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# Investigation of breast pathologies in medical students and their families

Bianca de Oliveira Sousa[1]*, Mariana Moraes Barbosa[1], Anna Julia Martins dos Santos[1], Laura Bortolato Cayres[1], Lorena Lex da Motta[1], Fernanda Kristina Carneiro[1], Felipe Sá Cicareli[1], Rafael da Silva Sá[1]

## ABSTRACT

**Introduction:** Breast diseases include benign and malignant pathologies. However, during the differential diagnosis, it is important to distinguish benign pathology, precursor lesions of breast cancer, and malignant breast neoplasm. We believe that research among medical students on the prevalence of breast pathologies in this population and their families is important in addition to identifying patients at high familial risk for breast and/or ovarian cancer and awakening the interest of other medical students in this topic. The objective of this study was to analyze the prevalence of benign and malignant breast pathologies among medical students and their families. **Methods:** This is a quantitative analytical cross-sectional study. Female medical students over 18 years old were included in the study. Data collection was carried out using an online questionnaire. It was approved by the Research Ethics Committee under CAAE Protocol No. 51338121.0.0000.5515, and each participant consented through the free and informed consent form (TCLE). **Results:** A total of 303 medical students responded to the questionnaire and were included in the study. Around 13.5% of participants reported having had some breast pathology, 76.2% of which were cases of breast lumps. The average age of participants was 22.9 years (ranging between 18 and 53 years). The average age of family members at diagnosis (a sample of 69 women) was 57.1 years (ranging between 29 and 84 years). There was an association between the prevalence of breast pathologies and a family history of breast cancer (OR=1.712 [0.818; 3.585]). **Conclusion:** From the results, it appears that 13.5% of the participants had already been diagnosed with breast pathology, and 20.8% of these reported a family history of breast cancer. In this way, we can affirm the contribution of the study in the evaluation of screening criteria for breast and neoplasms and thus increase the detection rate and carry out early therapy.

KEYWORDS: breast pathologies; breast cancer; medical students.

## INTRODUCTION

Breast diseases encompass a wide variety of benign and malignant pathologies. The risk of cellular dedifferentiation in most benign breast changes is very low. However, it is necessary to distinguish them from breast cancer and its lesions. Therefore, the diagnosis must be made correctly and early for a better prognosis[1]. Carrying out self-examination, together with quick access to health services for investigation, helps in early diagnosis, as it allows women to detect changes to be investigated. However, the main strategy recommended is mammographic screening, so the Brazilian Society of Mastology and the American Cancer Society recommend annual exams starting at the age of 40 years[2,3]. The National Cancer Institute of the Ministry of Health (INCA) recommends biannual exams for women aged 50 years and older[4].

Breast cancer is the most common cancer in women worldwide, with approximately 2.3 million new cases estimated in 2020. It is also the most frequent cause of death from cancer in this population, with 684,996 deaths estimated for this year (15.5% of cancer deaths in women)[5]. In Brazil, excluding non-melanoma skin tumors, breast cancer is also the most common cancer in women in all regions, with higher rates in the South and Southeast regions. For the year 2021, 66,280 new cases were estimated, which represents an incidence rate of 43.74 cases per 100,000 women[6].

Furthermore, studies have shown an increased incidence of breast cancer in young women under 40 years of age[5,7]. The prevalence of breast cancer in American women under 35 and 45 years of age reaches 1.85 and 11.5%, respectively; in Brazil, these values are 4.4 and 20.6%[8], and in the East, it is around 13%[9]. From 2013 to

[1]Universidade do Oeste de São Paulo – Presidente Prudente (SP), Brazil.
***Corresponding author:** biancaos_@hotmail.com
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2020, 10.69% of histopathological breast exams containing malignant neoplastic lesions carried out in Brazil were from women aged 9–39 years, as well as 10.41% of mammograms diagnostic of cancer lesions[10].

Therefore, it is clear that breast pathologies are very common in the population. We believe that research among medical students on the prevalence of breast pathologies in this population and their families is of fundamental importance. We hope to identify patients at high familial risk for breast and/or ovarian cancer and awaken the interest of other medical students in this topic, which is so important for public health. The general objective of this study was to analyze the incidence of breast pathologies in medical students and their families. As specific objectives, this study aimed to evaluate the incidence rates of benign and malignant breast neoplasm in this population and their families and to establish the most prevalent degree of kinship between the family member diagnosed with breast cancer and the medical student participating in the study, identifying possible patients with high familial risk.

## METHODS

### Research design

This study was carried out with a cross-sectional temporal design, as it is a very useful tool for describing population characteristics, identifying risk groups, and planning for diagnosis[11]. The study was based on an online questionnaire, in which the participants were invited to express information regarding their medical record and family history related to breast pathologies. Furthermore, the study has a quantitative analytical character aiming at the description and analysis of variables in several participants.

### Participants

The study inclusion criteria were female medical students who regularly enrolled on the campus of Presidente Prudente, Guarujá, and Jaú, in the Universidade do Oeste Paulista (UNOESTE), were over 18 years old, and were able to respond to the information collection tool. Those who did not meet one or more inclusion criteria were excluded from the study. The expected coverage was 300 participants.

### Instruments

Research questionnaire covered information such as the participant's age, history and breast pathological types, past breast surgeries, family history of breast cancer, current presence of a palpable lump, and use of a contraceptive method (Appendix A).

### Outcomes

The primary outcome of the study concerned the prevalence of breast pathologies among medical students.

### Data collection procedure

Data collection was developed through the investigation questionnaire, using the Google Forms tool. Google Forms is an integrated web-based application that makes it easy to design online surveys, quizzes, and tests with an application programming interface[12]. It is a fast, low-cost, effective method for creating online questions and analyzing your results[13]. The questionnaire was made available to participants via a multiplatform instant messaging application, e.g., WhatsApp®, and email, allowing a duration of 15 days for replies.

### Data analysis procedure

From the spreadsheet generated with the application of the electronic questionnaire, the data were analyzed in a descriptive way, through calculations of relative frequencies for qualitative variables and mean and standard deviation for quantitative variables.

For the association between quantitative variables, the Student's *t*-test was used, and for qualitative variables, the chi-square test was used.

The data were tabulated in Microsoft Excel and presented using frequency distribution for qualitative variables and summary measures for quantitative variables. To evaluate the association between breast pathologies and variables under study, a logistic regression model was adjusted to the data, with the help of the R software. The significance level adopted was $\alpha$=5%.

### Ethical issues

This study was approved by the Research Ethics Committee, in accordance with resolution no. 466 of December 12, 2012, under CAAE Protocol No. 51338121.0.0000.5515. Furthermore, the project adhered to the design wherein the participant is informed about the objective of the research and presented with the Free and Informed Consent Form (TCLE) on the first page of the research questionnaire, via Google Forms, conditioning the continuation of the research exclusively with the participant's consent.

## RESULTS

This work covered the statistical analysis of the prevalence of breast pathologies in medical students and their families. Through this analysis, it was possible to confirm what is described in the literature and identify the possible factors that have changed over the years.

As shown in Table 1, around 13.5% of medical students reported having already had some breast pathology, 76.2% of which were cases of breast lumps. Around 13.5% of medical students reported having already had some breast pathology, of which 76.2% were cases of breast lumps.

**Table 1.** Descriptive statistics of participants' responses (n=303).

| Question | Categories | n (%) |
|---|---|---|
| Self-reported race (n=303) | Yellow | 16 (5.3) |
| | White | 247 (81.5) |
| | Black | 3 (1.0) |
| | Brown | 36 (11.9) |
| | Other | 1 (0.33) |
| Have you ever been diagnosed with any breast pathology by a medical professional? (n=303) | No | 262 (86.5) |
| | Yes | 41 (13.5) |
| If yes, indicate whether: (n=42) | Breast cancer | 1 (2.4) |
| | Cyst | 4 (9.5) |
| | Lipoma | 1 (2.4) |
| | Mastitis | 3 (7.1) |
| | Nodule | 32 (76.2) |
| | None of these | 1 (0.3) |
| Have you ever undergone a breast surgical procedure? (n=303) | No | 253 (83.5) |
| | Yes | 50 (16.5) |
| If yes, please indicate: (n=50) | Nodule biopsy | 1 (2.0) |
| | Mammoplasty (with prosthesis) | 35 (70.0) |
| | Mammoplasty (reduction) | 8 (16.0) |
| | Mastectomy | 1 (2.0) |
| | Mastopexy | 3 (6.0) |
| | Lumpectomy | 1 (2.0) |
| | Cystic nodule puncture | 1 (2.0) |
| Do you have a family history of breast cancer? (n=303) | No | 240 (79.2) |
| | Yes | 63 (20.8) |
| What is the degree of kinship? (n=63) | Maternal grandmother | 23 (36.5) |
| | Paternal grandmother | 15 (23.8) |
| | Mother | 10 (15.9) |
| | Maternal aunt | 13 (20.6) |
| | Paternal aunt | 15 (23.6) |
| Number of family members who had breast cancer (n=63) | 1 | 50 (79.4) |
| | 2 | 12 (19.0) |
| | 4 | 1 (1.6) |
| The breast cancer presented was: (n=63) | Right unilateral | 6 (9.5) |
| | Left unilateral | 17 (27.0) |
| | Unilateral, I don't know which side | 35 (55.6) |
| | Bilateral | 5 (7.9) |
| Do you currently have a palpable nodule? (n=303) | No | 284 (93.7) |
| | Yes | 19 (6.3) |
| Which breast? (n=19) | Right | 11 (57.9) |
| | Left | 8 (42.1) |
| How many nodules? (n=18) | 1 | 14 (77.8) |
| | 2 | 1 (5.6) |
| | 4 | 2 (11.1) |
| | 5 | 1 (5.6) |

Continue...

**Table 1.** Continuation.

| Question | Categories | n (%) |
|---|---|---|
| Have you ever had a breast ultrasound? (n=19) | Yes | 19 (100.0) |
| If so, what is the BIRADS? (n=15) | 2 | 3 (20.0) |
| | 3 | 10 (66.7) |
| | 4 Intraductal | 2 (13.3) |
| Do you use contraception? (n=303) | Yes | 224 (73.9) |
| | No | 79 (26.1) |
| If so, indicate which one. (n=224)* | Oral contraceptive | 152 (67.9) |
| | Male condom | 89 (39.7) |
| | Copper IUD | 15 (6.7) |
| | Medicated IUD | 22 (9.8) |
| | Other | 10 (4.5) |

*Percentages add up to more than 100% because each participant can choose more than one category.

When asked if any surgical procedure had already been performed, 16% of the students reported having done so. Of this, 70% were the mammoplasty procedure with breast prosthesis and, in second place among the most performed, the reduction mammoplasty procedure.

Regarding family history of breast cancer, around 20.8% of the sample reported they had it. The degree of kinship of women who had cancer, from greatest to least, was maternal grandmother (36.5%), paternal grandmother (23.8%), paternal aunt (23.6%), maternal aunt (20.6%), and mother (15.9%).

Of the people who had family members with breast cancer, 79.4% reported they had only 1 family member with breast cancer, 19% reported they had 2 family members, and 1.6% reported they had 4 family members with breast cancer.

Regarding the location of this breast cancer in family members, the majority (around 55.6%) stated that it was unilateral without knowing which side, 27% reported that it was left unilateral, 9.5% reported that it was right unilateral, and 7.9% reported that it was bilateral.

When asked about currently having a palpable nodule, only 6.3% of the medicine students reported they did, with 77.8% reporting only one nodule, 5.6% two nodules, 11.1% four nodules, and 5. 6% five nodules.

Of the sample of women who reported having a palpable lump at this time, 100% of them had already undergone a breast ultrasound. Among these 19 women with a palpable nodule, 15 were able to report BIRADS, 66.7% BIRADS 3, 20% BIRADS 2, and 13.3% BIRADS 4 intraductal.

When asked about the use of a contraceptive method, 73.9% stated they used some contraceptive method, and among them, the majority of 67.9% used oral contraceptives, 39.7% male condoms, 6.7% the copper IUD, 9.8% the medicated IUD, and 4.5% another method, highlighting that the participant could choose more than one method.

## Sample characterization

According to data presented in Table 2, the average age of participants was 22.9 years, with a minimum of 18 years and a maximum of 53 years. The average age of family members at the time of diagnosis (a sample of 69 women) was 57.1 years, with a minimum of 29 years and a maximum of 84 years.

Table 3 presents the result of adjusting a logistic regression model for the outcome of breast pathologies in medicine students. Age was considered a factor associated with breast pathologies (p=0.002), and considering that OR=1.106 (95% CI: [1.037; 1.180]), it is possible to conclude that each year the age of the participants increases, and the chance of presenting a breast pathology increases by 10.6%.

Furthermore, white people had a 74% higher chance of breast pathologies, and a family history of breast cancer had a 71.2% higher chance. However, the association between such variables and the outcome was not considered statistically significant (OR=1.740 [0.651; 4.655] for white race and OR=1.712 [0.818; 3.585] for family history of cancer).

# DISCUSSION

Breast pathologies correspond to a comprehensive group of diseases. Mastitis is common during lactation and concerns an inflammatory condition, in which the breast is swollen and wedge-shaped with increased local temperature and pain, whether or not resulting from infection[14,15]. Mastalgia – the clinical name for breast pain – is the most common benign change in the female reproductive cycle and occurs mainly in the pre-menstrual phase[16]. Papillary effusion or papillary discharge is the exit of secretion through the mammary papilla in women who are not lactating and/or pregnant. In these cases, it is necessary to investigate the complaint, detailing the aspects of the secretion to diagnose the underlying cause, which is usually benign[14].

**Table 2.** Description of the quantitative variables under study.

| Variable | Average | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|
| Age (n=303) | 22.9 | 4.3 | 18 | 53 |
| Age of family members at the time of diagnosis (n=69) | 57.1 | 11.9 | 29 | 84 |

**Table 3.** Odds ratios obtained by the logistic regression model for the diagnosis of breast pathologies in medicine students (n=41).

| Variable | OR (95%CI) | p-value |
|---|---|---|
| Age | 1.106 (1.037; 1.180) | 0.002* |
| White breed | 1.740 (0.651; 4.655) | 0.270 |
| Family history of breast cancer | 1.712 (0.818; 3.585) | 0.154 |

*Statistically significant at $\alpha$=5%.

Benign breast nodules account for up to 80% of palpable masses. Its differential diagnosis is broad, involving breast cysts, fibroadenomas, phyllodes tumors, papillomas, lipomas, hamartomas, and adenomas, among others[17]. This percentage is very close to that found in our research, as 76.2% of participants who had already been diagnosed with breast pathologies had breast nodules diagnosed by ultrasound. Other pathologies found among our participants were also differential diagnoses of the nodule, such as cyst (4.9%) and lipoma (2.4%), among others.

The most prevalent lesions of the female breast are cysts, occurring more commonly in women aged between 35 and 50 years. Its incidence is 7–10% of this population, characterized by being single or multiple and unilateral or bilateral[18]. In our research, it was not the most diagnosed pathology, as the average age of the participants was 22.5 years, that is, younger than the most prevalent age for cysts.

Fibroadenomas are characterized by mobile nodules measuring from 2 to 3 cm, presented as homogeneous, oval masses with regular edges and histologically composed of an accumulation of collagen in the stroma of glands. Nodules are not associated with an increased risk of breast cancer and generally occur in women under 40 years of age[19,20]. It is also the second most common neoplasm of the mammary gland, occurring from menarche to senescence, usually between 20 and 30 years of age[18]. In this pathology, the usually prevalent age coincides with the average age of our participants.

In relation to breast cancer, it is clear that the incidence tends to increase progressively from the age of 40 years, reaching the highest level between the ages of 55 and 69 years[21], which is in line with the average age range of 57.1 years found in this study. Therefore, it is coherent to state that the low incidence of diagnosis among the interviewees is justified by the average age of 22.5 years.

Risk factors for the development of breast cancer include sex, age, early menarche, nulliparity, late pregnancy, use of oral contraceptives or hormone replacement, obesity, and family history associated with genetics[22]. The prevalence is higher in women over 50 years of age, at the same time that the risk increases with pre-menopause, having the same relationship with the use of oral contraceptives and hormone replacement therapy[23]. The presence of a low-fiber diet, associated with a high level of body fat, can also increase the likelihood of developing breast cancer because fat can provide doses of estrogen in addition to that produced by the reproductive organs[24]. Patients who have first-degree relatives previously diagnosed with cancer are at higher risk, especially if the diagnosis occurred before the age of 40 years.

Likewise, women with late pregnancies, i.e., over 30 years of age, have a higher risk and, conversely, women with more than one pregnancy have a lower risk[25]. Furthermore, patients with previous breast carcinoma have an increased chance of developing it again, as do women with a history of ovarian, endometrial, or colon cancer[26]. Another important factor to be considered is genetic influence, which is responsible for around 10% of breast cancer cases. In these cases, more than 90% are due to mutations in the BRCA1/BRCA2 gene, which can also increase the likelihood of developing ovarian, endometrial, pancreatic, colorectal, prostate, or melanoma cancer. However, even with genetic predisposition, environmental conditions are largely responsible for promoting the expression of genetic mutations[27].

Therefore, it is worth highlighting the importance of genetic analysis involving breast cancer, as, according to the literature, 10% of cases are attributed to hereditary factors[28]. Given this perspective, the context of the interviewees indicated that 20.8% of them have a family history of breast cancer, an extremely important point for analysis of prevention and future prior diagnosis. Regarding the history, we observed that only 7.9% of diagnoses were bilateral breast CA[29], which corresponds to the average incidence reported in the literature that varies from 2% to 11%, with unilateral breast CA prevailing. Furthermore, 15.9% reported a diagnosis of breast cancer in their mother, presenting a first degree of kinship, which doubles the risk of breast cancer, as shown in studies[28].

Regarding the association between white race and breast pathologies, a statistically significant outcome was not obtained. It can be considered that this result was influenced by the underrepresentation of other races in the study, a situation justified by the majority of medical students at the university analyzed, and also in Brazil, declaring themselves white[30]. In fact, it is worth considering that the lack of representation of all races in

the conduct of epidemiological and clinical studies in the health area is a global deficiency, which makes it impossible to generalize the results, requiring more future studies that include all races equally[31].

The limitations of this study are related to the small sample size and its heterogeneity. Therefore, to increase the strength of the study, it would be carried out in conjunction with other medical schools in the state or even in the country.

With regard to clinical implications, this study presents relevant data regarding medical students and encourages the search of a possible patient with breast pathology to a specialist. In this way, we can say the contribution of the study in the evaluation of screening criteria for breast and neoplasms, increasing the rate of early detection of such diseases, as well as starting the treatment of such diseases as soon as possible.

## CONCLUSIONS

With regard to clinical implications, this study presents relevant data regarding medical students and encourages the search of a possible patient with breast pathology to a specialist. In this way, we can say the contribution of the study in the evaluation of screening criteria for breast and neoplasms, increasing the rate of early detection of such diseases, as well as starting the treatment of such diseases as soon as possible.

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## AUTHORS' CONTRIBUTION

BOS: Formal analysis, Investigation, Methodology, Project administration, Resources. AJMS: Investigation, Visualization, Writing – original draft. LBC: investigation, writing – original draft. LLM: Investigation, Visualization, Writing – original draft. FKC: Investigation, Visualization, Writing – original draft. FSC: Investigation, Visualization. RSS: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Writing – review & editing.

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