



# Prevalence and Risk Factors for Frozen Shoulder in Breast Cancer Survivors: A National Asian Cohort



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## Introduction

1. Breast cancer is the commonest cause of cancer in female patients in Singapore
2. Despite improved survival outcomes in breast cancer patients, upper extremity dysfunction is a common complication after breast cancer surgery
3. Adhesive capsulitis is a common cause of shoulder dysfunction in this population
4. However, few studies have investigated the prevalence and risk factors for adhesive capsulitis in this population
5. This is surprising as effective physical and rehabilitative treatment modalities exists for adhesive capsulitis

## Objectives

1. To investigate the prevalence for adhesive capsulitis in post-operative breast cancer patients
2. To determine if there is any risk factors, including the presence of lymphedema, for the development of adhesive capsulitis in post-operative breast cancer patients

## Materials and Methods

1. This is a retrospective cross-sectional observation study
2. It was conducted at the rehabilitation centre of the National Cancer Society
3. The centre receives referrals from clinical specialists or primary care physicians from all local healthcare institutions
4. It provides comprehensive outpatient rehabilitation services with a physician-led multidisciplinary team, which includes physiotherapists, nutritionists, medical social workers and psychologists
5. Inclusion criteria were:
  - Age above 21 years old
  - Underwent surgery for breast cancer with a postoperative period of up to 5 years
6. Exclusion criteria were:
  - Metastatic disease
  - Glenohumeral osteoarthritis
  - Previous shoulder joint trauma or shoulder surgery
  - Inflammatory shoulder arthritis
  - Prior history of adhesive capsulitis before oncological treatment
7. Diagnosis of adhesive capsulitis was made if there was restricted passive ROM in 2 or more planes of movement, with normal radiographic findings
8. Basic demographic and clinical information were collected from both chart review and patient interview

## Results

1. There were 135 Asian women who were recruited
2. A large proportion had lymphedema (33.3%)
3. A significant number of participants also had adhesive capsulitis (22.2%)
4. On univariate analysis, significant risk factors for adhesive capsulitis were
  - a history of mastectomy ( $p = 0.30$ )
  - ALND ( $p = 0.037$ )
  - presence of lymphedema ( $p < 0.001$ ).
5. On multivariate analysis, significant risk factors for adhesive capsulitis were
  - treatment with mastectomy ( $p = 0.021$ )
  - mastectomy with reconstruction ( $p = 0.024$ )
  - presence of lymphedema ( $p < 0.001$ ).

Table 1: Details of patients

| Variable                         | n = 135             |
|----------------------------------|---------------------|
| Age at surgery (years)           | 58.6 ( $\pm 10.0$ ) |
| Ethnicity                        |                     |
| - Chinese                        | 120 (88.9%)         |
| - Malay                          | 12 (8.9%)           |
| - Indian                         | 3 (2.2%)            |
| Duration post surgery (months)   | 21.3 ( $\pm 14.3$ ) |
| Type of breast cancer surgery    |                     |
| - Breast conserving surgery      | 47 (34.8%)          |
| - Mastectomy                     | 72 (53.3%)          |
| - Mastectomy with reconstruction | 16 (11.9%)          |
| Lymph node dissection            |                     |
| - None or SLNB                   | 59 (43.7%)          |
| - ALND                           | 76 (56.3%)          |
| Stage of cancer                  |                     |
| - 0                              | 2 (1.5%)            |
| - I                              | 57 (42.2%)          |
| - II                             | 71 (52.6%)          |
| - III                            | 5 (3.7%)            |
| Presence of lymphedema           | 45 (33.3%)          |
| Presence of adhesive capsulitis  | 30 (22.2%)          |

Table 2: Multivariate analysis for adhesive capsulitis

| Variable                      | Odds ratio | 95% PI     | p value |
|-------------------------------|------------|------------|---------|
| Type of breast cancer surgery |            |            |         |
| - Breast conserving surgery   | 1.00       |            |         |
| - Mastectomy                  | 3.93       | 1.23-12.63 | 0.021   |
| - Mastectomy + reconstruction | 2.72       | 1.27-30.54 | 0.024   |
| Lymph node dissection         |            |            |         |
| - None or SLNB                | 1.00       |            |         |
| - ALND                        | 0.908      | 0.303-2.72 | 0.863   |
| Presence of lymphedema        | 7.92       | 2.73-23.0  | <0.001  |

## Discussion

1. This study found a high prevalence of adhesive capsulitis
2. There are limited studies examining the prevalence of adhesive capsulitis in the cancer rehabilitation setting, which may account for the high prevalence
3. This is a compelling factor for a cancer rehabilitation program incorporating surveillance, evaluation and management of adhesive capsulitis and other shoulder dysfunction in breast cancer survivors
4. Chronic lymphedema can potentially contribute to adhesive capsulitis via fatigue, inflammation, straining of the rotator cuff musculature
5. In conclusion, adhesive capsulitis is a common condition in breast cancer patients after breast surgery, and can lead to considerable morbidity and impaired quality of life.



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