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Factors Associated with Delay in Breast Cancer Presentation at the Only Oncology Center in North East Ethiopia: A Cross-Sectional Study

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Background: Female breast cancer is becoming an emerging public health problem which accounts for 33% of all cancers in women and 23% of all cancer cases in Ethiopia. The majority of women with breast cancer are diagnosed at later stages due to delayed presentation to seek treatment.

Objective: To determine the prevalence and factors associated with patient delay at presentation among breast cancer patients at Dessie Referral Hospital, the only oncology center in North East Ethiopia.

Methods: We conducted an institution-based cross-sectional study among 204 female patients with pathology-confirmed breast cancer at the only oncology center of North East Ethiopia from January to June 2020. An interviewer administered questionnaire and a medical record data extraction tool were used to address the objective of the study. Patients were said to be delayed for diagnosis if the time duration between first clinical presentations to first clinical consultation was more than 3 months. Then, bivariable and multivariable logistic regression was employed to analyze the association between dependent and independent variables.

Results: Among a total of 209 eligible participants, 5 refused to participate with a response rate of 97.6%. The proportion of patients with delayed presentation was 103 (50.5%), with the median time taken to visit a healthcare provider after recognition of the first symptom was 4 months. Age above 40 years (AOR=4.81; 95% CI=1.26–18.65) $P<0.024$, college and above educational status (AOR=0.05; 95% CI=0.01–0.77) $p<0.036$, government employee (AOR=0.19, 95% CI=0.03–0.91) $P<0.002$, urban residence (AOR= 0.21; 95% CI=0.01–0.82) $p<0.001$, visit traditional healer (AOR=0.38; 95% CI=0.2–0.69) $P<0.0037$, and no lump in under armpit (AOR= 9.05; 95% CI=1.14–22.69) $P<0.002$ were associated with delayed presentation.

Conclusion: Delays to seek treatment is generally high in our study. Age, educational status, occupation, residence, visiting traditional healer, and absence of lump in under armpit were significant factors for delayed presentation. Intervention programs focusing on reducing delayed presentation should be employed.

Keywords: breast cancer, delayed presentation, North East Ethiopia

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Introduction

Breast cancer (BC) is the most commonly diagnosed cancer and leading cause of death among women worldwide, with an estimated 2.3 million new cases representing 11.7% of all cancer cases and more than 685,000 deaths in 2020.[1] BC is also the most frequently diagnosed and the leading cause of death in sub-Saharan Africa

with an estimated incidence and mortality rate of 22.4 and 17.9 per 100,000 populations respectively in 2020.[1,2] According to the Addis Ababa cancer registry, BC constituted 33% of cancers in women and 23% of all cancers in Ethiopia.[3]

In high income countries, more than 70% of BC patients are diagnosed at an early stage (stages I and II), and prognosis is good; however, in low and middle income countries (LMCs), the infrastructure and resources for routine screening mammography are often unavailable, and BCs are commonly diagnosed at late stages with only 20–60% of patients diagnosed in early stages of the disease.[4–6] Advanced stage diagnosis is associated with decreased survival time and increased mortality rates.[5,7] Due to this reason, mortality rates are often much higher in LMIC and survival is poorer compared with rates in developed countries.[8–10]

The morbidity and mortality associated with BC can be mitigated through early detection and receipt of evidence-based, high-quality care.[11] However, in Ethiopia, a large proportion of BC patients were diagnosed at an advanced stage,[12] mainly because of delayed presentation to the health facility after recognition of first symptoms and provider/health system delays in referral of patients to cancer treatment centers average 7 to 18 months.[13,14]

The Aarhus statement defines patient delay presentation as the time interval from the first date of recognition of the first symptom to first clinical presentation or date of the patient first presenting to the health facility.[15] Different factors have been identified in different studies for the increment of delayed presentation or lack of early healthcare seeking practice after recognition of first symptoms. These factors include: advanced age,[16,17] low literacy rates,[16,18–21] lower socioeconomic status,[16,22–24] being single,[19,20] residing in a rural area,[20,21,25] and negative family history[16,19] among the socio-demographic factors that are responsible for delayed presentation. Lack of breast self-examination,[20,25–27] lack of knowledge regarding the illness,[22,24,27] ignorance,[19,24,26,28] fear of cancer treatment and outcome,[22,27–29] lack of adequate healthcare service,[28,30] and use of alternative therapies (traditional medicine and spiritual acts)[15,22,24–26,29] are also important factors for delayed presentation.

The Ethiopian government drafted the Ethiopian National Cancer Control plan in 2015 for the period of 2016–2020 aimed at improving early diagnosis of breast cancer by promoting breast self-awareness and breast examination for all women coming to the health institution for another purpose.[31] In addition, the government has expanded the chemotherapy treatment centre in five regions, trained more health professionals, and collaborated with different stakeholders to build the capacity of the healthcare providers. Understanding the recent specific barriers to early diagnosis that Ethiopian breast cancer patients are facing is important for planning targeted interventions that help to mitigate premature death of women from breast cancer.

Therefore, this study aims to investigate the prevalence and factors associated with delayed presentation among breast cancer patients using a quantitative method in Dessie Referral Hospital, the only oncology unit in North East Ethiopia.

Methods

Study Design and Setting

An institution-based cross-sectional study design was employed among 204 women with breast cancer at Dessie Referral Hospital (DRH), the only oncology centre in North East Ethiopia, from January to June 2020. DRH is one of the referral hospitals in Amhara region with about 9 million catchment populations who came from more than 200 km away and is used as a teaching hospital for health science students. The hospital oncology centre started chemotherapy treatment for breast cancer patients since December 2018, and treated approximately 40 breast cancer patients per month according to the center's cancer registry.

Data Collection Procedure and Participants

All breast cancer patients who were 18^{+} years and had a clear pathological diagnosis of staging (stage I–IV) (newly diagnosed and on follow up treatment) attending the oncology centre during the data collection period were enrolled consecutively. Those women with breast cancer who were critically ill and unable to communicate during the data collection were excluded from the study.

The data were collected using a structured and pretested questionnaire adapted from reviewing different literatures which can address the objective of the study. Delayed presentation was the dependent variable, while socio-demographic variables like age, level of education, marital status, occupation, residence, number of children, time to come to nearby health facility and referral hospital, and household income; clinical variables like

hypertension, DM, HIV, and clinical staging; patient history on the diagnostic pathway (dates of first symptom recognition and first healthcare visit, first symptom interpretation, reasons to visit healthcare provider, number of consultations before coming to the hospital, use of traditional medicine, family history of breast cancer, and breast self-examination) and health system factors like type of health service at first consultation, breast examination performed by the physician at first contact, and recommendation of healthcare provider are the independent factors. Household income was collected in Ethiopian birr with currency of 1 US dollar=37.8 ETB at the time of data collection. The data were collected through face to face interview and clinical data were extracted from patient's medical charts.

Even though there is no single cut-off point for delayed presentation, this study was based on the recommendation of the Aarhus statement.[15] Based on this recommendation, waiting for >3 months before consulting a healthcare provider was considered as delayed presentation. Patients were retrospectively asked about the breast cancer diagnosis pathway from their first recognition of symptoms to first healthcare visit. We have used local events and holidays to make them remember the dates.

To maintain the quality of data, the data were collected by two BSc nurses from the oncology unit. Training was given to the data collectors and supervisors about the data collection, interviewing, and research ethics. Continuous monitoring and supervision was done by the principal investigator every day for completeness and clarification of the data. Then, the collected data were revised and possible errors were returned to the data collectors for correction on a daily basis. The questionnaire was first developed in English and translated to Amharic, and then translated back to English for consistency (Supplementary Materials). In addition, the questionnaire was pretested on 5% of breast cancer patients and appropriate corrections were made.

Statistical Analysis

Data were entered into EpiData 4.2 then exported to STATA 14 software for cleaning and further analysis. Simple descriptive statistics such as frequencies, means, and standard deviations were calculated. Then, to select the variables which are eligible for the multivariable logistic regression model, binary logistic regression was performed and those variables with $p<0.25$ were taken into the final model which is a multivariable logistic regression model. As a result, crude and adjusted odds ratio with 95% confidence interval was calculated using a backward selection method. A p-value of less than or equal to 0.05 was declared significant.

Ethical Consideration

Ethical clearance and approval was obtained from the institutional review board of Wollo University, College of Health Sciences with protocol number CMHS 5061/13/12. The study was conducted in accordance with the declaration of Helsinki and consent was taken from the patients by clearly informing the aim of the study and the information required from them and that being the study subject will have neither financial benefit nor clinical impact. Their right not to be involved in the study was guaranteed without affecting the quality of care delivered to them and the right to withdraw from the interview at any time they want was observed throughout the study. Informed written consent was taken from the study participants and was kept anonymous throughout data collection.

Result

Socio-Demographic Characteristics

Out of 209 eligible participants, 5 women with BC refused to participate in the study giving a response rate of 97.6%. Of which 60 (29.4%) were unable to read and write and 53 (25.9%) were married. The mean age was 44.1 years (SD: 11.8), and 109 (53.4%) were above 40. Half of them 98 (48%) were housewives and 106 (52%) were from an urban residence. Of all 177 (86.8%) women who gave birth, 85 (48%) had ≤3 children. Of all patients, 78 (38.0%) reported average monthly income between 1201 and 2500 birr per month and the median income was 2000 birr. The mean time taken to go to nearby health center was 32.64 (15.02) minutes and it took <4 hours to go to referral hospital for nearly half 112 (54.9%) of patients (Table 1 shows the socio-demographic characteristics of women with BC at DRH).

Clinical Characteristics and Awareness of BC Among Women with Breast Cancer

More than half of BC patients 135 (66.2%) have not heard about the disease before their illness. Out of 134 (65.69%) women with late stage diagnosis, a quarter of them 53 (25.5%) were diagnosed with stage III and 82 (40.2%) stage IV. Only 12 (5.9%) were diagnosed with stage I at

Table 1 Socio-Demographic Characteristics of Women with Breast Cancer at the Only Oncology Center of North East Ethiopia, 2020 (N=204)

Variables	Category	N (%)
Age	20–29	33 (16.2)
	30–39	62 (30.4)
	40–49	57 (27.9)
	50–59	30 (14.7)
	60–69	22 (10.8)
Age mean (SD)	44.1 (11.8)	
Level of education	Unable to read and write	60 (29.4)
	Completion of primary education	59 (28.9)
	Completion of secondary education	50 (24.5)
	College and above	35 (17.2)
Occupational status	Housewife	98 (48.0)
	Employed	46 (22.6)
	Merchant	32 (15.7)
	Farmer	28 (13.7)
Marital status	Single	19 (9.3)
	Married	53 (25.9)
	Divorced	84 (41.2)
	Widowed	48 (23.6)
Residence	Rural	98 (48.0)
	Urban	106 (52.0)
Gave birth	Yes	177 (86.8)
	No	27 (13.2)
Number of children	≤3	85 (48.0)
	3–5	56 (31.6)
	>5	36 (20.4)
Household income	≤1250	51 (25.0)
	1250–2000	78 (38.0)
	2001–3000	27 (13.0)
	>3001	48 (23.0)
Time to come to DRH (hours)	<4	112 (54.9)
	4–8	64 (31.4)
	8–12	28 (13.7)
Time to come to nearby health center mean (SD)	32.64 (15.05)	

first presentation. Out of 28 (13.7%) women with breast cancer who had comorbidity, 8 (28.5) were living with HIV and the rest 20 (71.5%) had hypertension. Out of 11 (5.4%) women who had family history of breast cancer, only 3 (27.2%) of them performed breast self-examination. Breast lump was the first presenting symptom of their illness for 117 (57.4%) patients, followed by breast pain and lump in under armpit 70 (34.3%) and 30 (14.7%) respectively (Table 2 shows the clinical characteristics and awareness of BC among women with breast cancer).

The median time taken to visit a healthcare provider after recognition of the first symptom was 4 months and 103 (50.5%) women were delayed for >3 months. Out of these delayed women, 75 (72.8%) were diagnosed at late stage (p<0.030). The reasons given by patients for seeking healthcare late were considering the disease as nothing serious 185

Table 2 Clinical Characteristics and Awareness of Women with Breast Cancer at the Only Oncology Center of North East Ethiopia, 2020 (N=204)

Variables	Category	N (%)
Have you heard of breast cancer	Yes	69 (33.8)
	No	135 (66.2)
Breast self-examination	Yes	11 (5.4)
	No	193 (94.6)
Family history of breast cancer	Yes	11 (5.4)
	No	193 (94.6)
Comorbid disease	Yes	28 (13.7)
	No	176 (86.2)
Stage at diagnosis	Stage I	12 (5.9)
	Stage II	57 (27.9)
	Stage III	53 (25.5)
	Stage IV	82 (40.2)
First change of breast	Breast lump	117 (57.4)
	Breast pain	70 (34.3)
	Swelling	21 (10.3)
	Discharge	15 (7.4)
	Dimpling	3 (1.5)
	Pulling in of nipple	17 (8.3)
	Lump in under armpit	30 (14.7)

(90.7%), followed by not having enough awareness about the breast symptoms 113 (55.4%) and visiting a traditional healer 68 (33.3%). Persistence of the symptom was the main reason to seek a healthcare provider for 200 (98%) patients (Table 3).

The larger proportion 71 (68.9%) of patients aged ≥40 years delayed at presentation as compared with those less than 40 years old 32 (31.1%) (P<0.001). A higher proportion 61 (59.2%) of rural resident women were significantly delayed than their counterparts (P<0.001). A significantly large proportion 42 (40.8%) of illiterate women were also delayed at presentation than those who had primary 35 (33.9%) and secondary and above educational levels 26 (35.2%) (P<0.001) (Table 3).

More than half 111 (54.4%) of the BC patients went to a nearby health center to seek medical treatment for the first time. Out of 70 (34.3%) women who visited ≥3 health facilities, 35 (50%) were delayed to come to this hospital (p<0.002). Breast examination was performed for almost all (97.1%) of them at initial consultation and biopsy/FNAC was advised for 139 (68.1%) (Table 3).

Factors Associated with Delayed Presentation

Binary and multivariable logistic regression analysis had been performed to assess the association, control confounding variables and identify the strength of association between the dependent variable delayed presentation with independent variables.

In the binary logistic regression (Table 4), patients aged >40 years (COR=3.67, 95% CI=2.05–6.56), single marital status (COR=3.06, 95% CI=1.03–9.11), parity of ≥3 (COR=1.2, 95% CI=1.1–6.15), and more than 3 consultations before coming to the hospital (COR=2.05, 95% CI=0.98–4.27) were significantly associated with delay presentation than their counterparts. Those with college and above level of education (COR=0.08, 95% CI=0.03–0.25), employed women (COR=0.19, 95% CI=0.09–0.44), urban residence (COR=0.39, 95% CI=0.23–0.69), >3001 household income (COR=0.38, 95% CI: 0.17–0.86), and not visiting a traditional healer (COR=0.38, 95% CI=0.21–0.69) were also significantly associated with delayed presentation (crude odds ratio (COR) and 95% confidence interval (95% CI) are shown in Table 4).

Variables significantly associated in the binary logistic analysis were further explored in the multivariable logistic regression (Table 5). As a result, only age, educational status, occupation, residence, visiting traditional healer, lump in under armpit, and comorbidity become important factors for delayed presentation. BC patients aged 40 and above years were 4.8 times more

Table 3 Comparison of Socio-Demographic and Clinical Characteristics, Awareness, Personal and Health System Factors with Delayed Presentation Among BC Patients at the Only Oncology Center of North East Ethiopia, 2020 (N=204)

Variable	Patient Delay		Chi-Square	*P* value
Socio-Demographic Characteristics	**<3 Months**	**≥3 Months**		
Age				
<40	63 (62.4)	32 (31.1)	20.08	<0.001*
≥40	38 (37.6)	71 (68.9)		
Level of education				
Unable to read and write	18 (17.8)	42 (40.8)	28.74	<0.001*
Completion of primary education	24 (23.8)	35 (33.9)		
Completion of secondary education	30 (29.7)	20 (19.4)		
College and above	29 (28.7)	6 (5.8)		
Occupation				
Housewife	38 (37.6)	60 (58.3)	17.94	<0.001*
Employed	35 (34.7)	11 (10.7)		
Merchant	14 (13.8)	18 (17.5)		
Farmer	14 (13.8)	14 (13.6)		
Residence				
Rural	37 (36.6)	61 (59.2)	10.42	0.001*
Urban	64 (63.4)	42 (40.8)		
Marital status				
Single	12 (11.8)	7 (6.8)	6.30	0.098
Married	19 (18.8)	34 (33.1)		
Divorced	46 (45.5)	38 (36.9)		
Widowed	24 (23.8)	24 (23.3)		
Parity				
≤3	49 (59.0)	36 (38.3)	7.91	0.789
3–5	22 (26.5)	34 (36.2)		
>5	12 (14.5)	24 (25.5)		
Household income				
≤1250	21 (20.8)	30 (29.1)	10.56	0.103
1250–2000	37 (36.6)	41 (39.8)		
2001–3000	12 (11.8)	15 (14.6)		
>3001	31 (30.7)	17 (16.5)		
Time to come to DRH				
<4	57 (56.4)	55 (53.4)	5.78	0.875
4–8	30 (29.7)	34 (33.1)		
8–12	14 (13.8)	14 (13.6)		
Awareness of breast cancer				
Yes	21 (20.8)	9 (8.7)	10.29	0.001*
No	80 (79.2)	94 (91.3)		

(*Continued*)

Table 3 (Continued).

Variable	Patient Delay		Chi-Square	*P* value
Socio-Demographic Characteristics	**<3 Months**	**≥3 Months**		
Clinical characteristics				
Comorbidity				
Yes	10 (9.9)	18 (17.5)	2.47	0.116
No	91 (90.1)	85 (82.5)		
Stage at diagnosis				
Early stage	42 (41.6)	28 (27.2)	4.69	0.030*
Late stage	59 (58.4)	75 (72.8)		
First change of breast				
Breast lump				
Yes	56 (55.5)	61 (59.2)	0.29	0.586
No	45 (44.5)	42 (40.8)		
Breast pain				
Yes	44 (43.6)	26 (25.2)	7.59	0.006*
No	57 (56.4)	77 (74.8)		
Lump in under armpit				
Yes	21 (20.8)	9 (8.74)	5.91	0.015*
No	80 (79.2)	94 (91.3)		
Personal factors for delay				
Interpret symptom as nothing serious	85 (84.2)	100 (97.1)	10.5	<0.001
Lack of awareness about the symptom	50 (49.5)	63 (61.2)		
Visit traditional healer	23 (22.7)	45 (43.7)		
Lack of money	24 (23.7)	41 (39.8)		
Thought it will relief by itself	91 (90.1)	95 (92.2)		
Family history				
Yes	4 (3.96)	7 (6.8)	0.81	0.370
No	97 (96.1)	96 (93.2)		
Health system factors for delay				
Recommendation of healthcare provider				
Nothing series	23 (22.7)	22 (21.3)	1.03	0.597
Infection	14 (13.8)	10 (9.7)		
Maybe cancer	64 (63.7)	71 (68.9)		
Referred by the clinician				
Yes	64 (63.4)	71 (68.9)	0.77	0.401
No	37 (36.6)	32 (31.1)		
Number of consultations before coming to DRH				
0–1	37 (36.6)	18 (17.5)	12.12	0.002*
2	29 (28.7)	50 (48.5)		
≥3	35 (34.6)	35 (33.9)		

Note: *Statistically significant at $p<0.05$.

Table 4 Binary Logistic Regression Analysis of Variables Associated with Delayed Presentation Among BC Patients at the Only Oncology Center of North East Ethiopia, 2020 (N=204)

Variable	Patient Delay		COR (95% CI)	*P* value
Socio-Demographic Characteristics	**<3 Months**	**≥3 Months**		
Age				
<40	63 (62.4)	32 (31.1)	1	
≥40	38 (37.6)	71 (68.9)	3.67* (2.05–6.56)	0.021*
Level of education				
Unable to read and write	18 (17.8)	42 (40.8)	1	
Completion of primary education	24 (23.8)	35 (33.9)	0.62 (0.29–1.33)	0.118
Completion of secondary education	30 (29.7)	20 (19.4)	0.28* (0.12–0.62)	0.036*
College and above	29 (28.7)	6 (5.8)	0.08*(0.03–0.25)	0.031*
Occupation				
Housewife	38 (37.6)	60 (58.3)	1	
Employed	35 (34.7)	11 (10.7)	0.19* (0.09–0.44)	0.002*
Merchant	14 (13.8)	18 (17.5)	0.81 (0.36–1.82)	0.757
Farmer	14 (13.8)	14 (13.6)	0.63 (0.27–1.47)	0.298
Residence				
Rural	37 (36.6)	61 (59.2)	1	
Urban	64 (63.4)	42 (40.8)	0.39* (0.23–0.69)	0.001*
Marital status				
Single	12 (11.8)	7 (6.8)	1	
Married	19 (18.8)	34 (33.1)	3.06 (1.03–9.11)	0.043*
Divorced	46 (45.5)	38 (36.9)	1.41 (0.51–3.95)	0.506
Widowed	24 (23.8)	24 (23.3)	1.71 (0.57–5.10)	0.333
Parity				
≤3	49 (59.0)	36 (38.3)	1	
3–5	22 (26.5)	34 (36.2)	2.10 (1.05–4.18)	0.034*
>5	12 (14.5)	24 (25.5)	1.2 (1.1–6.15)	0.016*
Household income				
≤1250	21 (20.8)	30 (29.1)	1	
1250–2000	37 (36.6)	41 (39.8)	0.78 (0.38–1.58)	0.485
2001–3000	12 (11.8)	15 (14.6)	0.87 (0.34–2.24)	0.781
>3001	31 (30.7)	17 (16.5)	0.38 (0.17–0.86)	0.021*
Time to come to DRH				
<4	57 (56.4)	55 (53.4)	1	
4–8	30 (29.7)	34 (33.1)	1.17 (0.63–2.17)	0.608
8–12	14 (13.8)	14 (13.6)	1.03 (0.45–2.37)	0.933
Awareness of breast cancer				
Yes	21 (20.8)	9 (8.7)	1	
No	80 (79.2)	94 (91.3)	2.74 (1.18–6.32)	0.037*
Clinical factors				

(*Continued*)

Table 4 (Continued).

Variable	Patient Delay		COR (95% CI)	*P* value
Socio-Demographic Characteristics	**<3 Months**	**≥3 Months**		
Comorbidity				
Yes	10 (9.9)	18 (17.5)	1	
No	91 (90.1)	85 (82.5)	0.52 (0.23–1.19)	0.120*
Stage at diagnosis				
Early stage	42 (41.6)	28 (27.2)	1	
Late stage	59 (58.4)	75 (72.8)	1.91 (1.05–3.43)	0.031
First change of breast				
Breast lump				
Yes	56 (55.5)	61 (59.2)	1	
No	45 (44.5)	42 (40.8)	0.85 (0.49–1.49)	0.586
Breast pain				
Yes	44 (43.6)	26 (25.2)	1	
No	57 (56.4)	77 (74.8)	2.28 (1.26–4.13)	0.006*
Lump in under armpit				
Yes	21 (20.8)	9 (8.74)	1	
No	80 (79.2)	94 (91.3)	2.74 (1.18–6.32)	0.018*
Discharge/ulceration				
Yes	9 (8.9)	6 (5.8)	1	
No	92 (91.0)	97 (94.2)	1.58 (0.54–4.61)	0.402
Pulling in of nipple				
Yes	10 (9.9)	7 (6.8)	1	
No	91 (90.1)	96 (93.2)	1.55 (0.55–4.12)	0.4252
Personal factors for delay				
Lack of money				
Yes	24 (23.8)	41 (39.8)	1	
No	77 (76.2)	62 (60.2)	0.47 (0.25–0.86)	0.015
Lack of awareness about the symptom				
Yes	50 (49.5)	63 (61.2)	1	
No	51 (50.5)	40 (38.8)	0.62 (0.35–1.08)	0.595
Thought it will relief by itself				
Yes	91 (90.1)	95 (92.2)	1	
No	10 (9.9)	8 (7.7)	0.76 (0.28–2.02)	0.592
Sought traditional/spiritual healer				
Yes	23 (22.7)	45 (43.7)	1	
No	78 (77.2)	58 (56.3)	0.38 (0.21–0.69)	0.002
Health system factors for delay				

(*Continued*)

Table 4 (Continued).

Variable	Patient Delay		COR (95% CI)	*P* value
Socio-Demographic Characteristics	**<3 Months**	**≥3 Months**		
Type of health service at first visit				
Health centre	47 (46.5)	64 (62.1)	1	
Private clinic	27 (26.7)	13 (12.6)	0.35 (0.16–0.75)	0.007*
Hospital	27 (26.7)	26 (25.2)	0.71 (0.36–1.36)	0.301
Recommendation of healthcare provider				
Nothing serious	23 (22.8)	22 (21.4)	1	
Infection	14 (13.8)	10 (9.71)	0.74 (0.27–2.03)	0.567
May be cancer	64 (63.4)	71 (68.9)	1.15 (0.59–2.27)	0.667
Referred by the clinician				
Yes	64 (63.4)	71 (68.9)	1	
No	37 (36.6)	32 (31.1)	0.77 (0.43–1.39)	0.401
Number of consultations before coming to DRH				
0–1	37 (36.6)	18 (17.5)	1	
2	29 (28.7)	50 (48.5)	3.54 (1.71–7.32)	0.001*
≥3	35 (34.6)	35 (33.9)	2.05 (0.98–4.27)	0.054*

Note: *Statistically significant at $p<0.25$.

likely to delay to health center than age less than 40 years (AOR=4.81; 95% CI=1.26–18.65). Besides, BC patients who had college and above educational status were 95% less likely to delay at presentation than women who were unable to read and write (AOR=0.05; 95% CI=0.01–0.77). Being employed was also an important predictor of delayed presentation in which employed BC patients were 0.14 times less likely to delay housewives (AOR=0.19, 95% CI=0.03–0.91). Similarly, patients who were from an urban residence were 79% less likely to delay than rural residents (AOR=0.21; 95% CI=0.01–0.82).

Breast cancer patients who have not visited a traditional/spiritual healer were less likely to delay than their counterparts. Those women who did not visit a traditional healer were 62% less likely to delay than who visited a traditional healer (AOR=0.38; 95% CI=0.2–0.69). Similarly, breast cancer patients who had no lump in under armpit were approximately 9 times more likely to delay than their counterparts (AOR=9.05; 95% CI=1.14–22.69) (Table 5 shows adjusted odds ratio with 95% confidence interval of multivariable logistic regression analysis).

Discussion

Our study assessed delayed presentation of women with breast cancer and its associated factors at Dessie Referral Hospital, the only oncology unit in North East Ethiopia. The study revealed that the median time taken to consult a health professional after noticing the first symptom was 4 months. The finding is in line with a multi-national analysis survey[32] and other studies conducted in low and middle income countries like Mali, Rwanda, and Senegal.[21,25,33] However, it was shorter than studies in Nigeria and Libya[26,34] which is 17 months and 7.5 months respectively. In contrast, it is longer than studies conducted in Brazil, China, and Egypt.[18,35,36] The discrepancy might be due to the difference in knowledge and awareness status of the study population among countries. As Ethiopia is a developing country with low awareness about noncommunicable disease including cancer, women may present late to a health facility.[31] Besides, in this study, a large proportion of women with breast cancer have not had enough awareness about the symptoms before their diagnosis, resulting in delayed patient presentation to seek treatment.

The proportion of patient delay accounts for 103 (50.3%), which is higher than studies in Pakistan, Iran,

Table 5 Factors Associated with Delayed Presentation of Women with Breast Cancer at the Only Oncology Center of North East Ethiopia, 2020 (N=204)

Variable	Patient Delay		COR (95% CI)	AOR (95% CI)	*P* value
	<3 Months	≥3 Months			
Age					
<40	63 (62.4)	32 (31.1)	1	1	
≥40	38 (37.6)	71 (68.9)	3.67 (2.05–6.56)	4.81 (1.26–18.65)	0.021*
Level of education					
Unable to read and write	18 (17.8)	42 (40.8)	1		
Secondary not completed	24 (23.8)	35 (33.9)	0.62 (0.29–1.33)	0.42 (0.14–1.24)	0.118
Secondary education completed	30 (29.7)	20 (19.4)	0.28 (0.12–0.62)	0.2 (0.05–0.94)	0.036*
College and above	29 (28.7)	6 (5.8)	0.08 (0.03–0.25)	0.05 (0.01–0.77)	0.031*
Occupation					
Housewife	38 (37.6)	60 (58.3)	1		
Employed	35 (34.7)	11 (10.7)	0.19 (0.09–0.44)	0.14 (0.03–0.91)	0.002*
Private	14 (13.8)	18 (17.5)	0.81 (0.36–1.82)	0.77 (0.14–4.03)	0.757
Farmer	14 (13.8)	14 (13.6)	0.63 (0.27–1.47)	0.41 (0.07–2.2)	0.298
Residence					
Rural	37 (36.6)	61 (59.2)	1		
Urban	64 (63.4)	42 (40.8)	0.39 (0.23–0.69)	0.21 (0.01–0.82)	0.001*
Lump in armpit					
Yes	21 (20.8)	9 (8.7)	1		
No	80 (79.2)	94 (91.3)	2.74 (1.18–6.32)	9.05 (1.14–22.69)	0.037*
Visit traditional healer					
Yes	32 (31.7)	45 (43.7)	1		
No	69 (68.3)	58 (56.3)	0.38* (0.2–0.69)	0.05 (0.01–0.27)	0.002*

Note: *Statistically significant at $p<0.05$.

and South Africa,[16,37,38] however, lower than Senegal, Tanzania, and Nigeria.[18,33,39] The difference might be due to the difference in sample size of the studies and different use of the cut-off point for classifying patient delay. Besides, large proportions (65.69%) of women with breast cancer were presented at an advanced stage. This is higher than studies reported in Egypt[36] (60%) and Morocco (46%).[40] However, these studies had been conducted with small sample size resulting in shorter median time and small proportion of advanced stage diagnosis.

More than three-quarters of patients with delayed presentation were diagnosed with advanced stages of BC at presentation. It has been reported in studies conducted in South Africa and Ethiopia[14,41] that delayed presentation will create a good environment for the progression of the disease resulting in advanced stage diagnosis.[38,40]

The main reasons given by women with breast cancer for coming late to the health facility were considering the disease as nothing serious, not having enough awareness about the symptoms, and visiting a traditional healer. These reasons were also mentioned in other areas of the Ethiopia northwest region, Iran, Mali, Pakistan, Nigeria, and Libya.[14,16,19,25,26,38]

Our study showed that age greater than 40, college and above educational status, occupation, urban residence, no lump under armpit, and visiting a traditional healer were significantly associated with patient delay in the multivariable logistic regression.

Age of 40 and above was associated with delayed presentation by 4.8 times. A similar study from China[35] also found that aged women tend to present later than their counterparts. Those women of age 40 and above may think the disease symptoms could be results of the aging process

and menopausal features neglecting the symptom and delay at presentation.

Women who had college and above educational status and employed were 95% and 86% less likely to delay than women who were unable to read and write and housewives respectively. Similar findings have also been reported in Pakistan[16] and Morocco.[40] This is explained by illiterate and unemployed women not having enough awareness and knowledge about the disease symptoms and severity, as they could not have access to health information, health education, and sociocultural impacts on health-seeking behaviors. Moreover, literacy and unemployment may also affect presentation due to economic and transportation issues. Besides, it has been reported that breast cancer knowledge about early detection and treatment is low in sub-Saharan Africa.[27]

Patients who were from an urban residence were also 79% less likely to delay than rural residents. Women who come from rural countries may have difficulty of transportation to a nearby health center and referral hospitals, traveling a long distance to get appropriate diagnosis, which in turn may result in delayed presentation. The finding is consistent with previous studies in South Africa, Morocco, and North West part of Ethiopia.[14,37,40]

Breast cancer patients who have not visited a traditional/spiritual healer before seeking medical treatment were less likely to delay than their counterparts. Those women who did not visit a traditional healer were 0.38 times less likely to delay than who visited a traditional healer. Similarly, findings from Libya[26] and Rwanda[21] also show that the main reason given by the patients for their delays was having tried traditional medicine first. Most women in developing countries believe to treat themselves by traditional remedies before going to a health facility. So, while taking those remedies, most patients delay to come to the health facility leading to worsening of symptoms and advanced stage.

Breast cancer patients who had no lump in under armpit were approximately 9 times more likely to delay than their counterparts. Similar findings have been reported in Libya and Ethiopia.[14,26] This might be because women may perceive their symptom as benign and self-limited and not consider the symptom as severe and affect their daily lives. It may also be due to poor practice of breast self-examination among women resulting in failure to detect breast lump unless advanced resulting in armpit swelling or lump. This may contribute to delayed presentation in seeking medical care.

Strength and Limitations

This is the first study conducted in the only oncology center of North East Ethiopia to determine the factors associated with presentation delay of breast cancer patients. As a result, its representativeness is high to the region. However, due to the cross-sectional nature of the study and small sample size, the study could not show a cause and effect relationship. Besides, recall bias could be a potential threat to the study, not remembering the exact date of their first symptom recognition, therefore the study should be used cautiously.

Conclusion

Delayed presentation with advanced breast cancer disease is common in the region. Many factors may contribute to this situation. Age above 40 years, illiteracy, unemployed occupation, rural residence, no lump under armpit, and visiting a traditional healer were the main factors contributing to the delay at presentation to a health facility after recognition of the first symptom.

Abbreviations

DRH, Dessie Referral Hospital; ETB, Ethiopian birr; LMIC, Lower and middle income countries; NRR, Nonresponse rate; OR, Odds ratio; SPSS, Statistical Package for Social Science.

Data Sharing Statement

The data for this study will be obtained from the corresponding author upon reasonable request.

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Disclosure

The authors declare no conflicts of interest in this work.

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