www.directivepublications.org

The European Journal of Cancer

ISSN 3064-6731

Research Article

Comparative Study Of Breast Conserving Surgery And Modified Radical Mastectomy In Patients With Breast Cancer At A Tertiary Cancer Centre.

Diwan Shrestha,[1*] Utsab Man Shrestha,[1] Manish Roy,[1] Punyaram Kharbuja,[1] Nickey Pradhan,[2] Navindra Phuyal,[3] Shree Krishna Shilpakar[4]

[1]Department of Surgical Oncology, Bhaktapur Cancer Hospital, Bhaktapur, Nepal.
[2]Department of Community Medicine, Rapti Academy of Health Sciences, Dang, Nepal.
[3]Department of Anatomy, Rapti Academy of Health Sciences, Dang, Nepal.
[4]Department of Physiotherapy, Bir Hospital, Nepal.

Abstract

Background: Breast cancer considered as most common, is a leading cause of cancer related death among women worldwide. Early diagnosis and appropriate surgical management are important to improve patient outcomes. There are two primary surgical approaches for early breast cancer treatment: modified radical mastectomy and breast-conserving surgery. This study was conducted with the objectives of assessing and comparing the efficacy and oncological outcomes of breast-conserving surgery and modified radical mastectomy in patients with breast cancer at a tertiary cancer centre in Nepal.

Methods: A retrospective cross-sectional study was designed including data from patients who underwent breast conserving surgery and modified radical mastectomy at Bhaktapur Cancer Hospital, Nepal, from year 2012 to 2018, with the follow up period of at least 5 years postoperatively.

Results: A total of 200 patients were included in the study, with the mean age of 44.1 ± 10.3 years in breast conserving surgery group and 50.1 ± 12.6 years in modified radical mastectomy group. The operation time (69.65 ± 9.05 vs 115.5 ± 20.81) min, incision length (49.5 ± 7.05 vs 108.6 ± 14.07) mm, intraoperative blood loss (37.5 ± 14.96 vs 45.6 ± 8.44) ml, and complication rate (5% vs 20%) were significantly less in BCS group than in MRM group. Furthermore, significant difference was not observed in the local recurrence rate, distant recurrence rate, disease-free survival, and overall survival at 1 and 5 years postoperatively between the BCS and MRM groups.

Conclusion: BCS is as effective in the treatment of early breast cancer as MRM; however, it offers less operation time, incision length, blood loss, and complication rate than MRM.

Keywords: breast cancer; breast conserving surgery; modified radical mastectomy.

INTRODUCTION

According to World Health Organization (WHO), breast cancer is one of the most common cancers prevalent in women in 157 countries worldwide and it accounted for approximately 670,000 deaths worldwide in 2022. More than 1.5 million women (25% of all women with cancer) are diagnosed with breast cancer every year throughout the world [1]. The risk factors that can escalate the risk of developing breast cancer include sex, age, estrogen level, family history of breast cancer, gene mutations, and also unhealthy lifestyle [2]. It is predominantly prevalent in women and the rate of occurrence is 100 times more common in females when compared to males [3].

Among all invasive ductal carcinoma is the most common type of breast cancer that is followed by lobular, medullary, mucinous, comedo, papillary, tubular, and inflammatory variants [4]. In order to achieve a good prognosis, early diagnosis and treatment of breast cancer plays the vital role and surgery is considered as the primary treatment of choice in early breast cancer. Surgical treatment of breast cancer includes two main approaches, modified radical mastectomy (MRM) and breast-conserving surgery (BCS). There are many studies that have reported that BCS followed by radiotherapy has equivalent disease-free survival (DFS) and overall survival (OS) rates when compared with MRM [5-7]. In contrary, breast aesthetics are severely affected by MRM [8]. With the advancement in breast surgery, BCS has become a new therapeutic choice for patients presenting with early-stage breast cancer, which benefits with breast preservation while ensuring effective resection of the pathology [9].

In comparison to MRM patients, BCS patients have a better social, emotional, and physical adjustment, as well as fewer

***Corresponding Author: Diwan Shrestha,** Department of Surgical Oncology, Bhaktapur Cancer Hospital, Bhaktapur, Nepal.
Email: diwanshrestha2@gmail.com
Received: 09-May-2026, Manuscript No. TEJOC - 5752 **; Editor Assigned:** 10-May-2026 **; Reviewed:** 06-June-2026, QC No. TEJOC - 5752 **;**
Published: 09-June-2026. **DOI:** 10.52338/tejoc.2026.5752
Citation: Diwan Shrestha . Comparative Study Of Breast Conserving Surgery And Modified Radical Mastectomy In Patients With Breast Cancer At A Tertiary Cancer Centre. The European Journal of Cancer. 2026 June; 17(1). doi: 10.52338/tejoc.2026.5752.
Copyright © 2025 **Diwan Shrestha .** This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

postoperative complications, early return to normal function, and desirable cosmetic outcomes [10]. In countries such as Nepal, breast cancer patients still have low acceptance of BCS, due to traditional factors, fear of radiotherapy, and recurrence.

The objective of this study was to compare the oncological results and effectiveness of breast-conserving surgery over modified radical mastectomy in patients with early-stage breast cancer at a tertiary cancer center in Nepal.

METHODS

This was a retrospective study of breast cancer patients, who underwent surgery at Bhaktapur cancer hospital, Nepal from February 12, 2012 to March 20, 2018 A.D. A convenient sampling method was used, and 200 cases were enrolled in the study. Among them, breast-conserving surgery (BCS) was done in 100 patients, and modified radical mastectomy (MRM) was done in 100 patients. Ethical approval for the study was obtained from the Nepal Health Research Council (Reg no. 527/2023). Data were accessed for research purpose from 01/01/2024 to 25/03/2024 from hospital records and included unique inpatient number based on a pre-formed proforma. All identifiers were removed before data analysis, and the data-set was fully anonymized. As it was a retrospective study, written informed consent was waived.

Breast-conserving surgery

100 patients who underwent lumpectomy with axillary lymph node dissection were recruited. Along with the tumor, a 2 cm margin of normal tissue was also excised, and before closure of the defect, metallic clips were placed on the pectoralis muscles. Placement of drain was done in the tumor excision site and also in the axilla. All patients were administered adjuvant radiotherapy of 40 Gy in 15 fractions that was followed by 4 fraction boost doses.

Modified radical mastectomy

A total of 100 patients were subjected to a modified radical mastectomy. An elliptical incision was given around the lesion, it included the nipple-areolar complex as well, and the dissection was performed superiorly up to the clavicle, inferiorly up to the superior border of the rectus abdominis, medially to the lateral border of the sternum, and laterally to the latissimus dorsi up to the pectoralis fascia. Ipsilateral axillary lymph node dissection was performed in all cases, followed by placement of drains under the skin flap and axilla.

Postoperative treatment

Adjuvant chemotherapy comprising of Adriamycin, Doxorubicin, and Cyclophosphamide was administered to patients with positive axillary nodes. Tamoxifen 5 mg for 5 years was administered to premenopausal estrogen receptor (ER) and progesterone receptor (PR) positive patients, whereas, Letrozole 2.5 mg for 5 years was administered to postmenopausal ER and PR positive patients. They were examined on follow-ups every 3 to 6 months for at least five years. Mammography was performed annually. Patients with clinical suspicion of recurrence underwent imaging or biopsy to identify recurrence.

Statistical analysis

Data were entered in Microsoft Excel spreadsheet, and the statistical analysis was done using the Statistical Package for Social Sciences (IBM SPSS Version 22). The measurement data along with a normal distribution were expressed as the mean ± standard deviation (x ± SD). The Pearson's chi-square test was applied to compare categorical variables between BCS and MRM. An independent sample t- test was done to compare the numerical variables between the BCS and MRM groups. The Kaplan-Meier method was used to generate survival curves and analyze overall survival (OS) and disease-free survival (DFS), which were compared using the Log-rank test. Statistical significance was set at $p < 0.05$ and confidence interval (CI) of 95%.

RESULTS

This study included a total of 200 participants, among whom 100 patients underwent MRM, and 100 patients underwent BCS. The mean age of the patients in the BCS group was 44.1 ± 10.3 years, and that in the MRM was 50.1 ± 12.6 years. All the participants were female patients. In the BCS group, 25 patients were post-menopausal, whereas in the MRM group, there were 40 patients, which was statistically significant. Tumors were commonly present in the upper outer quadrant in both the MRM (46%) and the BCS group (42%), but centrally located tumors were present only in the MRM group (8%). The left breast was commonly affected in both groups, whereas the bilateral breast was affected in 1 patient in the MRM group. Axillary lymph node metastasis was significantly more common in the MRM group (60%) than in the BCS group (31%) ($P < 0.001$), as shown in **Table 1**.

Table 1. Baseline characteristics of participants.

Characteristics	BCS group (n=100)	MRM group (n=100)	p
Age (year)	44.1 ± 10.3	50.1 ± 12.6	**0.022***
Menarche (year)	14.02 ± 1.1	13.82 ± 0.95	0.451
Menopause (n)	25	40	**0.024***
Family history of breast carcinoma Yes No	 20 80	 21 79	 0.861
Time of onset (days)	29.46 ± 9.19	30.44 ± 9.16	0.763
Axillary lymph node metastasis Yes No	 31 69	 60 40	 **0.00***
Side Right Left Bilateral	 37 63 0	 45 54 1	 0.29
Tumor site UOQ UIQ LOQ LIQ Central	 42 10 37 11 0	 46 24 14 8 8	 **0.00***
Tumor size (mm)	26.34 ± 8.6	38.84 ± 16.92	**0.00***

MRM = modified radical mastectomy; BCS = breast-conserving surgery; UOQ = upper outer quadrant: UIQ = upper inner quadrant; LOQ = lower outer quadrant; LIQ = lower inner quadrant.

The most common histological type in both groups was invasive ductal carcinoma (89% in BCS and 87% in MRM group). Most of the patients were ER and PR positive in both groups, whereas triple negative tumors were present in 4% patients in BCS group and 10% patients in the MRM group, as shown in **Table 2**.

Table 2. Tumor characteristics.

Variables	BCS group (n=100)	MRM group (n=100)	P
Tumor grade I II	 2 98	 16 84	 0.001*
Histological type Invasive ductal carcinoma Carcinoma with medullary features Mixed Invasive ductal carcinoma and invasive lobular Ca Invasive lobular carcinoma	 89 9 2 0	 87 4 6 3	 0.075
Immunohistochemistry ER positive PR positive Her 2 positives Triple negative	 64 56 20 4	 56 53 15 10	 0.248 0.67 0.352 0.096

BCS = Breast Conserving Surgery; MRM = Modified Radical Mastectomy.

In the BCS group, patients had significantly shorter operation time, smaller incision length, and less intraoperative blood loss than the MRM group, whereas the difference in hospital stay was not statistically significant between the two groups, as shown in **Table 3**.

Table 3. Perioperative outcomes.

Variables	BCS group (n=100)	MRM group (n=100)	P
Operation time (minutes)	69.65 ± 9.05	115.5 ± 20.81	0.00*
Incision length (mm)	49.5 ± 7.05	108.6 ± 14.07	0.00*
Intra-operative blood loss (ml)	37.5 ± 14.96	45.6 ± 8.44	0.00*
Hospital stay (days)	3.43 ± 0.57	3.70 ± 0.52	0.058

BCS = breast conserving surgery; MRM = modified radical mastectomy.

The most common complication in both groups was seroma, but skin flap necrosis was present in four patients in the MRM group only. The overall complication rate in the BCS group was significantly lower than in the MRM group (5% vs 20%), as shown in **Table 4**.

Table 4. Complication rates.

Variables	BCS group (n=100)	MRM group (n=100)	P
Seroma	3	10	
Subcutaneous hemorrhage	1	2	
Skin flap necrosis	0	4	
Upper limb edema	1	4	
Total complication rate	5%	20%	**0.025***

BCS = breast conserving surgery; MRM = modified radical mastectomy.

The 1- and 5-year local recurrence-free rates postoperatively were 98%, 96% and 99%, 98% for the BCS and MRM group, respectively. Similarly, the distant recurrence-free rates at 1 and 5 years were 100%, 97% and 99%, 97% for BCS and MRM groups respectively. The disease-free survival rate and overall survival rates at 1 and 5 years for the BCS group were 98%, 95%, and 100%, 98%, respectively. Similarly, disease-free survival and overall survival at 1 and 5 years for the MRM group were 98%, 97%, and 99%, 99%, respectively, as shown in Table 5. A Kaplan–Meier survival analysis with the Log-rank (Mantel–Cox) test showed no significant difference in five-year disease-free survival between the BCS and MRM groups ($\chi^2 = 0.545$, df = 1, p = 0.460) as shown in Fig 1. Similarly, there was no significant difference in five-year overall survival between the BCS and MRM groups ($\chi^2 = 0.333$, df = 1, p = 0.564) as shown in Fig 2.

Table 5. Postoperative prognosis at one and five years.

Variables	BCS group (n=100)	MRM group (n=100)	P
Local recurrence rate			
1 year postoperatively	2	1	0.561
5 years postoperatively	4	2	0.407
Distant recurrence rate			
1 year postoperatively	0	1	0.361
5 years postoperatively	3	3	1.00
Disease free survival			
1 year postoperatively	98	98	1.00
5 years postoperatively	95	97	0.47
Over-all survival			
1 year postoperatively	100	99	0.361
5 years postoperatively	98	99	0.561

BCS = breast conserving surgery; MRM = modified radical mastectomy.

Figure 1. Kaplan-Meier curve of five-year disease-free survival (DFS) in BCS and MRM group.

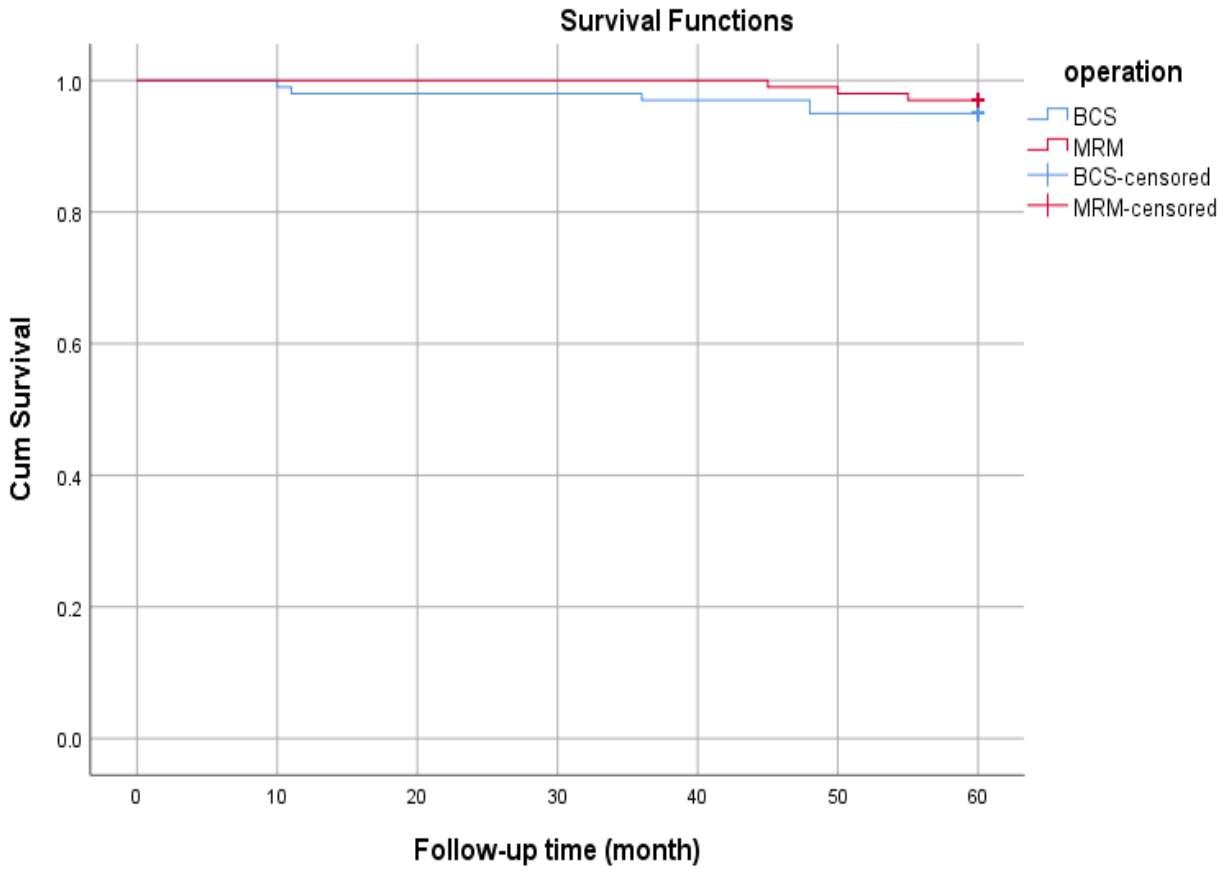
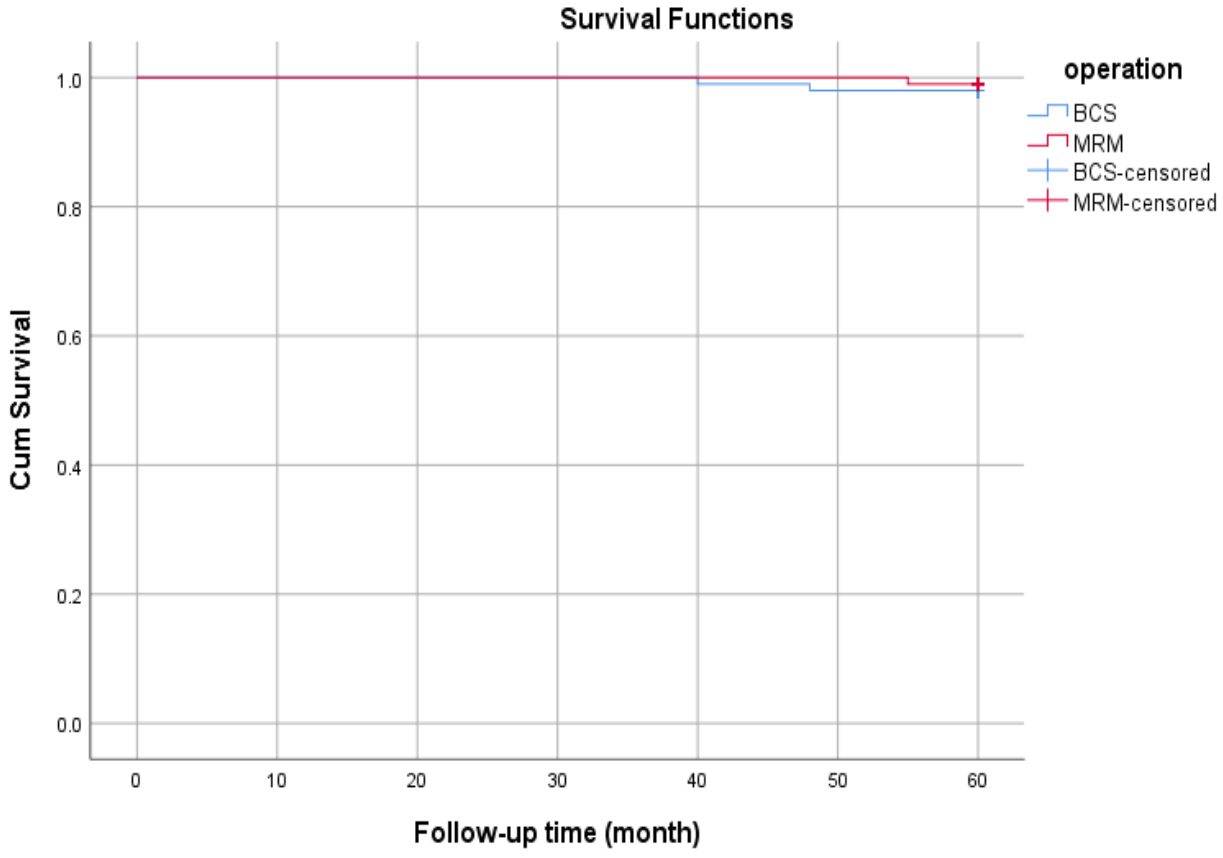


Figure 2. Kaplan-Meier curve of five-year over-all survival (OS) in BCS and MRM group.



DISCUSSION

Breast conserving surgery is preferred for the treatment of breast cancer worldwide nowadays, and have increased by up to 75% of the total surgeries for breast cancer [11]. However, it is less common in lower- and middle-income countries like Nepal. This study was designed to compare the BCS with MRM in terms of operation time, incision length, blood loss, complication rate and oncological outcomes. Age is reported as the significant factor affecting the surgical choice between BCS and MRM in most studies [12].

This study revealed that the patients undergoing BCS were significantly younger than those undergoing MRM, which is similar to the findings of Teh et al., in addition, they reported that patients above 60 years more commonly undergo mastectomy than BCS [12]. It may be due to the younger patient's concern for cosmetic outcomes and radiation hazard [13]. In a low-income country like Nepal, patients often prefer mastectomy due to lack of awareness, presentation at an advanced stage, traditional beliefs, limited access to adjuvant radiotherapy, and fear of disease recurrence [8,14].

Based on histology, the patients in both BCS and MRM groups, predominantly had invasive ductal carcinoma similar to Sreelesh et al. [15]. Only three patients in the MRM group had invasive lobular carcinoma. Most of the patients in both groups were ER and PR positive. Triple negative tumors were present in 4 and 10 patients in the BCS and MRM group, respectively, who were administered neoadjuvant chemotherapy. This study reported a significantly shorter operation time (69.65 vs 115.5 min) and incision length (49.5 vs 108.6 mm) in the BCS group when compared to MRM group with $p < 0.001$. The intraoperative blood loss was also less in the BCS group when compared with the MRM group (37.5 vs 45.6 ml) and it was statistically significant with $p < 0.001$. In this study, the average hospital stay was 3.43 days in the BCS group and 3.7 days in MRM group, but the difference was not statistically significant ($p = 0.058$), which is in contrast to Rizvi FH et al. showing a significantly less hospital stays in BCS group [16]. In a study of 74 patients, Syeda et al. reported the average hospital stay of 9 and 13 days in the BCS and MRM groups respectively [17].

This study reported a significantly lower complication rate in patients undergoing BCS (5%) when compared to MRM (20%), which is consistent with literature indicating reduced surgical morbidity, better postoperative recovery, and fewer complications such as seroma and flap necrosis with BCS [10,18]. This may be due to small incision length and less tissue removal in BCS. The most common complication in both groups was seroma, similar to another study [19].

This study showed no significant differences in the local and distant recurrence rate at 1 and 5 years postoperatively between the BCS and MRM groups which is similar to other studies [20,21]. This study also reported that the 5-year disease-free survival rate in BCS and MRM group was 95% and 97% respectively, which is in contrast to Houshyari et al which reported 87.94% 5-year disease-free survival rate in the BCS group and 80.46% in the MRM group [22]. Similarly, 5-year overall survival in this study in BCS and MRM group was 98% and 99 % respectively, which is similar to 97% and 94% reported by Agarwal et al. [23]. This study reported no significant difference in five-year disease-free and over-all survival between BCS and MRM group which is comparable to Chen et al. [24], but in contrast to Lize Wang et al. which reported disease free survival (DFS) rates of 91.3% and 86.3% ($p < 0.001$) in BCS and MRM group respectively [25].

Being a retrospective study, introduction of selection bias is inevitable. This was a single centered study where only female patients were included this might have affected the generalizability of the study. In addition, patients who had triple negative tumors and received neoadjuvant therapy might have affected the local and distant recurrences and also, radiotherapy given to BCS group might also have affected the local and distance recurrences. Lack of proper resolution of these confounding factors is recognized as another limitation. Furthermore, quality of life score, Breast Q-score and patient-reported outcomes were not assessed that might have quantified the cosmetic outcomes. Future studies should use measures like Breast Q-score and Quality of life score of the patients to assess the cosmetic outcomes and psychosocial wellbeing of the groups and that will give a valuable insight for the surgeons and help them enforce their justification for the choice of surgery.

CONCLUSION

Breast-conserving surgery and modified radical mastectomy are both oncologically effective treatment options for early-stage breast cancer. BCS is associated with shorter operation time, incision length, blood loss, and complications than MRM.

Conflict of interest

None

Acknowledgements

The authors have no acknowledgements.

Data availability

The datasets used or analyzed during this study is available from the figshare repository with the name 'Dataset of BCS vs MRM' and the doi is: https://doi.org/10.6084/m9.figshare.31585714.

Funding

None

REFERENCES

1. McGuire S. World Cancer Report 2014. Geneva, Switzerland: World Health Organization, International Agency for Research on Cancer, WHO Press, 2015. Adv Nutr. 2016 Mar 15;7(2):418-9. doi: 10.3945/an.116.012211.

2. Majeed W, Aslam B, Javed I, Khaliq T, Muhammad F, Ali A, et al. Breast cancer: major risk factors and recent developments in treatment. Asian Pac J Cancer Prev. 2014;15(8):3353-8. doi: 10.7314/apjcp.2014.15.8.3353.

3. Siegel RL, Miller KD, Jemal A. Cancer Statistics, 2017. CA Cancer J Clin. 2017 Jan;67(1):7-30. doi: 10.3322/caac.21387.

4. DeSantis CE, Ma J, Goding Sauer A, Newman LA, Jemal A. Breast cancer statistics, 2017, racial disparity in mortality by state. CA Cancer J Clin. 2017 Nov;67(6):439-448. doi: 10.3322/caac.21412.

5. Clarke M, Collins R, Darby S, Davies C, Elphinstone P, Evans V, et al.; Early Breast Cancer Trialists' Collaborative Group (EBCTCG). Effects of radiotherapy and of differences in the extent of surgery for early breast cancer on local recurrence and 15-year survival: an overview of the randomised trials. Lancet. 2005 Dec 17;366(9503):2087-106. doi: 10.1016/S0140-6736(05)67887-7.

6. Fisher B, Anderson S, Bryant J, Margolese RG, Deutsch M, Fisher ER, et al. Twenty-year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. N Engl J Med. 2002 Oct 17;347(16):1233-41. doi: 10.1056/NEJMoa022152.

7. Litière S, Werutsky G, Fentiman IS, Rutgers E, Christiaens MR, Van Limbergen E, et al. Breast conserving therapy versus mastectomy for stage I-II breast cancer: 20-year follow-up of the EORTC 10801 phase 3 randomised trial. Lancet Oncol. 2012 Apr;13(4):412-9. doi: 10.1016/S1470-2045(12)70042-6.

8. Sajikumar N, Syamsunder S, Pinheiro C. Proportions and reasons for breast conservation surgery and modified radical mastectomy in early breast carcinoma. Int Surg J. 2019;6(7):2405-10.doi:10.18203/2349-2902.isj20192964

9. Benjamin MA, Sinnott C, Bawa S, Kaufman DI, Guarino K, Addona T. Re-excision Rate after Partial Mastectomy in Oncoplastic Breast-Conserving Surgery: A Single-Institutional Experience and Review of the Literature. Ann Plast Surg. 2019 Apr;82(4S Suppl 3):S170-S172. doi: 10.1097/SAP.0000000000001874.

10. Al-Ghazal SK, Fallowfield L, Blamey RW. Comparison of psychological aspects and patient satisfaction following breast conserving surgery, simple mastectomy and breastreconstruction. Eur J Cancer. 2000 Oct;36(15):1938-43. doi: 10.1016/s0959-8049(00)00197-0.

11. Kummerow KL, Du L, Penson DF, Shyr Y, Hooks MA. Nationwide trends in mastectomy for early-stage breast cancer. JAMA Surg. 2015 Jan;150(1):9-16. doi: 10.1001/jamasurg.2014.2895.

12. Teh YC, Shaari NE, Taib NA, Ng CH, See MH, Tan GH, et al. Determinants of choice of surgery in Asian patients with early breast cancer in a middle income country. Asian Pac J Cancer Prev. 2014;15(7):3163-7. doi: 10.7314/apjcp.2014.15.7.3163.

13. Lautner M, Lin H, Shen Y, Parker C, Kuerer H, Shaitelman S, et al. Disparities in the Use of Breast-Conserving Therapy Among Patients With Early-Stage Breast Cancer. JAMA Surg. 2015 Aug;150(8):778-86. doi: 10.1001/jamasurg.2015.1102.

14. Kantor O, Pesce C, Kopkash K, Barrera E, Winchester DJ, Kuchta K, et al. Impact of the Society of Surgical Oncology-American Society for Radiation Oncology Margin Guidelines on Breast-Conserving Surgery and Mastectomy Trends. J Am Coll Surg. 2019 Jul;229(1):104-114. doi: 10.1016/j.jamcollsurg.2019.02.051.

15. L S, Sreelesh & Oommen, Alex. (2016). A comparative study of breast conservative surgery and modified radical mastectomy in early breast cancer. J. Evid. Based Med. Healthc. 2016 Oct; 3. 4760-4765. doi: 10.18410/jebmh/2016/1002.

16. Rizvi FH, Khan MK, Almas T, Ullah M, Shafi A, Murad MF, et al. Early Postoperative Outcomes of Breast Cancer Surgery in a Developing Country. Cureus. 2020 Aug 22;12(8):e9941. doi: 10.7759/cureus.9941.

17. Joty SM, Saiyara N, Shishir MT, Islam F, Rahman Md & Sarker A, et al. Comparative study between breast conservative surgery and modified radical mastectomy in early stage of breast carcinoma in a tertiary care hospital. Int J Res Med Sci. 2023 Mar;11(3):794-800. doi:10.18203/2320-6012.ijrms20230562.

18. Yang X, Lin Q, Wang Q. The impact of breast-conserving surgery and modified radical mastectomy on postoperative wound complications in patients with early breast cancer. Int Wound J. 2024 Feb 7;21(2):e14685. doi: 10.1111/iwj.14685.

19. Kadam SS, Tripathi P, Jagtap R, Kapoor R, Kadam T, Bhandarkar P, et al. Modified Radical Mastectomy vs Breast-Conserving Surgery: Current Clinical Practice in Women with Early Stage Breast Cancer at a Corporate Tertiary Cancer Center in India. Indian J Surg Oncol. 2022 Jun;13(2):322-328. doi: 10.1007/s13193-021-01457-8.

20. Yousefi Kashi AS, Yazdanfar S, Akbari ME, Rakhsha A. Triple negative breast cancer in Iranian women: Clinical profile and survival study. Int J Cancer Manage.2017;10(8). doi: 10.5812/ijcm.10471.

21. Wang L, Ouyang T, Wang T, Xie Y, Fan Z, Lin B, et al. Breast conserving therapy and modified radical mastectomy for primary breast carcinoma: A matched comparative study. Chin J Cancer Res. 2015;27(6):545–52. doi: 10.3978/j.issn.1000-9604.2015.11.02.

22. Houshyari M, Rakhsha A, Khademi M, Kashi ASY. A comparative matched study of breast-conserving therapy and modified radical mastectomy in Iranian women. Int J Can Mng. 2020;13(4). doi:10.5812/ijcm.92798

23. Agarwal S, Pappas L, Neumayer L, Kokeny K, Agarwal J. Effect of breast conservation therapy vs mastectomy on disease-specific survival for early-stage breast cancer. JAMA Surg. 2014 Mar;149(3):267-74. doi: 10.1001/jamasurg.2013.3049.

24. Chen Z, Xu Y, Shu J, Xu N. Breast-conserving surgery versus modified radical mastectomy in treatment of early stage breast cancer: A retrospective study of 107 cases. J Cancer Res Ther. 2015 Aug;11 Suppl 1:C29-31. doi: 10.4103/0973-1482.163835.

25. Wang L, Ouyang T, Wang T, Xie Y, Fan Z, Lin B, et al. Breast conserving therapy and modified radical mastectomy for primary breast carcinoma: A matched comparative study. Chin J Cancer Res. 2015;27(6):545–52. doi: 10.3978/j.issn.1000-9604.2015.11.02.