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Correlation between clinical staging and demographic findings among breast cancer patients in Port Harcourt, Nigeria

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ABSTRACT

Background: Variation in clinical staging, demographic characteristics, and outcome of breast cancer have been observed across the globe. This study aimed to determine the correlation between clinical staging and demographic characteristics of breast cancer patients in a tertiary health facility over three-years.

Materials and Methods: An analytical observational study was carried out among breast cancer patients using a proforma. The Statistical Package for Social Sciences (SPSS) version 20.0 was used for statistical analysis.

Results: The "clinical staging" of the disease increases as the "age of the patients" decreases ("r" of -0.159), although this relationship is weak and the percentage variation is small (R^2 value of 0.0015). Pearson correlation coefficient, "r", is in the positive for both "age at menarche" (r = 0.157) and "age at menopause" (r = 0.199), implying that the "clinical staging" of the disease increases as the "age at menarche" and "age at menopause" increases, although the relationship is weak, as the percentage variation which is small. The mean age of patients with stage IV disease (41.50±14.96 years) was relatively lower than the mean age of 50.00±0.00 years for stage I disease. Similarly, the mean age at menarche of 14.20±1.30 years observed for stage IV disease patients, was lower than the values of 14.50±0.70 years for stage I. However, these relationships are not statistically significant (p-values >0.05).

Conclusion: Correlation was found between breast cancer disease clinical staging and some demographic findings of the patient, although the percentage variations were small and the relationships weak.

INTRODUCTION

The stage of breast cancer seen in an area to some extent, is a reflection of the blend of the inherent characteristics of the tumor, socioeconomic standing, cultural values, and the response/degree of development of the peoples' health system. Hence variation in clinical staging of breast cancer is observed across the globe. These same factors also conspire to influence survival and mortality in patients with breast cancer in different regions. The first worldwide study on this subject as far back as 2012 therefore reported higher survival in breast cancer patients in Europe and the United States.[1, 2] In Europe, about 20 years ago, stage at diagnosis was 55% for locally advanced tumors, 18% for metastatic disease, and the overall 5-year survival was 79%.[3] In a Mexican report on 4411 patients, the average age at diagnosis was 53 years, stage at diagnosis was 36% for early stages and 45% for locally advanced.[4] In that report, triple negative tumors comprised 14.6% of all tumors. In Iran, early breast cancer is seen in 65.5%-70.5% of cases, and the overall survival rate was 72% as reported in a study published in 2018.[5] In that study, the mean age at diagnosis was 49.84 years, and the predominant histologic type was invasive ductal carcinoma. These Iranian observations are further strengthened by the findings of other Iranian researchers,[6] which contrast with those in Africa. A recent meta-analysis of studies from 23 countries in the five regions of Africa reported that 58% of the overall breast cancer occurred in patients who were less than 50 years of age, only 2% had carcinoma in-situ, and 50% of the patients had stage III disease.[7] It was observed in this study, that most of the advanced tumors originated from studies conducted among patients in West African Sub-region.

Investigations correlating clinicopathologic characteristics of breast cancer with some demographic variables have been carried out in different parts of the world with some differences in outcome. In the United States, African Americans and premenopausal women are associated with triple-negative breast cancer which has higher risk for brain and lung metastasis.[8] In an Iraqi study, no correlation was found between demographic findings (age of the patients, history of lactation or contralateral breast involvement) and stage at diagnosis.[9] However, a similar study done in year 2021 demonstrated significant association between clinical staging and marital status, educational status, history of hormonal intake, contralateral breast involvement and familial cancer.[10]

Correlational studies between breast cancer staging and demographic findings have also been done in few centers in Nigeria with variable outcomes. A multi-center study had reported that level of educational, living in rural areas, and not believing in cure of breast cancer were strongly associated with late-stage disease, whereas, no such association was observed for age at diagnosis, tumor grade and estrogen receptor status.[11] However, a center-based study demonstrated significant association between disease staging and age at menarche, age at menopause, age at first pregnancy, and body index mass.[12] This study aimed to determine the clinical correlation between clinical staging and demographic characteristics (age at diagnosis, age at menarche, age at menopause) of breast cancer patients who were seen in a tertiary health facility from July 2016 to June 2019.

MATERIALS AND METHODS

An analytical observational study was carried out among patients who had breast cancer at the Surgery Department of the University of Port Harcourt Teaching Hospital from July 2016 to June 2019. Total population of the patients who attended the breast clinic were enrolled using a proforma to extract data on clinical staging and demographic characteristics (age at diagnosis, age at menarche, age at menopause), from the patients, clinic and ward registers. All the authors verified the data before usage. The Statistical Package for Social Sciences (SPSS) version 20.0 was used for statistical analysis. Pearson's correlation and simple linear regression equation were used to explore the relationship between clinical staging and demographic characteristics. The mean demographic characteristics were compared across clinical staging using the one-way Analysis of Variance (ANOVA) to determine significant differences. All statistics were tested at the 0.05 significant level.

RESULTS

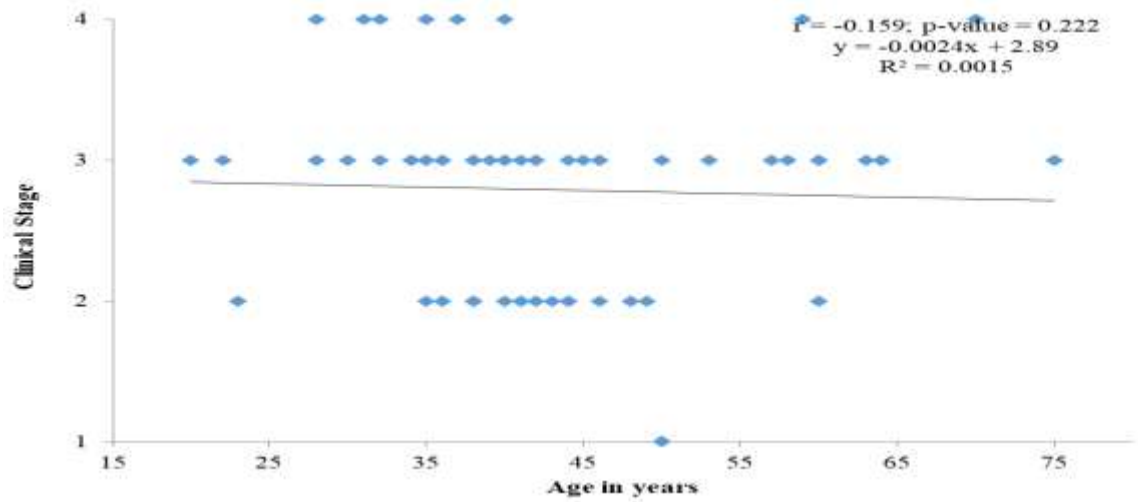

Figure 1: Correlation between age of patient and clinical staging

Figure 1 shows the correlation between the age of patients and their clinical staging. The Pearson correlation coefficient, "r", is in the negative (r = -0.159) implying that as the "age of the patients" increases, the "clinical staging" decreases. However, this relationship is weak. The R^2 value of 0.0015 indicates the percentage variation which is very small.

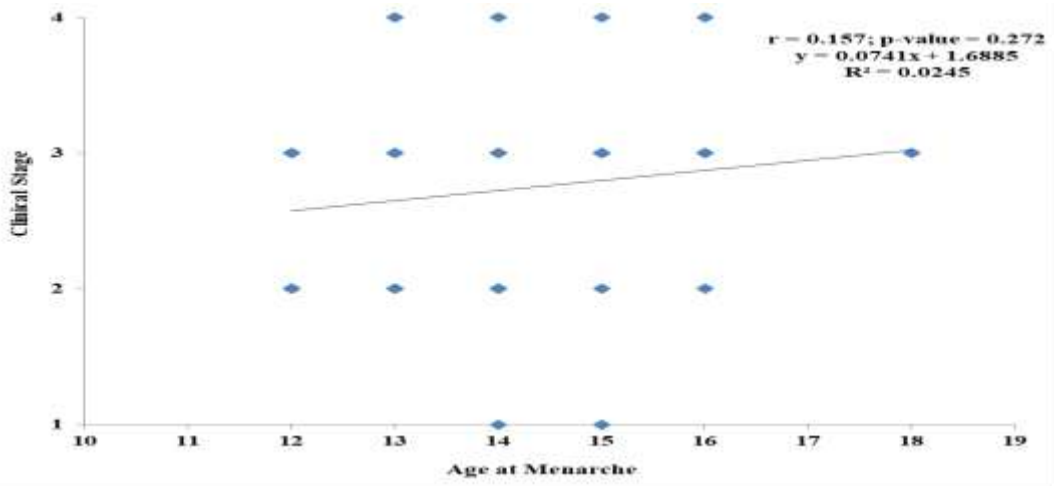

Figure 2: Correlation between age at menarche and clinical staging

Figure 2 shows the correlation between age at menopause and clinical staging. The Pearson correlation coefficient, "r", is in the positive (r = 0.157) implying that as the "age at menarche" increases, the "clinical staging" increases. However, this relationship is weak. The R^2 value of 0.0245 indicates the percentage variation which is small.

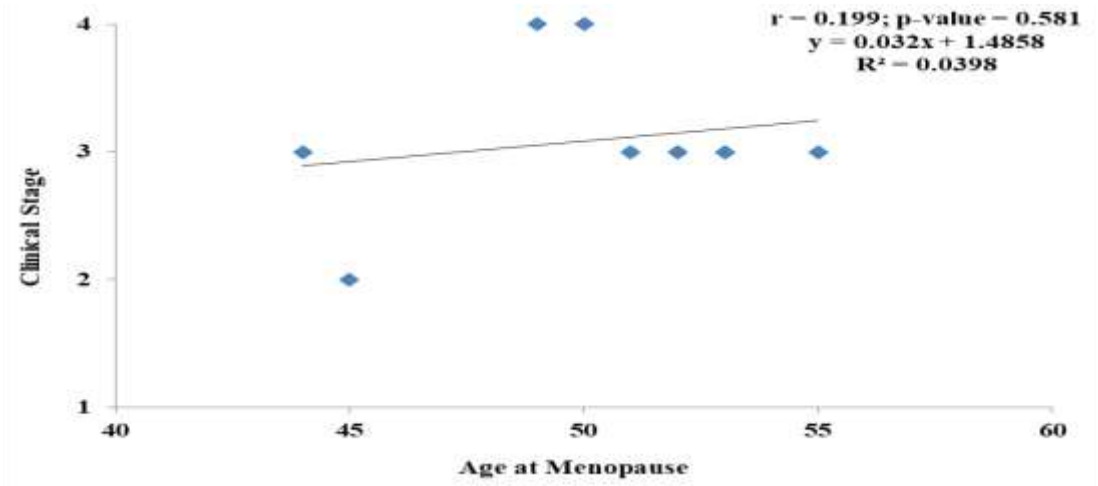

Figure 3: Correlation between age at menopause and clinical staging

Figure 3 shows the correlation between the age at menopause and their clinical staging. The Pearson correlation coefficient, "r", is in the positive (r = 0.199) implying that as the "age at menopause" increases, the "clinical staging" increases. However, this relationship is weak. The R^2 value of 0.0398 indicates the percentage variation which is very small.

Table 1: Comparison of the mean demographics across the clinical staging

Clinical Staging	Number	Demographic characteristics		
		Age of patient Mean ± SD	Age at menarche Mean ± SD	Age at menopause Mean ± SD
I	2	50.00±0.00	14.50±0.70	-
II	17	41.88±7.59	13.40±1.18	45.00±0.00
III	34	43.74±12.82	14.24±1.62	51.43±3.51
IV	8	41.50±14.96	14.20±1.30	49.50±0.70
		ANOVA=0.371 *p-value=0.774*	*ANOVA=1.218* *p-value=0.314*	*ANOVA=1.801* *p-value=0.234*

SD –Standard deviation

Table 1 shows the comparison of the mean demographics across the clinical staging of the disease. The mean age of patients who had stage IV disease was 41.50±14.96 years, relatively lower than the mean age of 50.00±0.00 years for stage I disease and 41.88±7.59 years for stage II disease. Similarly, the mean age at menarche of 14.20±1.30 years observed among patients who had stage IV disease, is lower than the values of 14.50±0.70 years for stage I and 13.40±1.18 years for stage II disease. Lower age at menopause was observed for stage II disease, while relatively higher age was seen for II (51.43±3.51 years) and IV disease (49.50±0.70 years). However, these were not statistically significant ($p > 0.05$).

DISCUSSION

It is already a known fact in academic research that correlational studies do not address causality.[13-15] However, it highlights association or relatedness of two or more variables of interest, akin to the saying "show me your friends, and I will tell you who you are".[16-18] We found an inverse and rather weak relationship between disease "clinical staging" and the "age of the patients". The meaning of this is that the clinical stage of breast cancer tends to be higher as the age of the patient decreases. Hence any delay in presentation of breast cancer in a younger patient is likely to result in more remarkable increase in the stage of the disease than in the older breast cancer patient. This finding appears to agree with what is already known about breast cancers that occur in younger patients which tend to be poorly differentiated and hence exhibit a tendency for rapid transition to advanced stage of disease within a short time.[19] However, our findings differ from that of an Iraqi study where no correlation was found, and also other similar studies.[9, 20, 21] It is rather not surprising in this study, why relatively younger mean age was associated with relatively advanced disease.

The relationship between disease "clinical staging" and "age at menarche" was linear with the Pearson correlation coefficient, "r", being positive. Although this relationship was weak and has a small percentage variation, it tends to suggest that the "clinical staging" increases in the same direction as the "age at menarche", i.e. the clinical stage will tend increase as the age of menarche increases. Our finding is similar to the observations in another study carried out in Lagos Nigeria where a significant association was found between age at menarche and disease stage.[12] We are unable to find a plausible explanation for this observation, as the opposite observation is rather expected. The finding of lower mean age at menarche observed among patients who had advanced disease is rather expected, although the relationship was not statistically significant. Most studies rather reported the correlation or association between age at menarche and breast cancer risk, as seen in a Taiwanese study which found a 6.47-fold early-onset increased risk of breast cancer for every year of menarche younger.[22]

The disease "clinical staging" increases in the same direction as the "age at menopause", implying that patients who have higher age at menopause are likely to have higher stage of disease. This implies that breast cancer stage will tend to increase as the patients' age at menopause increases, although this relationship is weak and has very small percentage variation. A Lagos Nigeria study also reported significant association between age at menopause and the clinical stage of breast cancer.[12] Otherwise, studies on this subject mostly dealt with the association between age at menopause and breast cancer risk, and not stage of breast cancer.

Study Limitations: The study population is small, and the correlations between the variables of interest is weak. A larger study population is need in another study to ascertain the findings of this study.

CONCLUSION

A trend was found in the relationship between the "clinical staging" of breast cancer and the "age of the patients" in inverse direction, and between the "clinical staging" and "age at menarche"/ "age at menopause" whose relationship was linear (in the same direction). Additionally, younger mean age/lower age mean age at menarche were associated with advanced disease. The percentage variation in each case was however, small and the relationships were weak.

Recommendation: Occurrence of breast cancer in the younger patient requires more urgency to ensure early diagnosis and commence proper treatment as the tendency for rapid progression of disease is higher.

OTHER INFORMATION

Acknowledgement: The resident doctors in the Breast Unit of the Hospital within the study period assisted in data collection, and the Management of Eagles Watch Research Centre analyzed the collected data, for which we are grateful.

Ethical Considerations: The approval of the Research Ethics Committee of the University of Port Harcourt was obtained. The personal details of the patients were excluded.

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Conflict of Interest: None declared

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