The influence of genetic factors on breast cancer and its relation with Nursing Care

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Abstract

Breast cancer is considered an extremely disabling and debilitating disease, with high rates of prevalence and mortality in the contemporary worldwide population. Considering the expansion and severity of cases related to breast cancer, including in Brazil, the present study carried out a review of the specialized literature concerning the influence of genetic factors on the etiology and

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progression of breast cancer. It was observed that a quick and conclusive diagnosis of breast cancer is essential to obtain the most adequate prognosis for the profile of each patient. Furthermore, knowledge about the hereditary predisposition to trigger breast cancer might help to prevent and reduce cases of the disease. Therefore, the performance of a prepared professional team is extremely important for an accurate diagnosis of the disease, as well as for the promotion of public health in Brazil.

Keywords: Health. Neoplasm. Oncology. Prevention. Treatment.

INTRODUCTION

Breast cancer is considered the most common type of cancer in women worldwide. Annually, more than two million cases are diagnosed, with more than 650.000 deaths. In Brazil, approximately 66.000 cases of breast cancer were estimated for the year 2020, with an incidence rate of 43,74 cases per 100.000 women (NATIONAL CANCER INSTITUTE, 2020a; SOUSA et al., 2020).

It is estimated that, by the year 2030, cases of breast cancer will show an increase of up to 47% in prevalence. Thus, there is a high risk of aggravation and mortality, related to the triggering of breast cancer, being the most frequent cause of cancer in women. Thus, breast cancer can be highly invasive, rapidly progressing to a more advanced stage of the disease (BRAGA et al., 2017; NATIONAL CANCER INSTITUTE, 2020a; NATIONAL CANCER INSTITUTE, 2020b; PEREIRA et al., 2018).

Therefore, it is considered the second type of cancer that causes more deaths in the world, being surpassed only by skin cancer. In women, breast cancer represents the leading cause of cancer death worldwide, in which considerable increases in the prevalence and morbidity and mortality rates have been evidenced since 1979 (MEDEIROS et al., 2015; SOUSA et al., 2020).

Breast cancer covers a very varied group of diseases, being characterized by considerable clinical and morphological changes. In this context, each case of breast cancer may present a differentiated genetic signature, which may influence the individual's responses to

therapeutic treatment, for example (NATIONAL CANCER INSTITUTE, 2020a).

Therefore, breast cancer presents a considerable clinical complexity, which can be corroborated by its respective multifactorial etiology. Several factors have recently been attributed to the triggering of breast cancer, such as age, endocrine factors and/or reproductive history, behavioural and/or environmental factors, and genetic and hereditary factors (BRAGA et al., 2017; NATIONAL CANCER INSTITUTE, 2020b).

In this context, daily habits can influence a greater predisposition to the development of breast cancer, which include alcohol consumption, overweight, sedentary lifestyle, and exposure to ionizing radiation. Such practices can result in damage to the cell genome, contributing to an increase in the prevalence of breast cancer cases. At the same time, recent studies have also emphasized the enormous relevance related to the influence of hereditary factors on the triggering of breast cancer (AMENDOLA & VIEIRA, 2005; COELHO et al., 2018).

The evident increase in breast cancer cases indicates that this is a very relevant issue for the medical and scientific communities in Brazil. There is a need to further investigate and understand the factors related to the disease, enabling the choice of preventive and therapeutic methods more effective for the disease (NATIONAL CANCER INSTITUTE, 2020a; NATIONAL CANCER INSTITUTE, 2020b; DEPARTMENT OF HEALTH, 2020).

Thus, based on these aspects, the aim of this article is to analyse the scientific production about the main genetic factors related to the onset and progression of breast cancer.

MATERIAL AND METHODS

It is a narrative literature review. This work aims to answer the following questions: What would be the main factors influencing the etiology and progression of breast cancer? What would be the nurse's contribution to the care of patients with breast cancer?

The following descriptors were used: breast cancer; cancer progression factors; nurses; to care. Data were collected in the following databases: Latin American and Caribbean Health Sciences

Literature (LILACS), Scientific Electronic Library Online (SCIELO) and Academic Google.

The search for studies took place in January 2020. The following were used as a filter: time frame from the years 2015 to 2020; the justification for this time frame was to have a more up-to-date literature on the subject; English, Portuguese, and Spanish languages; texts available in full; original articles, letters to the editor, systematic review, integrative review, or editor's notes. It was possible to find, in the databases, a total of 5000 articles.

The selection criteria were specific articles whose main theme was breast cancer; the main factors that influence the etiology and progression of breast cancer; contribution of nurses in the care of patients with breast cancer.

The exclusion criteria were articles that would have breast cancer as the main theme; Ovary cancer; bladder cancer; mouth cancer; brain cancer; lung cancer; spleen cancer; anorectal cancer.

After surveying the literature, available bibliography, the next step was to organize the material by means of filing, which constituted a first approach to the subject. Subsequently, the articles obtained were subjected to re-reading, to carry out an interpretive analysis guided by the objectives previously established and, thus, the contents found were grouped in their historical and conceptual aspects. Thus, 4987 articles were eliminated, resulting in 13 articles, which made up this scientific work.

RESULTS AND DISCUSSION

Breast cancer is the neoplasm that most affects women worldwide. Men can also be affected, but they represent the rarest clinical form of the disease. In Brazil, more than 59.000 women are affected by breast cancer each year, representing a serious public health problem in the country (DEPARTMENT OF HEALTH, 2020).

It is known that advancing age represents a determining factor on the increased susceptibility to triggering breast cancer. Thus, breast cancer is considered rare before the age of 35 in women, and its respective incidence gradually increases after the age of 50 (DEPARTMENT OF HEALTH, 2020).

Thus, breast cancer has a multifactorial and complex etiology, in which environmental factors, as well as factors inherent to the individual, have a huge influence on the susceptibility to manifest the disease. Among these, the role of endocrine, genetic and/or hereditary factors has been investigated by several research groups (BRAGA et al., 2017; NATIONAL CANCER INSTITUTE, 2020b).

About 10% of cases of breast cancer in women are influenced by hereditary factors, provided by gene mutations. In this sense, the technological advance evidenced worldwide in recent years has enormously impacted the medical field, including Oncology. Increasing efforts have been made to better understand the mechanisms related to the hereditary etiology of breast cancer (COELHO et al., 2018).

Recent studies have shown, for example, that the BRCA1 and BRCA2 genes lose their respective functions in two alleles, due to mutations in the germline. This fact is extremely relevant, in a context of breast cancer progression since these genes act as tumour suppressors. That is, individuals who have mutations in the BRCA1 and BRCA2 genes are more vulnerable to triggering breast cancer (CASTRALI & BAYER, 2019; COELHO et al., 2018).

More specifically, BRCA genes, in healthy individuals, promote the structural maintenance of DNA molecules, preventing the occurrence of potential defects during the homologous recombination process. When these genes mutate, the mechanisms of cell division are impaired, so that the cell starts to multiply disorderly. Thus, genetic recombination errors characterize the formation of tumours in breast cancer patients, from a hereditary predisposition (CASTRALI & BAYER, 2019; COELHO et al., 2018; SOUSA et al., 2020).

In general, familial breast cancer occurs from the inactivation or decreased activity of genes related to tumour suppression, as observed with BRCA1 and BRCA2. The additional activation of proto-oncogenes, as well as defects in DNA repair genes, were also pointed out as notorious mechanisms related to the genetic etiology of breast cancer (SOUSA et al., 2020).

Understanding the influence of certain genetic factors on breast cancer, therefore, is of paramount importance. It is known, for example, that up to 80% of cases of family history are related to

mutations in the alleles of the BRCA1 and BRCA2 genes (CASTRALLI & BAYER, 2019; COELHO et al., 2018).

Therefore, experts recommend a thorough analysis of each patient's clinical history, as previously inherited gene mutations can result in the formation of malignant cells. Therefore, the screening of findings from multiple family members with breast cancer comprises one of the crucial steps for the prevention and diagnosis of breast cancer (CASTRALLI & BAYER, 2019; COELHO et al., 2018).

The identification of bilateral carcinomas in women also represents a valuable indication of a hereditary predisposition to breast cancer. In general, the morphological aspects of breast cancer start from cellular changes evidenced in the ductal epithelium, characterizing invasive ductal carcinoma (CASTRALI & BAYER, 2019; COELHO et al., 2018; NATIONAL CANCER INSTITUTE, 2015).

Breast cancer, therefore, presents a very heterogeneous group, in which some types are related to a high degree of malignancy and tissue spread. Other subtypes of the disease include tubular, lobular, mucinous, micropapillary, medullary and papillary carcinoma (COELHO et al., 2018; NATIONAL CANCER INSTITUTE, 2015).

Clinically, breast cancer can be classified into different types, as some cases evolve faster than others. One of the first signs to be easily noticed is the presence of nodules, popularly known as lumps. From this perspective, the performance of the self-examination is extremely important, enabling a probative diagnosis in the initial stages (DEPARTMENT OF HEALTH, 2020).

The nodules are usually painless, hard in consistency and morphologically irregular. Some types of tumours can also be mild, globose, and well defined. Symptoms related to breast cancer may also include additional clinical signs such as skin edema with an appearance like an orange peel, skin retraction, pain, nipple inversion, hyperemia, desquamation or ulceration of the nipple and papillary discharge (DEPARTMENT OF HEALTH, 2020).

In turn, the presence of papillary secretion, usually unilateral and spontaneous, may be accompanied by a pink or reddish colour, indicating the presence of red blood cells. Additionally, the identification of palpable lymph nodes in the armpits is also frequently reported in breast cancer patients. When verifying the

suspicion of the disease, through the analysis of such signs and symptoms, the individual must seek a professional to obtain a more accurate diagnosis (DEPARTMENT OF HEALTH, 2020).

The clinical picture inherent to breast cancer, therefore, is characterized by a disordered growth of cells, which can expand to different tissues and organs. Consequently, breast cancer has metastatic potential, with a high degree of malignancy. In other words, breast cancer can evolve very quickly and have devastating effects on the individual's health (PEREIRA et al., 2018; SILVA, 2019).

Specialists highlighted, therefore, that early detection of the presence of nodules in the breast is essential to increase the individual's chances of cure. In addition, early diagnosis also enables the indication of therapeutic resources that are less invasive and debilitating to the patient's health (BRAGA et al., 2017).

To minimize the prevalence rates of breast cancer, as well as cases of related morbidity and mortality, in-depth research on factors related to breast cancer is extremely relevant, enabling a better quality of life for the affected population. In this sense, understanding the causes that potentially originate breast cancer is necessary (DEPARTMENT OF HEALTH, 2020).

In clinical practice, the role of professional Nurses plays a prominent role, from the prevention of breast cancer to the clinical management of patients with the disease (BRAGA et al., 2017; PEREIRA et al., 2018). In this sense, the actions provided for by public policies in Primary Health Care (PHC) for the control of breast cancer have the Nurse as a fundamental part, who maintains autonomy in their practices, contributing to the development of daily activities (BRAGA et al., 2017).

Furthermore, the nurse contributes to the prevention of breast cancer, through proper guidance in consultations, collection of preventive exams, home care and guidance for self-examination. Home visits, performed by nurses, are also highlighted by specialists, as they enable a more humanized treatment approach, strengthening the relationship between professional and patient (BRAGA et al., 2017).

In this context, from the visitation, the nurse can expose the enormous relevance of disease prevention tools, aimed at promoting

health and quality of life for those affected. From this relation, it is possible to obtain more accurate epidemiological data regarding breast cancer throughout the national territory. This measure is essential for the development and implementation of health promotion strategies, more suited to the clinical profile of each location (BRAGA et al., 2017).

On the other hand, reinforced that a more humanized approach in Primary Health Care is still a very recent issue. Therefore, efforts must be conducted by responsible bodies, allowing for greater strengthening of the role and contribution of nurses to the prevention and prognosis of breast cancer in Brazil (BRAGA et al., 2017).

The adoption of educational measures and activities, therefore, can represent a valuable ally in promoting the health of breast cancer patients. In general, most patients have satisfactory rates of disease prognosis, especially in cases of early detection. Such reports validate the relevance of early diagnosis of the disease, aiming for a better quality of life for the Brazilian population (DEPARTMENT OF HEALTH, 2020).

Considering the enormous influence exerted by genetic factors on the pathogenesis of breast cancer, several laboratory tests were recently developed to obtain a faster and more accurate diagnosis of the disease. From the isolation and sequencing of genes related to the mechanism of initiation of tumour formation, thus, allowed the identification of hereditary characters that contribute to the evolution of the disease (SOUSA et al., 2020).

In other words, it is currently possible to assess the genetic content of an individual to predict their respective susceptibility to developing familial breast cancer. Such data, together with a thorough clinical evaluation, therefore, represent desirable alternatives for the validation of a quick and conclusive diagnosis, in addition to allowing for a preventive intervention (SOUSA et al., 2020).

It is, therefore, a possibility of genetic counseling, especially in cases with a previous family history of the disease. Experts suggest that this measure represents a very contemporary alternative for patient treatment, in addition to contributing to the reduction of

morbidity and mortality rates (COELHO et al., 2018; SOUSA et al., 2020).

For this, periodic medical monitoring is necessary, so that the responsible professionals can intervene early, when the disease is suspected. Therefore, the performance of mammography is strongly recommended by specialists, to observe the integrity of the breast tissue, as well as the existence of possible abnormalities, suggestive of potential anomalies. On the other hand, it is noteworthy that the mammography exam has some limitations, so that some cases may even go unnoticed in the face of a clinical evaluation (CASTRALI & BAYER, 2019; SILVA, 2019; SOUSA et al., 2020).

Therefore, the development of more modern and effective diagnostic tools is of great value for the promotion of Public Health in Brazil, minimizing the clinical severity related to breast cancer. It is still worth noting that such measures, in addition to enabling an early diagnosis, also contribute to the determination of a better prognosis for the profile of everyone (CASTRALI & BAYER, 2019; SILVA, 2019; SOUSA et al., 2020).

The use of infrared thermography, for example, has been indicated as a promising alternative for the limitations related to mammography. Experts have suggested that infrared thermography can contribute to a more detailed classification about the level of evolution of the disease, providing more in-depth characteristic information. Considering the wide clinical complexity related to different types of breast cancer, the use of more sophisticated tools in the diagnosis of the disease is desirable (SILVA, 2019; SOUSA et al., 2020).

Thus, the determination of a more adequate prognosis for each clinical case can be obtained. However, not all places have access to more modern and expensive resources, a fact that can delay obtaining a more accurate and effective diagnosis (SILVA, 2019; SOUSA et al., 2020).

Recently reported that a broader disclosure about the genetic etiology related to familial breast cancer comprises a promising strategy for promoting public health in Brazil. For this, it is recommended that investments be intensified, especially by the Government and the pharmaceutical industry, in which the conduct of

research and scientific approaches are also very relevant (CASTRALLI & BAYER, 2019).

Regarding therapeutic procedures, the most adopted alternatives in contemporary clinical practice are still extremely invasive and debilitating for the affected individual. The most used procedure, therefore, comprises the surgical removal of the neoplasm, in which the breast, in its entirety, can also be removed (CASTRALI & BAYER, 2019).

Given the above, the treatment of breast cancer has considerable impacts on the patient's physical health, but especially on psychosocial health. In this perspective, the analysis of complementary therapeutic approaches has been frequently investigated by several contemporary research groups (CASTRALI & BAYER, 2019).

The authors reiterated the relevance of the Nurse's role in minimizing the physical and psychological impacts faced by breast cancer patients. Given the above, care in Primary Care for patients is essential to promote a better quality of life for these individuals, from the prevention of the pathology (BRAGA et al., 2017; REIS et al., 2018).

Once breast cancer has been diagnosed, patient care by the responsible team, with a focus on physical and psycho-emotional care, can also contribute to better results throughout the therapeutic treatment process (BRAGA et al., 2017; REIS et al., 2018).

From this perspective, state that this Nursing Care needs to be carried out through dialogue, listening and family support, however, one of the great challenges of the Nursing Team is to perform the reception in a humanized and safe way. It is concluded that Nursing care should be aimed at improving the quality of life of the patient in general, however, prioritizing individual needs and safeguarding the lifestyle of each one.

In a similar approach, the author carried out a case study in a Family Health Unit, located in the municipality of Cabedelo, Paraíba. The authors concluded that the practice of educational intervention, conducted by Nurses, represents a successful alternative for Systematizing Nursing Care (PEREIRA et al., 2018).

The proposal was able to strengthen professional autonomy in educational activities, which proved to be fundamental in expanding

the dissemination of more effective means of prevention and early detection of breast cancer. Such measures are in line with reports that the increase in breast cancer cases is often linked to the lack of popular knowledge on the subject (PEREIRA et al., 2018).

This can be quite common in regions of the Brazilian territory that have limited access to information, as well as to Health Care in general. Consequently, the role of health professionals in Primary Care, being available to different locations in the Brazilian territory, can contribute to expanding access to information on the prevention, diagnosis, and treatment of breast cancer (BRAGA et al., 2017; PEREIRA et al., 2018).

FINAL CONSIDERATIONS

Breast cancer represents a notorious pathology that is expanding nowadays, with high rates of prevalence and mortality. The severity of the disease reveals the need to better understand the factors related to its respective etiology and progression, in which genetic and hereditary characteristics can play a decisive role in the progression of the clinical picture.

Thus, the analysis of the profile of each patient comprises an extremely necessary measure to obtain an early diagnosis of cases of familial breast cancer. In this context, nurses can significantly contribute to promoting a better quality of life for patients, from prevention to management for individuals diagnosed with the disease.

Authors' contributions
Ramos and Costa - designed the study.
All the authors involved in collected the data.
All the authors analyzed the data.
Costa supervised the study.
All the authors involved in manuscript writing.
All the authors involved in critical revisions for important intellectual content.

Conflict of interests
The authors declare that there is no financial, legal, or political conflict of interest involving third parties (governments, companies, and private foundations, etc.).

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