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Prevalence and Associated Factors of Clinical Breast Examination among Women Aged 15–49 Years in Ethiopia: A Multilevel Analysis of the 2024–25 EDHS

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Abstract

Background: Breast cancer is the leading cancer in Ethiopia and a major cause of cancer deaths, and most women reach care late. Clinical breast examination (CBE) is a feasible early-detection tool, yet national data on its uptake are scarce. This study estimated the prevalence of CBE and identified individual- and community-level factors associated with it among Ethiopian women.

Methods: Data from the 2024-25 Ethiopia Demographic and Health Survey were analysed for women aged 15-49 years. CBE was defined as ever having had the breasts examined for cancer by a health care provider. Weighted prevalence was estimated among 20,840 women who answered yes or no. Multilevel logistic regression was used to identify factors associated with CBE, and the results were reported as adjusted odds ratios (AOR) with 95% confidence intervals (CI). Data were analysed in Stata version 17.

Results: The weighted prevalence of CBE was 4.66% (95% CI: 4.15-5.23), ranging from 0.75% in Somali to 11.2% in Addis Ababa. In the combined model, higher odds of CBE were associated with breast self-testing (AOR = 5.46; 95% CI: 4.60-6.48), age 35-49 years (AOR = 2.15; 1.60-2.88), the richest wealth quintile (AOR = 2.33; 1.42-3.80), having one to two living children (AOR = 1.48; 1.05-2.07) or three to four (AOR = 1.59; 1.09-2.31), health insurance (AOR = 1.27; 1.08-1.49) and a health facility visit in the past 12 months (AOR = 1.43; 1.22-1.68). Women in Somali (AOR = 0.32; 0.14-0.73), South Ethiopia (AOR = 0.44; 0.28-0.69) and Sidama (AOR = 0.53; 0.32-0.86) had lower odds.

Conclusions: The prevalence of clinical breast examination was very low (4.66%), with wide gaps between regions. Integrating CBE into routine facility contacts, such as antenatal and postnatal care, family planning and outpatient visits, is a priority, supported by training for health workers. Efforts should focus on poorer women and on low-uptake regions, notably Somali, South Ethiopia and Sidama. Wider health insurance cover that includes CBE, together with stronger breast awareness campaigns, could raise uptake across the country

Keywords: clinical breast examination; breast cancer; early detection; multilevel analysis; Demographic and Health Survey; Ethiopia

Introduction

Breast cancer is the most commonly diagnosed cancer in women. Global estimates for 2022 put it at 11.6% of all new cancer cases and 6.9% of all cancer deaths [1]. Africa carries a heavy share of this burden. Breast cancer is the most common cancer on the continent, and sub-Saharan Africa has the highest ratio of deaths to new cases[2]. Timing explains much of the gap, since roughly four in five women in the region are reported to arrive with locally advanced or metastatic disease[2,3]. The World Health Organization (WHO) responded with the Global Breast Cancer Initiative, which aims to cut breast cancer deaths by 2.5% a year. Its first pillar is early detection, with a target that at least 60% of invasive cancers are found at stage I or II[4].

Ethiopia fits this pattern. Breast cancer is the country's leading cancer, accounting for 20.9% of new cancer cases and 17.5% of cancer deaths in 2020[5]. A national meta-analysis found that 72.56% of breast cancers were diagnosed at an advanced stage[6]. A second review reported that 58.48% of patients waited before seeking care, with a median delay of 120 days [7]. Finding disease earlier is therefore a clear priority.

Screening can use clinical breast examination (CBE), breast self-examination or mammography. Where mammography is scarce, CBE is the option recommended for low-resource settings [8,9]. Ethiopia's National Cancer Control Plan asks that women over 18 who visit a health facility for any complaint receive a CBE [10]. Practice falls well short of this. In one study of rural primary care facilities in south central Ethiopia, nine in ten women had never had one [10].

Several DHS-based studies in Africa have looked at who gets examined. A multilevel analysis of six sub-Saharan countries (95,248 women) found that 14.23% had been screened, from 5.19% in Tanzania to 24.5% in Burkina Faso [11]. Screening was affected by age, educational status, women wealth quintile, and residence. It was also more likely among multiparous women , those who had visited a health facility in the past year and those who read a newspaper weekly [11]. Survey-based studies from four sub-Saharan African countries [11], Lesotho [12] and Ghana [13] point to many of the same factors. Distance to a facility [14] and health insurance with access to information[15] have been studied as separate factors. Reviews of barriers across Africa describe low awareness, fear, cost, stigma and misconceptions [16,17]. Together, these findings point to a mix of personal, household and health-system influences.

What is missing is a national picture for Ethiopia. Women who live in the same community share the same services, norms and distance to care, so their chances of being examined are unlikely to be independent. A multilevel approach can separate a woman's own characteristics from those of her community. The 2024-25 Ethiopia Demographic and Health Survey (EDHS) offers a recent national dataset for this. It asked women whether a doctor or other health worker had ever examined their breasts for cancer. To our knowledge, no national EDHS based analysis of clinical breast examination has been published for Ethiopia. This study therefore estimated the prevalence of clinical breast examination among women aged 15-49 years in Ethiopia, and identified the individual- and community-level factors associated with it.

Materials and methods

Data source, study setting and study design

This study used data from the 2024-25 Ethiopia Demographic and Health Survey (EDHS), a nationally representative cross-sectional survey carried out from August 2024 to April 2025. The Ethiopian Public Health Institute (EPHI) implemented it with the Central Statistical Agency (CSA) and the Federal Ministry of Health (FMoH), with technical support from ICF International. The survey used a two-stage stratified cluster sampling design to select households across urban and rural areas in all 14 regions of Ethiopia. In the first stage, primary sampling units (clusters) were selected from the national sampling frame. In the second stage, households within each cluster were chosen by systematic random sampling. In total, 805 enumeration areas (clusters) and 22,540 households were included in the survey.

At the time of the survey, Ethiopia had 14 regional states and city administrations: Tigray, Afar, Amhara, Oromia, Somali, Benishangul-Gumuz, Sidama, Central Ethiopia, South West Ethiopia, South Ethiopia, Gambella, Harari, and the city administrations of Addis Ababa and Dire Dawa. We downloaded the data from the DHS Program repository (https://dhsprogram.com/data/dataset_admin/index.cfm) after obtaining permission from the ICF Institutional Review Board and the Ethiopian Public Health Institute.

Study population and sample size

We used the Individual Recode (IR) file, which holds the women's interview data. The survey interviewed 21,395 women aged 15-49 years. Of these, 555 women (2.6%) answered "don't know" when asked whether a health care provider had ever examined their breasts for cancer, and we excluded them. This left 20,840 women for estimating prevalence. The multilevel regression models included 20,721 women from 797 clusters, after we excluded a further 119 women who answered "don't know" on breast self-testing.

Individual-level variables were taken directly from the IR file. Community-level variables were created by summarizing the responses of women within each cluster and then splitting them into low and high groups at the median. Sampling weights were applied to the prevalence estimates, to account for the complex survey design and to make the results nationally representative. The multilevel models were fitted without weights. Detailed sampling procedures are available in the official EDHS reports[18].

Study variables and measurements

Outcome variable

The outcome was clinical breast examination. In the EDHS, women were asked whether a doctor or other health worker had ever examined their breasts to check for cancer "Has a doctor or other healthcare provider examined your breasts to check for breast cancer?", We coded women who answered "yes" as 1 and those who answered "no" as 0. Women who answered "don't know" were excluded from the analysis[11,19].

Explanatory variables

We chose the explanatory variables after reviewing earlier studies of breast examination and screening in sub-Saharan Africa [9,11,13,16,17]. They fall into individual-level and community-level factors.

Individual-level variables: These were the woman's age (15-24, 25-34 or 35-49 years), education (no education, primary, secondary or higher), household wealth index (poorest, poorer, middle, richer or richest), marital status (never married, married or living with a partner, or

widowed, divorced or separated) and number of children ever born (none, 1-2, 3-4, or 5 or more). We also included whether she had given birth in the last five years, whether she was currently pregnant, whether she was covered by health insurance, and whether she had visited a health facility in the past 12 months. Further variables were whether she considered distance to a health facility a big problem for getting medical help, media exposure, and whether she had ever done a breast cancer self-test. Media exposure was defined as reading a newspaper or magazine, listening to the radio, or watching television at least once a week. Women who answered "don't know" about self-testing were excluded from the regression models (119 women).

Community-level variables: These were place of residence, region, community-level poverty, community-level education and community-level media exposure. We built the last three by summarizing the responses of all women interviewed in each cluster. Community-level poverty was the proportion of women in the two lowest wealth quintiles. Community-level education was the proportion with at least primary education, and community-level media exposure was the proportion with any media exposure. Each proportion was then grouped as low or high, with clusters above the median classed as high.

Data management and statistical analysis

The data were analysed in Stata version 17, using the Individual Recode (IR) file. Women who answered "don't know" when asked about breast examination were excluded, and women who answered "don't know" about breast self-testing were left out of the regression models only. EDHS sampling weights were applied when estimating prevalence, so that the figures represent the national population.

The study women were described with weighted frequencies and percentages, and the prevalence of breast examination is reported with its 95% confidence interval, overall and by region. Candidate variables were first screened with bivariable multilevel logistic regression, and those with a p-value below 0.25 were considered for the multivariable models. Multicollinearity was assessed using the variance inflation factor (VIF), and no multicollinearity was detected among the independent variables.

Women in the same cluster tend to be more alike than women in different clusters. Multilevel mixed-effects logistic regression with a random intercept for each cluster was therefore used.

Four models were built. The null model had no explanatory variables and showed how much the outcome varied between clusters. Model I contained the individual-level variables only, and Model II the community-level variables only. Model III contained both sets together.

Fixed effects are reported as adjusted odds ratios (AOR) with 95% confidence intervals, and a p-value below 0.05 was taken as statistically significant. Random effects were summarised with the cluster-level variance, the intraclass correlation coefficient (ICC), the median odds ratio (MOR) and the proportional change in variance (PCV). These were calculated as ICC = V / (V + $\pi^2/3$), MOR = exp($\sqrt{}$(2V) × 0.6745) and PCV = (V_null − V_model) / V_null × 100, where V is the cluster-level variance [20]. The ICC is the share of the total variation that lies between clusters. The MOR expresses the same difference as an odds ratio between two women with the same characteristics living in different clusters. The PCV shows how much of the null model's variation each later model explains. Model comparison relied on the log-likelihood, deviance, Akaike information criterion (AIC), Bayesian information criterion (BIC) and likelihood-ratio tests. The model with the lowest deviance and AIC was considered the best fitting.

Results

Background characteristics of respondents

A total of 20,840 women aged 15-49 years with a valid response on clinical breast examination were included in the descriptive analysis, and 20,721 were included in the multilevel models. Close to two in five women were aged 15-24 years (39.3%), 31.2% were aged 25-34 years, and 29.6% were aged 35-49 years. Most lived in rural areas (65.4%), and a third (33.3%) belonged to the poorest and poorer wealth quintiles. About one in three had no formal education (32.5%), while 9.2% had higher education. Most women were married or living with a partner (61.5%), 29.3% had never married, and 9.3% were widowed, divorced or separated. By number of living children, 35.2% had none, 27.2% had one or two, 18.8% had three or four, and 18.8% had five or more. Overall, 43.7% had given birth in the last five years, and 6.0% were currently pregnant.

Health insurance covered 45.8% of the women, and 44.1% had visited a health facility in the past 12 months. Distance to a health facility was reported as a big problem by 39.8%. About one in three (35.2%) were exposed to media at least once a week, and 15.7% had ever done a breast cancer self-test. At the community level, 38.5% of women lived in communities with high

poverty, 48.5% in communities with high education, and 58.7% in communities with high media exposure. Oromia (38.5%) and Amhara (24.5%) contributed the largest shares of women (Table 1).

Table 1: Distribution of the study population by individual- and community-level characteristics, Ethiopia DHS 2024-25 (n = 20,840)

Variables	**Categories**	**Weighted frequency**	**Percentage**
Individual-level factors			
Age (years)	15-24	8,183	39.27
	25-34	6,491	31.15
	35-49	6,166	29.59
Education level	No education	6,763	32.45
	Primary	8,160	39.16
	Secondary	4,003	19.21
	Higher	1,913	9.18
Household wealth quintile	Poorest	3,315	15.91
	Poorer	3,616	17.35
	Middle	3,934	18.88
	Richer	4,501	21.60
	Richest	5,474	26.27
Marital status	Never married	6,098	29.26
	Married/living with partner	12,810	61.47
	Widowed/divorced/separated	1,932	9.27
Number of living children	None	7,335	35.20
	1-2	5,670	27.21
	3-4	3,915	18.79
	5 or more	3,920	18.81
Birth in the last five years	No	11,730	56.28
	Yes	9,110	43.72

Currently pregnant	No	19,582	93.96
	Yes	1,258	6.04
Health insurance coverage	Not covered	11,302	54.23
	Covered	9,538	45.77
Health facility visit in the past 12 months	No	11,653	55.92
	Yes	9,187	44.08
Distance to health facility	Not a big problem	12,553	60.23
	Big problem	8,287	39.77
Media exposure	No	13,503	64.79
	Yes	7,337	35.21
Breast cancer self-test	No	17,423	83.60
	Yes	3,271	15.70
	Don't know	146	0.70
Community-level factors			
Place of residence	Urban	7,222	34.65
	Rural	13,618	65.35
Region	Oromia	8,021	38.49
	Amhara	5,098	24.46
	South Ethiopia	1,450	6.96
	Addis Ababa	1,418	6.80
	Tigray	1,184	5.68
	Sidama	998	4.79
	Central Ethiopia	814	3.91
	Somali	611	2.93
	South West Ethiopia	596	2.86
	Benishangul-Gumuz	192	0.92
	Afar	182	0.88
	Dire Dawa	116	0.56
	Gambella	93	0.44
	Harari	67	0.32

Community-level poverty	Low	12,815	61.49
	High	8,025	38.51
Community-level education	Low	10,736	51.51
	High	10,104	48.49
Community-level media exposure	Low	8,606	41.30
	High	12,234	58.70

Prevalence of clinical breast examination

The weighted prevalence of clinical breast examination (CBE) among women aged 15-49 years in Ethiopia was 4.66% (95% CI: 4.15-5.23) (Figure 1). Prevalence varied widely by region, from 0.8% in Somali to 11.2% in Addis Ababa (Figure 2).

Figure 1: Prevalence of clinical breast examination among women aged 15-49 years, EDHS 2024-25 (n = 20,840).

Figure 2: Prevalence of clinical breast examination by region among women aged 15-49 years in Ethiopia, EDHS 2024-25 (n = 20,840).

The random effect analysis result

The intraclass correlation coefficient (ICC) in the null model showed that 20.9% of the total variation in clinical breast examination was due to differences between clusters, and the remaining 79.1% occurred within clusters. In the full model (Model III), which included both individual- and community-level factors, the ICC fell to 5.5%. The likelihood-ratio test against a single-level logistic model was significant in every model ($p < 0.001$ in the null model and $p = 0.0001$ in Model III), so a multilevel model was justified.

The median odds ratio (MOR) in the null model was 2.44. In other words, when a woman moves from a cluster with lower CBE uptake to one with higher uptake, her odds of having had a CBE increase by a median factor of 2.44. The MOR fell to 1.70 in Model I, 1.59 in Model II and 1.52 in Model III. A MOR of 1.52 shows that some unexplained difference between clusters remains even after adjusting for all the factors in the model, though it is much smaller than before. The

proportional change in variance (PCV) in Model III was 78.2%, so the individual- and community-level factors together explained about four-fifths of the between-cluster variation in the null model. Individual-level factors alone explained 64.8% (Model I), and community-level factors alone explained 72.8% (Model II).

Model comparison favoured Model III. It had the lowest deviance (5938.2), compared with Model I (6023.2), Model II (6769.7) and the null model (7086.7), and the lowest Akaike information criterion (6018.2). It also fitted significantly better than Model I ($p < 0.001$) and Model II ($p < 0.001$). The Bayesian information criterion, which penalizes the number of parameters more heavily, was lowest for Model I compared with Model III) (Table 2).

Table 2: Random effects and model fit statistics

Parameter	Null model	Model I	Model II	Model III
Community-level variance	0.870	0.306	0.237	0.190
ICC (%)	20.9	8.5	6.7	5.5
MOR	2.44	1.70	1.59	1.52
PCV (%)	Reference	64.8	72.8	78.2
Log likelihood	-3543.4	-3011.6	-3384.8	-2969.1
Deviance	7086.7	6023.2	6769.7	5938.2
AIC	7090.7	6069.2	6807.7	6018.2
BIC	7106.6	6251.8	6958.5	6335.7

The fixed effect analysis result

In the multivariable multilevel logistic regression model (Model III), breast self-testing, age, household wealth, number of living children, health insurance, a recent health facility visit and region were significantly associated with clinical breast examination (CBE) (Table 3).

Self-testing showed the strongest association. Women who had ever done a breast cancer self-test had more than five times the odds of having had a CBE compared with those who had not (AOR = 5.46, 95% CI: 4.60-6.48). Odds also rose with age: women aged 25-34 years had 65%

higher odds (AOR = 1.65, 95% CI: 1.28-2.11), and those aged 35-49 years had more than twice the odds (AOR = 2.15, 95% CI: 1.60-2.88), compared with women aged 15-24 years. Household wealth followed a steady gradient. Compared with the poorest quintile, the odds were 67% higher in the poorer (AOR = 1.67, 95% CI: 1.18-2.35), 85% higher in the middle (AOR = 1.85, 95% CI: 1.28-2.68) and 89% higher in the richer quintile (AOR = 1.89, 95% CI: 1.25-2.85). The richest women had 2.33 times the odds (95% CI: 1.42-3.80). Women with one or two living children (AOR = 1.48, 95% CI: 1.05-2.07) and three or four (AOR = 1.59, 95% CI: 1.09-2.31) had higher odds than women with none, whereas the estimate for five or more children did not reach significance (AOR = 1.47, 95% CI: 0.96-2.24). Women covered by health insurance had 27% higher odds (AOR = 1.27, 95% CI: 1.08-1.49), and those who had visited a health facility in the past 12 months had 43% higher odds (AOR = 1.43, 95% CI: 1.22-1.68).

Regional differences remained after adjustment. Compared with Tigray (the reference), women in Somali (AOR = 0.32, 95% CI: 0.14-0.73), South Ethiopia (AOR = 0.44, 95% CI: 0.28-0.69) and Sidama (AOR = 0.53, 95% CI: 0.32-0.86) had significantly lower odds of CBE. Women in Gambella (AOR = 1.75, 95% CI: 1.16-2.65) and Amhara (AOR = 1.48, 95% CI: 1.02-2.16) had higher odds. The remaining regions did not differ significantly from Tigray.

Education, marital status, a birth in the last five years, current pregnancy, distance to a health facility, media exposure, place of residence, community-level poverty, community-level education and community-level media exposure were not significantly associated with CBE in the final model (Table 3). Some of these factors were significant before adjustment. Higher education was associated with higher odds in Model I (AOR = 1.39, 95% CI: 1.04-1.84), and rural residence with lower odds (AOR = 0.68, 95% CI: 0.53-0.87) and high community-level education with higher odds (AOR = 1.31, 95% CI: 1.03-1.66) in Model II. All three lost significance once individual and community factors were included together.

Table 3: Factors associated with clinical breast examination among women aged 15-49 years in Ethiopia, EDHS 2024-25

Variables	Categories	Model I AOR (95% CI)	Model II AOR (95% CI)	Model III AOR (95% CI)
Individual-level factors				
Age (years)	15-24	Ref		Ref
	25-34	1.67 (1.30-2.14)*		1.65 (1.28-2.11)*
	35-49	2.26 (1.69-3.02)*		2.15 (1.60-2.88)*
Education level	No education	Ref		Ref
	Primary	1.15 (0.92-1.43)		1.11 (0.89-1.40)
	Secondary	1.26 (0.96-1.64)		1.17 (0.89-1.53)
	Higher	1.39 (1.04-1.84)*		1.31 (0.98-1.74)
Household wealth quintile	Poorest	Ref		Ref
	Poorer	1.58 (1.15-2.18)*		1.67 (1.18-2.35)*
	Middle	1.68 (1.21-2.33)*		1.85 (1.28-2.68)*
	Richer	1.88 (1.35-2.63)*		1.89 (1.25-2.85)*
	Richest	2.84 (2.02-4.01)*		2.33 (1.42-3.80)*
Marital status	Never married	Ref		Ref
	Married/living with partner	1.41 (0.99-2.01)		1.39 (0.98-1.98)
	Widowed/divorced/separated	1.46 (0.99-2.16)		1.36 (0.92-2.00)

Number of living children	None	Ref		Ref
	1-2	1.48 (1.05-2.07)*		1.48 (1.05-2.07)*
	3-4	1.53 (1.05-2.23)*		1.59 (1.09-2.31)*
	5 or more	1.34 (0.88-2.05)		1.47 (0.96-2.24)
Birth in the last five years	No	Ref		Ref
	Yes	1.04 (0.86-1.26)		1.04 (0.86-1.27)
Currently pregnant	No	Ref		Ref
	Yes	1.14 (0.87-1.51)		1.17 (0.88-1.55)
Health insurance coverage	Not covered	Ref		Ref
	Covered	1.28 (1.09-1.49)*		1.27 (1.08-1.49)*
Health facility visit, past 12 months	No	Ref		Ref
	Yes	1.54 (1.31-1.80)*		1.43 (1.22-1.68)*
Distance to health facility	Not a big problem	Ref		Ref
	Big problem	0.90 (0.75-1.08)		0.94 (0.78-1.13)
Media exposure	No	Ref		Ref
	Yes	1.00 (0.82-1.21)		1.04 (0.86-1.27)
Breast cancer self-test	No	Ref		Ref
	Yes	5.45 (4.60-6.46)*		5.46 (4.60-6.48)*
Community-level factors				
Place of residence	Urban		Ref	Ref
	Rural		0.68 (0.53-0.87)*	0.83 (0.61-1.14)
Region	Tigray		Ref	Ref
	Afar		0.78 (0.49-1.23)	1.32 (0.81-2.14)
	Amhara		1.68 (1.17-2.42)*	1.48 (1.02-2.16)*
	Oromia		0.74 (0.50-1.09)	0.74 (0.49-1.11)
	Somali		0.14 (0.06-0.32)*	0.32 (0.14-0.73)*
	Benishangul-Gumuz		0.49 (0.29-0.83)*	0.61 (0.36-1.04)
	Central		0.87 (0.58-1.32)	0.82 (0.54-1.25)

	Ethiopia			
	Sidama		0.38 (0.23-0.61)*	0.53 (0.32-0.86)*
	South West Ethiopia		0.59 (0.37-0.94)*	0.74 (0.46-1.19)
	South Ethiopia		0.53 (0.34-0.83)*	0.44 (0.28-0.69)*
	Gambella		1.20 (0.81-1.79)	1.75 (1.16-2.65)*
	Harari		1.01 (0.67-1.53)	0.92 (0.59-1.41)
	Addis Ababa		1.82 (1.28-2.60)*	1.20 (0.83-1.74)
	Dire Dawa		0.97 (0.64-1.46)	1.05 (0.69-1.61)
Community-level poverty	Low		Ref	Ref
	High		0.77 (0.57-1.04)	1.03 (0.74-1.44)
Community-level education	Low		Ref	Ref
	High		1.31 (1.03-1.66)*	1.12 (0.88-1.44)
Community-level media exposure	Low		Ref	Ref
	High		1.19 (0.90-1.58)	0.92 (0.68-1.24)

*Key: Ref: reference group; *p-value < 0.05*

Discussion

Breast cancer in Ethiopia is usually found late [6,7], and clinical breast examination (CBE) is one of the few early-detection tools that can reach women where mammography is scarce [8,9]. The national cancer control plan calls for CBE for women over 18 who attend health facilities, yet few women appear to receive one [10]. This study used the 2024-25 Ethiopia Demographic and Health Survey (EDHS) to estimate how many women aged 15-49 years have ever had their breasts examined by a health care provider, and to identify the individual and community factors behind the differences.

Only 4.66% (95% CI: 4.15-5.23) of women reported ever having had a CBE, which is about one woman in twenty. The EDHS final report gives a marginally lower 4.6% because it counts women who answered “don’t know” as not examined [21]. The figure is far below the 14.23%

pooled across six sub-Saharan African countries, where national estimates ran from 5.19% in Tanzania to 24.5% in Burkina Faso [11], and below the 15.41% reported across 14 low-resource countries [22]. In the same six-country analysis, Lesotho reached 9.7% and Kenya 14.0% [11]. Ethiopia therefore sits near the bottom of the regional range, close to Tanzania. It also matches a facility-based study in south central Ethiopia, where nine in ten women had never been examined [10]. Low coverage across the region has been linked to limited awareness of breast cancer and screening, shortages of trained staff and equipment, cost, stigma and fear[16,17,23].

About a fifth of the variation in CBE (ICC = 20.9%) lay between communities before any factor was considered, compared with 15.64% in the six-country analysis[11]. Individual and community characteristics together explained 78.2% of this variation, leaving an ICC of 5.5% and a median odds ratio of 1.52. In practice, whether a woman is examined depends mainly on her own circumstances and her region, and much less on the particular cluster she lives in.

In the final model, breast self-testing, age, wealth, number of living children, health insurance, a recent health facility visit and region were associated with CBE.

Breast self-testing showed the strongest association with CBE (AOR = 5.46; 95% CI: 4.60–6.48). This is consistent with a 2014 Lesotho DHS analysis, where women who performed BSE had 5.30 times the odds of CBE[12]. This could be due to women who perform BSE may possess greater knowledge of breast health, making them more receptive to clinical examination when offered. Health education and media exposure may simultaneously promote both self-examination and acceptance of CBE. Clinical encounters may also reinforce this association, as providers who perform CBE often teach women how to examine themselves. Because the DHS is cross-sectional, the association is best interpreted as co-occurrence of behaviours driven by shared awareness and service engagement.

The odds of CBE rose with age, reaching 2.15 times (95% CI: 1.60-2.88) at ages 35-49 compared with ages 15-24. This agrees with study done in African countries[11] and with reports from Botswana and four other sub-Saharan countries [19,24]. Breast cancer risk rises with age, so providers may examine older women more often, and these women have had more years in which to meet the health system. Number of living children followed a similar pattern. Women with one to four living children had 1.48 to 1.59 times the odds of women with none, which is

supported by previous studies[11,12]. This could be because women who have given birth more often have more contact with health providers during pregnancy and delivery, and these repeated encounters may increase their exposure to breast screening.

A steady wealth gradient appeared, with the richest women having 2.33 times the odds of the poorest, which is in line with studies conducted in Sub-Saharan countries [11,19]. Gradients by wealth have also been described in Botswana and across low-resource countries [22,24]. This could be due to wealthier women are better placed to pay for transport, consultation and related costs, and to reach a facility that offers the service. Health insurance added to this. Insured women had 27% higher odds (AOR = 1.27; 1.08-1.49), echoing Namibian findings that insurance coverage was linked to screening [15]. The insurance effect remained after wealth was accounted for, so extending cover to poorer women could help narrow the gap.

Insured women had 27% higher odds of CBE (AOR = 1.27; 95% CI: 1.08-1.49), as in Namibia [15]. Insurance lowers the cost of consultation, a known barrier to screening [17,23], and has been shown to reduce catastrophic health spending in Ethiopia[25]. Members also use health services far more than non-members [26], so they have more chances to be offered an examination.

Women who had visited a health facility in the previous 12 months had 43% higher odds of CBE, consistent with the six-country result (AOR = 1.64)[11] and studies from Lesotho [12,27]. Screening in low-resource settings is largely opportunistic, and Ethiopia's national plan expects health workers to offer CBE to women over 18 years who attend any facility [10,28], so a woman in contact with a facility is more likely to be in a position to be examined[29]. Yet 44.1% of women had visited a facility in the past year and only 4.7% had ever been examined, so at least 89% of visitors were never examined. These visits are missed opportunities.

Regional differences persisted after adjustment. Compared with Tigray, women in Somali (AOR = 0.32), South Ethiopia (AOR = 0.44) and Sidama (AOR = 0.53) had lower odds of CBE, whereas women in Gambella (AOR = 1.75) and Amhara (AOR = 1.48) had higher odds. Addis Ababa had the highest crude prevalence (11.2%), but its adjusted odds did not differ significantly from Tigray (AOR = 1.20; 0.83-1.74), which suggests that the capital's lead mainly reflects its wealthier and better-served population. The Somali result fits the wider picture of service use

there. In the 2019 mini-EDHS, antenatal care use was highest in Addis Ababa (82.7%) and lowest in Somali (11.3%) [30], and studies of pastoralist communities describe limited access to services and the demands of a mobile way of life [31].

Conclusion

Clinical breast examination uptake is low in Ethiopia: only about one in twenty women aged 15–49 years (4.66%) had ever had a clinical breast examination. Uptake was higher among women who had done a breast self-test, were older or wealthier, had one to four living children, were insured, or had visited a health facility in the past year. These findings suggest some practical directions. Routine facility contacts, including antenatal and postnatal care, family planning and outpatient visits, should become regular opportunities for CBE. Outreach should be directed to poorer women and to low-uptake regions such as Somali, South Ethiopia and Sidama. Wider insurance cover may help, and breast awareness messages, which appear closely tied to uptake, should reach women who rarely see a provider. Future surveys should record when and why an examination took place, so that progress can be tracked.

Strength and limitations:

The study draws on a recent, nationally representative survey and a multilevel design that accounts for clustering, which allows individual and community influences to be separated. To the authors' knowledge, it is the first national analysis of this outcome using the 2024-25 EDHS. Several limitations apply. The outcome is self-reported and may be affected by recall or social desirability bias. The survey asks whether a woman has ever been examined, so it gives no information on when, how often or why the examination took place, whether as screening or to investigate a symptom. The cross-sectional design rules out conclusions about cause. The DHS has no facility-level data, such as service availability or provider training, and no data on women's knowledge or attitudes, all of which probably influence uptake.

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Author contributions

ABB: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. BB: Investigation, Methodology, Visualization, Writing – review & editing. AAB: Methodology, Visualization, Writing – review & editing. HTW: Supervision, Software, Visualization, Writing – review & editing.

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Data availability statement

The original dataset utilized and analyzed in this research can be obtained from the DHS website at https://dhsprogram.com/data/dataset_admin/index.cfm.

Declarations

Ethical approval and consent to participate

All procedures adhered to applicable guidelines and regulations. This study, involving a secondary analysis of publicly accessible survey data from the MEASURE DHS program, did not necessitate ethical approval or participant consent. Permission to download and utilize the data was obtained from http://www.dhsprogram.com. The datasets used do not contain personal identifiers such as names or addresses of individuals or households.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

Abbreviations

AOR, Adjusted odds ratio; AIC, Akaike's information criterion; BIC, Bayesian information criterion; CBE, Clinical breast examination; EPHI, Ethiopian Public Health Institute; ICC, Intraclass correlation coefficient; PCV, Proportionate change in variance; WHO, World Health Organization

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Figures

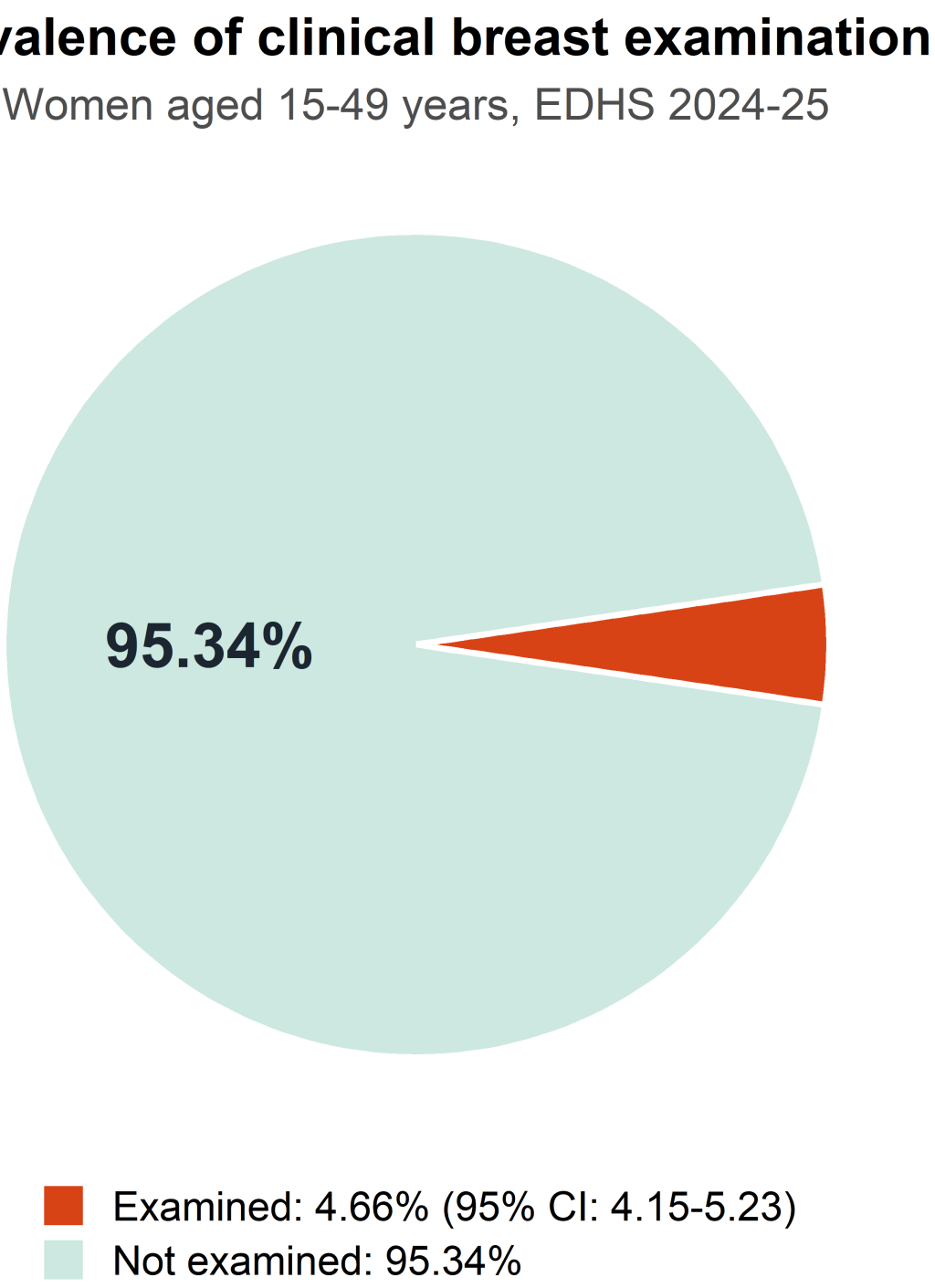


Figure 1

Prevalence of clinical breast examination among women aged 15-49 years, EDHS 2024-25 (n = 20,840).

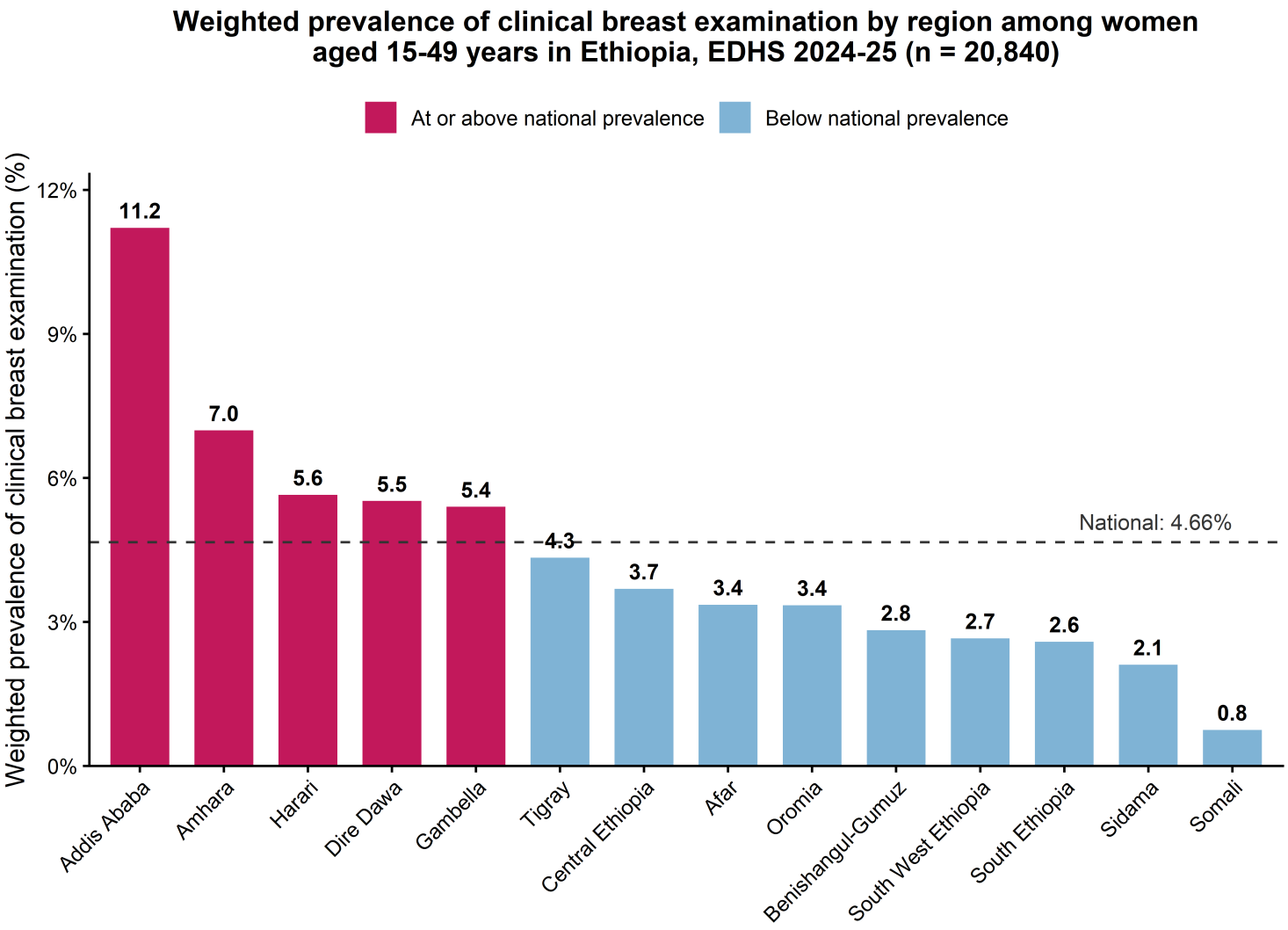


Figure 2

Prevalence of clinical breast examination by region among women aged 15-49 years in Ethiopia, EDHS 2024-25 (n = 20,840).