# MINIMIZING SURGICAL COMPLICATIONS IN PROPHYLACTIC MASTECTOMY FOR BREAST CANCER RISK REDUCTION: A REVIEW OF REVIEWS

## **BACKGROUND**

- Breast cancer is the **most common malignancy** in females worldwide and
  remains a leading cause of cancer-related
  deaths (WHO, 2024).
- Surgical interventions are a cornerstone of prophylactic treatment in combination with other therapies to reduce the risk of metastasising and advanced cancers.
- However surgical interventions have been associated with **post-surgery complications** (Dindo et al., 2004).
- Twenty percent of patients affected by **lymphedema** and up to 30% of cases experiencing surgical **site infections** (Gillespie et al., 2018; Ramadan et al., 2014).

#### AIM

- To synthesise the current treatment strategies used to reduce post-surgery complications following prophylactic breast cancer mastectomy, and
- To consider strategies to improve postsurgery cancer, complication severity, and recovery outcomes.

# SEARCH STRATEGY

- Systematic search using **PubMed database** to identify relevant meta-analyses and reviews.
- **Restricted date range** post-COVID (2020-2024).
- **Search terms**: ((((breast cancer) AND (intervention)) AND (surgery)) AND (complication)) AND (strategies).

# SCREENING

- Titles and abstracts were **independently evaluated** following eligibility criteria (outcomes) and **PICOS**.
- Those with full-text availability, **meta-analysis or any review type**, and human studies published in English.
- Articles included if they **related to surgical complications or outcomes** in individuals undergoing prophylactic breast cancer risk-reducing surgery.
- **Secondary outcomes** included health-related quality of life, recurrence of cancer, recovery time, and risk factors for complications, including behavioural factors, such as BMI and lifestyle.

#### **EXTRACTION**

- After removing duplicates, **165 potential records** were identified. **One hundred and 19 were excluded** after screening and/or relevance, resulting in **46 relevant articles**, by which **30 met inclusion criteria**.
- Interventions reviewed were prepectoral versus subpectoral implants, vascularised lymph node transfer, pre-operative antibiotics, physiotherapy, acupuncture and innovative techniques (e.g., stem cell therapy). There were no demographic or cancer grading/staging restrictions.
- Articles published across various locations, primarily China, US and the UK (67%) between 2004-2023 (majority from 2014 onwards).

STUDY CHARACTERISTICS (n = 15)						
Fields of study	Countries	Review designs	Exclusion criteria	Review characteristics	Review outcomes	Quallity tools
Plastic and reconstructive surgeries ( <b>5</b> ), Oncology and cancer care ( <b>3</b> ), Pharmacology and therapeutics ( <b>2</b> ), Physiotherapy and rehabilitative care ( <b>2</b> ), Traditional medicine and innovative techniques ( <b>1</b> ), Fertility preservation strategies ( <b>1</b> ), Paravertebral block ( <b>1</b> ).	China ( <b>4</b> ), UK ( <b>3</b> ), USA ( <b>3</b> ), Italy ( <b>2</b> ), Singapore, Brazil Canada, and Ireland ( <b>1</b> ).	8 Systematic reviews and meta-analyses (159 studies), 3 Meta-analyses only (38 studies), 3 Literature reviews (246 citations), 1 systematic review only (10 studies)	Articles without outcomes were excluded.	Primarily RCTs (9) including double-blinded and trials comparing surgical techniques, observational studies (7) such as prospective/retrospective cohorts and cross-sectional or epidemiological, non-randomised controlled studies (3), Case series/reports (3), Clinical studies, and Preclinical studies (1)	Impact and management of Lymphedema (6), Breast reconstruction (4), SSI's (2), factors contributing to re-occurrence (2).	4 Did not include quality assessment, 3 found most studies to be high quality (MINORS, Newcastle-Ottawa, PRISMA), 4 reported mostly low quality (GRADE, PEDro, ROBINS-I), and 4 showed mixed findings between moderate to low risk of bias.

#### **FINDINGS**

- Risk of recurrence is highest for **triple negative breast cancer** subtypes (Chen et al., 2014).
- Stem cell therapies hold significant promise for managing longterm post-surgical complications, including lymphedema (Chen et al., 2021).
- Acupuncture was found to be complementarily effective for managing hot flashes in breast cancer survivors (Yu et al., 2020).
- Implant-based breast reconstruction decreased complication rates when completed prior to post-mastectomy radiotherapy (O'Donnell et al., 2021) and patients receiving prepectoral implants or paravertebral block had better overall outcomes post-surgery (Ching et al., 2022; Offodile et al., 2022).
- Variability in antibiotic protocols limits universal guidelines on reducing SSIs with preoperative antibiotics (Alam et al., 2022).
- Whilst most patients were **satisfied with autologous fat grafting** (AFG) as a reconstruction technique, its **oncological safety remains unclear** (Agha et al., 2015).

### **IMPLICATIONS**

- Inconsistencies in methodology and research designs meant inconclusive findings, risk of bias and quality assessment.
- Future research should focus on prospective, RCTs with longer follow-up periods to provide more robust evidence on the oncological safety of AFG (Agha et al., 2015), the optimal timing and choice of antibiotics (Alam et al., 2022), and the effectiveness of stem cell therapies in treating lymphedema (Chen et al., 2021).
- More studies are needed to clarify the long-term effectiveness of innovative and non-hormonal treatments like stem cells and acupuncture (Wang et al., 2018).
- The variability in evidence quality and the **need for more robust data** necessitate ongoing research to inform clinical decision-making.
- However, harnessing combinations of novel therapies and personalised treatment plans based on molecular subtypes, could significantly enhance patient care.





CURTIN MEDICAL RESEARCH INSTITUTE



