# *Original Research Article*

## Prevalence of Major Depressive Disorder in Patients Diagnosed with Breast Cancer in Southwest Nigeria

**Abstract**

**Background:** Globally, breast cancer remains the commonest cancer diagnosis among women which is usually accompanied by an array of psychological distress including depression. This study aimed to determine the prevalence of major depression among people living with breast cancer in Ogbomoso, Oyo State Nigeria.

**Methods:** The study was a comparative cross-sectional design conducted among 222 women with breast cancer attending the General Surgery Outpatient clinic and a comparison control group of age-matched women without a history of breast cancer. Data were obtained using a self-administered questionnaire while other clinical details were extracted from their hospital records following informed consent. The PHQ-9 and MINI were instruments used in the diagnosis of depression and Major depressive disorder respectively. Data obtained were analyzed using SPSS version 21.

**Results:** Of the 222 respondents, 70 have been diagnosed with breast cancer with a mean age of 35.2 ± 8.6. It was observed that 34.3% had major depression while 38.6% had minor depression and 27.1% were not depressed using PHQ-9. Of the respondents positive for the PHQ screening, 8 fulfilled the criteria for major depression after screening with MINI.

**Conclusion:** The prevalence of major depressive disorder was higher among women with breast cancer (11.42%) compared to age-matched control without breast cancer (1.97%)

***Keywords***: depression, major depressive disorder, breast cancer, Ogbomoso, Nigeria

## Introduction

Breast cancer remains the commonest cancer diagnosis among women worldwide.[1] Each year, over 1.1 million newly diagnosed women with breast cancer are reported worldwide and about 410,000 died from the disease[2]. Breast cancer accounts for about 28% of the reported cancers in Europe[3]. In Africa, it is also the most commonly diagnosed cancer among women with an incidence rate of 40/100,000[4]. The prevalence rate of 10.4/100,000 women was also reported in 2011[5]. In 2014, breast cancer death in Nigeria was 13,264/0.70% of the total deaths[6].

Women with breast cancer may have an array of physical symptoms, psychological distress, and social challenges[7]. Varying degrees of psychological distress may be experienced in the course of diagnosis, during and after the treatment. The loss of liberty and control over the new status, inherent disability, fear of the future, and death are among the factors associated with a psychological burden in women with breast cancer[8]. Breast cancer treatments, the possibility of recurrence and metastasis in advanced cases also compound their distress. In cancer patients, the most commonly diagnosed psychological disorders are; depressive disorder, anxiety disorders, adjustment disorder, and delirium[9]. Although depression is a common psychological disorder among women with breast cancer, it is, however, underrated, thus unnoticed and not treated by Clinicians[10].

The prevalence of depression among women with breast cancer has been reported to be 1-50% in studies in western countries and also 10-25% more than in the general population[11]. One-third to half of the women with breast cancer have psychological distress. On the other hand, breast cancer risk is higher among women with depression because they are less likely to show concern for their health and thus forfeit the chance of early detection and treatment[12]. Thus, depression could precede breast cancer and ultimately deter a woman from seeking treatment early.

Another link between breast cancer and depression has been explained via the neuro-immunology pathway. A significantly lower proliferation of lymphocytes in response to mitogen and a decrease in cytokine production have been reported among patients with breast cancer who are depressed[13]. Dysfunction of cortical secretion (reduced diurnal variability) has also been implicated in the association between depression and breast cancer. This results from reduced lymphocyte proliferation, cytokine production and natural killer (NK) cells activities[14].

Women with breast cancer could also be more susceptible to depression because of the stress that results in the course of diagnosis and treatment[15]. Changes in the integrity of the body, physical symptoms stemming from cancer, the debilitating side effects of the treatment, financial burden, and social difficulty could make them vulnerable to depression.

Management most of the time is directed to the physical symptoms while the psychological issues are overlooked and this may have a significant effect on their attitude to the treatment. Therefore, this study aimed to determine the prevalence of depression among people living with breast cancer in this study area.

## Methodology

### Study Area

The study was carried out at the General Surgery Outpatient Unit of LAUTECH Teaching Hospital, Ogbomosho, located in Ogbomosho North Local Government Oyo State Nigeria. The General Surgery Unit clinic holds twice a week, with approximately 40 patients seen per week. Two to 3 new breast cancer cases are seen in a week and at least 10 patients for follow-up

### Study Design

The study was a comparative cross-sectional study design.

### Study Population

Participants were women with breast cancer attending the General Surgery Outpatient clinic and a comparison group of age-matched women without a history of breast cancer attending the General Outpatient Unit of LAUTECH Teaching Hospital, Ogbomosho.

### Study Instruments

*Patients Health Questionnaire (PHQ-9)*

The PHQ-9 is a self-report questionnaire that consists of 9-items. Participants rated how they felt in the preceding 2 weeks. Each question was scored 0-3 (0=not at all, 1=several days, 2=more than half the day, and 3=nearly every day). The least score is 0 while the highest is 27. The items reflect the DSM- IV criteria for major depressive disorder. It has internal consistency of 0.85, good concurrent validity with BDI ($r=0.67$, $P<0.001$) and good one month test-retest reliability ($r=0.894$, $P<0.001$)[16]. An optimal cut- off of 5 for minor depressive disorder (sensitivity 0.897, specificity 0.989, PPV 0.875, NPV 0.981 and Overall Correct Classification—OCC rate 0.973) and 10 for major depressive disorder (sensitivity 0.846, specificity 0.994, PPV 0.750, NPV 0.996 and OCC rate 0.992).

*Mini-International Neuropsychiatric Interview (MINI)*

Diagnosis of Major depressive disorder was made using the Mini International Neuropsychiatric Interview (M.I.N.I) English version for those who have high scores on PHQ-9. It is a brief structured interview for making a diagnosis of a major axis I psychiatric disorders in DSM-IV and ICD-10[17]. It has been validated by various studies with good reliability outcome[18]. It has been used in several studies in Nigeria with good cross-cultural validity. Inter-rater reliability of 0.88 measured by Cohen kappa has been reported[10].

### Sample Size

The sample size was calculated using the formula for comparing two groups by Wang et al[19]. Taking the prevalence in the two groups was 40.3% and 13.9% from previous similar studies[10,20.] The calculated minimum sample size was 69 respondents. Therefore, 69 questionnaires were administered to the subjects with breast cancer, and twice this number to the comparative group

(1:2), making a minimum sample size of 207. However, 240 questionnaires were distributed during the sampling period.

**Procedure**

The study was conducted on clinic days for women with breast cancer. For each clinic day, case notes of patients with breast cancer were sorted out. After the vital signs had been checked, these women were addressed on the importance of the study, the procedure, and the benefits. The first respondent was randomly selected from the sampling frame for the day. Then subsequent respondents were recruited by a sampling interval of 2 in order of arrival. The selected respondents were taken to a convenient room and consent to participate in the study was sought individually. Both Yoruba and English Language versions of the pre-tested questionnaires were administered to all consenting participants depending on their preference.

For each breast cancer patient, 2 women (age-matched of ±3 years) were recruited for the comparison group (women without a history of breast cancer). The respondents in this group were run through a checklist of symptoms and signs of breast cancer according to the Centre for Disease Control (CDC). The General Outpatient clinic runs daily, thus recruitment of respondents was done every Tuesday and Thursday. A total of 4 trained research assistants assisted in the data collection and sampling process.

**Statistical Analysis**

Data were analyzed using the statistical package for social sciences (SPSS version 21) computer software. The prevalence of depressive symptoms PHQ and Major Depressive Disorder by clinical interview were presented categorically using frequency distribution, tables, figures, and percentages.

**Ethical Approval**

Ethical clearance was obtained from the Ethical Research Committee of LAUTECH Teaching Hospital, Ogbomoso Oyo State Nigeria.

**Results**

A total of 240 questionnaires were administered, 222 questionnaires were retrieved with a response rate of 93%. Of the 222 respondents, 70 were diagnosed with breast cancer while 152 were age-matched women with no breast cancer.

Table I shows the socio-demographic profile of respondents with breast cancer and age-matched women with no breast cancer. There were more respondents without breast cancer who were single (32.9%) compared to respondents with breast cancer (15.7%) while married respondents were more among respondents with breast cancer (70.0%) compared to the other group (61.2%), p-value = 0.022.

**Table I: Socio-Demographic Profile of Respondents**

| **Variables** | **Control (n = 152)** | **Cases (n = 70)** | **$X^2$** | **Df** | **ρ-value** |
|---|---|---|---|---|---|
| **Age (years)** | | | | | |
| 20 – 29 | 34 (22.4) | 16 (22.8) | | | |
| 30 – 39 | 43 (28.3) | 17 (24.3) | | | |
| 40 – 49 | 35 (23.0) | 19 (27.1) | 0.8268 | 4 | 0.9348 |
| 50 – 59 | 22 (14.5) | 9 (12.9) | | | |
| 60 – 69 | 18 (11.8) | 9 (12.9) | | | |
| **Mean ± SD** | 38.3 ± 11.2 | 35.2 ± 8.6 | | | |
| **Marital status** | | | | | |
| Single | 50 (32.9) | 11 (15.7) | | | |
| Married | 92 (61.2) | 49 (70.0) | | | |
| Divorced | 3 (2.0) | 2 (2.9) | 11.474 | 4 | 0.022* |
| Separated | 4 (2.6) | 3 (4.3) | | | |
| Widow | 2 (1.3) | 5 (7.1) | | | |
| **Level of education** | | | | | |
| No education | 8 (5.3) | 12 (17.1) | | | |
| Primary | 19 (12.5) | 10 (14.3) | | | |
| Secondary | 33 (21.7) | 18 (25.7) | 10.682 | 3 | 0.014* |
| Tertiary | 92 (60.5) | 27 (42.9) | | | |
| **Employment status** | | | | | |
| Employed | 103 (67.8) | 57 (82.9) | 5.480 | 1 | 0.019* |
| Un-employed | 49 (32.2) | 12 (17.1) | | | |
| **Religion** | | | | | |
| Christianity | 101 (67.3) | 55 (78.6) | | | |
| Islam | 50 (32.9) | 15 (21.4) | 3.615 | 2 | 0.164 |
| Others | 1 (0.7) | 0 (0.0) | | | |
| **Average monthly income (naira)** | | | | | |
| Below 50,000 | 65 (42.8) | 28 (40.0) | | | |
| 50,000 – 99,000 | 21 (13.8) | 9 (12.9) | | | |
| 100,000 – 149,000 | 7 (4.6) | 7 (10.0) | 6.048 | 4 | 0.196 |

| | | | | | |
|---|---|---|---|---|---|
| 150,000 – 199,000<br>200,000 and above<br>No response | 2 (1.3)<br>6 (3.9)<br>51 (33.6) | 0 (0.0)<br>0 (0.0)<br>26 (37.1) | | | |

***$X^2$: Chi-square statistics, df: the degree of freedom, ρ- value < 0.05 indicates significance***

Depression was assessed among respondents with breast cancer using PHQ-9. 34.3% had major depression while 38.6% had minor depression and 27.1% were not depressed (Figure 1).

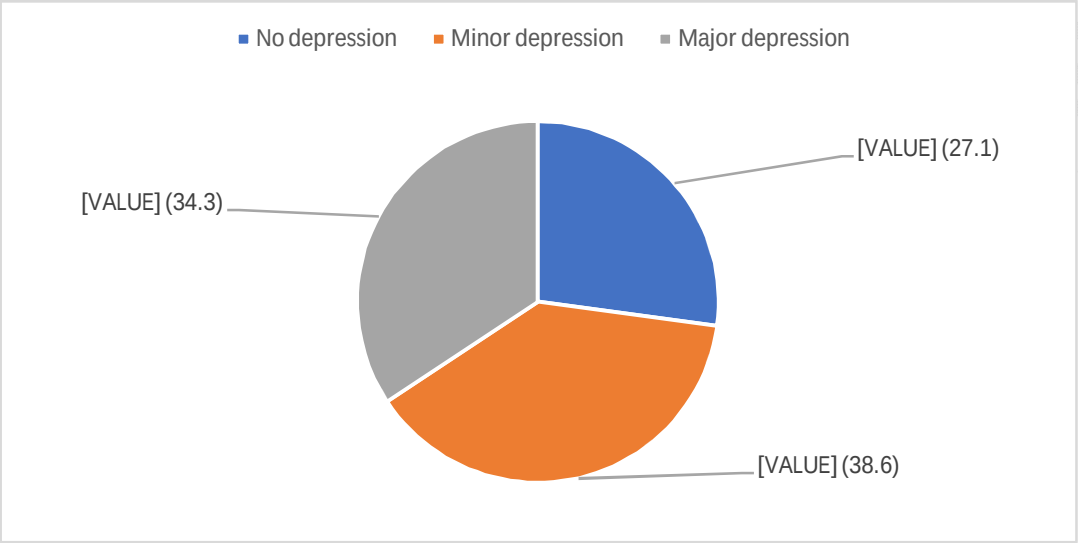


**Figure I: Prevalence of Depressive Symptoms Among Women With Breast Cancer using PHQ-9**

Tables II and III showed that for women with breast cancer, a total of 51 respondents were positive for the PHQ screening instrument. Twenty-seven had a cut-off of 5 but less than 10 (minor depression) and 24 had a score of 10 and above (major depression).

10% of PHQ-negative respondents who were randomly selected were added to the PHQ-positive respondents for a clinical interview with MINI. A total of 53 women with breast cancer were interviewed with MINI. Eight of the 53 respondents fulfilled the criteria for the diagnosis of Major Depressive Disorder. 10% of the PHQ-negative respondents who were randomly selected did not meet the criteria for Major Depressive Disorder.

However, for the comparison group, 49 respondents screened positive for PHQ-9 while 103 were negative. Ten percent of PHQ-negative respondents without breast cancer were also randomly selected for a clinical interview. A total of 59 respondents without a history of breast cancer were interviewed with MINI. Three met the criteria for Major Depressive Disorder. None of the PHQ-negative respondents who were randomly selected met the criteria for diagnosis.

**Table II: Depressive Symptoms Among Respondents with Breast Cancer Using PHQ-9**

| Variables | Women with breast cancer | Age-matched women without breast cancer |
|---|---|---|
| **Depressive symptoms** | | |
| **PHQ negative** | 19 | 103 |
| **PHQ positive** | 51 | 49 |

**Table III: Major Depressive Disorder Among Respondents with Breast Cancer Using MINI**

| Variables | Women with breast cancer | Age-matched women without breast cancer |
|---|---|---|
| **Major Depressive Disorder** | | |
| **No** | 45 | 56 |
| **Yes** | 8 | 3 |

Table IV depicts a comparison of the prevalence of Major Depressive Disorder among women with breast cancer and women without breast cancer. The prevalence of MDD was higher among women with breast cancer (11.42%) compared to women without breast cancer (1.97%)

**Table IV: Prevalence of Major Depressive Disorder Among Women With Breast Cancer and Age-Matched Without Breast Cancer**

| | Women with breast cancer n (%) | Women without breast cancer n (%) |
|---|---|---|
| **Psychiatry diagnosis** | | |
| **No** | 45 (84.9) | 56 (94.9) |
| **Yes** | 8 (15.1) | 3 (5.1) |
| | **11.42%** | **1.97%** |

**Discussion**

This study examined the prevalence of Major Depressive Disorder among 240 women with breast cancer and also compared it with age-matched women without breast cancer. The completely recovered questionnaires were 222 giving a response rate of 93% which is comparable to that reported in a study conducted among women with breast cancer in Southwest, Nigeria with a rate of 91%[10].

In this study, the age range of women with breast cancer was 29-65 years. This is similar to a study among the same population in Turkey which reported the range of 27-67 years[21]. In a study of depression among women with breast cancer conducted in Southwest, Nigeria, 54% of the respondents were between ages 41-60 years[10]. This study also found a similar proportion of 52.9%.

This study found that 75.7% of the respondents with breast cancer had stages II and III of the disease. A similar proportion was found in studies done in Nigeria and Ethiopia. Popoola et al and Abigiya et al reported that 76.6% and 81% respectively were found to have these stages of breast cancer[10,22]. However, a similar study in Italy by Andrea et al, found that about 50% of the women had stage I whereas 34% were in stage II and III[23]. The possible explanation for the larger proportion of advanced breast cancer cases in African countries might be due to late presentation and a dearth of facilities for early detection.

The majority of the respondents in this study were diagnosed within 5 years of having the disease. This is similar to a study in Southwest, Nigeria, which found that more than 80% were diagnosed within the same year[10].

In this study, respondents were first screened with PHQ-9 and those with a cut-off of 5 and above were clinically diagnosed with MINI. Respondents having 5 but less than 10 were classified as having minor depression while 10 and above, had major depression. The total prevalence was 72.9% (38.6% for minors and 34.3% for majors).

This high prevalence is comparable to a rate of 84.2% (39.2% mild and 45% moderate-severe depression) reported by Calys et al in their study on anxiety and depression among 120 women with breast cancer in a tertiary hospital in Ghana[24]. Kovacs et al also reported a 75.8% prevalence of depression among women with breast cancer[25].

However, this study found a prevalence of 11.4% for the major depressive disorder after the clinical diagnostic interview of respondents who screened positive for PHQ-9 with MINI. This is comparable to the prevalence rate of 16.9% reported in a similar study that made use of MINI as an assessment tool for depression in Southwest, Nigeria[10]. The prevalence of 11.4% in this study falls within the range of 15.6% and 8.3% reported in previous studies in Portugal and Taiwan respectively[26,27].

The prevalence of depression among women with breast cancer varies across the world. In a meta-analysis by Zainal et al, 10,826 breast cancer patients were reviewed from 32 studies[28], the

prevalence was reported to be in the range of 1-56%. In Western culture, a rate between 10 and 35% was reported. In Africa, previous studies have reported 26.9%, 36.6%, 40.3%, and 25% in Morocco, South Africa, Nigeria, and Ethiopia respectively[29,30,10,31]. The reason for the variability in the prevalence of depression among women with breast cancer globally might be due to race, promptness of detection and treatment, and the assessment tools for depression.

## Conclusion

This report shows that depression is common among women with breast cancer, though more often not recognized by the clinicians and thus not treated. For women, the breast is an organ of beauty and femininity hence anything less of such may affect their self-esteem. Also, coming to terms with the diagnosis of breast cancer could be traumatic and most women are initially in a state of denial. The stigma, chronic nature of the disease, and the probability of survival are major concerns. Management of breast cancer is capital intensive, especially in settings where the Health Insurance Scheme does not cover breast cancer treatment. The financial demands, debilitating physical symptoms, and side effects of some of the medications might increase their stress making them more vulnerable to depression. Therefore, the active involvement of mental health experts cannot be overemphasized.



## References

1. WHO | Breast cancer: prevention and control. WHO. 2016;
2. Stewart BW, Kleihues P. World Cancer Report. Vol. 2008, International Agency for Research on Cancer. 2003. p. 351.
3. World Health Organisation. Latest world cancer statistics Global cancer burden rises to 14.1 million new cases in 2012: Marked increase in breast cancers must be addressed. Press release 223. 2013.
4. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. Vol. 127, International Journal of Cancer. 2010. p. 2893–917.
5. Oboirien M KA. Clinical Presentation, Prevalence and Management of Breast Cancer in Sokoto, Nigeria. Vol. 03, Journal of Women's Health Care. 2014.
6. BREAST CANCER DEATH RATE BY COUNTRY.
7. Philip EJ, Merluzzi T V., Zhang Z, Heitzmann CA. Depression and cancer survivorship: Importance of coping self-efficacy in post-treatment survivors. Vol. 22, Psycho-Oncology. 2013. p. 987–94.
8. Lo C, Li M, Rodin G. The assessment and treatment of distress in cancer patients: Overview and future directions. Minerva Psichiatr. 2008;49(2):129–43.
9. Kroll J. Posttraumatic Symptoms and the Complexity of Responses to Trauma. Vol. 290, Journal of the American Medical Association. 2003. p. 667–70.

10. Popoola AO, Adewuya AO. Prevalence and correlates of depressive disorders in outpatients with breast cancer in Lagos, Nigeria. Psychooncology. 2012 Jun 1;21(6):675–9.

11. Massie MJ. Prevalence of depression in patients with cancer. J Natl Cancer Inst Monogr. 2004;2004(32):57–71.

12. Ell K, Sanchez K, Vourlekis B, Lee PJ, Dwight-Johnson M, Lagomasino I, et al. Depression, correlates of depression, and receipt of depression care among low-income women with breast or gynecologic cancer. Vol. 23, Journal of Clinical Oncology. 2005. p. 3052–60.

13. Nunes SOV, Reiche EMV, Morimoto HK, Matsuo T, Itano EN, Xavier ECD, et al. Immune and hormonal activity in adults suffering from depression. Vol. 35, Brazilian Journal of Medical and Biological Research. 2002. p. 581–7.

14. Sephton SE. Diurnal Cortisol Rhythm as a Predictor of Breast Cancer Survival. Vol. 92, Journal of the National Cancer Institute. 2000. p. 994–1000.

15. Jafari A, Goudarzian AH, Nesami MB. Depression in women with breast cancer: A systematic review of cross-sectional studies in Iran. Asian Pacific Journal of Cancer Prevention. 2018;19(1):1–7.

16. Adewuya AO, Ola BA, Afolabi OO. Validity of the patient health questionnaire (PHQ-9) as a screening tool for depression amongst Nigerian university students. Vol. 96, Journal of Affective Disorders. 2006. p. 89–93.

17. Sheehan DV LY reability and validity of MI. The Mini-International Neuropsychiatric Interview (M. 1997. p. 232–41.

18. sheehan DV LY. MINI - Mini-International Neuropsychiatric Interview. J clinical Psychiatry; 1998. p. 20–3.

19. Wang H, Chow SC. Sample Size Calculation for Comparing Proportions. In: Wiley Encyclopedia of Clinical Trials. 2007.

20. Vin-Raviv N, TF A, Galea S, DH B. - Depression and Anxiety Disorders among Hospitalized Women with Breast Cancer.

21. Gokgoz S, Sadikoglu G, Paksoy E, Guneytepe U, Ozcakir A, Bayram N, et al. Health Related Quality of Life among Breast Cancer Patients: a Study from Turkey. Glob J Health Sci. 2011;3(2).

22. Wondimagegnehu A, Abebe W, Abraha A, Teferra S. Depression and social support among breast cancer patients in Addis Ababa, Ethiopia. BMC Cancer. 2019;19(1).

23. Lipsett A, Barrett S, Haruna F, Mustian K, O'Donovan A. The impact of exercise during adjuvant radiotherapy for breast cancer on fatigue and quality of life: A systematic review and meta-analysis. Vol. 32, Breast. 2017. p. 144–55.

24. Calys-Tagoe BNL Senaedza NAH Department of community Health university of G school of public health. (PDF) ANXIETY AND DEPRESSION AMONG BREAST. p. vol.6, No.1.

25. Kovács Z, Rigó AP, Szabó É, Sebestyén Á, Hoyer M, Fülöp E, et al. The prevalence of depression and anxiety in patients with malignant breast tumour. New Medicine. 2011;2011-Janua(2):61–6.

26. Trinca F, Infante P, Dinis R, Inácio M, Bravo E, Caravana J, et al. Depression and quality of life in patients with breast cancer undergoing chemotherapy and monoclonal antibodies. Ecancermedicalscience. 2019;13.

27. Su JA, Yeh DC, Chang CC, Lin TC, Lai CH, Hu PY, et al. Depression and family support in breast cancer patients. Neuropsychiatr Dis Treat. 2017;13:2389–96.

28. Rezaianzadeh A, Mousave M, Hassanipour S, Maghsoudi A, Mokhtari A, Dehghani SL. Prevalence of Depression Among Iranian Women with Breast Cancer: A Systematic Review and Meta-Analysis. Health Scope. 2019;In Press(In Press).

29. Berhili S, Kadiri S, Bouziane A, Aissa A, Marnouche E, Ogandaga E, et al. Associated factors with psychological distress in Moroccan breast cancer patients: A cross-sectional study. Breast. 2017;31:26–33.

30. Kagee A, Roomaney R, Knoll N. Psychosocial predictors of distress and depression among South African breast cancer patients. Psychooncology. 2018;27(3):908–14.

31. Wondimagegnehu A, Abebe W, Abraha A, Teferra S. Depression and social support among breast cancer patients in Addis Ababa, Ethiopia. BMC Cancer. 2019;19(1).