

## Upper limb dysfunction in newly diagnosed individuals after surgery for breast cancer: Baseline results from the AMBER cohort study

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**Introduction:** Breast cancer is the most common malignancy among Canadian women, with one in eight expected to develop the disease in their lifetime. Breast cancer surgery frequently causes upper limb dysfunction, with effects reported to last years into survivorship. Upper limb dysfunction is characterized by the presence of arm/shoulder pain, arm swelling, axillary web syndrome, limited shoulder mobility, and upper limb weakness. These symptoms are associated with poorer upper limb mobility and lower levels of physical activity and can negatively impact the individual's quality of life.

**Aims of study:** To examine potential associations between post-surgical upper limb dysfunction including lymphedema, and demographic, medical, surgical, and health related fitness variables in newly diagnosed individuals with breast cancer.

**Method:** Participants in the AMBER study were recruited between 2012 and 2019. Objective measures of health-related fitness, body composition, shoulder range of motion, axillary web syndrome, and lymphedema were performed within three months of breast cancer surgery, and prior to, or at the start of adjuvant cancer treatment.

**Results:** Of the 3,673 (25%) eligible individuals with breast cancer, we recruited 1,528 (42%) in the AMBER cohort study. For the present analysis, of the 1,528 AMBER participants, we excluded 117 participants undergoing neoadjuvant chemotherapy, one participant not receiving cancer treatment, and 177 who had undergone bilateral surgery, resulting in a final sample of 1,233 participants who had unilateral surgery. Upper limb assessments were completed a median of 55 (IQR=45 to 70) days post-surgery. The mean age of participants was 56.4 years (SD=10.6), most were white (87.5%), diagnosed with stage I (48.5%) or II (44.4%) breast cancer, 68.8% had breast conserving surgery, and 83.4% had undergone a sentinel lymph node biopsy. Upper limb dysfunction was identified in 54% of participants and was associated with poorer upper limb function and higher pain. Axillary web syndrome was identified in 16.6%, while an arm volume difference of >200mls was found in only 4% of participants. Poorer lower body muscular endurance and higher percent body fat were significantly associated with greater severity of upper limb dysfunction.

**Conclusion:** Upper limb dysfunction is common in individuals after breast cancer surgery prior to adjuvant cancer treatment, whereas rates of lymphedema were low. Health-related fitness variables were associated with severity of upper limb dysfunction. Given the increased risk of lymphedema over the first three years after cancer treatment, we anticipate that lymphedema rates will increase in the cohort over time.