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Breast Awareness, Self-Reported Abnormalities, and Breast Cancer in Rural Ethiopia: A Survey of 7,573 Women and Predictions of the National Burden

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Disclosures of potential conflicts of interest may be found at the end of this article.

Key Words. Breast neoplasms • Health services • Ethiopia

Abstract

Background. Breast cancer (BC) is the most frequently diagnosed cancer and leading cause of cancer deaths among women in low-income countries. Ethiopia does not have a national BC screening program, and over 80% of patients are diagnosed with advanced stage disease. The aim of this study was to assess how many women self-report a breast abnormality and to determine their diagnoses in rural Ethiopia.

Methods. A community-based cross-sectional study was conducted among 7,573 adult women. Women were interviewed and educated about breast awareness, and those who reported breast abnormalities underwent clinical examination by experienced surgeons. Ultrasound-guided fine needle aspiration cytology (FNAC) was obtained, and cytological analysis was performed. The findings were projected to the female population of Ethiopia to estimate current and future burden of diseases.

Findings. Of the 7,573 women surveyed, 258 (3.4%) reported a breast abnormality, 246 (3.2%) received a physical examination, and 49 (0.6%) were found to be eligible for ultrasound-guided FNAC or nipple discharge evaluation. Of all the cases, five (10.2%) breast malignancies were diagnosed. We projected for Ethiopia that, approximately, 1 million women could self-report a breast abnormality, 200,000 women could have a palpable breast mass, and 28,000 women could have BC in the country.

Conclusion. The health care system needs to build capacity to assess and diagnose breast diseases in rural areas of Ethiopia. These data can be used for resource allocation to meet immediate health care needs and to promote detecting and treating BC at earlier stages of disease. ***The Oncologist*** 2021;26:e1009–e1017

Implications for Practice: Routine mammography screening in a resource-limited country with a young population is neither sensitive nor affordable. Clinical breast examination with consecutive ultrasound-guided fine needle aspiration cytology may ensure early diagnosis, downstage disease, and reduce breast cancer mortality. This study had the unique opportunity to educate over 7,573 rural women about breast abnormalities and offer clinical and cytological diagnosis for reported breast abnormalities. The findings were extrapolated to show the nationwide burden of breast abnormalities and unmet diagnostic needs. These data will serve as policy guide to improve adequate referral mechanisms and breast diagnostic and treatment facilities.

Introduction

In Ethiopia, breast cancer (BC) is the most frequently diagnosed and most prevalent cancer in women, as well as the second leading cause of cancer death. The recent publication of GLOBOCAN estimates an annual number of 15,244

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new cases and 8,159 deaths. A reported 25,156 women have been diagnosed with BC over the last 5 years [1–3]. This number is comparable to the estimated number of pregnancy-related deaths in the country, but BC care remains underfunded and underdeveloped. For a country of 107 million people, one centralized comprehensive cancer center with one radiation machine exists in the capital city of Addis Ababa. Patients with BC suffer from poor survival and are often diagnosed at a young age [4–5]. BC screening programs are not in place, and more than 80% of BCs are diagnosed at an advanced stage. Early detection of BC is an optimal approach to reduce premature BC deaths in developing countries [6–7]. Routine BC screening using mammography in a country with a young population is less sensitive, unaffordable, and not feasible in a resource-limited setting like Ethiopia [8–11]. Clinical breast examination followed by ultrasound-guided fine needle aspiration cytology (FNAC) is a simple and effective strategy to downstage disease and reduce BC mortality in resource-limited countries [12]. Studies have documented that the strategy is efficient without serious complications or adverse effects for the patients [13–17]. Clinical breast examination is recommended by guidelines [18] and was recently introduced in Ethiopia. To reach the general population, examination by lay volunteers has been shown to be effective but involves high costs [19]. This study aimed to assess and offer a diagnostic workup for women with self-reported breast abnormalities to investigate the magnitude of rural women who would use diagnostic services if public awareness and diagnostic health services were in place.

In the absence of up-to-date data on the magnitude of BC abnormalities and cancer in rural Ethiopia, developing tailored interventions for the future prevention and control of the disease are major challenges [20]. Identifying women with self-reported breast abnormalities provides the opportunity to detect untreated BC cases at early stages. The aim of this study was to estimate the proportion of adult women with self-reported breast abnormalities in a rural region of Ethiopia, assess the diagnosis of these abnormalities, and extrapolate the disease burden for the entire Ethiopian female population.

Materials and Methods

Study Design and Population

This community-based cross-sectional study was conducted at the Butajira Health and Demographic Surveillance Site (HDSS) in Ethiopia. The site is located in a densely populated area within a rural region in the South. The HDSS was created in 1986 to continuously collect longitudinal population health and health-related data and to provide infrastructure for additional studies. Currently, over 78,000 inhabitants are under surveillance in this site. The people reside in nine rural and one urban "kebeles" (neighborhoods) [21]. The kebeles are further classified based on geographic zones as highland, midland, and lowland areas. The area is considered a representative cross-section of Ethiopia's diverse population and living conditions, as over 73% of Ethiopia's female population lives in rural areas. Patients typically receive care in health posts or in health centers and then receive a more complex diagnostic workup and treatment for medical conditions in hospitals. In the context of BC, patients receive physical examination by surgeons, fine needle aspirations, surgeries, and endocrine therapies in the zonal hospital. Patients requiring chemotherapy or radiation would be sent to the regional hospital or to the national comprehensive cancer center, Black Lion Hospital, Addis Ababa, which at the time of this study has the country's only radiation machine. The data for this study were collected from March 2018 to April 2018.

Sampling Size and Sampling Procedure

The sample size of 7,580 women was calculated using the single proportional sample size determination formula. In similar settings of rural patients in sub-Saharan Africa, the reported proportion of women with a self-detected breast abnormality had been found to be 3.5% [22]. We assumed 10% variation in our setting, assuming 95% confidence intervals (CIs) and 0.8% margin of error. We used a design effect of 2 for intra-kebele correlation and 10% upward adjustment for nonresponses. A two-stage stratified cluster sampling technique was used. The demographic information of nine kebeles were reviewed for number of houses and number of female residents. Three kebeles were located in the highland area, three in the midland area, and three in the lowland area. All of the kebeles were considered rural (as defined by central statistics agency concepts and definitions) [23], except for one kebele located in a midland area.

Data Collection and Variables

Data on self-reported breast abnormalities were collected based on a structured data collection tool with options for open responses and were adapted from the National Comprehensive Cancer Network guidelines [18]. Prior to the actual survey, an assessment was conducted and revealed that women preferred face-to-face interviews by female interviewers. Female data collectors, health extension workers, and supervisors were instructed on breast self-awareness and the signs, symptoms, risk factors, and interventions for breast abnormalities, including clinical assessment by a surgeon, ultrasound-guided FNAC, and referral within the health care system when needed.

Twenty female data collectors and two supervisors collected data on sociodemographic factors, gynecologic history, breast health awareness, and whether participants sought care for medical problems within the health care system or with traditional healers. Women were asked if they had any breast abnormalities, including nipple discharge, mass, skin changes, burning sensation, nipple retraction, redness, pain, or any other condition felt to be abnormal compared with baseline. Women who reported self-detected breast abnormalities were further asked about any past history of breast problems and whether the symptoms resolved or persisted. Those with active complaints were referred to the nearby health center for a physical examination by a surgeon and consideration of ultrasound-guided FNAC. The surgeon performed ultrasound-guided FNAC for palpable breast lesions and cytologic assessment of nipple discharge. An experienced pathologist interpreted the cytology slides. Women diagnosed with suspected BC were referred for oncologic

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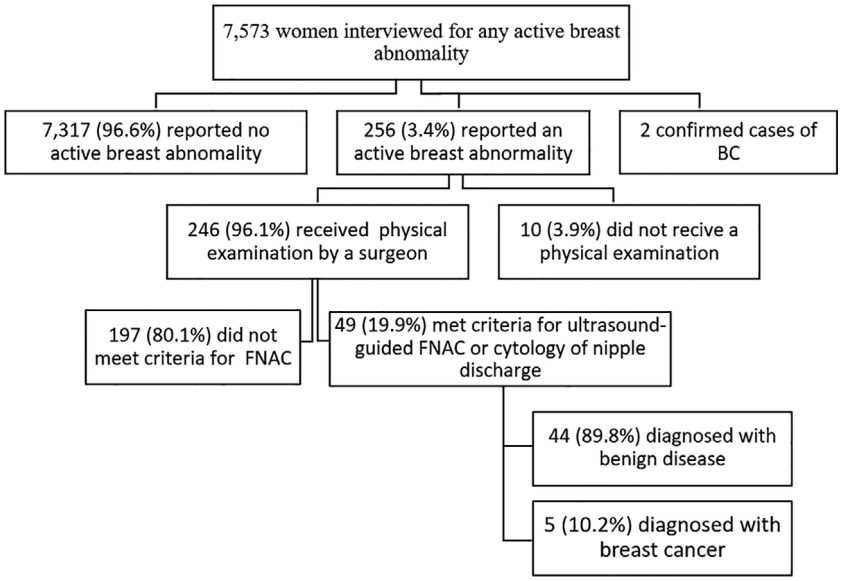

Figure 1. Diagram of self-reported breast abnormalities among study participants (five repeated FNACs). Abbreviations: BC, breast cancer; FNAC, fine needle aspiration cytology.

care at Butajira Hospital. Ethical clearance was obtained from the institutional review boards of the College of Health Science in Addis Ababa University. Written consent was obtained from each woman before starting the interview, and an informed consent was obtained from parents of participants between 15 and 18 years of age. Women with BC were linked to the nearby hospital for free oncology care.

Statistical Analysis

Data were checked for completeness and inconsistencies, entered into Epi Info version 3.5, and analyzed by statistical software SPSS version 23. Descriptive statistical methods were used to summarize sociodemographic, clinical, and pathologic characteristics and reported breast abnormalities. Projections of the burden of benign and malignant breast disease were computed as prevalence for the next 10 years. We assumed a moderate and rapid rate of Ethiopian population growth and increase in life expectancy [23–25]. Our predictions of future disease burden were based on projections from United Nations population data on the expected population growth and extrapolation within age-specific strata. Pearson chi-square and Fisher's exact tests were used to assess the factors associated with self-reported breast abnormalities (Fig. 1).

Results

Sociodemographic Characteristics

The mean ± SD age of the study participants was 35 ± 15 years. Breast abnormalities were self-reported more frequently among women between the age groups of 25–34 years and 35–49 years ($p < .001$). In our survey, 5,285 (69.8%) women lived in rural areas. We found that the majority of women, 5,066, (66.9%) were married, 3,944 (52.1%) had no formal education, 5,345 (70.6%) were Muslim, and 5,557 (73.4%) perceived themselves as having a "medium" economic status in their society (Table 1).

Breast Awareness, Symptoms of Abnormalities, and Treatment Sought

Of the total 7,573 women surveyed, 3,281 (43.3%) had heard about a breast examination, but only 1,188 (15.7%) had actually ever examined themselves. We found 256 (3.4%) women had current breast abnormalities. Women with reported breast abnormalities were asked about major symptoms: 130 (50.8%) reported pain, 91 (35.5%) reported a mass or lump and 7 (2.7%) reported nipple discharge. Respondents were asked for perceived causes of the symptoms: 169 (66.0%) mentioned sun stroke (locally known as "Mitch"), 57 (24.0 %) said "I do not know," and 14 (5.5%) thought their breast problem was cancer.

Of the 256 women who reported active breast abnormalities, 107 (41.8%) said they sought treatment before. Of these, 85 (79.4%) sought care at health facilities, 10 (9.3%) went to a traditional healer, and 12 (11.2%) visited both traditional healers and health facilities.

The 107 women then were asked about the care they received: 66 (61.7%) had received medication, such as analgesics or antibiotics; 14 (13.1%) had surgery (excisional biopsy); and 8 (7.5%) received traditional medicine (Table 2).

Reproductive Health Characteristics

Of the 256 women with current breast abnormalities, 135 (52.7%) used modern family planning methods. Of these, 16 (10.7%) took oral contraceptives. The mean age of menarche for the study participants was 15 years ± 1 year, and the age of first live childbirth was 19.6 years ± 2.7 years. The mean duration of breastfeeding was 2 years ± 0.6 years. We observed that breast abnormalities were associated with use of modern family planning methods ($p < .001$), current breastfeeding ($p < .001$), early age of menarche ($p < .001$), and older age at first birth ($p < .015$) (Table 3).

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Table 1. Sociodemographic characteristics of women in Butajira Health and Demographic Surveillance Site, Southern Ethiopia, 2018

Sociodemographic variables	*n* (%)
Age group	
15–24	1,959 (25.9)
25–34	2,047 (27.0)
35–49	2,200 (29.1)
>49	1,367 (18.1)
Residence	
Urban	2,288 (30.2)
Rural	5,285 (69.8)
Marital status	
Single	1,458 (19.3)
Married	5,066 (66.9)
Divorced/separated	219 (2.9)
Widowed	830 (11.0)
Education status	
No formal education	3,944 (52.1)
Could read and write	382 (5.0)
Primary education (grade 1–8)	2,147 (28.4)
Secondary education (grade 9–12)	876 (11.6)
Tertiary education (grade >12)	223 (2.9)
Religion	
Orthodox	1,513 (20.0)
Muslim	5,345 (70.6)
Protestant	711 (9.4)
Catholic	4 (0.1)
Perceived economic status	
High	155 (2.0)
Medium	5,557 (73.4)
Low	1,861 (24.6)

Medical Comorbidities and Social and Family History

Of the 256 women with reported breast abnormalities, 19 (7.4%) indicated that they had other medical problems. We found 68 (26.6%) reported that they had chronic diseases, such as kidney diseases (24 or 9.4%), hypertension (10 or 3.9%), cardiac disease (5 or 2.0%), tuberculosis (4 or 1.6%), diabetes (1or 0.4%), and other chronic diseases (not otherwise specified; 23 or 9.0%); 43 (16.8%) women reported a history of alcohol consumption, and 108 (42.2%) chewed khat, whereas we found that only two (0.03%) were ever smokers. A total of 33 (12.9%) women with reported breast abnormalities had a family history of BC, specifically, 25 (78.2%) in a first-degree relative (mother or sister) and 7 (21.2%) in a second-degree relative (uncles or aunts).

By comparison, 2.4% of women without self-reported breast abnormalities had a family history of BC (supplemental online Table 1). We found that self-reported breast abnormalities were associated with a family history of BC ($p < .001$), positive medical history of a chronic disease ($p < .001$), and a history of having an abnormality or mass in another part of the body ($p < .004$).

Table 2. Breast self-awareness and self-reported abnormalities among 7,573 women in Butajira Health and Demographic Surveillance Site, Southern Ethiopia, 2018

Questions	*n* (%)
Have you ever heard of breast self-examination?	
Yes	3,281 (43.3)
No	4,292 (56.7)
Have you ever examined your breast for abnormalities?	
Yes	1,188 (15.7)
No	6,385 (84.3)
Do you have any breast abnormalities now?	
Yes	256 (3.4)
No	7,317 (96.6)
What kind of symptoms did you have? (*n* = 256)	
Breast pain	130 (50.8)
Nipple discharge	24 (9.4)
Breast skin changes	4 (1.6)
Mass/lump	91 (35.5)
Nipple discharge/breast skin change	7 (2.7)
What did you think is the possible cause of the symptom? (*n* = 256)	
Sun stroke (“Mitch”)	169 (66.0)
I do not know	57 (24.0)
Cancer	14 (5.5)
Wound	8 (3.1)
Breastfeeding	3 (1.2)
Other	5 (2.0)
Did you seek treatment?	
Yes	107 (41.8)
No	149 (58.2)
Where did you seek care/treatment? (*n* = 107)	
Traditional healer	10 (9.3)
Health facility	85 (79.5)
Health facilities and traditional healers	12 (11.2)
What kind of care did you receive? (*n* = 107)	
Traditional healer/regions’ place (holy water)	8 (7.5)
Medication (painkiller/antibiotics)	66 (61.7)
Surgery	14 (13.1)
Other	3 (2.8)
Traditional/medication (painkiller/antibiotics)	12 (11.2)
Nothing	4 (3.7)

Diagnosis of Patients with Self-Reported Breast Abnormalities

We interviewed 7,573 women and found that 256 (3.8%) reported current breast abnormalities and 2 reported current known BC. Of the 256 women with self-reported current breast abnormalities, 246 (96.1%) underwent physical examination by a surgeon. The clinical diagnosis was documented. The surgeon determined that 121 (49.2%) women had breast tenderness or cyclical mastalgia, 54 (27.4%) had

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Table 3. Age and reproductive characteristics of study participants in Butajira Health and Demographic Surveillance Site, southern Ethiopia, 2018

Age and reproductive characteristics	Women with a breast abnormality, *n* (%)	Women without a breast abnormality, *n* (%)	*p* value
5-year age categories			
15–19	7 (2.7)	1,103 (15.1)	.015
20–24	33 (12.9)	817 (11.2)	
25–29	54 (21.1)	1,092 (14.9)	
30–34	49 (19.1)	851 (11.9)	
35–39	56 (21.9)	1,014 (13.9)	
40–44	21 (8.2)	647 (8.8)	
45–49	13 (5.1)	449 (6.1)	
50–54	12 (4.7)	403 (5.5)	
55–59	4 (1.6)	236 (3.2)	
60–64	4 (1.6)	297 (4.1)	
≤65	3 (1.2)	408 (5.6)	
Ever used modern family planning			
Yes	135 (52.7)	2,540 (34.7)	.001
No	121 (47.3)	4,777 (65.3)	
Type of family planning used			
Pills	16 (10.7)	310 (4.2)	
Implant	24 (16.1)	661 (9.0)	
Injectable/DPO	95 (62.9)	1,590 (21.7)	
IUCD	1 (0.7)	35 (0.5)	
Have you ever been pregnant?			
Yes	228 (89.1)	5,574 (76.2)	.001
No	28 (10.9)	1,743 (23.8)	
Are you currently breastfeeding?			
Yes	99 (43.9)	1,788 (32.1)	.001
No	130 (56.8)	3,781 (67.9)	
Age at menarche?			
≤11	11 (4.3)	47 (0.6)	.001
12	1 (0.4)	165 (2.3)	
13	17 (6.6)	565 (7.7)	
14	56 (21.9)	1,624 (22.2)	
≥15	171 (66.8)	4,916 (67.2)	
Age at first birth?			
<19	107 (46.9)	2,997 (54.0)	
19–24	100 (43.9)	2,249 (40.6)	.001
≥25	21 (9.2)	299 (5.4)	

Abbreviations: DPO, Depo-Provera; IUCD, intrauterine contraceptive device.

physiological changes because of pregnancy and lactation, 12 (6.1%) had bacterial infection or breast abscess, and 49 (19.9%) had a palpable breast mass or nipple discharge, which met criteria for ultrasound-guided FNAC or cytologic examination. On final pathology review of those 49 cases, the most common diagnosis was benign breast disease (Fig. 2). Five patients (10.2%) were diagnosed with BC after clinical examination and FNAC.

Clinical Presentation and Physical Examination of Women with Breast Abnormalities

We calculate the prevalence of BC to be 66 per 100,000 adult women (95% CI, 8–123 per 100,000). When including the two cases of already confirmed BC in our survey population, we calculated the prevalence of BC among rural women as 92 per 100,000 women (95% CI, 24–161 per 100,000). The mean age of women with BC was 58 ± 7.8 years. Of the women aged >49 years, nine presented with breast abnormalities, and four were diagnosed with breast cancer, whereas only 1 of 40 (81.6%) women aged <50 years was diagnosed with BC. In contrast, the mean age of women with benign breast diseases was younger, 36 ± 1.5 years. We found that BC was associated with the age group ≥49 years ($p < .002$) and with age at first birth ($p < .001$). The mean duration of illness for women with BC was 6 ± 1.5 years, whereas the mean duration of illness was 2.7 ± 0.7 years for women with benign breast diseases ($p = .001$). The average size of the mass for patients with BC was 6 cm. The mean size of the benign breast masses was 2.2 cm.

Two women interviewed had been previously diagnosed with BC. The first patient, who was aged 56 years and had received surgery, was taking adjuvant tamoxifen with regular follow-up and surveillance. The second patient was aged 78 years and had been referred to the capital city of Addis Ababa for treatment. She declined to travel to Addis Ababa because she reported a negative perception of the outcome.

Five women who participated in the survey were ultimately diagnosed with BC. The first patient, aged 80 years, presented with a locally advanced ulcerated lesion >5 cm, was referred for care within the health system, was found to have metastatic disease, and then received tamoxifen. The second patient, aged 56 years, presented with an inoperable ulcerated breast lesion greater than 5 cm. She declined all forms of treatment because of negative perceptions about the outcome and ultimately died 9 months after her diagnosis at home. The third patient, aged 48 years, presented with an ulcerating inoperable tumor measuring 4 cm, was found to have metastatic disease, and received tamoxifen. The fourth patient, aged 35 years, presented with an ulcerating tumor measuring 3 cm (grade 1), received tamoxifen, and died 6 months after her diagnosis. The fifth patient, aged 70 years, presented with an ulcerating 3 cm breast mass and declined surgery and all forms of treatment, stating, "I do not want to lose my breast."

Future Burden of BC and Breast Abnormalities in Ethiopia

We projected our findings to the general population of Ethiopian women and also accounted for anticipated population growth over the next 10 years. We found that the number of self-reported breast abnormalities could increase from 1.0–1.1 million in 2018 to 1.3–1.5 million in 2028. We project 196,868 to 210,604 breast abnormalities could have met the criteria for ultrasound-guided FNAC in 2018 in the entire country. When projected to 2028, we calculate that 241,263 to

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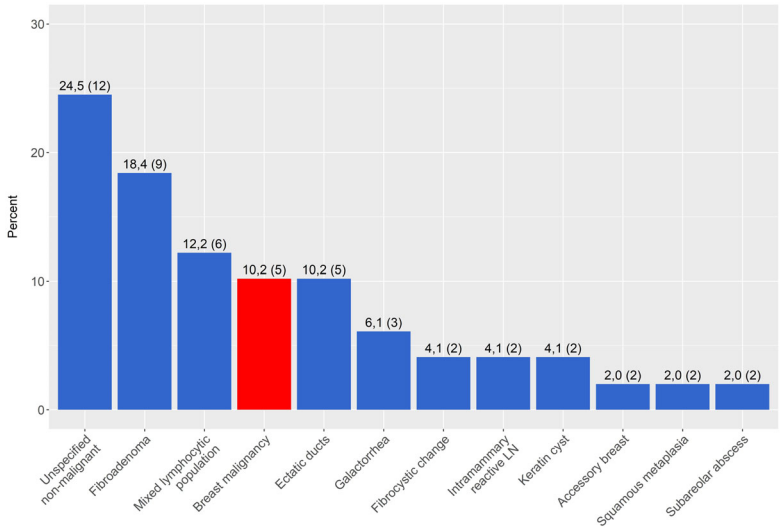

Figure 2. Fine needle aspiration cytology findings of women with a breast mass (*n* = 49).
Abbreviation: LN, lymph node.

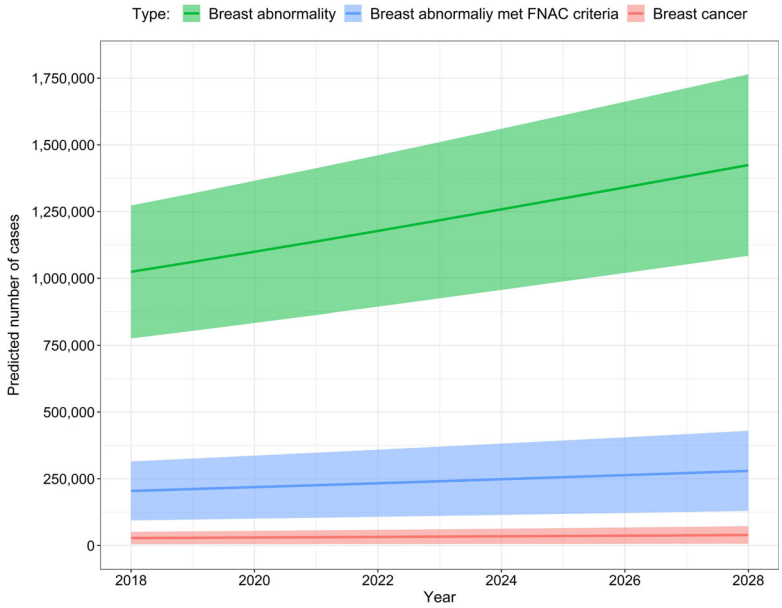

Figure 3. Projected absolute number of reported breast abnormalities (green), palpable breast abnormalities meeting criteria for fine needle aspiration cytology (blue), and cases of breast cancer (red) in Butajira 2018–2028 (projection based upon fast population growth and population pyramid 1950–2100 projection).
Abbreviation: FNAC, fine needle aspiration cytology.

281,777 women would need diagnostic services around the country, an estimated 647 per 100,000 adult women.

The projected BC numbers will increase from an estimated 27,967 (95% CI, 4,759–51,175) in 2018 to 39,552 (95% CI, 6,667–72,436) in 2028, with a prevalence rate of 92 per 100,000 adult women. The average percentage increase in absolute number of BC cases between 2018 and 2028 is 32.6%–33.8%. The annual average percentage increase is 3.3%–3.4% per year. We categorized the data in three age groups. The projected increase in BC cases among women aged 35 to 49 years will increase from 6,509 in 2018 to 9,616 in 2028, a 47.7% increase. We predict that the prevalence of BC in 2028 will be 90 per 100,000 adult women in this age bracket. For women aged ≥50 years, the number of BC cases will increase from 21,406 in 2018 to 30,112 in 2028, a 40.7% increase (Fig. 3). The prevalence for this age group will be 366 per 100,000 adult women.

Discussion

This study is, to our knowledge, the first large population-based study to assess self-reported breast abnormalities among adult women in rural Ethiopia. We observed that self-breast awareness in 7,573 rural women was low. Importantly, 84.5% of women reported they never had examined their breasts, and 96.6% of women stated that they did not have a breast abnormality. This study enabled the unique opportunity to educate over 7,573 women about breast

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awareness. We were able to further evaluate 246 women with self-reported abnormalities, confirmed 49 breast masses by physical examination that met criteria for FNAC, and found seven cases of BC in the region. Three women who otherwise would not have received any attention for their BCs were linked with oncologic care services within the region. We have projected the future needs for breast care in the Ethiopian health care system, focusing on the rural population.

The magnitude of future cases of breast abnormalities, demand for diagnostic services, and need for treatment of BC cases were projected for the next 10 years based on predictions for population growth and aging in the country. The proportion of women with self-reported breast abnormalities in our normal population was 3.4%, which was similar to studies from other African countries [22, 26]. These finding were lower than a study conducted in Malawi that reported a prevalence of 7% with regard to breast abnormalities [27]. This difference could be explained by the fact that the researchers in that study used trained breast health workers to examine breast abnormalities; therefore, this method may have had a higher probability of identifying abnormalities compared with the method of self-reporting abnormalities. The major limitation of our study is that it may underestimate the actual burden of disease. We predict, based on population changes alone, that the future demand for breast diagnosis in the next 10 years will be 1.5 million for women with self-reported breast abnormalities. We project that 281,777 women with breast abnormalities may meet the criteria for FNAC, and we project that 40,254 BC cases could be identified. A limitation of this study is that we projected future disease burden by extrapolating our regional survey data to make predictions for the national burden, assuming a quickly growing and aging population. We believe that these data to a certain extent reflect the actual population because our sample survey of women in the rural region consisted of demographic characteristics, like age distribution and rural residence, that mirror the national composition of the population. We did not adjust our projections for rural/urban differences because few urban women were included in our sample. In an area without diagnostic service or breast cancer screening program, we were unable to assess the incidence of breast cancer.

We were able to survey behaviors of women when they self-detected an abnormality and found that few sought medical attention. This finding is consistent with another study that showed a high unmet need of addressing breast abnormalities in developing countries because of the low severity of symptoms, financial constraints within the health care system, low awareness about breast abnormalities among health care professionals and the public, and general lack of access to medical care [28].

We were able to provide further analysis of the underlying diagnosis in 3.4% of patients who self-detected their abnormalities, and we identified associated factors. A considerable number of young women in our study reported cyclical breast swelling, tenderness, and pain, which might be explained by hormonal changes related to lactation, pregnancy, and the menstrual cycle in a young age group.

In our study, a higher proportion of BC was diagnosed among women over the age of 49 years who complained of a breast abnormality. This finding concurred with findings from Rwanda that reported a higher proportion of BC cases among women aged $\geq$50 years with a palpable mass [29].

For those women with a confirmed palpable breast mass who underwent ultrasound-guided FNAC by a surgeon, the majority had benign breast disease. We found seven women with BC. These findings were lower than a study conducted in Kenya that reported 14 cases of BC among 1,094 adult women [30]. This difference could be explained by the fact that our study population was younger and BC was diagnosed only in women with self-reported breast abnormalities; we have not been able to detect BC among asymptomatic women. Those with confirmed cases of BC had late stage disease. In five cases, these women with BC were not aware of their disease. The low awareness about breast cancer and treatment may be due to a variety of reasons, including lack of health care seeking behavior, lack of access to BC diagnostic services, and lack of routine BC early detection programs in the country [10]. Had these women not participated in our survey, it is quite possible they could have remained untreated for their disease and ultimately died in their homes, without knowledge of the cause of death. As a result of participating in our survey, three women received tamoxifen treatment, and two declined any formal treatment.

This survey allowed us to interview seven rural women who we diagnosed with BC, discuss their perceptions of the disease, and follow their clinical course. Two women died 9 months after their diagnoses; they had declined oncologic care. The major reasons were related to their negative perception about outcome, fear of mastectomy, and no knowledge of any BC survivors. All seven women perceived being diagnosis with BC as a death sentence. We observed that the late presentation of BC with unfavorable outcome was contributing to the negative perception about BC. Raising awareness that the early detection of BC improves outcomes is needed.

The findings in our study underestimated the disease burden of breast abnormalities because clinical examination was performed only on symptomatic patients. Nevertheless, it provides a starting point to plan resource allocation in the health care system. In accordance with the National Cancer Control Plan, the Ethiopian health care system is improving access to adequate breast diagnostic and treatment facilities in rural part of the countries to respond to the unmet needs of breast abnormalities among women. The population is aging, and resource allocation for future cancer control initiatives needs to be planned. When the country increases breast awareness, it would be informative to survey this region again and find out if BCs are detected at earlier stages of disease.

As the country develops education initiatives to increase breast awareness among rural women, the findings from our survey of this area will be informative. We found the majority of women were married, Muslim, between the ages of 25 and 49 years, and perceived themselves as of ‘‘medium’’ economic status. The majority of women had children, and approximately 50% were using forms of

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contraception. Therefore, opportunities for increasing breast awareness could exist in the clinical setting where women receive gynecologic care. Barriers to seeking breast care may also involve the following: level of education and access to information, perceptions of the female body and breast examination, fears of the diagnostic and treatment interventions, and balancing other family needs, such as being mothers and caregivers [28, 31–35]. Such factors should be considered when developing educational materials with small focus groups to assess the effectiveness of messaging and content.

Evaluating palpable breast masses with ultrasound-guided FNAC offers a cost-effective approach for the early detection of BC in less developed countries that lack routine BC screening programs with mammography [36]. In a low-income country like Ethiopia, where more than three-fourths of the female population is aged <50 years, mammographic BC screening is not recommended [37].

Conclusion

A considerable prevalence of self-reported breast abnormalities of 3.4% among nearly 8,000 women and seven BC cases were found in rural Ethiopia. Only half of the women knew about and only one in eight had practiced breast self-examinations in the past. Only one-third of the women sought formal health care after being aware of abnormal breast changes. Breast awareness campaigns may inform the population. Of seven BC cases, only two had been diagnosed before. The other patients had clinically locally advanced disease, but even after a confirmed diagnosis, only three women opted for care within the health care system. This vicious cycle of late presentation, short survival, and fatalistic attitude in patients must be addressed.

The Ethiopian national cancer control initiatives must respond to the increasing burden of BC in rural and urban areas and address the need for breast examination, diagnostic services, and treatment. Ethiopia's health care system should develop tailored interventions to track BC at an early stage. Initiatives could mobilize groups of BC survivors, who may play an important role to raise awareness, alter negative perceptions, and inform ways to improve care in a complex health care system.

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