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Anxiety and breast cancer: the influence of physical activity

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Abstract: Objective: to describe the clinical, epidemiological and sociodemographic profile of cancer patients, attended by a support institution in the north of Minas Gerais. **Methodology:** a cross-sectional, descriptive and quantitative study based on the analysis of 449 medical records of patients diagnosed with cancer attended by a support institution in the north of Minas Gerais, in the year 2015 and 2016. For the data collection, an instrument containing clinical, epidemiological and sociodemographic variables was used. Data were analyzed by descriptive statistics. **Results:** the majority of the patients were male (n=298; 66,4%), elderly (n=225; 50,1%), mean age 60.3 years, and standard deviation of 14.2 , being the minimum age of 18 years and the maximum of 93 years. As for the municipality of origin, 381 (84,9%) came from small municipalities of Minas Gerais. The most prevalent neoplasia was head and neck (n=94; 20,9%). Considering sex, prostate cancer was the most frequent (n=78; 26,2%) in men, whereas in women it was breast cancer (n=35; 23,2%). The most commonly used therapy was the association of radiotherapy and chemotherapy, representing 158 people (35,2%). **Conclusion:** the characterization of the clinical, epidemiological and sociodemographic profile of cancer patients is fundamental since the changes accompany the health / disease process that varies according to the region, the individual, in equivalence to their vulnerability. Results of this research suggest new studies for not achieving association of diseases with their respective risk factors.

Keywords: Epidemiology; Neoplasms; Risk factors; Health Profile.

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Resumo: Objetivo: descrever o perfil clínico, epidemiológico e sociodemográfico dos pacientes com câncer, atendidos por uma instituição de apoio do norte de Minas Gerais. **Metodologia:** estudo transversal, descritivo e quantitativo elaborado por meio de análise de 449 prontuários de pacientes com diagnóstico de câncer, atendidos por uma instituição de apoio do norte de Minas, do ano de 2015 e 2016. Para o levantamento dos dados utilizou-se um instrumento contendo variáveis clínicas, epidemiológicas e sociodemográficas. Os dados foram analisados por estatística descritiva. **Resultados:** a maioria dos pacientes era do sexo masculino (n=298; 66,4%), idosos (n=225; 50,1%), com média de idade, 60,3 anos e desvio-padrão de 14,2, sendo a idade mínima de 18 anos e a máxima de 93 anos. Quanto ao município de origem 381(84,9%) eram oriundos de pequenos municípios de Minas Gerais. A neoplasia mais prevalente foi o de cabeça e pescoço (n=94; 20,9%). Considerando o sexo, o câncer de próstata foi o que apresentou maior frequência (n=78; 26,2%) nos homens, já nas mulheres foi o câncer de mama (n=35; 23,2%). A terapêutica mais utilizada pelos pacientes foi associação de radioterapia e quimioterapia, representando 158 pessoas (35,2%). **Conclusão:** a caracterização do perfil clínico, epidemiológico e sociodemográfico dos pacientes oncológicos é fundamental visto que as mudanças acompanham o processo saúde/doença que varia de acordo com a região, o indivíduo, em equivalência a sua vulnerabilidade. Resultados dessa pesquisa sugerem novos estudos por não alcançar associação das doenças com seus respectivos fatores de risco.

Palavras-chave: Epidemiologia; Neoplasias; Fatores de Risco; Perfil de Saúde.

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INTRODUCTION

Cancer is a disease in which there is an inordinate multiplication of cells from the mutation in a single cell or in a set of cells. After undergoing mutations, the cell does not respond to the body stimuli, interrupting the process of programmed cell death, also called apoptosis, multiplying disorderly, without suffering influence of barrier mechanisms of the organism, among which the inhibition by contact.[1-2]

Breast cancer is the most common type of cancer among Brazilian women, excluding non-melanoma skin cancer, and represents approximately 28% of new cases each year.[3] Relatively rare before the age of 35 years, above this age its incidence grows progressively, especially after 50 years.[2] Statistics indicate an increase in their incidence both in developed and in developing countries, the estimate is 59,700 new cases per year in Brazil, while the number in relation to mortality represents 14,388, , being 181 men and 14,206 women according to SIM (Mortality Information System), 2013.[3]

Upon receiving the diagnosis of breast cancer, women begin a new moment in their lives, consisting of a mixture of feelings and emotions to this new reality, in which stands anxiety, fear, anger, denial and insecurity.[4] Anxiety is a common symptom among women with breast cancer, occurring at the time of diagnosis, throughout treatment, either surgical or by means of adjuvant therapies such as chemotherapy and radiotherapy, and also during the follow-up process and establishment of the "cure".[5]

Anxiety is a disorder considered mental illness, pathologically defined as an emotional state in which the affected individual retains the various perspectives of the future, which causes discomfort.[5] The anxiety becomes a problem in the rehabilitation and the expectation of survival of oncologic patients, because it is a differentiated disease different from other chronic diseases, generating negative feelings from the time of diagnosis, in function of its

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pathology have the ability to cause deformities, pain, mutilation and the fear of death.[6]

Programs based in physical activity (AF) have an important role in improving the quality of life of patients with breast cancer, reducing the levels of anxiety and generating positive effects that prevent the emergence of another malignancy or metastasis.[7-8-9]

Several studies have demonstrated that the practice of aerobic physical exercise combined with the anaerobic are beneficial among women with breast cancer. These types of exercise together have the potential to promote functional, physical and psychological improvements among them, in addition to reducing anxiety.[10] It has been evidenced an increase of strength, flexibility, balance, the cardiorespiratory capacity, reduction in fatigue and improvements in immune function. The systematic physical activity (AFS), has the ability to increase the activation of lymphocytes,

upon periodicity, promoting significant improvements in the quality of life of women with breast cancer, preventing the occurrence of metastasis and the future appearance of another malignant neoplasm.[11]

Before what was explained previously, the study aims to evaluate anxiety levels among women diagnosed with breast cancer, before and after performing a systematic program of physical activities.

METHODOLOGY

It is a descriptive and analytical epidemiological study with quasi-experimental character, developed in the city of Montes Claros, located to the north of the state of Minas Gerais. This municipality stands for incorporating health services of high complexity, receiving people who need health monitoring across the northern region of Minas Gerais State, Brazil and South of Bahia.

The study population was composed by 25 women diagnosed with

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breast cancer, assisted by "Life Extension Project" of the State University of Montes Claros MG, approved by Resolution number 245/2008 - Chamber of Education, Research and Extension (Legrand).

The inclusion criteria were based on the women's consent duly registered in the "Project of Life Extension" to participate in the research, as well as the release of the oncologist responsible for the participant. Reduced frequency, based on procedures inherent to the disease (radiotherapy, fatigue after chemotherapy, examinations or consultations), did not exclude the possibility of participation in this research. As exclusion criteria women were excluded who did not have the release of the oncologist in function of advanced bone metastases or women with surgeries for less than 03 months. Women who did not attend any of the days that are scheduled for physical activity, were not excluded from the present study, having the opportunity to refit the lost activities. Of the 25 selected women, three were excluded after application of the criteria aforementioned.

The final sample comprised 22 women participants. For data collection, structured questionnaire was used

approaching sociodemographic, clinical, anthropometric, characteristics of the treatment and the Beck Anxiety Scale (BAI). Self-reports were used in the perspective of enriching the discussion in the present study.

The data were obtained by a team composed by a coordinator, by a psychologist, academics of the Physical Education course and by a professional of the same course. The researchers were duly trained and calibrated and the results subjected to the Kappa coefficient. The degree of concordance for the applicability of the sociodemographic questionnaire was 0.93 interaximaner and 0.94 intraexaminer. Regarding the anthropometric data, the degree of concordance for measures of height and weight was 0.99 and interexaminer and 0.99 intraexaminer.

The application of the instruments and the physical assessment occurred in two moments: before the beginning of the activities (pre-test) and after 25 weeks of insertion in the systemized program of physical activities (post-test).

For the sample characterization for the independent variables were used age, time of participation in the project,

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breast laterality affected by cancer, type of treatment used against breast cancer, prior surgery and time elapsed since its implementation, type of surgery and use of tamoxifen.

For the realization of the physical assessment anthropometric mechanical balance Filizola brand was used ® with capacity for 150 kilograms (kg) and resolution of 0.1kg, measuring weight and height. For the calculation of body mass index - BMI the formula of Quetelec was used: BMI = Weight (kg)/height (meters)^2.[12]

The Beck anxiety scale is composed of 21 questions that indicates discomfort and sensations.[13] To answer this questionnaire the individual has four answer choices: never have felt the symptom asked; have a light feeling , not being very uncomfortable; have felt moderately, considering the symptom unpleasant, but bearable; and have felt seriously, so that the symptom could hardly be endured.

The physical activity occurred in the exercise laboratory of the State University of Montes Claros, twice a week with a duration of one hour (each session). The days and times for execution of activities were previously defined by the researchers and communicated in advance to the participants.

For the realization of the physical evaluation all participants were instructed earlier on food, clothes, rest and activity on the previous day. The planning of activities was grounded in order to adapt themselves to the level of practitioners, keeping the activities related to the proposed objective. In the systematization aspects were considered such as age and whether the practitioners were still under treatment, taking into account the possible consequences of this on the activities. The practice of physical activity was supervised during all the time so that the intervention is kept consistent with the analysis proposed by this study.

The activities were held twice a week, during 25 weeks in sessions of 60 minutes, starting with warm-up (10 minutes) giving emphasis in the joints, followed by aerobic work (40 minutes), the main focus, and finally stretching to the end (10 minutes). For the aerobic work the soil aerobic gymnastics was adopted.

The analyzed variables were

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described by absolute and relative frequencies. Specifically, for the age variable the mean and standard deviation was used. The Student *t test* for paired samples was used to compare the difference among the averages, verifying whether the results obtained were statistically significant ($p \leq 0.05$), before and after the intervention. All statistical analyzes were conducted using the Statistical *Package for Social Science* (SPSS) version 20.0.

This research meets the Resolution 466/2012 of the National Health Council approved under the law number 8080/1990 and 8142/1990 governing research with human beings, having been approved by the Research Ethics Committee of the State University of Montes Claros - Unimontes, opinion number 2.024 271/2017. All participants signed the Informed Consent Form stating they are aware about the research and the procedures to be adopted.

RESULTS

Regarding the average age of most participants (81.8%), were less than 60 years and participated in the Project of Life extension for more than 03 years (86.4%). All women underwent surgical procedures and underwent some type of adjuvant therapy (radiotherapy, chemotherapy or both) (Table 1).

Table 1 - Sample characterization: age, time of participation in the Project of Life Extension, type and location of the surgery and use of tamoxifen.

Variable	N 22	%
Age		
Up to 60 years	18	81.8
Over 60 years	4	18.2
Time for participation in "Life Project"		
More than 3 years	19	86.4
From 1 to 3 years	1	4.5
From 6 months to 1 year	2	9.1
Up to 6 months	0	0
Total	22	100
Type of surgery		
Mastectomy	11	50.1
Quadrantectomy	5	22.7
Quadrantectomy/Nodulotectomia	6	27.2
Total	22	100
Affected side		

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Right Breast	14	63.6
Left Breast	6	27.3
Bilaterally	2	9.1
Total	22	100.0

Time of surgery		
More than 3 years	21	95.5
From 1 to 3 years	1	4.5
Total	22	100.0

Type of treatment		
Chemotherapy	2	9.1
Radiotherapy	3	13.6
Combination of radiotherapy and chemotherapy	17	77.3
Total	22	100.0

Time of use of tamoxifen		
5 years	14	63.6
3 years	1	4.6
Never used	7	31.8
Total	22	100.0

When considering the weight and the average BMI of participants before and after the participation in the systemized program of physical activities, it was noticed a slight reduction of both after the intervention (Table 2). Listing the difference in mean BMI in the pre-test when compared to the post-test, it should be emphasized that both results fit in the overweight group. When performing the individual analysis, it was noticed that all remained in the same group of classification of BMI in two collections, being that 45.4% had a normal BMI (18.5-24,99), 31.8% were overweight (25-29,99), 9% grade I obesity (30-34,99) and 13.6% grade II obesity (35-39.99).

Table 2 - Body Mass Index (BMI) and weight of the participants in the pre and post-test.

	n	Minimum	Maximum	Mean	Standard Deviation
Weight Kg					
Pre-test	22	46.100	103.500	67.390	15.134

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Post-teste	22	46.100	99.300	66.654	14.720
BMI kg/h^2					
Pre-test	22	21.0	37.1	27.1	4.87
Post-Test	22	20.1	36.0	26.9	4.75

When classifying the degrees of anxiety present among women before and after the completion of the systematic practice of physical exercises, it was observed that the levels of anxiety reduced significantly, being that of the 13 women who had severe anxiety in the pre-test, after participating in the program none was classified like that again (Table 3).

Table 3 - Results of Beck Anxiety Inventory (BAI).

	Pre-test n (%)	Post-Test n (%)	p-Value
Anxiety Degree			
Minimum degree of anxiety	1 (4.5%)	12 (54.5%)	
Light Anxiety	3 (13.6%)	9 (40.9%)	
Mild Anxiety	5 (22.7%)	1 (4.5%)	*0.000*
Critical Anxiety	13 (59.1%)	0	

DISCUSSION

Regarding age, considering the average of the participants it was noted that the majority of these (77.3%) had age above 50 years, and it is at this age that prevails the greater chance of developing breast cancer in women.[14]

On the type of surgery, it should be noted that most participants underwent total mastectomy. It is a type of surgery that entails a social and psychological impact, causing women the feeling of loss of sexual attraction, as well as affecting the interpersonal relations.[15] The mastectomy has physical issues that can compromise the strength of the limbs of the affected side, reduce the amplitude of the movement of the same state, being the articulation of the shoulder the most affected, and, still, can generate postural changes affecting the scapular waist and the column. Muscle strengthening and muscle stretching, in that way, backed in rehabilitation, are good strategies for functional recovery after surgery.[16]

Among the limitations caused by total mastectomy, the flexion, internal rotation, adduction and horizontal flexion of the shoulder are the most affected movements, in addition to these, there may be shortening of the trapezium of the side of the surgery and the impairment of the movement of chest expansion interfering in the

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dynamics of breathing.[16]

Mastectomy can generate complications immediately after surgery or later, such as the limitation of movement of the arm and shoulder, causing lymphedema with varying degrees of fibrosis and hindering the movement of the scapulohumeral joint.[17] The lymphedema (abnormal accumulation of lymph in the tissues) is one of the most common complications after breast surgery, usually caused by the draining of the axillary lymph nodes. The main signs and symptoms present are: reduction in functionality and increase the diameter of the ipsilateral limb surgery, stiffness and decreased range of motion of the limb and sensory disturbances.[18,19]

In the present study, it was found that 3 participants (13.7%), developed complications after the surgery, but participated in the intervention performing physical activities with certain adaptations. Regarding the adjuvant treatments, all participants in the present study reported having done chemotherapy and/or radiotherapy, being that of these 77.3% performed both treatments.

Another treatment is the use of tamoxifen, medicine for oral use which operates through hormone replacement. The hormone therapy is often used after surgery, as adjuvant therapy to help reduce the risk of disease recurrence.[20]

According to the results, 68.2% made use of tamoxifen, and of these 63.6% made use for more than five years, being that none of the participants was making use of this medication at the time of the survey. Tamoxifen is considered one of the main strategies in reducing mortality in this population, however, this medicine may trigger adverse reactions such as increased body weight, BMI, reflected in an increase in visceral fat and muscle pain, being that this last factor may exclude women who use the practice of physical activities.[20,21,22,23]

The adjuvant treatments significantly contribute to the survival of patients but brings along effects such as fatigue. Fatigue is a common symptom in women with breast cancer during the radiotherapy treatment, being that studies attest that fatigue increases when starting the radiotherapy sessions. Whereas the chemotherapy, in addition

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to promoting the increase of fatigue, amenorrhea, causes an increase in weight, due to interference in the thyroid function, and the reduction of the search for physical activities.[24]

Fatigue is considered a synonym of weakness, tiredness, anergy, apathy, and in women with breast cancer, these symptoms are accentuated during chemotherapy.[25] Evidence attested that regular physical activity acts fighting fatigue in women with breast cancer previously sedentary.[25]

Studies suggest the practice of physical activities systematized to combat fatigue, since exercise improves the cardiovascular system, respiration, the blood supply to the muscles, strength gain and improves the functioning of the lymphatic system, softening, thus , the effects of treatments.[26] Studies also demonstrated that the physical activity (PA) acts fighting the deleterious effects of chemotherapy and radiotherapy improving cardiorespiratory, muscle and physical functions for performing daily activities.[25]

In the anthropometric variables, according to the results presented here makes it possible to report small difference in BMI when comparing the

pre- to the post-test, however most of the evaluated participants, 77.2% had a BMI below that considered within a framework of obesity.

Obesity is considered a risk factor for the development of neoplasms[27]. The maintenance of adequate weight, the style of life and the practice of physical activity are strategies to combat the emergence of cancer, as well as on the survival of cancer patients.[27] Obesity related to sedentary lifestyle are factors that negatively influence the treatment of women with cancer, observing a worse prognosis.[28]

Considering that most participants (68.2%) made use of tamoxifen, it should be emphasized that it has been reported that the use of this medication increases the percentage of body fat - especially visceral, therefore, can have an influence on the BMI of patients who use it.[23]

In the present study, upon relating to the use of tamoxifen with BMI, it has not been possible to highlight major differences. Among the participants who did not use drugs, 50% were within the weight considered adequate, already among those who used tamoxifen 47% fell on ideal

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weight.

In relation to the levels of anxiety based on the Beck Anxiety Scale (BAI), it was noticed a significant change in the pattern of levels of anxiety. In the pre-test, 59.1% of the sample was classified with severe anxiety. After the insertion of the AFS program, it was noticed that the participants started having anxiety from low to moderate degree. The results observed in relation to BAI demonstrated a significant association between the pre- and post-test ($p=0.000$). According to the analysis, more than 90% of the women were concentrated between minimum to mild anxiety degree in the post-test.

For a better understanding of the situation it was sought to understand what experiences that the participants had in a given period which could lead to such results. In the period prior to the intervention, unfortunately, one of the participants passed away in function of a sepsis (a systemic complex and potentially severe disease). It is triggered by a severe systemic inflammatory response in the face of an infection, most often caused by bacteria.

The same was very dear, and according to the reports of other consisted of the project for more than 10 years, always interactive, cheerful and companion of the group.

Shortly after the incident the first data collection was held. However, it is considered that 73% of the participants reported fear of death being mostly from moderate to severe in the pre-test. Whereas in the post-test, the percentage of this variable rose to 27.3%, distributed between mild and moderate. Comparing the results of the BAI with the intervention, the findings showed that physical activity is beneficial in this context, because it has the ability to improve the psychological factors and to promote the relationship of mutual benefit.[29] These improvements can be explained by the benefits afforded by physical exercise to the different bodily systems, among them the skeletal muscle system, whose development of new healthy cells occurs in replacement to healthy cells that have died as a result of the cancer treatment.[30]

A study similar to this study, measured the level of anxiety in 50

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women in breast cancer treatment, the findings were positive for the group that practiced physical activities when compared to the control group (sedentary lifestyle), which determined that physical activity has a positive influence on reducing the levels of anxiety, corroborating with this result.[31]

The results found in this research showed positive effects on aspects related to the anxiety of women diagnosed with breast cancer. However, so that the exercise be effective and safe in this population, it should be prescribed, respecting principles as individuality, type, intensity, frequency and duration of exercise, including in the training program both aerobic and anaerobic components.[30]

After the data collection in the post-test an interview was conducted with the participants about the experience obtained during the intervention period. Assuming similar diagnoses comparing the breast cancer and different outcomes, it was possible to verify different ways of coping with the disease. The women reported a significant improvement in their lives after joining the program. Among the answers it was connoted that 86.4% reported physical and psychological improvement and 54.5% signaled a

significant improvement in social relations.[29] In this perspective, it is considered that groups based on activities that provide well-being to women with breast cancer, has the ability to provide sharing of life experiences related to sickness, generating opportunities for a better social interaction, confidence and strength to overcome.

CONCLUSION

A systematic program of physical activity based on aerobic exercises promoted a significant effect in reducing the levels of anxiety among women with breast cancer, generating physical, social and psychological benefits, after 25 weeks of intervention. Regarding the interaction, encouragement and adhesion of the participants, it was perceived that the coping with the disease was associated with the understanding about the necessity of the practice of regular physical activity. Other studies should be conducted, generating the possibility of demonstrating the benefits concerning the practice of physical activity and the benefits related to the levels of anxiety (among other psychological measurements) of women

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diagnosed with breast cancer.

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