

## Rising Public Health Concern: Breast Cancer Awareness, Attitude, and Screening Practices among Community Members in Addis Ababa

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### Abstract

**Background:** Limited awareness and intervention strategies contribute to delayed diagnosis and treatment of breast cancer, significantly impacting overall outcomes. In Ethiopia, awareness creation campaigns and strategies remain inadequate despite the growing public health concern.

**Objective:** To assess the level of awareness, knowledge, attitude, and screening practice related to BC and to identify factors associated with knowledge and attitudes among female community members in Kirkos- Sub-city, Addis Ababa, Ethiopia.

**Methods:** This cross-sectional study utilized a multistage random sampling technique to select participants from various neighbourhoods and communities within the 10 “*woreda*” (districts) of Kirkos Sub-City in Addis Ababa, Ethiopia. A total of 767 female community members were recruited. Data were entered and analyzed using SPSS statistical software v.26.0. Descriptive statistics were used to summarize demographic data, awareness, knowledge, attitudes, and screening practices, and multivariable logistic regression analyses were employed to identify factors associated with satisfactory knowledge and positive attitudes towards breast cancer and its screening methods. A statistical significance in the final model was declared at  $p < 0.05$  and reported adjusted odds ratios (AOR) and 95% confidence intervals.

**Results:** The median age of participants was 32 (Inter-quartile range: 25-42) years, with the majority being currently single (412, 53.7%). All the participants had heard about breast cancer, with an overall 72.0% having satisfactory knowledge. Additionally, 453 (59.1%) of the participants had a positive attitude towards breast cancer and its screening and 197 (57.3%) reported rarely performing breast self-examination (BSE), and 61 (8%) had seen a doctor due to changes detected during BSE. Participants aged 41-50 and married participants were about 40% [AOR = 0.600; 95% CI: 0.420-0.857,  $p = 0.002$ ] and 45% [AOR = 0.554; 95% CI: 0.321-0.956,  $p = 0.046$ ] less likely to have satisfactory knowledge towards BC as compared to those under 30 and single, respectively. Participants who had heard about BC were 1.42 times more likely to have satisfactory knowledge [AOR = 1.42; 95% CI: 1.018-1.98,  $p = 0.013$ ]. Those with a family history of BC had 2.7 times more often a positive attitude towards the disease [AOR = 2.71; 95% CI: 1.39-5.27,  $p = 0.002$ ].

**Conclusion:** Knowledge about breast cancer and screening was found to be satisfactory, while attitude was relatively negative. Younger age, being single, and prior awareness of breast cancer were associated with better knowledge. However, only family history was linked to a more positive attitude. Therefore, tailored education and awareness campaigns that emphasize the impact of breast cancer, its risk factors, and screening methods are essential to enhance community-wide knowledge and promote early detection practices. [*Ethiop. J. Health Dev.* 2025; 39(4)]

**Keywords:** Breast Cancer, Awareness, Early detection, Female community members, Screening, Kirkos Sub-city, Addis Ababa, Ethiopia.

### Introduction

Breast cancer (BC) is a significant growing global public health concern, with rising incidence and mortality rates. It causes more disability-adjusted life years (DALYs) than any other cancer, especially in low and middle-income countries (LMICs) where early detection and access to treatment facilities are limited (1–3). Globally, BC is the 2<sup>nd</sup> most common cancer overall, after bronchial, tracheal, and lung cancer, and it is the most prevalent cancer among women, with over 2.3 million cases and 670,000 deaths annually (4). In Ethiopia, BC is the most common cancer, regardless of sex, with nearly 17,000 new cases and 10,000 deaths each year (5). However, many cases in LMICs, including Ethiopia, remain unreported as women in rural areas often seek help from traditional healers before turning to medical services, suggesting that the actual burden may be even higher (6,7).

Women in underprivileged nations are at higher risk of late-stage diagnosis of BC, often due to limited knowledge, unfavourable attitudes, inadequate healthcare systems, and restricted access to early detection and treatment (6–8). While risk reduction strategies and prevention efforts are important, they are not enough to address the majority of BC cases, especially in LMICs' fragile healthcare systems, and poor awareness. Therefore, prioritizing early detection through screening and awareness campaigns is crucial for reducing BC-related mortality and improving outcomes (6,9,10).

Prevention and early detection are essential pillars of cancer control, requiring enhancement in both developed and developing countries. Foundational to these efforts is the public's knowledge and awareness of cancer, pivotal for advancing prevention and early detection practices. Evidence indicates that more than

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90% of BC cases can be self-detected by women. However, the practice of breast self-examination (BSE) in Africa remains inadequate, that was as low as 5.3% in rural South Africa and 6.25% in Adwa, Ethiopia, to 91.2% among nurses in Nigeria (11). Cultural norms, religious beliefs, and socioeconomic factors significantly influence individuals' knowledge, attitudes, and breast self-examination (BSE) practices related to cancer. Understanding the impact of these factors is therefore essential for designing effective awareness and early detection interventions, which, in turn, enhance cancer control (11–14). Socioeconomic disparities have been found to impact awareness levels of cancer signs, symptoms, and risk factors across various countries (13). Studies indicate that individuals with a higher level of education and economic status exhibit greater awareness of cancer signs and symptoms compared to their counterparts (15–17).

In Ethiopia, several studies have shown the limited awareness and knowledge about BC among community members, yet there is a notable absence of comprehensive and focused interventions to improve understanding and awareness (9–12,14). The lack of awareness often results in delayed diagnosis and suboptimal treatment outcomes, contributing to higher morbidity and mortality rates. Furthermore, inadequate awareness undermines the effectiveness of BC prevention and early detection initiatives. It is critically important to identify existing gaps and misconceptions in Kirkos Sub-city, Addis Ababa, paving the way for targeted interventions and the development of educational materials and programs. This study, therefore, aims to assess the level of awareness, knowledge, attitude, and screening practice related to BC and to identify factors associated with knowledge and attitudes among female community members in Kirkos- Sub-city, Addis Ababa, Ethiopia.

## Methods

### Study area

The study was conducted among women residing in Kirkos Sub-city, Addis Ababa, Ethiopia. Kirkos Sub-city is one of the 11 Sub-cities of Addis Ababa, is comprises 10 woredas. Situated in the heart of Addis Ababa, Kirkos Sub-city is home to prominent national sports and cultural landmarks such as Addis Ababa Stadium and Meskel Square. Additionally, it serves as a hub for international organizations, including the African Union (AU) and the United Nations Economic Commission for Africa (ECA). Covering an area of 1,472 hectares, Kirkos Sub-city has a population of 324,361 residents, making it one of the most densely populated areas in Addis Ababa with 150 persons per hectare. Comprising 11 woredas, the Sub-city is equipped with 10 health centers and two general hospitals, namely, Zewditu Memorial Hospital and Ghandi Memorial Hospital (18).

### Study design and period

A cross-sectional study was employed, and data were collected from 15<sup>th</sup> to 29<sup>th</sup> January 2024 to assess the awareness, knowledge, attitude, and screening practice

regarding BC among residents of selected woredas within Kirkos Sub-city.

### Source and study population

The source population for this study consisted of all permanent adult female residents (aged 18 years and above) residing in Kirkos Sub-city, Addis Ababa, Ethiopia. The study population specifically included all eligible adult females who met the residency criteria of the same sub-city.

### Eligibility criteria

All adult females (18 years and older) who have been permanent residents of Kirkos Sub-city for at least six months and who were willing to participate were included in the study. Adult females were excluded if they were under 18 years of age, seriously ill or mentally impaired at the time of the study, unable to provide informed consent for participation in the study, or if they were temporary residents of Sub-city.

### Sample size determination

The required sample size was determined by using a single population proportion formula, assuming a 5% marginal error (type I error = d), a 95% confidence interval, and 80% power of the test. The prevalence was based on previous research conducted on knowledge, attitude, and practice of BSE among women aged 20-49 years in Addis Ababa, Ethiopia, which was 34.7% (19).

$$n = \frac{[Z_{\alpha/2}]^2 \times p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 \times 0.347(1-0.347)}{(0.05)^2}$$

$$\underline{\underline{= 348}}$$

### Where:

P is the prevalence of Knowledge of BSE practice among students,  
d is the margin of error,  
 $Z_{\alpha/2}$  is the Z-value for a 95% confidence level, which is 1.96, and  
n is the required sample size.

Considering a 10% non-response rate and a design effect of two, the final sample size was 767.

### Sampling procedures

A multi-stage sampling was employed to select the participants for the study (Fig. 1). Kirkos Sub-city was chosen from among the 11 Sub-cities to focus on community-level BC awareness and screening intervention strategies and address the knowledge and attitude gaps. The sub-city was purposively selected due to its diverse population and central location in Addis Ababa. It includes a mix of socio-economic groups, both formal and informal settlements, and access to healthcare and media. Within Kirkos Sub-city, which comprises 11 woredas (districts), five woredas were randomly selected using a lottery method. Although standard cluster sampling typically uses 20–30% of clusters (rule of thumb), a larger proportion (approximately 45%) was selected based on expert consultation to ensure broader geographic and demographic representation, given the heterogeneity across woredas. However, due to the unavailability of a

complete household listing in each woreda, convenience sampling was used to recruit eligible participants on-site until the required sample size was reached. To enhance representativeness and despite the limitation of deviating from a fully probabilistic method, we employed a multistage sampling approach to select the woredas, with proportional allocation based on population size.

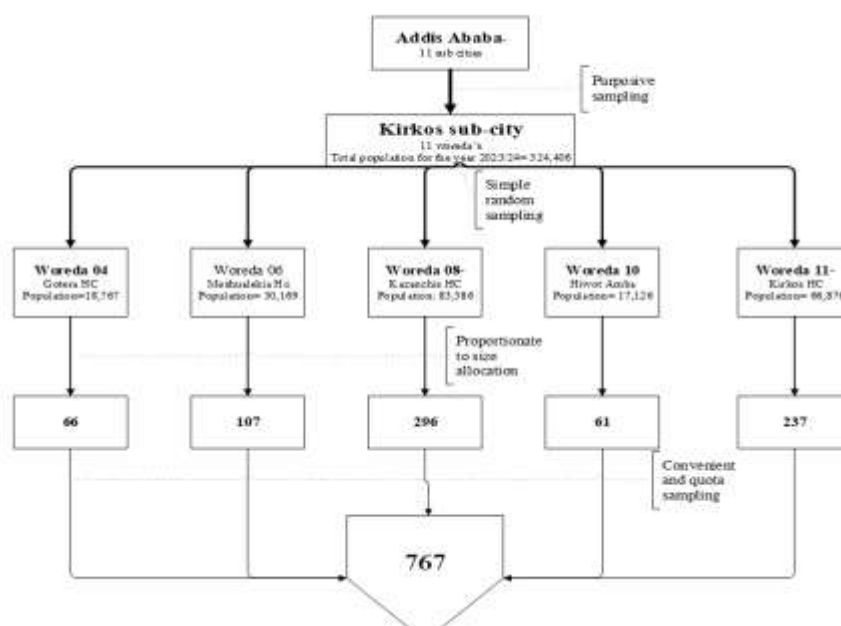


Figure 1: Schematic presentation of the sampling procedure used in the study.

#### Data collection instrument

The questionnaire was developed through a comprehensive literature review of similar studies conducted in Ethiopia, drawing on previously validated instruments<sup>1</sup>. It included sections on sociodemographic information, family and personal history of breast cancer, awareness of early warning signs, knowledge of risk factors and screening methods, attitudes toward breast cancer, and screening practices such as breast self-examination (BSE).

Awareness was measured using recognition-based questions on early warning signs (e.g., presence of a breast lump, nipple discharge), while knowledge was assessed using questions on risk factors, curability, screening modalities, and timing of BSE. Attitudes were measured using a Likert scale assessing beliefs and perceptions about breast cancer risks and prevention. Screening practices were captured through self-reported behaviors such as BSE frequency and timing.

#### Data collection procedure and quality assurance

Data collection was conducted using a pre-tested structured questionnaire at Arada Sub-city, Addis Ababa. Initially, the questionnaire was developed in English by reviewing pertinent literature through a rigorous search. To ensure its suitability for the local context, the questionnaire was then translated into Amharic for data collection purposes. The translation process involved translating the Amharic version back into English by a different set of language translators to verify the clarity and accuracy of the instrument. Two

health professionals with a BSC degree oversaw the survey process to ensure compliance with the study protocol and accuracy of data collection. Six data collectors underwent a three-day training session focused on the data collection procedure and tool to administer the questionnaire consistently and accurately, and to adhere to ethical guidelines. Data was collected through face-to-face interviews administered by the interviewers. After data collection, thorough data cleaning procedures were performed to identify and correct any errors or inconsistencies. The data was then analysed using appropriate statistical methods. Peer review was sought to ensure the study was conducted to a high standard.

#### Data analysis

Descriptive statistics were used to summarize the demographic characteristics of the participants and their awareness of BC risk factors, symptoms, and screening methods. Binary logistic regression was used to identify factors associated with two dichotomous outcomes: (1) level of knowledge (satisfactory vs. poor), and (2) attitude (positive vs. negative) toward breast cancer and its screening. Bivariable logistic regression was first performed, and variables with p-values <0.2 were included in the final multivariable logistic regression model. Adjusted odds ratios (AORs) with 95% confidence intervals were used to interpret the strength and direction of associations. To ensure the validity of the logistic regression analysis, key model assumptions were assessed. Multicollinearity among independent variables was evaluated using the

Variance Inflation Factor (VIF), and all values were found to be below the acceptable threshold of 10, indicating no serious multicollinearity. Model fit was examined using the Hosmer–Lemeshow goodness-of-fit test, with p-values greater than 0.05 suggesting an adequate fit of the model to the data.

### Operational definitions

**Awareness:** Participants who scored a mean and above from the provided 11 closed-ended questions about the early warning signs of breast cancer were labelled as having good awareness, and poor awareness was for those participants who scored below the mean value of the provided 11 closed-ended questions about the early warning signs of breast cancer.

**Knowledge:** To categorize levels of knowledge, we used a modified Bloom's cutoff point, a method frequently applied in knowledge, attitude, and practice (KAP) studies (6). Participants scoring above 60% on knowledge-related items were considered to have satisfactory knowledge; those scoring  $\leq 60\%$  were categorized as having poor knowledge.

**Attitude:** Participants scoring equal to or above the median on attitude-related items were categorized as having a positive attitude, while those below the median were considered to have a negative attitude, as used in other studies (6).

**Screening practice:** Breast cancer screening practice was assessed by self-reported behavior, including whether participants had ever performed BSE, the frequency of BSE, and whether they had sought medical attention based on breast changes.

## Results

### Sociodemographic characteristics

A total of 767 women aged 18 years and above residing in Kirkos Sub City, Addis Ababa, participated in the study. The participants' ages ranged from 18 to 85, with a median age of 32 years. Of the participants, 330 (41.3%) were below the age of 30. Regarding their marital status, 355 (46.3%) participants were married, and more than half of the participants (453, 59.1%) had children, with an average number of children per mother of 2.79. The ages at first birth ranged from 13 to 38 years with a median of 22 (19–25). In terms of breastfeeding history, 442 (57.6%) of the participants had breastfed their first child. The length of breastfeeding for their first child varies widely, with most women (384, 86.8%) breastfeeding for  $> 6$  months. The educational backgrounds of the participants showed diversity, with slightly over half (514, 67%) attaining at least a secondary level of education. Conversely, 94 participants (12.2%) were classified as illiterate. In terms of occupational status, a significant proportion of the participants were self-employed (194, 25.3%) (Table 1).

**Table 1: Socio-demographic characteristics of the women aged 18 years and above in Kirkos Sub-city, Addis Ababa, Ethiopia, 2024, N= 767.**

Variables		N	%
Age in years, median (IQR)	32 (25-40)		
Age category	<30	330	43.0
	30-40	246	32.1
	41-50	91	11.9
	>50	100	13.0
Marital status	Single/never married	285	37.2
	Married	355	46.3
	Divorced	60	7.8
	Widowed	67	8.7
Educational status	Can't read or write	51	6.6
	Can read and write	43	5.6
	Primary education	159	20.7
	Secondary education	281	36.6
	College and above	233	30.4
Occupation	Employed	258	33.6
	Self-employed	194	25.3
	Unemployed	315	41.1
Women who have ever given birth (n=767)	Yes	453	59.1
Breastfed the first child (n= 453)	Yes	442	97.6
Length of breast feeding in months, median (IQR)	24 (12-30)		
	$\leq 6$ months	58	13.2
	$> 6$ months	384	86.8
Age in years at first child; median (IQR)	22 (19-25)		
	< 30 years	412	91.1
	$\geq 30$ years	41	8.9

### Breast cancer family and personal history of respondents

The majority of the study participants, specifically 710 individuals (92.6%), reported no family history of BC. Among those with a family history, 20 individuals (35.1%) indicated that their aunts had a history of BC, while only 5 individuals (8.8%) reported that the

disease had affected their mothers. In terms of personal history, only eight individuals (1%) disclosed having BC themselves. Furthermore, 298 participants (38.9%) acknowledged knowing someone with BC, with 168 individuals (56.4%) learning about it through social media and 101 individuals (33.9%) hearing about it from their neighbours (Table 2).

**Table 1: Family and personal history of breast cancer among women aged 18 years and above in Kirkos Sub-city, Addis Ababa, Ethiopia, 2024. N = 767.**

Variables	Response	n	%
Having a family history of breast cancer	Yes	57	7.4
Family members affected by breast cancer, n=57	Mother	5	8.8
	Sister	9	15.8
	Aunt	20	35.1
	Grandmother	8	14.0
	Other family members	15	26.3
	Have personal history of breast cancer, N=767	Yes	8
Knows someone suffering from breast cancer, N=767	Yes	298	38.9
Source of information (multiple responses are possible) n= 298	From neighbours	101	33.9
	From the workplace/ colleague	72	24.2
	From social media	168	56.4

**Awareness of the early warning signs of breast cancer**  
 Among the participants, more than half (n=391) demonstrated good awareness of the early warning signs of BC. The most commonly recognized signs included a lump or thickening in the breast, noted by 578 participants (75.4%), bleeding or discharge from the nipple, 572 participants (74.6%), and pain in the breast or armpit, 581 participants (75.7%). Other significant early warning signs noted by the participants were lump or thickening under the armpit, 365 participants (47.6%), pulling in of the nipple, 326 participants (42.5), change in the position of the nipple, 322 (42%), rash around the nipple, 317 participants (41.3%), redness of the breast skin, 294 participants (38.3%), and change in the size of breast or nipple, 312 participants (40.7%) (Table 3).

**Table 3: Awareness of women on breast cancer early signs and detection in Kirkos Sub-city, Addis Ababa, Ethiopia, 2024, N = 767.**

Which one is an early sign of breast cancer?	Response	n	%
A lump or thickening in your breast	Yes	578	75.4
	I don't know	145	18.9
A lump or thickening under your armpit	Yes	365	47.6
	I don't know	282	36.8
Bleeding or discharge from your nipple	Yes	572	74.6
	I don't know	162	21.1
Pulling in of your nipple	Yes	326	42.5
	I don't know	345	45
A change in the position of your nipple	Yes	322	42.0
	I don't know	363	47.3
A rash on or around your nipple	Yes	317	41.3
	I don't know	225	29.3
Redness of your breast skin	Yes	294	38.3
	I don't know	268	34.9
A change in the size of your breast or nipple	Yes	312	40.7
	I don't know	327	42.6
A change in the shape of your breast or nipple	Yes	290	37.8
	I don't know	365	47.6
Pain in one of your breasts or armpits	Yes	581	75.7
	I don't know	146	19.0
Dimpling of the breast skin	Yes	346	45.1
	I don't know	341	44.5
<b>Overall awareness</b>	Poor	376	49.0
	Good	391	51.0

**Knowledge about breast cancer and breast self-examination**

The majority of respondents, specifically 636 individuals (82.9%), affirmed that early detection of BC enhances the chances of survival. About 477 respondents (62.2%) expressed disagreement with the notion that BC is incurable. When asked which gender is affected by BC, only 188(24.5%) correctly identified both. In terms of beliefs about BC, 303 respondents (39.5%) considered it hereditary, while 534

respondents (69.6%) concurred that it is neither a sin nor a curse from God. Additionally, 483 respondents (63.0%) noted that BC typically manifests as a painless lump. An assessment of the study participants' knowledge regarding screening methods showed that 400 (52.2%) participants were aware of BC screening methods. Regarding the recommended age to commence BSE, 366 respondents (47.7%) suggested an age equal to or greater than 20 years. About 257 (33.5%) believed that BSE should be performed by standing in front of a mirror, while 14 (1.8%) of the

individuals didn't have the idea of how to perform satisfactory knowledge of BC and BC screening (Table BSE. Overall, 551 respondents (72.0%) demonstrated 4).

**Table 4: Knowledge about BC and breast self-examination in Kirkos Sub-city, Addis Ababa, Ethiopia, 2024, N = 767**

Variables	Response	n	%
Sex group BC affects	Male only	2	0.3
	Female only	577	75.2
	Both	188	24.5
BC can be inherited	Yes	303	39.5
	No	252	32.9
	I don't know	212	27.6
BC is a result of someone's sin/curse or God's anger	Yes	173	22.6
	No	534	69.6
	I don't know	60	7.8
BC is an incurable disease	Yes	206	26.9
	No	477	62.2
	I don't know	84	11.0
Early detection of BC increases the chance of survival	Yes	636	82.9
	No	48	6.3
	I don't know	83	10.8
BC is curable if detected at the early stage of the disease	Yes	596	77.7
	No	72	9.4
	I don't know	99	12.9
BC usually presents as a painless breast lump	Yes	483	63.0
	No	46	6.0
	I don't know	238	31.0
Knows methods of BC screening	Yes	400	52.2
	No	367	47.8
BC screening methods N = 400	BSE	342	85.5
	Mammography	98	24.5
	CBE	309	77.3
	X-ray	90	22.5
	CT-Scan	69	17.3
Recommended age to begin BSE (years)	≥20	366	47.7
	<20	84	11.0
	I don't know	317	41.3
Breast self-examination should be done N = 342	By standing in front of mirror	257	33.5
	While showering	252	32.9
	Lying flat on the back	163	21.3
	I don't know	14	1.8
<b>Overall knowledge</b>	Poor knowledge	215	28.0
	Satisfactory knowledge	552	72.0

BSE: breast self-examination; CBE: Clinical breast examination, BC: Breast cancer

#### **Information source and screening behaviour**

Out of the study participants, 442 individuals (57.6%) had heard of BSE. The primary channels through which they gained this information were mass media platforms such as TV, radio, newspapers, and magazines (307, 69.5%). Approximately 344 individuals (44.8%) had engaged in BSE at some point. The motivations behind this practice were commonly for early detection and treatment (88.7%). In terms of frequency, only 52 individuals (15.1%) conducted self-examinations weekly. Surprisingly, the majority, comprising 197 participants (57.3%), only engaged in

this activity infrequently. Of the respondents, 37 (10.8%) adhered to the recommended timing of 5-7 days after menstruation for their examinations, while 258 (75.0%) conducted self-examinations at various times throughout the month. Among those who perform BSE, the majority (210, 61.0%) feel fairly confident in detecting changes in their breasts, and only 61 individuals (8.0%) had sought medical attention upon detecting a change in their breasts. Merely 85 individuals (11.1%) had visited a physician for breast screening as part of follow-up care (Table 5).

**Table 5: Assessment of breast self-examination practice among women in Kirkos Sub-city, Addis Ababa, Ethiopia, 2024, N = 767**

Variables	Response	n	%
Heard about breast self-examination	Yes	442	57.6
	No	325	42.4
Source of information about breast self-examination, N = 442	Mass media	307	69.5
	Health personnel	132	29.9
	Friends and relatives	246	55.7
	Others	7	1.6
	None	50	11.3
Ever performed BSE	Yes	344	44.8
	No	420	55.2
Reason to perform BSE, N = 344	Had a breast problem	28	8.1
	Fear from family history	23	6.7
	For early detection and treatment	305	88.7
	Fear of developing breast CA	224	65.1
	None	12	3.5
Frequency of performing BSE, N = 344	Regularly	147	42.7
	Rarely	197	57.3
Period of BSE, N = 344	5-7 days after menses	37	10.8
	2-3 days before menses	15	4.4
	Any time during the month	258	75.0
	I don't remember	34	9.9
	None	10	2.9
Confidence to notice any change during BSE, N = 344	Not at all confident	9	2.6
	Not very confident	53	15.4
	Fairly confident	210	61.0
	Very confident	72	20.9
Seen a doctor due to a change in the breast during BSE	Yes	61	8.0
	Never noticed a change	623	81.2
When a change was noticed, how fast would you go to a healthcare institution?	Immediately, regardless of the pain	38	62.9
	Only if it becomes very painful and bothersome	18	29.0
	Only if the change is worsening	5	8.1
Breast screening as part of follow-up Method for screening N = 85	Yes	85	11.1
	Mammography	15	17.6
	Clinical breast examination	45	52.9
	Don't remember/know the method	25	29.4

**Attitude Towards Breast Cancer Risk Factors**

Among all the participants, various risk factors for BC were mentioned. A history of BC as a risk factor was highlighted by 275 respondents (35.9%), while 265 (34.5%) pointed to consuming more than one unit of alcohol daily as a risk factor. Additionally, 214 (27.9%) identified being overweight, 289 (37.7%) cited food habits, and 550 (71.7%) identified smoking as a

risk factor for developing BC. Interestingly, 239 respondents (31.1%) believed that physical inactivity is not a risk factor. On average, 335 respondents (43.7%) were uncertain about whether these factors contribute to the development of BC or not. Overall, 453 (59.1%) had a positive attitude towards the risk factors associated with BC (Table 6).

**Table 6: Attitudes on the risk factors to BC among women in Kirkos Sub-city, Addis Ababa, Ethiopia, 2024**

Variables	Response	N	%
Past history of breast cancer	Agree	275	35.9
	Not sure	231	30.1
	Disagree	261	34.0
Hormone replacement therapy	Agree	91	11.9
	Not sure	515	67.1
	Disagree	161	21.0
Drinking more than one unit of alcohol a day	Agree	265	34.5
	Not sure	305	39.8
	Disagree	197	26.7
Being overweight	Agree	214	27.9
	Not sure	345	45.0
	Disagree	208	27.1

A close relative with breast cancer	Agree	252	32.9
	Not sure	257	33.5
	Disagree	258	33.6
Children later on in life or not at all	Agree	154	20.0
	Not sure	385	50.2
	Disagree	228	29.8
Starting period at an early age	Agree	67	8.8
	Not sure	420	64.8
	Disagree	280	36.5
Late menopause	Agree	112	14.6
	Not sure	435	56.7
	Disagree	220	28.6
Moderate physical activity	Agree	201	26.2
	Not sure	327	42.6
	Disagree	239	31.1
Cigarette smoking	Agree	550	81.7
	Not sure	147	19.2
	Disagree	70	9.1
Food habits (eating more fatty and carbohydrate foods)	Agree	299	37.7
	Not sure	313	40.8
	Disagree	165	21.5
Overall attitude	Negative attitude	314	40.9
	Positive attitude	453	59.1

#### Factors associated with breast cancer-related satisfactory knowledge and screening.

Out of the 13 variables tested in the bivariate logistic regression, eight variables with p-values <0.2 were included in the final multivariable logistic regression analysis model. In the univariate binary logistic regression analysis, age category, level of education, marital status, having a child, ever having heard about BC, and family or personal history of BC were significantly associated with knowledge of the study participants. However, in the multivariable logistic regression, only age category, marital status, and having ever heard about BC remained significant.

Participants aged 41-50 years were 45% less likely to have satisfactory knowledge about BC and screening

(AOR = 0.554; 95% CI: 0.321- 0.956, p = 0.046) as compared to participants younger than 30 years. Additionally, married participants were 40% less likely to have satisfactory knowledge compared to their unmarried counterparts (AOR = 0.600; 95% CI: 0.420-0.857, p = 0.002). However, participants who had heard of BC were 1.42 times more likely to have satisfactory knowledge compared to those who had not (AOR = 1.42; 95% CI: 1.018 - 1.98, p =0.013). In addition, participants who had ever heard of BC were 1.42 times more likely to have satisfactory knowledge compared to those who had not (AOR = 1.42; 95% CI: 1.018-1.98, p = 0.013) (Table 7).

**Table 7. Factors associated with knowledge of BC and BC screening methods using regression analysis among women in Kirkos Sub-city, Addis Ababa, Ethiopia, 2024**

Variables	Response	Knowledge, n(%)		COR (95% CI)		AOR (95% CI)	
Age category		Poor	Satisfactory				
	< 30	72(33.3)	258(48.8)	1		1	
	30-40	85(39.4)	161(29.2)	0.529	(0.365-	0.681	(0.453-
				0.766)		1.023)	
	41-50	34(15.7)	57(10.3)	0.468	(0.284-	0.554	(0.321-
Marital status							
	Single	90(41.6)	322(58.4)	1		1	
	Married	126(58.3)	229(41.6)	0.508	(0.369-	0.600	(0.420-
				0.699)		0.857)*	
	Educational status	Educated	199(92.1)	474(86.0)	0.526	(0.303-	0.536
Occupational status							
	Uneducated	17(7.9)	77(14.0)	1		1	
	Employed	77(35.6)	181(32.8)	1.231	(0.833-	1.174	(0.773-
				1.834)		1.783)	
	Self-employee	58(26.9)	136(24.7)	1.220	(0.851-	1.192	(0.796-
Unemployed							
	Unemployed	81(37.5)	234(42.5)	1.771)		1.785)	

Personal history of BC	Yes	4(1.9)	4(0.7)	2.577 10.42)	(0.639- 1.976	8.474)	(0.462-
	No	212(98.1)	547(99.3)	1	1		
Family history of BC	Yes	24(11.1)	33(6.0)	1.961 3.448)	(1.136- 1.724	3.076)	(0.967-
	No	192(88.9)	518(94.0)	1	1		
Knows/heard of someone with BC	Yes	99(45.8)	199(36.1)	1.497 2.041)	(1.087- 1.420	1.98)*	(1.018-
	No	117(54.2)	352(63.9)	1	1		
Ever gave birth	Yes	140(64.8)	313(56.8)	1.400 1.923)	(1.010- 1.132	1.754)	(0.729-
	No	76(35.2)	238(43.2)	1	1		

### Factors associated with a positive attitude towards breast cancer and its screening

Out of the eight variables tested by the bivariate logistic regression analysis, only family history of BC was significantly associated with positive attitudes towards BC and BC screening. In addition, the final multivariable logistic regression analysis model

confirmed that participants with a family history of BC were significantly more likely to have a positive attitude towards BC and BC screening. Specifically, participants with a family history of BC were 2.7 times more likely to have a positive attitude towards BC and screening compared to those without such a history (AOR=2.71; 95% CI: 1.39-5.27, p=0.002) (Table 8).

**Table 8: Factors associated with attitude of BC and BC screening methods using regression analysis among women in Kirkos Sub-city, Addis Ababa, Ethiopia, 2024**

Variables	Response	Attitude, N(%)		COR (95% CI)		AOR (95% CI)	
		Positive	Negative				
Age Category	<30	189(41.7)	141(44.9)	1		1	
	30-40	145(32)	101(32.2)	1.071 1.49)	(0.766-	1.066 1.584)	(0.717-
	41-50	57(12.6)	34(10.8)	1.251 2.016)	(0.776-	1.263 2.179)	(0.732-
	>50	62(13.7)	38(12.1)	1.217 1.926)	(0.769-	1.211 2.206)	(0.665-
Marital status	Single	246(54.3)	148(47.1)	1		1	
	Married	207(45.7)	166(52.9)	0.944 1.26)	(0.707-	0.844 1.199)	(0.594-
Educational status	Educated	399(88.1)	274(87.3)	1.079 1.67)	(0.697-	1.36 2.341)	(0.795-
	Uneducated	54(11.9)	40(12.7)	1		1	
Occupational status	Employed	149(32.9)	109(34.7)	0.789 1.135)	(0.549-	0.810 1.180)	(0.556-
	Self-employee	109(24.1)	85(27.1)	0.841 1.77)	(0.601-	0.826 1.189)	(0.574-
	Unemployed	195(43.0)	120(38.2)	1		1	
Personal history of BC	Yes	6(1.3)	2(0.64)	2.094 10.44)	(0.42-	1.571 8.165)	(0.302-
	No	447(98.7)	312(99.4)	1		1	
Family history of BC	Yes	45(9.9)	12(3.8)	2.776 5.34)	(1.44-	2.71 5.27)*	(1.39-
	No	408(90.1)	302(96.2)	1		1	
Knows or has heard of someone with BC	Yes	178(39.3)	120(38.2)	1.046 1.41)	(0.78-	0.991 1.342)	(0.731-
	No	275(60.7)	194(61.8)	1		1	
Ever gave birth	Yes	271(59.8)	182(58)	1.08 (0.81-1.45)		1.08 (0.73-1.61)	
	No	182(40.2)	132(42)	1		1	

## Discussion

Breast cancer is a significant public health issue worldwide, and awareness and understanding of BC, its screening, and risk factors remain ongoing challenges in Ethiopia (1,2,11-14). This cross-sectional study conducted among 767 women aged 18 years and above in this area reported several important findings related to BC awareness and practices within the community.

All survey participants had at least heard about BC. A notable majority of the respondents (72%) exhibited a satisfactory level of knowledge about BC, mainly regarding the importance of early detection, treatment, and dispelling some BC myths. This percentage surpasses the findings of the previous two studies conducted nine years ago among female healthcare professionals in primary healthcare facilities in Addis Ababa, which reported rates of 30.3% (20) and 57.8% (21), and another study in north-west Ethiopia (56%) (22). Similar studies in Kenya (44.4%) (23) and Nigeria (49.7% knowledge of risk factors, 65.2% recognition of symptoms) (24) also reported lower awareness levels. The variance in these results could be linked to the varying types of knowledge rating questions and differences in educational status compared to the north-west Ethiopia study (14–16).

In this research, a substantial majority of women, totalling 636 individuals (82.9%), believed that early detection of BC enhances the likelihood of survival. A significant proportion of the participants, 596 individuals (77.7%), correctly acknowledged that early detection can lead to a cure. Additionally, another study focusing on the understanding of BC and its prevention among female heads of households in Northern Ethiopia reported an awareness rate of 86.6% (22). Regarding the participants' awareness of BC symptoms, 483 individuals (63%) correctly identified a painless lump as a common presentation of BC, similar to the north-west Ethiopia study (66.4%) (22). Out of the total participants, 400 individuals (52.2%) demonstrated familiarity with BC screening techniques. This was slightly lower than the knowledge reported in Nigeria (67.3%) (25) and Rwanda (60.2%) (26), but higher than previously conducted studies in Ethiopia, which reported 35.5% and 36.9% (27,28).

In terms of women's awareness of warning signs for BC, the most commonly recognized symptoms were pain in one breast or armpit (75.7%), followed by a painless lump or thickening in the breast (75.4%) and bleeding or discharge from the nipple (74.6%). Knowledge of other warning signs was limited, with only a small number of women aware that a lump in the armpit (47.6%), nipple retraction (42.5%), and changes in nipple position (42%) could also be warning signs. Previous studies in Ethiopia and other countries similarly identified discharge or bleeding from the nipple, pain in the armpit or breast, thickening of the breast, changes in breast shape, and nipple retraction as early signs of BC (12,20,25,29). In a separate study involving female school teachers in Saudi Arabia, the most commonly recognized symptom was a painless

lump in the breast (65%), followed by bleeding or nipple discharge (52%) and changes in breast or nipple shape (50%) (30).

Only 344 (44.8%) of study participants had ever practiced BSE, and of these, only 147 practiced regularly. A meta-analysis conducted by Kassie et al reported a pooled prevalence of regular BSE practice in Ethiopia of 11.23% and irregular BSE practice of 33.28% (31). This poor utilization of BSE may be due to less focus on BSE, given that the primary source of information for those who have ever practiced in this study was mass media platforms such as TV, radio, magazines, and newspapers (69.5%). This finding aligns with similar studies conducted in Ghana (48%) (32), Mekelle (58.5%) (33), and Addis Ababa, Ethiopia (50.1%) (22).

This study found that only 47.7% of the participants believed that the recommended age to start BSE was over 20 years old. In a separate study in Addis Ababa, Ethiopia, 39.4% of participants recognized that BSE should begin after the age of 20 (19). Conversely, a study involving nurses in Addis Ababa revealed that 71.9% of respondents correctly identified the age to initiate BSE as 20 years old (21). This discrepancy may be attributed to the fact that the nurse study participants had a higher level of knowledge and experience with BSE.

When questioned about their level of confidence in detecting changes in breast tissue during BSE, the majority (61%) expressed being moderately confident in their ability to notice any changes. A similar trend was observed in a study involving Sudanese women, where 50.3% reported being moderately confident in their ability to detect changes during BSE (34). This suggests that while many individuals are aware of BSE, they may not adhere to the recommended practices, indicating a tendency to respond positively to specific questions and potentially leading to an overestimation of compliance with BSE guidelines.

In response to whether they had consulted a doctor upon noticing changes in breast tissue, a concerning pattern emerged. Only 10.8% acknowledged detecting alterations in breast tissue but refrained from seeking medical assistance, while a mere 8% sought medical attention upon noticing changes. In contrast, a study in Sudan revealed that 38.2% of participants noticed changes in breast tissue but did not seek medical help (34). These findings underscore a troubling lack of awareness and proactive behaviour within the community regarding breast health and the importance of seeking medical attention for any observed changes.

The most commonly cited risk factors for BC in the study were cigarette smoking (81.7%), dietary habits (37.7%), previous history of BC (35.9%), and alcohol consumption (34.5%). A comparison with research on female health professionals in Addis Ababa showed that race or ethnicity (62.5%) was the top risk factor mentioned, followed by smoking (35.1%), increasing age (22.9%), and alcohol consumption (12.2%) (20). Another study highlighted familial predisposition

(59.2%) as a risk factor, along with alcohol consumption (27.5%) and obesity (26.5%) (35).

The study's regression analysis uncovered a relationship between demographic factors and participants' knowledge and attitudes of BC and screening techniques. Factors such as age, marital status, and familiarity with BC were significantly associated with knowledge of study participants, while only family history of BC was significantly associated with attitude towards BC. Participants aged 41-50 years had 40% ( $p = 0.002$ ) and married participants 45% ( $p = 0.046$ ) less likely to have satisfactory knowledge about BC as compared to those under 30 years old and single, respectively. Similarly, different studies have shown that marital status is significantly associated with knowledge of BC and screening methods (20,36). Moreover, participants who knew or heard of someone with BC were 1.42 times more likely to have satisfactory knowledge about the disease and screening techniques compared to those without such knowledge ( $p = 0.013$ ). This finding aligns with studies among Saudi female students and Addis Ababa University students, which showed that knowing someone with BC was significantly associated with better knowledge of the disease and screening methods (35,36). This is attributed to the heightened curiosity to learn about BC due to its seriousness. Family history of BC was found to be significantly associated with attitude towards BC, with those having a family history of the disease being 2.71 times more likely to have a positive attitude than those without family history. This is closely related, as individuals often exhibit heightened sensitivity towards familial matters and actively seek out information in such contexts (11,13,14).

#### **Strengths and limitations of the study**

The study encompassed 767 women aged 18 and above, ensuring a wide-ranging sample representing the community and generating a substantial dataset offering valuable insights into the current situation. However, the study had certain limitations. Firstly, it relies on self-reported data from participants, which may be subject to recall bias, such as ever screening and frequency of BSE may potentially affect the accuracy of the findings. In addition, responses related to awareness of breast cancer symptoms and risk factors, attitudes toward screening, and reported screening practices (e.g., BSE or CBE) may be influenced by participants' desire to provide socially acceptable answers or their inability to accurately recall past behaviours or exposures. Secondly, the study's findings may be specific to the context of Kirkos Sub-city and may not be directly generalizable to other populations or regions, limiting the broader applicability of the results. Thirdly, the study may not account for all potential confounding variables, such as health literacy level, access to healthcare services, and exposure to educational programs that could influence participants' knowledge and practices related to BC awareness, screening, and practices. Fourth, the use of convenience sampling in the selection of study participants might also incur bias in the results

reported. Lastly, the cross-sectional nature of the study limits the ability to establish causal relationships between demographic factors and participants' knowledge levels, highlighting the need for further longitudinal research to confirm the findings.

#### **Conclusion**

Knowledge towards BC and screening was satisfactory. Age, marital status, and level of education were significantly associated with knowledge. However, only the family history of BC was significantly associated with attitudes towards the disease. Hence, tailored education and awareness strategies emphasizing the impact of BC, its risk factors, and screening methods are essential to enhance community-wide knowledge and promote early detection practices.

#### **Declarations**

##### **Ethics approval and consent to participate**

Ethical approval was first obtained from the School of Pharmacy institutional review board (**Approval number: ERB/SOP/563/16/2024**), and permission was secured from Kirkos Sub-city authorities. Oral informed consent was obtained from all participants, ensuring they understood the purpose of the study, their rights to withdraw at any time, and the confidentiality of their responses. All collected data was kept confidential and anonymous, with maximum effort made to protect the participants' privacy. The researchers conducted the study with cultural sensitivity and respect for the local community.

##### **Consent for publication**

Not applicable

##### **Competing interests**

The authors declare that they have no competing interests.

##### **Data availability statement**

All the minimum data set is included in the manuscript and as supporting information. The datasets used for this publication can be obtained from the corresponding author on reasonable request.

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##### **Author's contribution**

AMF, TS, TGF and TGM conceptualized the study. TGM supervised and secured resource for the data collection. AMF and EM wrote the draft manuscript and conducted the statistical analysis. All the authors read, reviewed and edited the manuscript.

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