

# The effect of weather on lymphedema in breast cancer patients: a retrospective study

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## BACKGROUND

Breast cancer-related lymphedema (BCRL) is a chronic complication following breast cancer treatment, requiring ongoing management. While infections, strenuous exercise, and lifestyle factors are acknowledged as aggravating factors for lymphedema, the impact of changes in barometric pressure and temperature remains inconclusive. This study aims to explore the potential relationship between seasonal climate changes and variations in limb volume post-breast cancer treatment.

## Method and Results

The study included women who had had at least two arm circumference measurements since being diagnosed with breast cancer and undergoing surgery. Inclusion criteria specified patients with arm circumference measurements during both summer (June, July, August) and winter (December, January, February). A diagnosis of lymphedema was confirmed by a difference of 2 cm or more in at least one of the circumference recordings of the affected and unaffected arm. A total of 20 patients with lymphedema and 32 in the control group were recruited.

Limb volume was calculated using the frustum formula. Eleven frustums were calculated for each arm and summed together to calculate the total limb volume. Among women diagnosed with BCRL and the control group, no significant correlation was found between seasonal changes and upper limb volume (Figure 1). The volumes of the affected arm of women with BCRL were 1938.68mL in summer and 1950.18mL in winter, while the volumes of the unaffected arm were 1809.73mL in summer and 1829.60mL in winter (Table 1, 2).

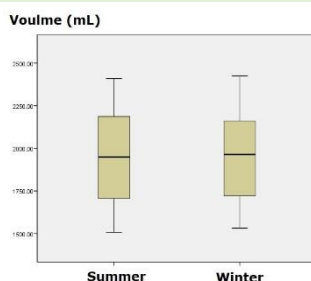
**Table 1. Limb Volume (mL) in Participants Diagnosed with Breast Cancer-Related Lymphedema**

N=20	Summer (June, July, August)	Winter (December, January, February)	Independent t-test
Volume of affected arm	1938.68	1950.18	0.897
Volume of non-affected arm	1809.73	1829.60	0.825

**Table 2. Limb Volume (mL) in Participants without a Diagnosis of Lymphedema after Breast Cancer**

N=34	Summer (June, July, August)	Winter (December, January, February)	Mann-Whitney Test
Volume of affected arm	1868.53	1849.27	0.941
Volume of non-affected arm	1820.87	1803.68	0.922

**Fig 1. Seasonal volume of affected arm in participants diagnosed with breast cancer-related lymphedema**



## CONCLUSION

Although statistically significant fluctuations in limb volume post-breast cancer were not observed concerning seasonal variations, investigating the status of lymphedema based on risk factors and climate in BCRL patients requires additional research with a more extensive population. Additionally, considering potential variations in lymphedema definitions, diagnoses, and measurement tools, further studies to establish additional clinical diagnostic criteria are warranted.