

Quality of Life of Breast Cancer Patients in Amhara Region, Ethiopia: A Cross-Sectional Study

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1 **Quality of life of breast cancer patients in Amhara region,**
2 **Ethiopia: a cross-sectional study**

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Abstract

Background: Although breast cancer has a markedly higher incidence in developed countries, 50% of the new diagnosis and 70% of deaths occur in developing countries. There are limited data available on the quality of life among breast cancer patients in Ethiopia, notably in the Amhara region. This study aimed to assess the quality of life and associated factors among patients with breast cancer in the Amhara Region, Ethiopia, 2019.

Methods: Institutional based cross-sectional study was conducted from March 25 to July 7/2019 among 256 patients with breast cancer in the Amhara region. A systematic random sampling technique was used. Data were collected by using a standardized interviewer-administered Amharic version of the European Organization for research and treatment of cancer quality of life questionnaire core 30(EORTC QLQ C30) and breast cancer supplementary measure (QLQ-BR23). Data were analyzed by SPSS version 23. A binary logistic regression model was fitted to identify the associated factors. The odds ratio (OR) with 95% confidence interval (CI) was used to measure the strength of association.

Results: Sixty-eight point four percent (68.4%) of breast cancer patient's QoL was poor. The mean score of quality of life was 70.6(standard deviation (SD) \pm 13.9; 95% CI: 69.0-72.4). All functional component scores were less than 75, from the symptom scale; diarrhea (11.6), constipation (17.5), and dyspnea (24.7) were less noticeable. Unmarried patients (AOR=2.59, 95% CI: 1.32-5.07), poor (AOR=2.39, 95%CI: 1.32-5.03), non housewife (AOR=3.25, 95% CI: 1.16-7.22), and complaints to dyspnea (AOR=3.48, 95% CI: 1.79-6.79), and insomnia (AOR=2.03, 95% CI: 1.05-3.91) were significantly associated with quality of life.

Conclusions:-Health care professionals should give attention to unmarried, and non-housewife breast cancer patients, besides the treatment to improve the health of breast cancer patients.

Keywords: Quality of Life, Breast Cancer, Amhara region, EORTC QLQ

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24 **1. Introduction**

25 Breast cancer is the leading cause of cancer-related mortality among women worldwide [1-5]. Globally,
26 in 2018, an estimated that 627,000 women died from breast cancer, which accounts for 15% of all
27 cancer deaths among women. Approximately, 2.1 million new cases were diagnosed per year[5]. In
28 Ethiopia, breast cancer is the most prevalent type of cancer and the leading cause of high mortality
29 among women[6] and accounts for 34% of all female cancer cases[7]. In 2018, over 15,000 breast
30 cancer cases were diagnosed, and an estimated 8,000 cases were died[5]. In Ethiopia, about
31 15,244(32.9%) new breast cancer cases were diagnosed, also the incidence and mortality rate of breast
32 cancer were 42 and 23 per 100,000 respectively[8].

33 The World Health Organization (WHO) defines the quality of life (QoL) as “an individual’s perception
34 of their position in life in the context of the culture and value systems in which they live and in relation
35 to their goals, expectations, standards, and concerns.” It is a broad-ranging concept affected in a
36 complex way by the person's physical health, psychological state, personal beliefs, social relationships,
37 and their relationship to salient features of their environment[9].

38 The consequences of breast cancer in the poorest settings are socially and economically devastating[10].
39 QoL plays an increasingly important role in treatment decisions, and it has become an obligatory aspect
40 of evaluating new treatments[11]. Better QoL has been associated with longer survival of patients with
41 cancer[12].

42 The impairment in the QoL starts from the diagnosis of cancer and continues with the aggressive nature
43 of treatment[13]. QoL in breast cancer is influenced by the disease itself (direct disease effects, stage at
44 diagnosis and clinical course), the treatment of the disease[14], comorbidity[15], age at presentation,
45 race or ethnicity, and socioeconomic status. Oncologic medical treatments may lead to QoL

46 improvements but, sometimes, a wide variety of side effects can arise bringing about significant health-
47 related complaints[16]. The most common systematic chemotherapeutic side effects; nausea, and
48 vomiting, followed by fatigue [14, 17], which can be emotionally distressing and debilitating which in
49 turn may affect their QoL. Women receiving chemotherapy and took more than three cycles of
50 chemotherapy had lower QoL[18, 19].

51 Studies show that at the age of 51 to 60 years[20]and a young age [21], unmarried patients[20, 22] were
52 associated with poor QoL. However, studies show that; higher household income [23], older than 55
53 years of age, post-menopausal, stage I malignancy, patients who have completed treatment, and patients
54 who underwent breast-conserving surgery were more likely to have a better QoL[24]. In a study in
55 Black Lion hospital, educational status of college and above had good QoL than patients with no formal
56 education, and divorced mothers were more likely to have good QoL than singles marital status[19].

57 Even though in Ethiopia breast cancer is among the leading causes of morbidity and mortality among
58 women, few published studies have been conducted so far on the QoL in breast cancer patients[19]. It is
59 important to include patients in various treatment categories; surgery, chemotherapy, and post-treatment
60 follow-up, it gives broad pictures of the issue of the QoL. Therefore, this study was probably the first
61 study tried to assess the QoL and associated factors among breast cancer patients in the Amhara region
62 using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire
63 Core 30 (EORTC QLQ C30) and breast cancer supplementary measure (QLQ-BR23) instrument. Thus,
64 identifying the associated factors of QoL may provide insights into how to improve living conditions in
65 breast cancer patients and, their survival.

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68 **Materials and Methods**

69 **Study setting and Population**

70 An institution-based cross-sectional study design was employed in oncology centers of three public
71 hospitals in the Amhara regional state. The three public hospitals considered in the study were Felege
72 Hiwot Comprehensive Specialized Hospital (FHCSH), Gondar Referral Teaching Hospital (GRTH), and
73 Dessie Referral Hospital (DRH). FHCSH is located in Bahir Dar city 565 Km away from Addis Ababa,
74 the capital city of Ethiopia. The hospital started oncology services in April 2016 with 18 inpatient beds.
75 GRTH is located in Gondar town 750km far from Addis Ababa and it started to provide oncology
76 service in January 2015 with 17 inpatient beds. DRH is located in Dessie town of South Wollo
77 Administrative zone of Amhara region and it started providing oncology services as of October 2017
78 with 15 inpatient beds. Currently, three of the hospitals had both outpatient department (OPD) and
79 inpatient department for cancer diagnosis and treatment, including surgery and chemotherapy services;
80 however, none of the hospitals had no radiotherapy service. In 2018/19, there were 217, 191, and 168
81 breast cancer patients on treatment or post-treatment follow-up in FHCSH, GRTH, and DRH,
82 respectively.

83 The source populations were those breast cancer patients who were evaluated and treated in the
84 oncology units of the three hospitals. Those breast cancer patients who visit the hospitals and being
85 evaluated or treated at the oncology units from March 25, 2019, to July 7, 2019, were the study
86 population. We included female breast cancer patients aged 18 years or above, and who had received at
87 least two or more cycles of chemotherapy, or who were on post-treatment follow up, or who received
88 surgical therapy irrespective of receiving chemotherapy while excluding those patients who had known
89 cases of chronic illness, or those patients who were newly diagnosed for breast cancer.

90 **Sample size and sampling technique**

91 The sample size was determined using a single population proportion formula: $n = \frac{(Z_{\alpha/2})^2 P(1-p)}{d^2}$. The
92 following assumptions were taken into considerations: a 95% confidence level ($Z_{\alpha/2} = 1.96$), 5% marginal
93 error ($d = 0.05$) and 80% proportion of poor QoL of breast cancer patients[25]. Then, adding 10% to
94 compensate non-response ($248 * 10\% = 24.8$). The calculated sample size was 273.

95 A systematic random sampling technique was used to select study participants. The sample was taken
96 proportional to each hospital patient load. The previous three months patient load were taken from
97 patient logbook of each hospitals (i.e., FHCSH = 217, GRTH = 191, and DRH = 168; total load = 576).
98 The calculated sample size was proportionally allocated to each hospital. Then, a sampling interval (K)
99 was calculated by dividing the total number of breast cancer patients expected to come to the hospitals
100 during the data collection time by the calculated sample size ($k = 576 / 274 = 2$). The lottery method was
101 used to select the first patient and then, every other patient was included according to her order of visits
102 to the oncology unit.

103 **Data Collection and variable measurement**

104 Data were collected through face-to-face interview and patient chart review. Six trained BSc Nurses
105 have collected the data with the supportive supervision of three BSc Nurses. A structured questionnaire
106 or data extraction checklist was used to collect socio-demographic, economic, clinical, and QoL data via
107 interview or patient chart review. Medical data such as the stage of the disease, type of treatment, type
108 of surgery, cycles of chemotherapy, and other medical conditions were extracted from the patient's
109 medical charts. The socio-demographic data include residence, age, education, religion, occupation, and
110 marital status. The economic status was measured by the wealth index. The wealth index was assessed

111 separately for rural and urban residents. The tool used to assess the wealth index was adapted from the
112 Ethiopian demographic and health survey 2016 questionnaire.

113 The quality of life of breast cancer patients was the outcome variable for this study. We have used the
114 EORTC QLQ tool to measure the patients' quality of life. The measurement tool was used after getting
115 permission from the EORTC. The Amharic version of EORTC QLQ version 3 of QLQ-C30 and its
116 breast cancer supplementary measure (QLQ-BR23) was used in the current study. This tool is a disease-
117 specific QoL scale. In the assessment of patients' QoL, there is evidence remarking that disease-specific
118 QoL scales are preferred because they are sensitive and are capable of detecting small but clinically
119 significant changes in health[26]. It is a reliable and valid measure of QoL of cancer patients; the
120 internal consistency had a Cronbach's α value of 0.81. The internal consistency of the subscale, a
121 Cronbach's α value were greater or equal to 0.73 except for cognitive function (Cronbach's α =
122 0.29)[27].

123 The EORTC QLQ-C30 is a tool used to address quality of life issues to all cancer type patients and it is
124 composed of nine multi-item scales and six single items. The multi-item scales include five functioning
125 scales (physical, role, cognitive, emotional, and social), a global health status(QoL) scale, and three
126 symptom scales (fatigue, pain, and nausea/vomiting). The six single items include dyspnea, insomnia,
127 appetite loss, constipation, diarrhea, and financial difficulties[28]. The EORTC QLQ-BR23 is unique to
128 breast cancer patients and it is composed of four functional scales (future perspective, body image,
129 sexual function, and sexual enjoyment) and four symptom scales (systemic therapy side effect, arm
130 symptom, breast symptom, financial difficulties, and upset by hair loss). The global health status (QoL)
131 had two questions, with a modified 7 point linear analog scale ranging from 1 "very poor" to 7
132 "excellent". All other items are scored on a 4-point categorical scale ranging from 1 "not at all to 4 "very
133 much".

134 There is no agreed threshold score to mean significant impairment for the EORTC QLQ-C30 and QLQ-
135 BR23 scales. However; a study in Ethiopia, Black Lion Specialized and Referral Hospital, dichotomized
136 each scale and subscales into the “good” or “poor” category[29]. We have followed the same
137 classification for the current study.

138 **In functional component/scale and Global health status or QoL**

139 ✓ **Good-** Higher scores on the functioning/global health status scale 75 and above

140 ✓ **Poor-** lower mean score in the functioning/global health status scales (75 and lower)

141 **In symptom scale/ item**

142 ✓ **Good-** when the mean score is lower or less than 25

143 ✓ **Poor-** when the mean score is higher or 25 and above

144 **Data Analysis**

145 The data were coded and entered into EPI data version 3.1 software. Then exported to statistical
146 packages for social sciences (SPSS) version 23 software for further analysis. Descriptive statistics were
147 used to summarize the data in the form of frequency, mean, standard deviation(SD), and cross-
148 tabulation. The internal consistency of the EORTC QLQ was evaluated using the reliability
149 coefficient(i.e. Cronbach's alpha value). The Cronbach's alpha value of EORTC QLQ-C30 and QLQ-
150 BR23 was 0.80. The reliability coefficient of each subscale was also greater than 0.7 except for the
151 cognitive function (0.63) and pain (0.65) subscales. We used Hosmer-Lemeshow’s goodness-of-fit test
152 to evaluate model fitness, its p-value was 0.687.

153 The EORTC QLQ-C30 and QLQ-B23 scoring manual were used to create raw scores and transform the
154 raw scores to 0 to 100 values[30]. A 100 corresponds to the maximum score while 0 corresponds to the
155 minimum score. A high scale score represents a higher response level. Thus, a high score for a
156 functional scale or a global health status/QoL scale represents a high/healthy level of functioning while a

157 high score for a symptom scale/item represents a high level of symptomatology/problems. The principle
158 for scoring these scales is the same in all cases and it involves two procedures: 1) Raw Score, which is
159 the average of the items that contribute to the scale, and 2) A linear transformation to standardize the
160 raw score[30].

161 The procedure for these calculations presented as follows:

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$$\text{The raw score(RS)} = (I_1 + I_2 + I_3 + \dots + I_n)/n$$

163 Where, $I_1 + I_2 + I_3 + \dots + I_n$, are items included in the scale

164 A linear transformation: we applied the linear transformation to 0-100 to obtain the score S ,

165 Functional scale: $S = \left\{1 - \frac{RS-1}{\text{Range}}\right\} \times 100$

166 Symptom scale/item: $S = \left\{\frac{RS-1}{\text{Range}}\right\} \times 100$

167 Global health status/QoL: $S = \left\{\frac{RS-1}{\text{Range}}\right\} \times 100$

168 Where a range is a difference between the maximum possible value of RS and the minimum possible
169 value. All items of any scale in the QLQ-C30 and QLQ-BR23 have been designed to take the same
170 range of values. Therefore, the range of RS equals the range of item values. Most items are scored 1 to
171 4, giving range = 3. The exceptions are the items contributing to the global health status/QoL, which are
172 7-point scale questions with a range = 6.

173 Bi-variable and multivariable binary logistic regression analyses were carried out to identify factors
174 associated with the outcome variable. Variables with P-value less than 0.2 in bi-variable logistic
175 regression were considered to fit the multivariable logistic regression model. A p-value of less than 0.05
176 was used to determine the presence of a significant association in the multivariable logistic regression

177 model. Wealth index for rural and urban residencies was separately analyzed by principal component
178 analysis (PCA).

179 **Result**

180 **Socio-demographic characteristics of patients**

181 A total of 256 breast cancer patients with a response rate of 93.4 % were included in the study. The
182 participants' mean (SD) age was 44.34 (\pm 14.11) years with a range of 22-95 years. One hundred fifty-
183 five (60.5%) patients were married. One hundred fifty-three (59.8%) were urban residents, and
184 190(74.2%) were Orthodox Christian. About seventy percent of patients were house-wives, and
185 134(52.3%) had no formal education. One hundred sixteen (45.3%) patients had health insurance
186 schemes to cover the cost of treatment and 91 (35.6%) patients were from poor wealth (Table 1).

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196 Table1: Socio-demographic characteristics of breast cancer patients, Amhara region Ethiopia 2019
 197 (N=256)

| Variables | Categories | Frequency | Percentage(%) |
|--------------------|----------------------------|-----------|---------------|
| Age | <=40 years | 129 | 50.4 |
| | 41-54 years | 64 | 25.0 |
| | >=55 years | 63 | 24.6 |
| Residence | Urban | 153 | 59.8 |
| | Rural | 103 | 40.2 |
| Marital status | Married | 155 | 60.5 |
| | Unmarried | 101 | 39.5 |
| Educational status | No formal education | 134 | 52.3 |
| | Primary(1-8) | 46 | 18.0 |
| | Secondary(9-12) | 24 | 9.4 |
| | Higher ^a | 52 | 20.4 |
| Religion | Orthodox | 190 | 74.2 |
| | Muslim/protestant | 66 | 25.8 |
| Occupation | House-wife | 180 | 70.3 |
| | Non-housewife ^c | 76 | 29.7 |
| Cost of treatment | Health insurance/Free | 140 | 54.7 |
| | Private/self | 116 | 45.3 |
| Wealth index | Poor | 91 | 35.6 |
| | Medium | 83 | 32.4 |
| | Rich | 82 | 32.0 |

198 ^adiploma and above, ^bOromo and Tigre; ^cstudent, farmer and daily laborer, merchant, gov't employee

199 **Clinical Characteristics of the patients**

200 One hundred eighty-two(70.6%) (Stage III, 38.3%, and stage IV, 32.3%) patients were with advanced
201 stages of breast cancer, and 96.9% of the patients receiving/received chemotherapy treatments. Seventy-
202 eight percent of patients were less than 12 months since they were diagnosed with breast cancer. The
203 mean (\pm SD) duration from diagnosis was $12\pm (12.6)$ months (Table 2).

204 Table 2: Clinical characteristics of the breast cancer patients Amhara region Ethiopia 2019(N=256)

| Variables | Categories | N | Frequency (%) |
|--------------------------|-----------------------|----------|----------------------|
| Stage of breast cancer | Early stage | 74 | 28.9 |
| | Advanced stage | 182 | 71.1 |
| Duration of disease | < 12 months | 200 | 78.1 |
| | 13-24 months | 28 | 10.9 |
| | 25-36 months | 13 | 5.1 |
| | > 36 months | 15 | 5.9 |
| Type of treatment | Chemotherapy +surgery | 217 | 84.8 |
| | Chemotherapy only | 31 | 12.1 |
| | Surgery only | 8 | 3.1 |
| Cycle of Chemotherapy | 1-3cycle | 108 | 42.2 |
| | 4-6 cycle | 83 | 32.4 |
| | >7cycle | 51 | 19.9 |
| | Completed | 14 | 5.5 |
| Type of surgery | Mastectomy | 205 | 91.1 |
| | Conserving | 20 | 8.9 |

205 **Quality of life of Breast cancer patients**

206 The mean score for the global health status (QoL) for breast cancer patients was 70.6 (SD=13.9, 95%
207 CI: 69-72). The mean scores on the functional scale range from emotional function 43.8 (SD=35.2) to
208 social function 64.2(SD=27.7). In the symptom scale, almost all symptoms were noticeable with

209 different levels of intensity. The mean score of symptom scales ranged from as high as 67.2 (SD=34.3)
 210 for appetite loss to as low as 11.6(SD=25.6) for diarrhea (Table 3).

211 On the EORTC QLQ-BR23, mean scores on functional scales ranged from 40.5(SD=42.5) for future
 212 perspective to 67.5 (SD=33.3) for sexual enjoyment. Mean scores on symptoms scales ranged from
 213 57.0(SD=41.6) for an upset by hair loss to 63.0(SD=34.1) for breast symptoms (Table 3).

214 Table3: Mean and standard deviation of EORTC QLQ-C30 and BR23, components for breast cancer
 215 patients, Amhara region Ethiopia, 2019(N=256)

| | | Analysis Category | Question N^o | Mean | SD | 95% CI |
|------------------------|-------------------|--------------------------|-------------------------------|-------------|-----------|---------------|
| EORTC QLQ-C30 | Global health/QoL | | 29 & 30 | 70.6 | 13.9 | 69.0 -72.3 |
| | Functional scale | Physical function | 1-5 | 52.4 | 33.8 | 48.0-56.2 |
| | | Role function | 6 & 7 | 61.8 | 25.6 | 58.7-65.0 |
| | | Emotional function | 21- 24 | 43.8 | 35.2 | 39.6-48.2 |
| | | Cognitive function | 20 & 25 | 62.2 | 31.4 | 58.5-66.2 |
| | | Social function | 26 & 27 | 64.2 | 27.7 | 60.9-67.7 |
| | Symptom scale | Fatigue | 10, 12 & 18 | 60.5 | 31.9 | 56.3-64.5 |
| | | Nausea & vomiting | 14 & 15 | 40.9 | 37.0 | 36.3-45.8 |
| | | Pain | 9 & 19 | 53.6 | 30.3 | 49.7-57.5 |
| | | Dyspnea | 8 | 24.7 | 29.9 | 21.2-28.3 |
| Insomnia | | 11 | 34.1 | 35.3 | 29.8-38.5 | |
| Appetite loss | | 13 | 67.2 | 34.3 | 63.2-71.2 | |
| Constipation | | 16 | 17.5 | 26.2 | 14.3-20.8 | |
| Diarrhea | | 17 | 11.6 | 25.6 | 8.6-15.1 | |
| Financial difficulties | 28 | 63.3 | 39.4 | 58.5-68.1 | | |
| EORTC- | Functional scale | Body image | 39-42 | 64.3 | 33.3 | 60.1-68.1 |
| | | Sexual function | 44 & 45 | 67.5 | 33.3 | 63.6-71.7 |
| | | Sexual enjoyment (N=132) | 46 | 46.5 | 29.6 | 41.4 -51.8 |
| | | Future perspective | 43 | 40.5 | 42.5 | 34.9-46.0 |

| | | | | | |
|----------------------------|-------------------------------|----------------|------|------|-----------|
| Symptom scale/ items | Systemic therapy side effects | 31 -34 & 36-38 | 58.2 | 28.8 | 54.5-61.5 |
| | Breast symptoms | 50-53 | 63.0 | 34.1 | 58.6-67.2 |
| | Arm symptoms | 47-49 | 59.5 | 34.2 | 55.2-63.8 |
| | Upset by hair loss(N=231) | 35 | 57.0 | 41.6 | 51.4-62.5 |

216 About 68.4% of breast cancer patients' QoL was poor. From the functional status, most patients had a
 217 poor emotional function, physical function, and future perspective 207(80.9%), 183(71.5%), and
 218 183(71.5%) respectively. About 122(47.7%) sexual function and 109(42.6%) body image of the patients
 219 QoL was good (Figure 1).

220 As shown in the graph below from the symptom scale; most of the breast cancer patients were affected
 221 by appetite loss, 226(88.3%), and systemic therapy side effect, 219(85.5%). However, breast cancer
 222 patients were less affected by diarrhea 54 (21.1%) and constipation 94(36.7%) (Figure 2).

223 **Factors affecting the quality of life of breast cancer patients**

224 On bi-variable logistic regression analysis, variables with a p-value less than 0.2 were entered into
 225 multiple logistic regressions. The results of bi-variable logistic regression showed that socio-
 226 demographic variables (marital status, religion, occupation, and wealth), clinically related variables
 227 (stage of disease), role function, future perspective, dyspnea, and insomnia were the candidate variables
 228 for multivariable logistic regression.

229 The results of the multivariable logistic regression analyses showed that marital status, religion, wealth
 230 status, insomnia, and dyspnea were significant factors that affect the QoL of breast cancer patients.

231 Those unmarried breast cancer patients were 2.59 times more likely to have poor QoL compared to
 232 married breast cancer patients (AOR=2.59, 95% CI: 1.32-5.07). Those poor wealth status breast cancer
 233 patients were 2.39 times more likely to have poor QoL compared to rich breast cancer
 234 patients(AOR=2.39, 95% CI: 1.32-5.03). Those none housewives breast cancer patients were 3.25 times

235 more likely to have poor QoL as compared to housewives breast cancer patients (AOR=3.25, 95% CI:
 236 1.46-7.22). From the symptomatic breast cancer patients; with complaints of dyspnea were 3.48 times
 237 more likely to have poor QoL (AOR=3.48, 95% CI: 1.79-6.79) and those complaints of insomnia were
 238 2.03 times more likely to have poor QoL (AOR=2.03, 95% CI: 1.05-3.91) compared to those not
 239 complaints dyspnea and insomnia respectively(Table 4).

240 **Table4:** Factors associated with affected quality of life among breast cancer patients, Amhara region,
 241 Ethiopia 2019(N=256)

| Variables | Response | Quality of life (QoL) | | COR(95% CI) | AOR(95% CI) |
|--------------------|-----------------------------|-----------------------|------------|-----------------|---------------------------|
| | | Good | Poor | | |
| Marital status | Married | 62(40.0%) | 93(60.0%) | 1 | 1 |
| | Unmarried | 19(18.8%) | 82(81.2%) | 2.88(1.59-5.21) | 2.59(1.32-5.07)* |
| Wealth status | Poor | 22(24.2%) | 69(75.8%) | 2.58(1.35-4.93) | 2.39(1.32-5.03)* |
| | Medium | 22(26.5%) | 61(73.5%) | 2.28(1.19-4.38) | 1.90(0.88-4.08) |
| | Rich | 37(45.1%) | 45(54.9%) | 1 | 1 |
| Stages of disease | Early stage | 19(25.7%) | 55(74.3%) | 1.50(0.82-2.74) | 1.34(0.65-2.76) |
| | Advanced stage | 62(34.1%) | 120(65.9%) | 1 | 1 |
| Dyspnea | Poor | 23(18.5%) | 101(81.5%) | 3.44(1.95-6.08) | 3.48(1.79-6.79)*** |
| | Good | 58(43.9%) | 74(56.1%) | 1 | 1 |
| Insomnia | Poor | 38(24.8%) | 115(75.2%) | 2.17(1.27-3.71) | 2.03(1.05-3.91)* |
| | Good | 43(41.7%) | 60(58.3%) | 1 | 1 |
| Role function | Poor | 46(26.4%) | 128(73.6%) | 2.07(1.19-3.60) | 1.54(0.76-3.12) |
| | Good | 35(42.7%) | 47(57.3%) | 1 | 1 |
| Future perspective | Poor | 50(27.3%) | 133(72.7%) | 1.96(1.11-3.46) | 1.74(0.91-3.34) |
| | Good | 31(42.5%) | 42(57.5%) | 1 | 1 |
| Religious | Orthodox | 68(35.8%) | 122(64.2%) | 1 | 1 |
| | Muslim/protestant | 13(19.7%) | 53(80.3%) | 2.57(1.29-5.13) | 2.00(0.92-4.35) |
| Occupation | Housewives | 67(37.2%) | 113(62.8%) | 1 | 1 |
| | Not Housewives ^a | 14(18.4%) | 62(81.6%) | 2.63(1.37-5.05) | 3.25(1.46-7.22)** |

242 * P< 0.05, **P<0.01, *** p<001, ^astudents, farmer,merchant, daily laborer

243 **Discussion**

244 This study showed that 68.4 % (95% CI: 62.5- 73.8) of breast cancer patients' QoL was poor. The mean
245 score of QoL was 70.6(95% CI: 69-72.4). The study identified that marital status, occupation, wealth
246 status, insomnia, and dyspnea as predictors of poor QoL of breast cancer patients in the Amhara region.

247 This study showed that the QoL is higher than the EORTC QLQ-C30 reference value 61.8(±24.6)[30],
248 and other studies done in India(59.3), Malaysia(65.7±21.4), Morocco(68.5±18.5), Cote d'var and Addis
249 Ababa(53±25.6)[19, 20, 22, 24, 31]. The study participants were different in Malaysian; chronic illness
250 patients were included, in Morocco; received treatment for more than 3 months and severe
251 neuropsychiatric disorders patients were excluded. It is evidenced that breast cancer patients with
252 comorbidities had reduced QoL[15]. In Addis Ababa, the study population was breast cancer patients
253 under chemotherapy[19]. However, the mean score of QoL was lower than Colombia 77.5(±20.1) the
254 possible reason might be due to socio-demographic difference such as mean age 55.7, 95% of the
255 women reported religious affiliation and relatively high level of socioeconomic status were included[32]
256 and all these improve the QoL. Even though religious affiliation was not included in this study, being
257 religious and high socioeconomic status improves the QoL.

258 This study revealed that all functional components; physical function (52.3±33.8), role function
259 (61.8±25.6), emotional (43.8±35.2), cognitive function (62.2±31.4) and social function (64.2±27.7) were
260 lower than the EORTC QLQ C30 reference value 78.4±21.3, 70.9±29.9, 68.6±23.8, 81.5±21.8 and
261 77±27.1 respectively. It is similar to a study done in India but lower than Morocco, Malaysia, and
262 Colombia [20, 22, 24, 32]. As compared to our study, the Malaysian study involved less number of
263 patients who were at the advanced stage of the disease (48% vs 72%) and a small number of the patients
264 who were receiving chemotherapy as a treatment option (38% vs 96%). In Morocco, a few cases had

265 stage IV (12.9%) breast cancer. This might be the possible reason because the side effects of
266 chemotherapy and stages of the disease significantly affect the QoL in breast cancer patients.

267 From the EORTC QLQ C30, symptomatic scale/item constipation (17.5 ± 26.3) was consistent with the
268 EORTC QLQ-C30 reference value 17.4 ± 27.2 [30] while fatigue (60.5 ± 31.9), nausea and vomiting
269 (40.9 ± 37), pain (53.6 ± 30.3), dyspnea (24.7 ± 29.9), insomnia (34.1 ± 35.3), appetite loss (67.2 ± 34.3),
270 diarrhea (11.6 ± 25.6) and financial difficulties (63.3 ± 39.4) were higher than the EORTC QLQ-C30
271 reference value. Diarrhea (11.6 ± 25.6) consistent with a study done in Turkey[33]. In this study, 96.9%
272 of breast cancer patients were receiving chemotherapy as a type of treatment. It was reported that
273 patients receiving chemotherapy might experience several side-effects that negatively affected their
274 QoL[14].

275 From EORTC QLQ-BR23, body image and future perspective were lower than EORTC QLQ BR23
276 reference value[30] and Malaysia[24]. However, sexuality, systemic therapy side effects, upset by hair
277 loss, breast, and arm symptom were higher than EORTC QLQ BR23 reference value[30] and
278 Malaysia[24].

279 This study revealed that women who underwent breast-conserving surgery had better global health
280 status than women who had a mastectomy. This finding is in line with other studies done in Morocco
281 and Taiwan[22, 34]. This might be due to fact that breast cancer patients who underwent mastectomy
282 may start to worry about their body image and feel less attractive because of the surgery.

283 The current study found that being unmarried was negatively affected by the QoL of breast cancer
284 patients. This is similar to studies done in Morocco, India, and Ethiopia [19, 20,22]. Married persons
285 tend to present early before metastasis and receive advanced care unlike unmarried patients[29]. This
286 might be because of the reason that unmarried women who have been diagnosed with breast cancer

287 might feel insecure about getting a partner and develop a fear of not being loved by others that likely
288 compromise their QoL. There are also studies with null[19] or reversal association to the current
289 findings[24]. The presence of inconsistent findings is appealing for further investigation.

290 Non-housewives occupational status of breast cancer patients was a significant effect on the QoL. It is
291 similar to a study done in Indian[20]. The reason might be the disease and treatment-related side effects
292 disrupted in their daily lives, work schedules, and financial stability. The treatment needs frequent
293 regular hospital visits and costs for transportation, diagnostic, treatment, and accommodation it may
294 worsen the QoL.

295 In this study, breast cancer patients with poor wealth status were found to have poor QoL. This is similar
296 to a study done in Shanghai, China[18], and Asia[23]. This might be because of poor wealth status
297 patients might be unlikely to access comprehensive care because of financial problems to cover direct
298 (i.e., health care cost) cost and indirect costs such as transportation and accommodation costs. In most
299 instances, chemotherapy medications including strong analgesics for managing disease and treatment
300 side effects and diagnostics may not be available at government hospitals in the current study setup.
301 These all incur additional costs for patients and likely affect their QoL. A study also signified that
302 financial problem is the most devastating in cancer patients; nearly 2 out of 3 patients may sell their
303 homes/other household assets to cover for medical care and other costs[35].

304 The most common compliance on the symptom scale was dyspnea and insomnia. The mean score of
305 insomnia was greater than 25, which is the most symptomatic, and significantly affects the QoL. This is
306 similar to a study done in Addis Ababa, Ethiopia [19]. In this study pain is the most common complaint
307 and there might not be adequate pain management and prescribed opioids analgesics. In this study, about
308 71% of breast cancer patients were at an advanced stage, which likely reduces the QoL. When breast

309 cancer is at an advanced stage, it might metastasize to the lung and other organs which leads the patient
310 to face difficulty breathing. The disease itself and treatment side effects can also result in patients having
311 stress and disturbed sleeping patterns.

312 This study had both strengths and limitations. As a strength, the study considered main hospitals with
313 oncology centers in the Amhara region, breast cancer patients at various treatment cycles and types, and
314 various stages of the disease. This gave us the chance to observe a broad picture of the QoL issues in the
315 Amhara region of Ethiopia.

316 As a limitation, some of the questions in the interviews were personal or sensitive issues; therefore,
317 response bias is a possible limitation of the study. Because of the cross-sectional natures of the study
318 design, data on QoL before the diagnosis or before starting the treatment were not available, and it was
319 therefore not possible to assess the temporal relationship. Participants were also required to recall events
320 as far back as a month before the interview, and therefore, recall bias is also a possible limitation.

321 **Conclusions**

322 We can conclude that the QoL of breast cancer patients was poor. This study identified that being
323 unmarried, none housewife, being poor wealth status, and having complaints of insomnia and dyspnea
324 were significantly affected the QoL of breast cancer patients in the Amhara region.

325 We recommend that the Regional Health Bureau should prepare and incorporate QoL in the patient's
326 treatment protocol and support financially poor wealthy status breast cancer patients. Health Care
327 Professionals should recognize and take into consideration the importance of QoL, besides clinical
328 treatment. They should emphasize unmarried, none housewife and educated breast cancer patients on
329 chemotherapy treatment, and manage the side effects to improve QoL. Further studies with strong
330 design, for example, prospective cohort, are recommended to identify the determinants of QoL.

331 **List of abbreviations**

332 AOR: Adjusted Odd Ratio, CI: Confidence Interval, COR: Crude Odd Ratio, DRH: Dessie Referral
333 Hospital, EORTC QLQ BR23: European Organization for Research and Treatment of Cancer Quality of
334 Life Questionnaire Breast Cancer supplementary measure, EORTC: European Organization for
335 Research and Treatment of Cancer, FHCSH: Felege Hiwot Comprehensive Specialized Hospital, QLQ-
336 BR23: Quality of Life Questionnaire breast cancer supplementary measure, QLQ-C30: Quality of Life
337 Questionnaire Core 30, QoL: Quality of Life, SD: Standard Deviation, SPSS: Statistical package for
338 social sciences, GRTH: University of Gondar Referral Teaching Hospital, WHO: World Health
339 Organization

340 **Ethics declarations**

341 **Ethics approval and consent to participate**

342 The research approval (CMHS/IRB 03-008) was obtained from the Institutional Review Board (IRB) of
343 the College of Medicine and Health Sciences of Bahir Dar University. The administrators of each
344 hospital were communicated with an official letter and we got permission from each official to go ahead
345 with the study. All the participants gave written informed consent under the Declaration of Helsinki.
346 Patients' privacy and confidentiality of information were maintained throughout the study process.

347 **Competing interests**

348 The authors have declared that they have no competing interests.

349 **Consent for publication**

350 Not applicable

351 **Availability of data and material**

352 The datasets used and/or analyzed during the current study available from the corresponding
353 author on reasonable request.

354

355 **Authors' contribution**

356 TA: conception of the research idea, study design, data collection, analysis and interpretation, and
357 manuscript write-up. DN, AB, TF, and MG: data collection, analysis and interpretation, and manuscript
358 write-up. All authors have read and approved the final manuscript.

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Figures

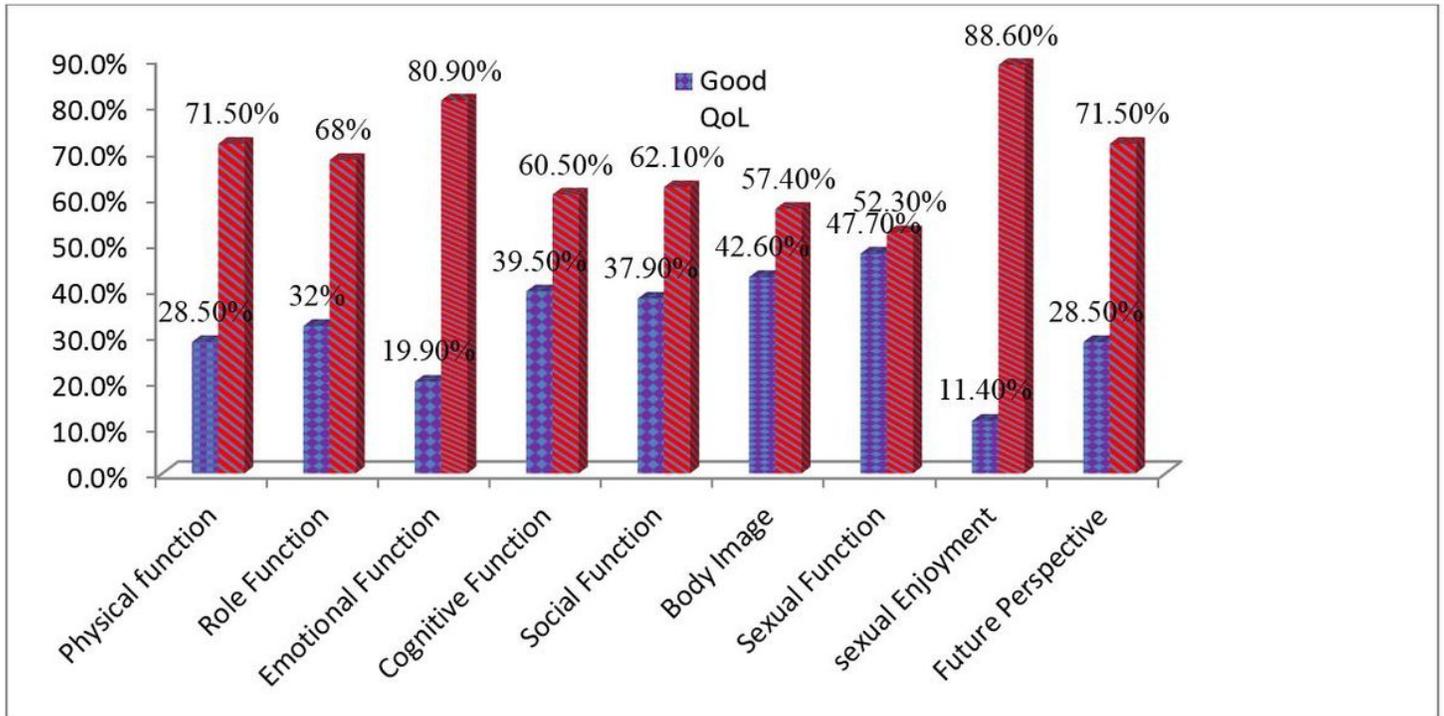


Figure 1

Distribution of QoL and functional components among patients with breast cancer, Amhara region Ethiopia 2019.

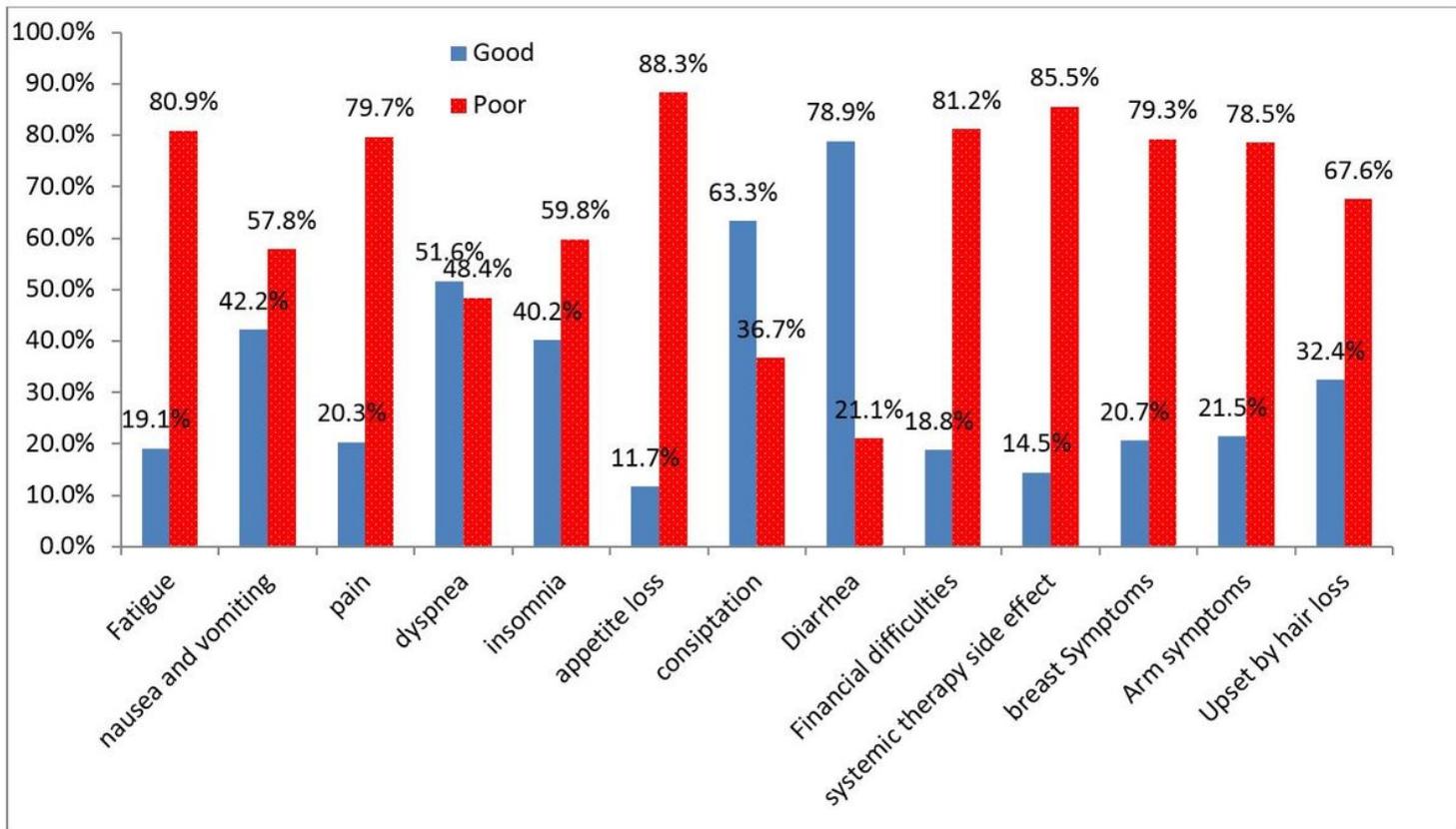


Figure 2

Proportion of QoL in symptom scales/items, breast cancer patients, Amhara region Ethiopia 2019.