

Female breast cancer survivors: How can physical activity and grip strength impact the development of Lymphedema?

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Introduction

- In recent years, there has been a remarkable increase in the number of breast cancer survivors, highlighting advances in treatment and care (Sung et al., 2021). In many situations, this means living with chronic complications of treatment, such as pain, loss of upper limb strength, lymphedema (LE), and others, which can significantly impact the function, active participation, and overall quality of life of these individuals (Dieli-Conwright et al., 2016).
- It is imperative to gain a deeper understanding of the most effective strategies for preventing and treating the sequels of breast cancer treatment (Naghibi & Varshoie Tabrizi, 2018).
- Promoting active and healthy lifestyle by instilling behavioral changes and addressing modifiable risk factors plays an important role in preventing cancer recurrence and increasing survival (Paxton et al., 2016).

Objective

Analyze the relationship between physical activity (PA) with grip strength and lymphedema volume in female breast cancer survivors.

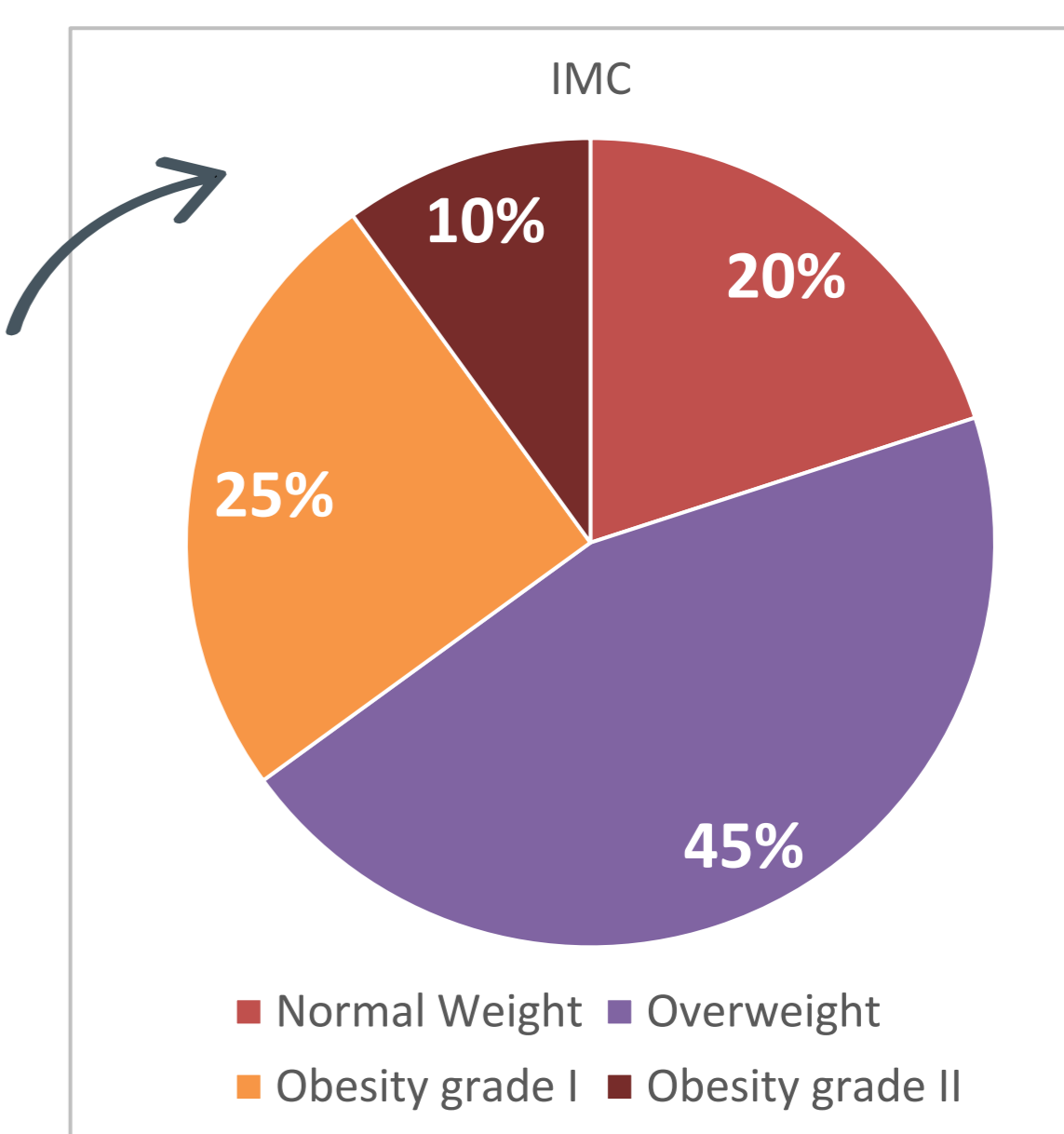
Materials and methods

- A cross-sectional analytical study was conducted.
- Women who survived breast cancer between 1 and 5 years after surgery were selected. Women with bilateral surgery and who had not completed the active phase of treatment were excluded.
- A characterization questionnaire was performed, upper limb lymphedema volume was measured with tape measures, PA levels were assessed with International Physical Activity questionnaire (IPAQ-SF) and the handgrip strength was evaluated with the JAMAR dynamometer.

Results

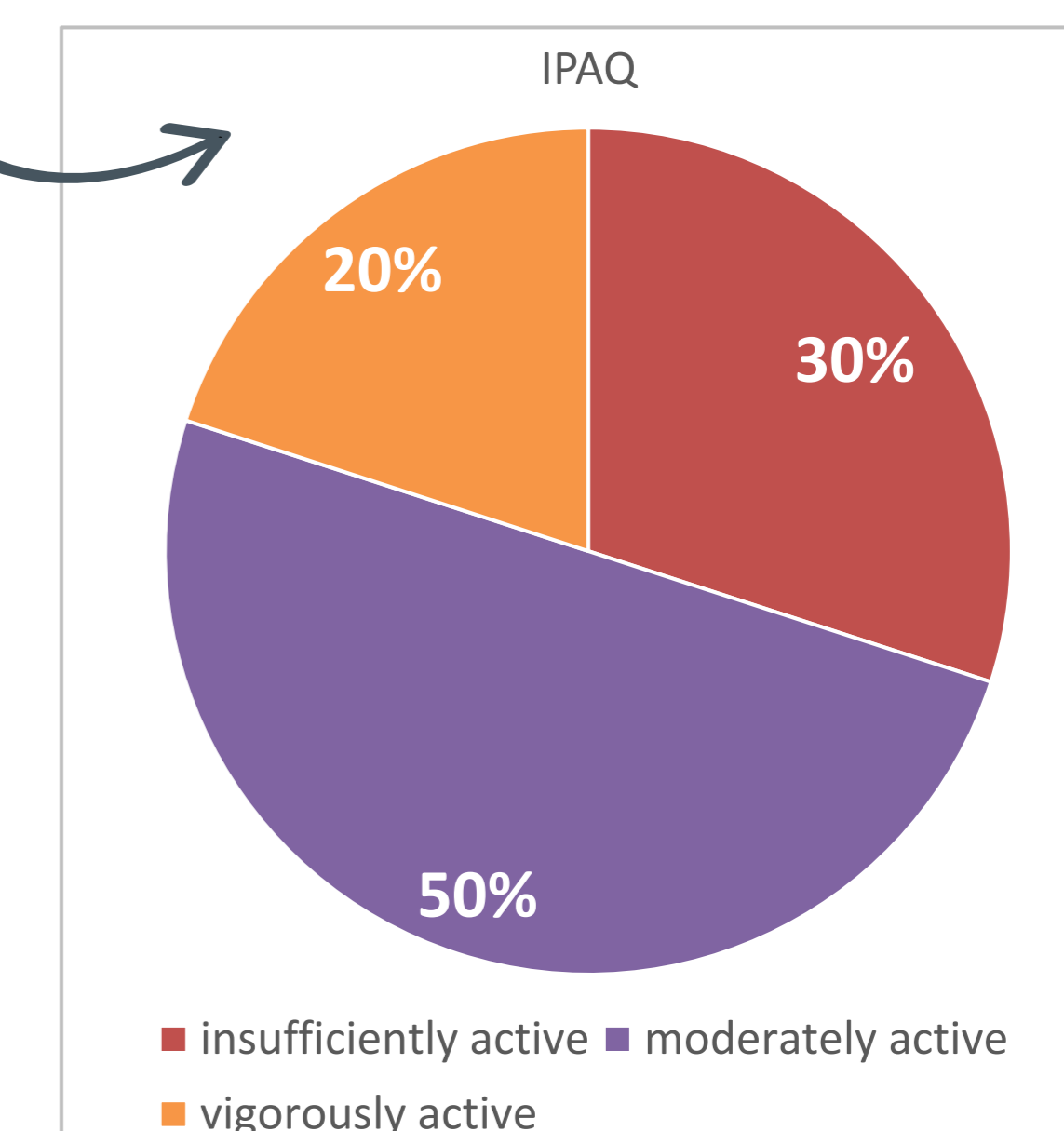
- A group of 20 women with a mean age 61 ± 8 years and an average of 39 months after breast surgery participated in the study. Six underwent mastectomy and 14 underwent axillary surgery. Most participants underwent sentinel node biopsy (16) and only 4 underwent axillary lymph node dissection.
- 80% were overweight**, of which **35% were obese**.
- There was an average volume of 2100 cm^3 in the affected upper limb and an average of 2013 cm^3 in the unaffected side. **The difference between the two limbs presented an average of 87.3 cm^3 .**

→ None of the participants showed a significant difference between limbs (greater than 10% difference). Despite this, 45% of participants have subclinical LE (difference between both upper limbs of 5 to 10%).



Graph 1: Characterization of the sample according to the body mass index

- Mean grip strength was 20.5 ± 1.2 and 21.4 ± 1.2 on the nondominant and dominant side, respectively. It was found that only **25% of the women included are within the normative values of grip strength on the dominant side** according to their age. As for the **nondominant side, 40% of the sample is within the normative values** for their age.
- In the present study, 30% of the sample were insufficiently active, 50% moderately active, and 20% vigorously active, with a weighted average of 5 ± 0.6 hours of sitting per day.
- No significant associations were found between the LE and PA** ($r_s=0.231$; $p=0.3$) nor between **LE and the number of hours sitting** ($r_s=0.291$, $p=0.213$). There was **no significant correlation between PA levels and grip strength** on the dominant side ($p=1$; $r_s<0$) and non-dominant side ($r_s=0.062$; $p=0.796$) or **between grip strength and volume difference between members**. *
- A strong positive correlation was found between Body Mass Index (BMI) and limb volume difference** ($r_s=0.583$; $p=0.007$). *



Graph 2: Characterization of the sample according to the physical activity levels

* Statistically significant $p < 0,05$.

Conclusions

- In this sample, it is concluded there is no relationship between limb grip (dominant or non-dominant), LE volume and PA. However, it indicates a **correlation between body mass index (BMI) and lymphedema**, and **higher BMI is identified as a risk factor for the development of lymphedema**.
- Moreover, engaging in **physical activity** can contribute to the control and management of BMI, revealing the influence of PA in BMI. Consequently, PA indirectly serves as a preventive strategy against lymphedema and loss of upper limb strength.
- By incorporating PA as part of a comprehensive approach to managing BMI, the **risk of developing lymphedema may be reduced**. In summary, the observations suggest that while PA may not directly prevent lymphedema, it can play an important role in indirectly preventing its development by helping to control BMI.

References:

Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021 May;71(3):209–49.; Dieli-Conwright CM, Lee K, Kiwata JL. Reducing the Risk of Breast Cancer Recurrence: an Evaluation of the Effects and Mechanisms of Diet and Exercise. Vol. 8, Current Breast Cancer Reports. Current Medicine Group LLC 1; 2016. p. 139–50.; Paxton RJ, Anderson A, Sarkar S, Taylor WC. Breaking up sedentary behavior: Perceptions from cancer survivors. Cancer Nurs. 2016 Jul 1;39(4):272–8.; Naghibi S, Varshoie Tabrizi F. Exercise Training and Breast Cancer-Related Lymphedema: A Systematic Review. Razavi International Journal of Medicine. 2018 Feb 10;6(1).; Ficarra S, Thomas E, Bianco A, Gentile A, Thaller P, Grassadonio F, et al. Impact of exercise interventions on physical fitness in breast cancer patients and survivors: a systematic review. Vol. 29, Breast Cancer. Springer Japan; 2022. p. 402–18.