(1.56,5.10)*</b>	1.08(0.41,2.84)
45–49	44(33.3%)	74(17.5%)	<b>2.84(1.71,4.71)*</b>	<b>4.18(1.59,10.9)**</b>
<b>Marital status</b>				
Divorced/widowed	24(18.2%)	38(9%)	1	1
Single	16(12.1%)	40(9.5%)	0.63(0.29,1.37)	0.04(0.01,1.39)
Married	92(69.7%)	344(81.5%)	<b>0.42(0.24,0.74)*</b>	0.12(0.03,1.42)
<b>Educational status</b>				
Primary education & below	32(24.2%)	298(70.6%)	1	1
Secondary education	58(48.3%)	62(14.7%)	<b>6.31(3.69,10.8)*</b>	0.57(0.13,2.46)
College and above	42(31.8%)	62(14.7%)	<b>8.71(5.23,14.5)*</b>	<b>5.49(2.01,13.1)**</b>
<b>Employment status</b>				
Housewife	18(13.6%)	173(41%)	1	1
Daily labor	42(31.8%)	63(14.9%)	<b>6.41(3.44,11.9)*</b>	0.23(0.08,1.70)
Merchant	22(16.7%)	48(11.4%)	<b>4.41(2.19,8.87)*</b>	1.16(0.39,3.40)
NGO/private	7(5.3%)	94(22.3%)	0.72(0.29,1.78)	2.03(0.56,7.36)
Governmental	43(32.6%)	44(10.4%)	<b>9.39(4.94,14.9)*</b>	0.97(0.34,2.83)
<b>Income</b>				
≤1500 Birr	10(7.6%)	131(31%)	1	1
1501–3000 Birr	37(28%)	195(46.2%)	<b>2.49(1.19,5.17)*</b>	5.52(0.73,12.6)
≥3001 Birr	85(64.4%)	96(22.7%)	<b>11.6(5.72,18.1)*</b>	9.64(0.21,13.2)
<b>Number of children</b>				
None	27(20.5%)	36(8.5%)	1	1
1–2	49(37.1%)	115(27.3%)	0.57(0.31,1.04)	0.19(0.03,1.16)
3–4	28(21.2%)	161(38.2%)	<b>0.23(0.12,0.44)*</b>	0.05(0.01,1.34)
>4	28(21.2%)	110(26.1%)	<b>0.34(0.18,0.65)*</b>	0.22(0.03,1.53)
<b>Family/friend history of BC/CC</b>				
No	85(64.4%)	297(70.4%)	1	1
Yes	47(35.6%)	125(29.6%)	<b>1.31(1.17,1.99)*</b>	<b>5.55(2.47,12.5)**</b>
<b>Number-of information sources</b>				
One	98(74.2%)	383(90.8%)	1	1
More than one	34(25.8%)	39(9.2%)	<b>3.41(2.05,5.68)*</b>	0.64(0.22,1.86)
<b>Knowledge</b>				
Poor	113(85.6%)	411(97.4%)	1	1
Good	19(14.4%)	11(2.6%)	<b>6.28(2.91,13.6)*</b>	0.96(0.26,3.57)
<b>Health status</b>				
Poor	36(27.3%)	246(58.3%)	1	1
Good	96(72.7%)	176(41.7%)	<b>3.73(2.43,5.73)*</b>	1.35(0.61,3.01)
<b>Anticipated time to seek help</b>				
Long	7(5.3%)	142(33.6%)	1	1
Short	125(94.3%)	280(66.4%)	<b>9.06(4.12,12.9)*</b>	<b>4.66(1.31,11.7)**</b>
<b>Health literacy</b>				
Inadequate/problematic	33(25%)	305(72.3%)	1	1

(Continued)

Table 5. (Continued)

Variables	Screening attendance		COR	AOR
	Yes	No		
Sufficient/Adequate	99(75%)	117(27.7%)	<b>7.82(4.99,12.2)*</b>	<b>6.98(2.82,13.3)**</b>
<b>Perceived risk</b>				
Low	97(73.5%)	203(48.1%)	1	1
High	35(26.5%)	219(51.9%)	<b>0.33(0.22,0.52)*</b>	0.35(0.16,1.74)
<b>Fear arousal</b>				
Low	88(66.7%)	168(39.8%)	1	1
High	44(33.3%)	254(60.2%)	<b>0.33(0.22,0.49)*</b>	1.33(0.55,3.21)
<b>Response efficacy</b>				
Low	35(26.5%)	152(36%)	1	1
High	97(73.5%)	270(64%)	<b>1.56(1.01,2.41)*</b>	0.44(0.18,1.05)
<b>Response cost</b>				
Low	118(89.4%)	154(36.5%)	1	1
High	14(10.6%)	268(63.5%)	<b>0.07(0.04,0.12)*</b>	<b>0.19(0.08,0.50)**</b>
<b>Self-efficacy</b>				
Low	41(31.1%)	197(46.7%)	1	1
High	91(68.9%)	225(53.3%)	<b>1.94(1.28,2.94)*</b>	<b>2.32(1.08,4.96)**</b>

COR-crude odd ratio; AOR-adjusted odds ratio

\* = P-value  $\leq$  0.25

\*\* = P-value < 0.05, 1 = reference category

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enhance early detection, behavioral interventions will need to be focused on increasing knowledge of symptoms.

Self-efficacy was also found to be associated with screening attendance at BCC. Another study from Iran showed that women with higher self-efficacy were more likely to perform screening regularly [30]. Additionally, the effectiveness of HPV self-sampling and sexual health education in promoting cervical cancer screening among hard-to-reach women emphasizes the importance of self-efficacy in screening uptake, as highlighted by a study conducted in India [31]. This indicates that more attention on self-efficacy in intervention programs is needed to increase women's screening attendance.

Health literacy was associated with screening attendance for two female cancers. Adequate levels of health literacy are associated with increased participation in behaviors that promote health (e.g. screening attendance) while inadequate levels of health literacy are associated with increased participation in health risk behaviors (e.g., screening avoidance). This is consistent with results from previously done studies in India and Australia showing that individuals with lower health literacy may experience greater barriers to adopting protective behaviors due to their limited ability to use health information [32, 33]. Other studies indicate that higher health literacy is associated with favorable health behaviors [34, 35].

This study had a number of limitations and strengths. Our study was based on the self-reported information provided by the participants, which may have led to some information bias. Participants may have provided socially desirable responses. Also, this study only included participants who lived in catchment Kebele's presented under a health center that provides screening services. However, this study was a community-based study with coverage of both urban and rural areas. This study adds evidence to research on non-communicable diseases in a country like Ethiopia, where there is more focus on communicable diseases, and in

exploring a relatively new arena of understanding for the early detection of two female cancers.

## Conclusion

The findings of this study revealed low attendance rates for breast or cervical cancer screenings among women in southern Ethiopia. There is a need for increased efforts to promote and improve screening rates to meet the WHO goals for the global breast and cervical cancer initiatives.

Being older, having higher educational status, family or friend history of breast or cervical cancer, short anticipated time to seek help, adequate health literacy, and high self-efficacy were positive factors, while high response cost was a negative factor associated with screening attendance.

Health care providers should improve health education and motivate age-eligible women using protection motivation theory in the health facility or in the community. Survivors could be included in awareness campaigns for better understanding as well as to show that cancer screening and treatment may lead to overcoming the diseases. Regional, zonal, and district health administrators should enforce public health education and awareness creation by using their most commonly used source of health related information. The Ministry of Health should design health literacy focused screening policy guidelines.

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