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Clinical characteristics of women with triple-negative breast cancer in a fourth-level institution in Barranquilla.

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Abstract

Introduction: Triple-negative breast cancer (TNBC) is characterized by the absence of estrogen, progesterone hormone receptors, and human epidermal growth factor receptor 2 (HER2). TNBCs are associated with high recurrence rates, rapid metastases, poor survival, and increased mortality compared with other histologic breast cancer subtypes. This study aimed to establish the prevalence of TNBC and the clinical characteristics of patients treated in a reference cancer center in Bogotá.

Methodology: This was a retrospective descriptive cross-sectional observational study in which the triple-negative subtype breast cancer frequency and clinical variables were evaluated. Women treated at the Bonnadona Prevenir SAS Clinic Organization in Barranquilla, Colombia, in 2021-2022.

Results: A total of 350 patients were studied, of whom 61 (17.4%) presented the triple-negative immunophenotype. The mean age was 54.5 years, 74% were multiparous, 85% breastfed, 70% were postmenopausal, and the most frequent clinical stage was IIIB.

Conclusion: In the present study, 57.35% of the population exhibited an advanced clinical stage at the time of diagnosis. Likewise, the clinical characteristics are consistent with the reports in the literature.

Keywords:

MeSH: Risk Factors, Breast Neoplasms, Epidemiology, Triple Negative Breast Neoplasms.

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Introduction

Breast cancer (BrCa) is a malignant proliferation of the epithelial cells that line the ducts of the breast, representing 30% of female cancers worldwide; it is estimated that BrCa causes 15% of cancer mortality among women worldwide [1]. In Colombia, breast cancer is the most common, constituting 28.02% of new cases in 2021, an estimated 306.7 (95% CI: 304.6 - 308.8)

cases per 100,000 women in the same period [2]. Triple-negative breast cancer (TNBC) lacks estrogen receptor (ER), progesterone receptor, and human epidermal growth factor receptor 2 (HER2) expression [3]. In Colombia, TNBC represents 24.16% of all female breast cancers; in Colombia, it is estimated to represent 24.16% [2].

Ambrosone C et al. (2015) concluded that increasing age at menarche was associated with decreased TNBC rates for patients with menarche at age 15 years or older compared with those younger than 11 years (OR, 0.70; 95% CI, 0.49–1.01). On the other hand, a study by Yang XR and colleagues (2011) demonstrated that older age at first pregnancy was associated with fewer cases of triple-negative disease (OR, 0.89 per 5-year increase in age; 95% CI), 0.83–0.95). This sense of pregnancy is associated with mammary angiogenesis, stromal changes, and a unique hormonal environment that can give rise to TNBC [4].

Breastfeeding appeared to reduce the risk of ER breast cancer with parity. For example, having four or more children was associated with a greater than 60% increased risk of TNBC among women who did not breastfeed (OR, 1.68; 95% CI, 1.15–2.44) but did not increase the risk among women who did not breastfeed (OR, 1.08; 95% CI, 0.65-1.77); likewise, the early age of menopause and first childbirth was associated with a higher probability of suffering from TNBC cancer, evidencing that the risk decreases as age increases in both variables (trend of P = 0.003 and 0.024, respectively) [4]. On the other hand, as reported by Gulbahce et al. (2021), unlike the more common hormone-dependent cancers that develop with a lifetime of estrogen exposure, the relative rates of TNBC are higher in younger patients, being more common in patients aged 20 to 39 years. Therefore, it is necessary to expand the knowledge of the epidemiological characteristics of patients with TNBC to build personalized detection protocols adjusted to the local population.

TNBC is associated with higher mortality than other pathologic breast cancer subtypes. This is probably due to insufficient receptor-directed therapies leading to increased recurrence, rapid metastasis, and poor survival. The diversity in the clinical and demographic presentation means that the disease occurs in a unique variety of patients who are convenient to characterize [5]. In short, the risk factors associated with the development of the disease are vital to establishing early diagnosis protocols, as well as therapeutic behaviors; these can be identified through a statistical approach to the events, risks, and characteristics related to the clinical response, which facilitates the approximation of a favorable clinical evolution [6].

The objective of this study was to establish the prevalence of TNBC and its clinical characteristics in patients treated at the Organization Clínica Bonnadona Prevent SAS from 2021 to 2022.

Materials and methods

Study design

This study is descriptive, cross-sectional, and observational from a retrospective source.

Study area

The study was conducted in the Organización Clínica Bonnadona Prevenir SAS oncology department in Barranquilla, Colombia. The study period was from January 1, 2021, to December 31, 2022.

Universe and sample

The sample was made up of women who consulted the oncology service with a diagnosis of breast cancer. The sample calculation was nonprobabilistic, taken for convenience, and comprised all the patients who met the selection criteria.

Participants
Female patients whose age was more significant than or equal to 18 years diagnosed with breast cancer with triple-negative histological characterization were included. Records without primary data necessary for the traceability of the subjects or analysis of the information were excluded.

Variables
Clinical variables of the patients were included (age, age at first pregnancy, menarche, parity, menopause, breastfeeding, clinical stage, Ki67, location in the mammary gland, and histological variant of the tumor).

Procedures, techniques, and instruments
The data were collected from the clinical history in a form designed exclusively for that purpose. The system was used, thus protecting the confidentiality of the information and identity of the patients.

Avoidance of bias
To avoid selection bias, the restriction technique was used by clearly delimiting the inclusion and exclusion criteria of the patients. To prevent measurement bias, standardization was used, where the personnel involved in data collection were trained, trained in the variables to be considered, and familiar with the collection instrument, all before the start of the study. Since the medical records and tests that the patients previously had were reviewed, there was a risk of information bias since, when correlating data, the results could be incomplete, as well as the omission of other antecedents. To avoid this type of bias, when the complete clinical history that included the selection criteria was not available, the patient was not taken for evaluation.

Statistical analysis
The Microsoft Excel ® 2021 spreadsheet was used in a database that compiled all the information collected for the statistical analysis. The statistical analysis was conducted using the SPSS statistical program version 15. A univariate analysis was carried out with measures of central tendency and dispersion for the quantitative variables and the determination of frequencies or percentages for the qualitative variables (n and %).

Results

Participants
The study analyzed 61 patients with the triple-negative immunophenotype out of 350 breast cancer cases, representing 17.4%.

General characteristics of the sample
A total of 17.4% of the patients expressed the triple-negative immunophenotype, with a 95% confidence interval of 13.5% - 21.4%; the average age was 54 ± 12.8 years, with a minimum age of 29 years and a maximum of 81 years, and the most significant number of cases occurred between 40 and 59 years. On the other hand, the age at first pregnancy was 18.9 ± 9.51 years, and the age at menarche was 12.6 ± 1.62 years (Figure 1). In the studied population, 74% of the patients were multiparous, 15% nulliparous, and 11% primiparous. Regarding menopause, 70% reported it, and 30% denied it; menarche occurred in most cases between the ages of 11 and 14 years, and 85% of the patients provided breastfeeding (Table 1).

Figure 1. Age distribution of the population

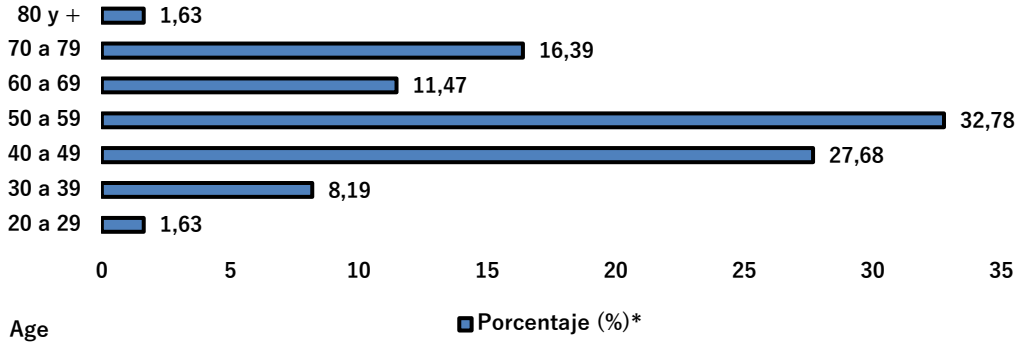
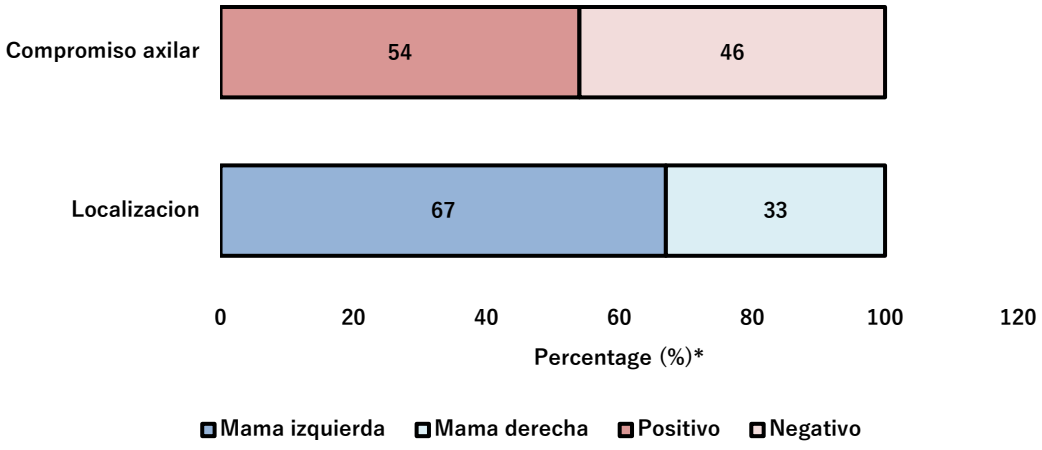


Table 1 . Clinical characteristics of the sample.

Category	Variable	Frequency n=61 (%)
Parity	multiparous	45 (74%)
	nulliparous	9 (15%)
	primiparous	7 (11%)
Menopause	Yes	43 (70%)
	No	18 (30%)
Breastfeeding	Yes	52 (85%)
	No	9 (15%)

Figure 2. Distribution of cases according to location in the breast and axillary involvement.



Regarding the distribution of cases according to location, most cases occurred in the patient's left breast and had greater axillary involvement (Figure 2). The most prevalent histological variety was infiltrating ductal carcinoma (85.24%), followed by infiltrating ductal adenocarcinoma (5%) (Figure 3).

Distribution of cases according to stage and Ki67

Most patients were found in stage IIIB, which corresponds to 36% of the population studied, followed by stage IIA with 21.31%, and stages IV, IIIC, IIIA, IB, and IA together represent 42.69%. Regarding the Ki67 proliferation index, positivity ≥20% was found in 95.09% of the cases (Figure 4).

Figure 3. Distribution of cases according to histological variety.

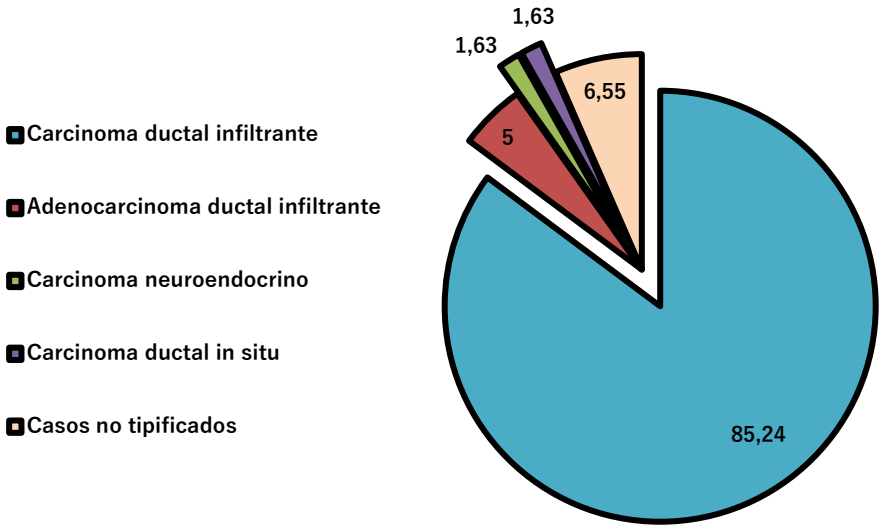
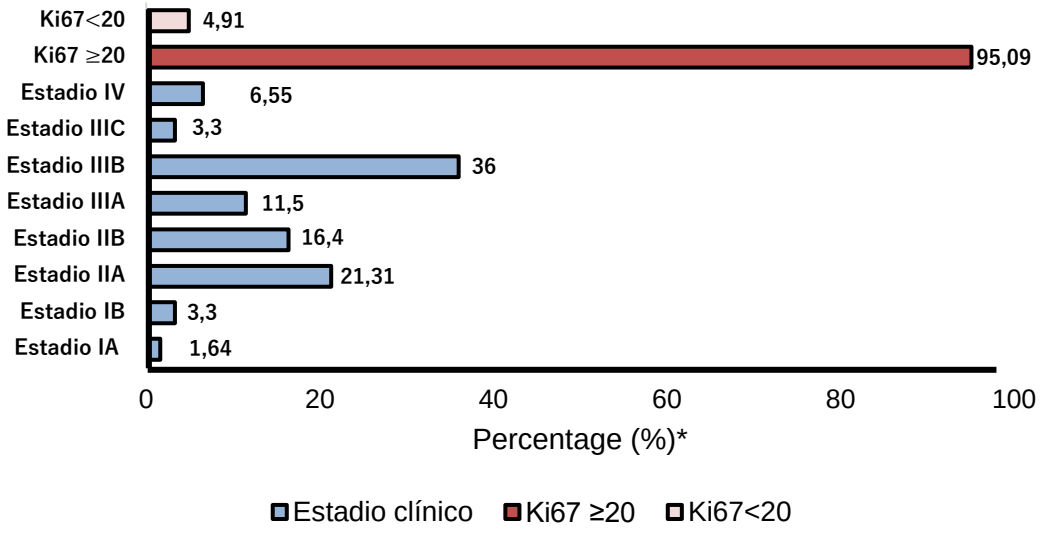


Figure 4. Distribution of cases according to clinical stage and Ki67.



Discussion

Triple-negative breast cancer accounts for approximately 15-20% of all breast cancers [7]. A population of 350 patients diagnosed with breast cancer was analyzed, of whom 61 patients (17.4%) had TNBC, which is compatible with global epidemiology. Multiple risk factors have been described for TNBC; it is more frequently observed in young, African-American and Hispanic women [8] and has a more aggressive clinical course; consequently, the diagnosis of TNBC increases the risk of mortality up to three times compared to other histological subtypes [9].

The average age at diagnosis in this population was 54.5 years, with the highest number of cases (20 cases) between 50 and 59 years, representing 32.78% of the population. In short, these findings are compatible with the available literature. The median age is estimated at 54 years in patients with TNBC. Although the odds of TNBC in women younger than 40 years are 1.53 times higher than those in women older than 60 years [10], the age at diagnosis is predicted to increase progressively due to population aging.

Regarding parity, 74% of the patients were multiparous. Likewise, 85% of the population stated that they had breastfed; 62% of the patients presented their first pregnancy between the ages of 20 and 29. In line with what was described by Phipps et al. (2011), these variables could increase the risk for the development of TNBC; on the other hand, they constitute a protective factor for other immunophenotypes of breast cancers [11]. Patients with TNBC have unique epidemiological behavior, so more extraordinary efforts are needed to broaden, delimit and identify the factors contributing to the substantial variations and disparities observed in juxtaposition with other subtypes of breast neoplasms to develop diagnostic protocols and early treatment in TNBC.

At the clinical stage, patients with TNBC have a high probability of exhibiting a higher degree of clinical disease and a larger tumor lesion size than other subtypes of breast tumors [9]. Dent R et al. (2007) reported that the probability of presenting grade III tumors was 66%. In this study, 50.8% of the population was found to be in this stage, and 6.55% was in stage IV. Additionally, 54% of the population studied presented involvement of axillary nodes. Thus, the people of the present study coincide with those reported in the literature, observing homogeneous behavior when contrasting with the 55.6% involvement in the axillary nodes described in the global population. On the other hand, the histological variants that were most frequently documented were infiltrating ductal and infiltrating ductal adenocarcinoma, corresponding to 85.24% and 5%, respectively, of the population of this study. These findings are consistent with other TNBC populations [9].

Regarding the Ki-67 marker, 95.08% of the patients exhibited a value ≥20% in immunohistochemistry; this behavior is frequently described in TNBC [12]. The potential of Ki-67 as a prognostic or predictive factor for clinical outcomes in patients with TNBC has been questioned. Ankit J et al. (2022) found that the increase in Ki-67 is related to a more significant response to neoadjuvant chemotherapy. As Ki-67 represents tumor proliferation, a high level will translate into a more potent therapeutic response. However, this assertion is not true regarding prognosis. In reality, low-proliferating tumors have the worst prognosis. However, a specific value indicating better adverse outcomes is unknown. Even so, those patients with a high Ki-67 value showed poor overall recurrence-free survival of tumor disease [13].

This study answers questions about the sociodemographic and clinical characteristics of patients with TNBC in Barranquilla, Colombia. However, it may not be extrapolated to the entire Latin American population with triple-negative breast cancer, as it is limited by data collection in a single reference center. However, despite these limitations, the sample size is more significant than most similar studies. Therefore, it paves the way to generate consensus recommendations considering the characteristics described in the present study.

Conclusions

After analyzing the population of the present study, it was found that the clinical characteristics evaluated in the population studied did not differ from what was reported in the literature. The frequency of triple-negative breast tumors was 17.4% in the study population. It was found that the majority of the population corresponded to multiparous patients (74%) whose age at first pregnancy was less than 30 years (95%) and who provided breastfeeding (85%). Finally, 57.35% of the population exhibited clinical stage III or IV disease.

Abbreviations

TNBC: triple-negative breast cancer.
ER: estrogen receptor.
PR: Progesterone receptor.
HER2: Human epidermal growth factor receptor 2.

Administrative information

Additional Files

None declared by the authors.

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Not applicable.

Author contributions

Epitaph Rafael Mestre Sequeda: Conceptualization, methodology, research, project administration, validation, visualization, writing - original draft, writing – revision, and edition.

Esteban Andrés Morales Díaz: Conceptualization, methodology, research, project administration, validation, visualization, writing – original draft, writing – review, and editing.

Ángel Hernández Lastra: Conceptualization, supervision, methodology, validation, visualization, review, and edition.

Lourdes Varela Prieto: Supervision, methodology, validation, visualization.

All the authors have read and approved the final version of the manuscript.

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Availability of data and materials

Data are available upon request to the corresponding author. No other materials are reported.

Statements

Ethics committee approval

The bioethics committee of the Barranquilla sectional Free University approved the study of human beings.

Consent for publication

It is not required when images, resonances, or tomographic studies of specific patients are not published.

Conflicts of interest

The authors declare that they have no conflicts of competence or interest.

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