

## Functional capacity of upper limbs in patients with breast cancer

### Capacidade funcional de membros superiores em pacientes com câncer de mama

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**RESUMO | INTRODUÇÃO:** O câncer de mama é o tipo de câncer que mais acomete as mulheres em todo o mundo. Complicações decorrentes do tratamento oncológico para esta neoplasia, a exemplo da redução da amplitude de movimento dos membros envolvidos, devem ser consideradas como relevantes, pois podem prejudicar o retorno às atividades rotineiras, e comprometer a qualidade de vida das pacientes. **OBJETIVO:** Realizar uma análise funcional de membros superiores de pacientes submetidas ao tratamento cirúrgico do câncer de mama, além descrever as características socioeconômicas e clínica dessa população. **MÉTODOS:** Tratou-se de um estudo analítico observacional transversal que utilizou uma amostra por conveniência de trinta e uma pacientes submetidas ao tratamento cirúrgico do câncer de mama em tratamento fisioterapêutico no âmbito ambulatorial. Como instrumento para a coleta de dados das pacientes, foi aplicado o questionário *Disability Arm Shoulder and Hand* (DASH) e realizada uma análise descritiva das variáveis do estudo por meio de medidas de tendência central e de dispersão para as variáveis contínuas e frequências relativa e absoluta para as variáveis categóricas. **RESULTADOS:** As pacientes entrevistadas apresentaram média de idade de  $51 \pm 7$  anos. O tratamento fisioterapêutico ambulatorial ocorreu em um período menor ou igual a sete meses após a cirurgia (51,6%). A média total do escore final do DASH foi  $45 \pm 17$ . **CONCLUSÃO:** A Fisioterapia a nível ambulatorial, mesmo iniciada de forma tardia, interferiu positivamente na capacidade funcional dos membros superiores após a cirurgia do câncer de mama.

**PALAVRAS-CHAVE:** Câncer. Fisioterapia. Neoplasias. Oncologia. Câncer de mama.

**ABSTRACT | INTRODUCTION:** Breast cancer is a type of cancer that affects women worldwide. Complications of this cancer treatment, such as the reduction of upper members movement should be considered as relevant, as they may harm the return to daily activities, and compromise the patients' quality of life. **OBJECTIVE:** To perform a functional analysis of upper limbs of patients undergoing surgical treatment for breast cancer, and describe sociodemographic and clinical characteristics of this population. **METHODS:** This was a cross-sectional observational analytic study that compromised a convenience sample of thirty-one patients undergoing surgical treatment for breast cancer and they were also submitted to Physiotherapy on ambulatory. It was used the questionnaire *Disability Arm Shoulder and Hand* (DASH) in order to perform a descriptive analysis of the study variables using measures of central tendency and dispersion for continuous variables and frequencies relative and absolute for categorical variables. **RESULTS:** The interviewed patients had a mean of  $51 \pm 7$  years old. Physiotherapy approach occurred in a period less than or equal to seven months after surgery (51.6%). The total average final score of DASH was  $45 \pm 17$ . **CONCLUSION:** Physiotherapy treatment, even started belatedly, had a positive influence on the functional capacity of the upper limbs after surgery for breast cancer.

**KEYWORDS:** Cancer. Physiotherapy. Neoplasms. Oncology. Breast cancer.

## Introduction

Breast cancer affects women worldwide and has the highest mortality in the female population, both in developing and developed countries<sup>1</sup>. Depending on the degree of staging, this type of cancer can have a good prognosis, if diagnosed early and treated quickly. Mortality rates for this type of malignant neoplasm remain high in Brazil because of the fact that most cases of the disease are still diagnosed in advanced stages. However, according to the National Cancer Institute in South America, particularly in Brazil, the survival of cancer patients has increased, being estimated at 87% in the last period of the survey<sup>1</sup>.

Currently, the standard treatment for early stage breast cancer encompasses conservative surgery and sometimes surgical approach to axillary lymph nodes, whether or not followed by radio and chemotherapy<sup>2</sup>. In the more advanced stages, systemic treatment with chemotherapy and hormone therapy is always used to control the potential for metastasis to other sites in the organism<sup>3</sup>. Regardless of the surgical approach used, be it radical or conservative, there are innumerable complications resulting from the treatment which have been described as painful, disabling and unpleasant sensations that may hinder the recovery of patients. It is of fundamental importance the study of the behavior of these interurrences, since the appropriate physiotherapeutic approach can help in the functional rehabilitation of this population<sup>4</sup>.

Functionality is related to the activities performed in the daily life of each individual. Complications resulting from oncologic treatment for breast cancer, such as lymphedema, pain, paresthesia, decreased muscle strength and reduced range of motion of the involved limbs, may impair the performance of daily activities, and compromise the quality of life<sup>3</sup>. In view of the above, the objective of this study is to perform an analysis of the upper limbs functionality of women submitted to surgical treatment for breast cancer accompanied by physiotherapists in a public and private service in the city of Salvador, Bahia. Additionally, it aims to describe the sociodemographic and clinical characteristics of this population.

## Methods

This was a cross-sectional observational study that used a convenience sample of women submitted to surgical treatment for breast cancer from a private clinic and from Oncology Center of Bahia State (CICAN), both located in the city of Salvador - Bahia. This study was approved by the Ethics and Research Committee of the Health Sciences Institute of the Federal University of Bahia (UFBA) in the city of Salvador-BA, under protocol number 2,080,047 and CAAE number: 42839214.1.0000.5662. All participants signed a free and informed consent term. The research was carried out in accordance with CNS resolution 196/06 and comprised the period of one year (2014-2015).

Thirty-one women who underwent surgical treatment for a year or more, accompanied by physiotherapists in the outpatient setting, and who answered 27 or more questions outlined in the evaluation questionnaire, were included in this study. Patients with cognitive deficits or other systemic diseases such as diabetes, malignant hypertension, genetic syndromes, heart diseases, nephrotic syndrome, bacterial and/or viral infections and preexisting brachial plexus lesions were not included in the research. Only two patients were excluded from the study because they did not fit the inclusion criteria adopted for the study.

The Disability Arm Shoulder and Hand (DASH) questionnaire was used to measure the functionality of the upper limb of these women, an instrument already validated in the literature<sup>5</sup>. The DASH is a questionnaire adapted for the Brazilian population that contains 30 questions, with a maximum value of five. The total score was calculated using the sum of the first 30 questions and divided them by 1.2. The questions usually address aspects related to physical function, symptoms and impact on the performance of the social function of the patient in the last week preceding the interview. At least 27 items were required to validate the patients' participation. This questionnaire still has two optional modules (musical or sports performance and work), which were not used in the present study, since they were beyond the scope of the research.

The following descriptive variables were collected: age, schooling, marital status, occupation, dominant side, type of breast surgery, breast reconstruction, time elapsed between surgery and physiotherapy, and oncological treatments (chemotherapy, radiotherapy and hormone therapy). A descriptive analysis of the variables was carried out through the measures of central tendency (mean) and dispersion measures (standard deviation) for the continuous variables and relative and absolute frequency, for the dichotomous variables. To analyze the data, the statistical package SPSS 17.0 (Statistical Package for the Social Sciences) was used.

## Results

The patients had a mean age of  $51 \pm 7$  years, were mostly single (58.1%), and completed first or second grade (38.7%). About thirty-two percent of the women were away from their work activities. The dominant side was the right one (93.6%), which predominantly corresponded to the same side of the surgical procedure (54.9%). Most of the women interviewed were submitted to Physiotherapy on the Unified Health System of Bahia (SUS / BA) (80.6%), (Figure 1).

Regarding the surgical variables and cancer treatment, most of the participants underwent radical mastectomy (67.7%). Breast reconstruction was performed in 16.2% of cases by the use of silicone prosthesis. Considering the modalities of systemic therapies, adjuvant chemotherapy was performed in 96.8% of cases, radiotherapy in 80.6% and hormone therapy in 67.7%. Physiotherapeutic treatment occurred in a period less than or equal to seven months after surgery (51.6%). When questioned about the physiotherapeutic orientations before surgery, only 16.2% reported having received such orientations, (Figure 2).

The functional characteristics of the upper limbs were analyzed by the DASH questionnaire. Among the activities that the patients classified as having a great difficulty were the following categories: Recreational activities that required strength or

impact on the arms, shoulders or hands (32.3%) and heavy housework (25.9%). The activities that were classified as having no difficulty in performing included: Writing (90.4%), turning a key (96.8%), preparing a meal (70.9%) and recreational activities that required little effort (playing cards , knitting) (80.7%). Other tasks that were classified as not easy to perform include bedding (64.6%), washing or drying hair (51.8%), using a knife to cut food (67.8%), (54.8%) and sexual activities (58.3%), (Figure 3).

About 84% of the women reported that the arm, shoulder, or hand problem had not affected their normal social activities with family, friends, neighbors, and colleagues last week, and 51.8% reported that their work or his daily activities were not limited due to his problem with arm, shoulder or hand (Figure 4).

Many patients reported feeling no spontaneous pain or little pain in the arm, shoulder or hand (41.8% and 19.4%, respectively). When performing some specific activity, 32.3% of patients did not complain of pain, 58% reported low or medium degree of pain and only 9% reported severe pain. Regarding the discomfort in the skin (pinched) in the upper limbs, 41.9% reported not feeling such a symptom, but 6% of the interviewees reported feeling little and medium pain respectively. Forty-two percent of the patients did not report weakness in the arm, shoulder or hand, however 32.2% reported little weakness and only 16.1% reported a lot of weakness. When questioned about the difficulty in moving the upper limbs, 41.9% reported no difficulty, 16.1% had little difficulty and 29% answered that they felt medium difficulty (Figure 5).

The patients also reported that there was no difficulty in working or performing normal daily activities due to their problem with the upper limbs (61.2%). Regarding how they felt about arm, shoulder or hand problems, 29% of the women answered that they disagreed totally with the following statement: "I feel less capable, less confident and less useful because of my arm, shoulder and hand problem ", (Figure 6). The total mean DASH final score was  $45 \pm 17$ .

**Figure 1.** Descriptive analysis of sociodemographic and clinical variables of breast cancer patients. Salvador / BA, 2017.

Variable	N	%
<b>Age (Years)</b>		
<50 anos	11	35,5%
>=50 anos	20	64,5%
<b>Civil Status</b>		
Single	18	58,1%
Divorced	1	3,2%
Widow	2	6,5%
Married	10	32,3%
<b>Level of schooling</b>		
Illiterate	0	0%
Incomplete first degree	1	3,2%
First full degree	12	38,7%
Incomplete high school	1	3,2%
Incompleted Second degree	12	38,7%
Completed Second degree	5	16,1%
<b>Occupation</b>		
From home	9	29,0%
Work outside home	9	29,0%
Away	10	32,3%
Retired	3	9,7%
<b>Dominant Side</b>		
Right	29	93,5%
Left	2	6,5%
<b>Is the dominant side the same as surgery?</b>		
Yes	17	54,8%
No	14	45,2%
<b>Institution of Physiotherapeutic Care</b>		
Public	25	80,6%
Private	6	19,4%

Figure 2. Descriptive analysis of surgical treatment and therapeutic oncological approaches for breast cancer. Salvador / BA, 2017.

Variable	N	%
<b>Type of surgery</b>		
Radical Mastectomy	21	67,7%
Conservative	7	22,6%
Conservative / mastectomy	3	9,7%
<b>Breast Reconstruction</b>		
Yes	5	16,1%
No	26	83,9%
<b>Adjuvant Chemotherapy</b>		
Yes	30	96,8%
No	1	3,2%
<b>Adjuvant Radiotherapy</b>		
Yes	25	80,6%
No	6	19,4%
<b>Adjuvant hormone therapy</b>		
Yes	21	67,7%
No	10	32,3%
<b>Beginning of Physical Therapy after the surgical approach</b>		
<=7 months	16	51,6%
1 year	11	35,5%
>1 year	4	12,9%
<b>Physiotherapeutic Guidance Before Surgery</b>		
Yes	5	16,1%
No	26	83,9%

Figure 3. DASH score according to the ability to perform daily activities related to the responses of patients with breast cancer. Salvador / BA, 2017.

Measure your ability to do the following activities last week:	There was no difficulty n (%)	There was little difficulty n (%)	There was average difficulty n (%)	There was a lot of difficulty n (%)	Could not do n (%)	Not Reviewed n (%)	Mean and standard deviation n (%)
Open a new glass with a very tight	9 (29,0%)	6 (19,4%)	11 (35,5%)	2 (6,5%)	3 (9,7%)	--	2,48 ± 1,26
Write	28 (90,3%)	1 (3,2%)	1(3,2%)	1 (3,2%)	--	--	1 ± 0
Turn a key	30 (96,8%)	1(3,2%)	--	--	--	--	1 ± 0
Prepare a meal	22 (71%)	5 (16,1%)	1 (3,2%)	3 (9,7%)	--	--	1 ± 0
Open a heavy door	10 (32,3%)	9 (29%)	4 (12,9%)	6 (19,4%)	2 (6,5%)	--	2 ± 1,41
Put something on a shelf above your head	15 (48,4%)	8 ( 25,8%)	4 (12,9%)	3 (9,7%)	1 (3,2%)	--	1 ± 0
Do heavy housework (for example: washing walls, washing the floor)	7 (22,6%)	6 (19,4%)	5 (16,1%)	8 ( 25,8%)	4 (12,9%)	1 (3,2%)	2,5 ± 2,12
Do gardening work	17 (54,8%)	6 (19,4%)	3 (9,7%)	2 (6,5%)	3 (9,7%)	--	3 ± 2,82
Make the bed	20 (64,5%)	4 (12,9%)	4 (12,9%)	1 (3,2%)	2 (6,5%)	--	2 ± 1,41
Carry a bag or a suitcase	14 (45,2%)	6 (19,4%)	6 (19,4%)	3 (9,7%)	1 (3,2%)	1 (3,2%)	1 ± 1,41
Load a heavy object (more than 5 kg)	4 (12,9%)	5 (16,1%)	4 (12,9)	8 ( 25,8%)	8 ( 25,8%)	2 (6,5%)	2,5 ± 3,5
Replace a bulb above the head	13 (41,9%)	5 (16,1%)	4 (12,9%)	3 (9,7%)	6 (19,4%)	--	3 ± 2,8
Wash or dry hair	16 (51,6%)	7 (22,6 %)	5 (16,1%)	2 (6,5%)	1 (3,2%)	--	2,5 ± 2,12
Wash your back	10 (32,3%)	8 ( 25,8%)	5 (16,1%)	7 (22,6 %)	1 (3,2%)	--	2,38 ± 1,25
Wear a closed blouse	15 (48,4%)	7 (22,6 %)	3 (9,7%)	6 (19,4%)	--	--	3 ± 1,41
Use a knife to cut food	21 (67,7%)	6 (19,4%)	1 (3,2%)	2 (6,5%)	1 (3,2%)	--	1 ± 0
Recreational activities that require little effort (playing cards, knitting)	25 (80,6%)	2 (6,5%)	3 (9,7%)	--	--	1(3,2%)	0,5 ± 0,70
Recreational activities that require strength or impact on the arms, shoulders or hands (playing volleyball, hammering)	4 (12,9%)	3 (9,7%)	3 (9,7%)	10 (32,3%)	10 (32,3%)	1 (3,2%)	1,5 ± 0,70
Recreational activities in which you move your arm freely (such as: fishing, playing)	6 (19,4%)	3(9,7%)	6 (19,4%)	9 (29,0%)	6 (19,4%)	1(3,2%)	1 ± 1,41
Carrying around (going from one place to another)	17 (54,8%)	5 (16,1%)	3 (9,7%)	5 (16,1%)	1(3,2%)	--	1 ± 0
Sexual activity	18 (58,1%)	1(3,2%)	3 (9,7%)	2 (6,5%)	--	7 (22,6%)	0,5 ± 0,70

Figure 4. DASH score according to the symptoms of breast cancer patients last week prior to the interview. Salvador / BA, 2017.

Measure the severity of the following symptoms last week:	Did not affect n (%)	A little affected n (%)	It affected moderately (%)	It affected a lot n (%)	Extremely n (%)	Not Reviewed n (%)	Mean and standard deviation n (%)
Last week, at what point did your arm, shoulder, or hand problem affect your normal activities with family, friends, neighbors, and colleagues?	26 (83,9%)	3 (9,7%)	1 (3,2%)	1 (3,2%)	--	--	1 ± 0
Measure the severity of the following symptoms last week:	Did not limit n (%)	Limited n (%)	Moderately constrained n (%)	Limited too much n (%)	Could not do n (%)	Not Reviewed n (%)	Mean and standard deviation n (%)
During the past week, have your work or normal daily activities been limited due to your arm, shoulder or hand problem?	16 (51,6%)	9 (29,0%)	4 (12,9%)	1 (3,2%)	1 (3,2%)	--	1,5 ± 0,70

Figure 5. Scoring of pain symptoms of the arm, shoulder and hand of patients with breast cancer. Salvador / BA, 2017.

Measure the severity of the following symptoms last week:	None n (%)	Few n (%)	Median n (%)	Many n (%)	Extreme n (%)	Not Reviewed n (%)	Mean and standard deviation n (%)
Arm, shoulder or hand pain	13 (41,9%)	6 (19,4%)	10 (32,3%)	2 (6,5%)	--	--	2 ± 1,41
Pain in the arm, shoulder, or hand when you did some specific activity	10 (32,3%)	9 (29,0%)	9 (29,0%)	3 (9,7%)	--	--	2,5 ± 0,70
Discomfort in the skin (pinching) on the arm, shoulder or hand	13 (41,9%)	6 (19,4%)	6 (19,4%)	5 (16,1%)	1 (3,2%)	--	2 ± 1,41
Arm, Shoulder, or Hand Weakness	13 (41,9%)	10 (32,3%)	3 (9,7%)	5 (16,1%)	--	--	2 ± 1,41
Difficulty moving arm, shoulder or hand	13 (41,9%)	5 (16,1%)	9 (29,0%)	4 (12,9%)	--	--	2 ± 1,41

**Figure 6.** Social convalescence score of patients with breast cancer. Salvador / BA, 2017.

Measure the severity of the following symptoms last week:	There was no difficulty n (%)	Little difficulty (%)	Average difficulty n (%)	Too much difficulty n (%)	So hard you could not sleep n (%)	Not Reviewed n (%)	Mean and standard deviation n (%)
During the past week, have your work or normal daily activities been limited due to your arm, shoulder or hand problem?	19 (61,3%)	5 (16,1%)	1 (3,2%)	6 (19,4%)	--	--	1 ± 0
	Strongly disagree n (%)	Disagree n (%)	I do not agree or disagree n (%)	Agree n (%)	Strongly agree n (%)	Not Reviewed n (%)	Mean and standard deviation n (%)
I feel less able less confident and less useful because of my arm, shoulder and hand problem	9 (29,0%)	6 (19,4%)	2 (6,5%)	8 (25,8%)	6 (19,4%)	--	3 ± 2,82

## Discussion

The present research aimed to analyze the functionality of the upper limbs of women submitted to surgical breast cancer treatment in the outpatient setting, accompanied by physiotherapists in the public and private service in the city of Salvador, Bahia, and to describe the sociodemographic and clinical profile of this population. It is known that this population segment is represented by 2,760 new cases per 100 thousand inhabitants for the year 2016 in the state of Bahia. For Salvador, 1,000 new cases are expected<sup>1</sup>. According to the sociodemographic data, the patients interviewed presented the mean age  $51 \pm 7$  years. According to INCA, age remains a major risk factor for breast cancer in women. Incidence rates increase rapidly until age 50, after that age, the increase occurs more slowly. However, breast cancer in young women has very different clinical and epidemiological characteristics than those observed in older women. Generally, they are more aggressive, since they present a high rate of presence of mutation of BRCA1 and BRCA2<sup>1</sup> genes.

Most of the patients included in this study underwent radical mastectomy, a surgical approach involving removal of the breast, chest muscles, thoracic fascia and ipsilateral axillary lymph nodes<sup>2</sup>. Such a surgical approach is associated with greater limitations of

limb functionality<sup>6</sup>, a fact that instigated authors' interest in this study. A DASH score of  $45 \pm 17$  was found in this study, which seems to suggest the action of Physiotherapy as an integrative specialty for breast cancer patients, even though it was started in an average time of seven months after surgery. It should be taken into account that 54.9% of the patients performed the surgical approach on the dominant side, which may have been an impediment to the evolution regarding the functional capacity of the affected limb and justified the obtained score, especially if we consider the final score reported by Souza et al, in which a score of 27.07 was found in a sample of 105 patients. However, these authors reported that the physiotherapeutic protocol started immediately after surgery, at the bedside<sup>7</sup>.

The postoperative physiotherapeutic treatment in the present study covered seven or even more months after the surgery. Although the need for physiotherapy follow-up after breast surgery is widely known, many women are referred to the physiotherapist late, when they already present complications, which reduces the chances of a complete functional recovery and an early return to the activities<sup>8</sup>. When asked about physiotherapeutic guidelines before surgery, only 16.2% reported having received such guidelines. These data demonstrate the need of the physiotherapist to



act in the prevention of complications at the pre-surgical time and to guide their patients early in the postoperative period.

To assess the functional capacity of the upper limbs the authors chose the Disability Arm Shoulder and Hand questionnaire. It is believed that DASH represents the most complete instrument for assessing upper limb functionality since it was the most documented in the literature and provided information about the basic activities of daily living that can be compromised in the postoperative period<sup>9</sup>.

In the postoperative period, many women related difficulties regard instrumental, basic and advanced activities of daily living<sup>8</sup>. The findings observed in the present study showed that patients undergoing physiotherapeutic treatment still had limitations on the performance of recreational activities that required strength or impact on the arms, shoulders or hands and to perform heavy domestic tasks. Such activities require greater skills. In contrast, activities like writing, turning a key, preparing a meal, recreational activities that required little effort, bedding, washing or drying hair, using a knife to cut food, moving around and sexual activity were considered easy to perform.

In relation to the relationship with family, friends, neighbors and colleagues, the interviewees reported that the symptoms of the shoulder, arm and hand did not affect them. This may be justified by negative reports concerning upper limb pain symptoms and functional limitations. It is important to emphasize that the painful symptoms together with the incapacities related to the neoplasia and its treatment can cause functional impairment, loss of social interaction, reduction of professional and leisure activities. Painful symptoms not caused by neoplasia include those resulting from immobility, and consequent reduction in joint amplitude. Pain complaints may also arise due to musculoskeletal or metabolic abnormalities, decubitus ulcers, and stay in analgesic positions for long periods<sup>10,11</sup>.

It is also important to point out the relevance of multidisciplinary in the treatment of patients submitted to breast cancer surgery. The patients included in the present study, besides the professional physiotherapist, had the support of other health

professionals such as nutritionist, psychologist, nurse, mastologist, oncologist, radiotherapist and social worker who were also important for obtaining good results.

It was observed that a limitation of the study was represented by the restricted approach related to oncological findings, such as tumor staging, axillary approach and radiotherapy location, which were not described in some medical records. The sample population was small and perhaps did not represent truly the reality of the general population. As a suggestion for future studies, the researchers emphasize the need for an increase in the number of patients and the data regarding cancer tumor staging, whether or not the axillary approach and radiotherapy were performed, since these variables are directly related to the functional capacity of the upper limbs after the surgical approach.

## Conclusion

Physiotherapy at the outpatient level, even started late, interfered positively in the functional capacity of the upper limbs after breast cancer surgery, mainly in relation to the basic and instrumental activities performed by these patients. The present study also showed that the patients did not report painful symptoms on the shoulders, arms or hands or alterations that interfered dramatically in their social life.

## Authors' contributions

Jesus LA, Cedraz IS, Medrado AP participated in the study design, data collection and interpretation and paper writing.

## Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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