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Effect of a Structured Decision Aid on Decisional Conflict and Decision Regret in Breast Cancer Surgery: Experience from Pakistan

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ABSTRACT

Objective: The most prevalent cancer among Pakistani women is breast cancer. Even though mastectomy and breast-conserving surgery (BCS) have similar oncologic results in early stages, patient decisions are influenced by socioeconomic status, family involvement, knowledge of health issues, and radiotherapy availability. Decisional conflict and regret are caused by systematic impediments and inadequate consulting time in public-sector hospitals. Although available data indicates that decision aids increase patient participation and satisfaction with the treatment plan, little is known about their utility in low- and middle-income countries (LMICs).

Methods: From April to October 2025, a prospective cohort research was conducted at Mayo Hospital Lahore. A total of 126 women (63 in each group) with stage I–II breast cancer who qualified for either BCS or mastectomy were recruited. Counseling combined with a structured decision aid was compared to regular counseling. The Decisional Conflict Scale (DCS) was used to measure outcomes prior to surgery, and the Decision Regret Scale (DRS) was used six weeks and six months after surgery.

Results: Patients who received the decision assistance exhibited better understanding of available treatments, increased involvement in the decision-making, and lower DCS scores, indicating lesser uncertainty. Additionally, less remorse at both follow-up intervals was reported through lower DRS ratings.

Conclusion: This study demonstrates the efficacy of low-cost decision aids in LMICs such as Pakistan. Decision aids reduce decisional conflict and regret in breast cancer surgery by overcoming challenges such low literacy, limited consultation time, and family dominance by simplifying complex knowledge and by clarifying patient values

Keywords: Decision making, Decision aids, Patient Participation, Patient Satisfaction.

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[1,2]Conception; Literature research; manuscript design and drafting; [3,4]Critical analysis and manuscript review; [5]Data analysis; Manuscript Editing.

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Introduction

Nearly 98,000 new cases of breast cancer are reported annually in Pakistan, making it the most common cancer among women with a significant mortality rate.[1] Due to limited consultation time, complex referral pathways, and restricted radiotherapy access, shared decision-making (SDM) is particularly difficult in LMIC settings. These necessitate the development of standardized tools to facilitate patient decisions.[2] The majority of the care is provided in tertiary centers, which increases travel, expense, and access restrictions for a large number of patients.[1,3] The necessity of efficient,

reproducible counselling interventions is underscored by the high patient volumes at major centres, as confirmed by national and institutional registries.[4]

"Decisional conflict" is defined as the uncertainty in choosing options, influenced by inadequate knowledge, unclear values, or lack of support. It can be measured using the Decisional Conflict Scale (DCS), where higher scores indicate greater conflict before surgery. The term "Decisional regret" refers to remorse or dissatisfaction with a treatment choice after surgery, often linked to external pressures, complications, or unmet expectations, assessed using the Decision Regret Scale (DRS) at two different intervals postoperatively. Calderon et al. validated the DRS in cancer patients, showing that regret is a measurable construct reflecting post-treatment dissatisfaction.[5]

According to recent evidence, decision aids significantly boost decision-making, when short, organized aids are added to routine counselling, randomized and prospective trials in operable breast cancer patients reveal lower decisional conflict scores and less decision regret.[1,6] These tools tackle the flexible factors of decisional uncertainty by clearly presenting options, highlighting alternatives, and encouraging clarity of patient values.[5] Follow-up studies utilizing the Decision Regret Scale (DRS) show that patients who used decision aids had sustained reductions in regret weeks to months following surgery compared to patients who did not.[5]

Three useful modifications have a greater impact for Pakistan: (1) one-page option grids in Urdu and regional languages that correspond with basic literacy; (2) family-inclusive values checklists that recognize collective decision-making; and (3) linking to specialized services that deal with radiotherapy travel and expenses. Low-cost implementation strategies include incorporation into preoperative clinics, staff training, and printable tools. Tailoring time and format to local practices enhances the utilization of SDM.[7] Among the risks and limitations are clinical time constraints and a requirement to validate translated information. Pilot audits, brief physician workshops, and regular DCS/DRS outcome measurement should be considered to reduce these. This study's results can be used to support policy making by incorporating decision aids into national cancer centre protocols, standardizing counselling practice throughout Pakistan.[2,4] In addition to encouraging other centres to carry out additional research, and iterating depending on patient and family input, this study may help in the development of a standardized one-page Urdu option grid. These actions, which are achievable within Pakistan's health-sector limitations, will contribute to the local data and assist in getting our methods in accordance with international evidence.[5,6,8]

Methodology

This was a prospective quasi-experimental study, conducted between April 2025 and October 2025 at the breast clinic of Mayo Hospital Lahore, a public tertiary care center in Pakistan with high patient influx. A total of 126 patients were enrolled in the study, with 63 patients per group (control vs intervention). Patients were recruited using consecutive sampling, enrolling all eligible women presenting to the breast clinic during the study period (April–October 2025). This ensured representativeness of the high-volume public-sector setting and minimized selection bias. The inclusion criteria were:

1. Women aged 18–70 years with histologically diagnosed early breast cancer (Stage I–II), suitable for either breast-conservation (BCS) or mastectomy.
2. All women with the mental capacity to give informed consent for their treatment.

Women with following criteria were excluded from the study:

1. Previous breast surgery for malignancy
2. Locally advanced breast cancer (Stage 3)
3. Metastatic disease (Stage 4)

4. Inability to provide informed consent, or cognitive impairment.

Sample size was calculated using the formula given below to achieve statistical power of 0.80 with a two-sided significance level of $\alpha = 0.05$.[8]

$$\mathbf{n = 2(Z_{\alpha/2}+Z_{\beta})^2 x \sigma^2 / \Delta^2}$$

Where:

n = sample size of each group

$Z_{\alpha/2}$ = desired significance level, for confidence interval of 95% ($\alpha = 0.05$), the value is 1.96

Z_{β} =desired statistical power, for 80% power, the value is 0.84

σ = standard deviation of the outcome

Δ = expected mean difference between groups wished to be detected

The control group underwent routine surgical counselling by the surgeon, whereas the intervention group was offered routine counselling plus a structured decision aid, consisting of:

a. **a one-page option grid** comparing breast-conserving surgery (BCS) and mastectomy on oncologic equivalence, need for radiotherapy, recovery period, and cosmetic outcome.
b. **a values-clarification checklist** that prompts patients to rate the importance of body image concerns, treatment burden, family input in decision-making, and travel for radiotherapy. The patients were then assessed using the following two scales:

a. **Decisional Conflict Scale (DCS):** A validated instrument with 16 items. This was utilized before the operation. Each item is rated on a 5-point Likert scale (Strongly agree → Strongly disagree). Items are reverse-coded where appropriate. Scores are averaged and transformed to a 0–100 scale, greater scores indicate more decision conflict.
b. **Decision Regret Scale (DRS):** A validated 5-item instrument. This was utilized after the operation at 6 weeks and 6 months. Each item is rated on a 5-point Likert scale (Strongly agree → Strongly disagree). Positive items (e.g., "The decision was right") are reverse-coded. Scores are summed and transformed to a 0–100 scale. The scores range from 0 to 100; higher scores show more regret.

All statistical analyses were conducted using the most recent version of SPSS (version 31). Continuous data are expressed as mean ± standard deviation. Differences in means between groups were analyzed using independent samples t-tests for between-group comparisons and paired t-tests for within-group changes. The relationship between conflict/regret and clinical factors was analyzed using multivariate linear regression analysis. Statistical significance is set at a $p < 0.05$.

Ethical approval was taken from King Edward Medical University (No. 112/RC/KEMU) dated. 09-02-2026. (At the time of study initiation, the investigators considered the project to be a minimal-risk observational study involving interviews and questionnaire-based data collection without any deviation from standard clinical care. Consequently, prior ethical review was not sought. During manuscript preparation, it was recognized that publication of human-subject research generally requires formal ethical oversight. Therefore, the study was subsequently submitted to the Institutional Ethical Review Committee, which reviewed the study procedures and issued an ethical review/approval certificate. Written informed consent had been obtained from all participants, and patient confidentiality was maintained throughout the study).

Results

Baseline characteristics: The mean age of study population was 49.2 ± 8.7 years (control) vs. 48.7 ± 9.1 years (intervention), with a p-value of 0.72. When literacy rates of participants were compared, more than two-thirds of patients had literacy level up to secondary, with 42.1 % of patients falling into the low literacy group (below primary level). The distribution was balanced across groups, ensuring comparability. This is further elaborated in table 1.

Decisional Conflict (DCS): Decisional conflict was much lower in the intervention group (Control 41.3 ± 12.5 vs. Intervention 28.7 ± 10.2), suggesting more confident and clear choices. The mean difference was statistically significant. Decision aids helped patients feel more confident about their surgical choice by reducing uncertainty. As a result of greater understanding, patients in the intervention group felt better educated. The DCS aid improved decision-patient values' coordination. Patients who had access to decision aid tools stated feeling more at ease when making decisions than the control group. All of these are statistically shown in table 2.

Decision Regret (DRS): Regret was considerably lower in the intervention group six weeks after surgery, indicating overall satisfaction with decisions. When these patients were reassessed six months later, the intervention group showed lesser regret. These results are presented in further detail in Table 3. When the different variables of higher conflict/regret were evaluated using the multivariate regression method, the data demonstrated that postoperative complications increased conflict and regret. Similarly, increased regret was observed in patients requiring re-excision, highlighting the challenge of additional operations. Family-controlled decision-making reduces patient autonomy and results in an elevated regret score due to external pressure from family. Higher regret was also observed due to unanticipated radiotherapy burden and radiation appointment delays. Table 4 demonstrates these results.

With effect sizes in the moderate to high range (Cohen's d = 0.6–0.8), the structured decision aid resulted in a clinically significant decrease in both decisional conflict and regret. The highest improvements were observed in the informed subscales, indicating that simplified, values-based counseling techniques may enable patients even in resource-limited, family-centered situations like Pakistan.

Table I. Patient Literacy Level Distribution Across Study Groups

Literacy Level	Control Group (n=63)	Intervention Group (n=63)	Total (n=126)	Percentage
Below Primary (low literacy)	29	24	53	42.1
Primary to Secondary	19	22	41	32.5
Above Secondary	15	17	32	25.4

Table II: Decisional Conflict Scale Outcomes

Outcome	Control (Mean ± SD)	Intervention (Mean ± SD)	Mean Difference (95% CI)	p-value
Overall score (preoperative)	41.3 ± 12.5	28.7 ± 10.2	–12.6 (–16.2 to –9.0)	< 0.001
Uncertainty subscale	45.8 ± 11.9	30.5 ± 9.8	–15.3 (–20.1 to –10.5)	< 0.001
Informed subscale	39.1 ± 10.7	25.2 ± 8.9	–13.9 (–18.4 to –9.4)	< 0.001
Values clarity subscale	40.6 ± 12.1	27.8 ± 9.7	–12.8 (–20.7 to –4.9)	0.002
Support subscale	33.9 ± 10.4	22.4 ± 8.6	–11.5 (–19.2 to –3.8)	0.004

*Values are mean ± SD. Mean differences with 95% confidence intervals calculated using independent samples t-tests.

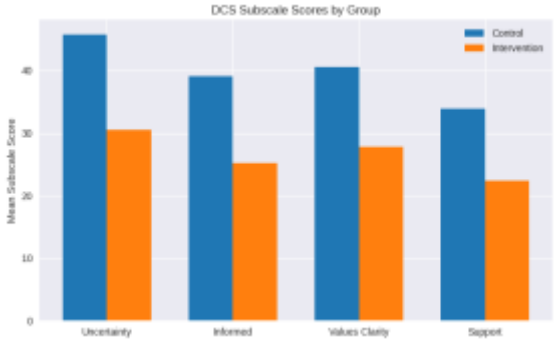

Figure 1: Demonstrates decisional conflict scores by various subscales

Table III: Decision Regret Outcomes			
Outcome	**Control (Mean ± SD)**	**Intervention (Mean ± SD)**	**Mean Difference (95% CI)**
6 weeks postoperative	32.1 ± 14.8	21.4 ± 11.2	–10.7 (–14.5 to –6.9)
6 months postoperative	29.7 ± 13.9	18.9 ± 10.5	–10.8 (–14.3 to –7.3)

*Values are mean ± SD. Mean differences with 95% confidence intervals calculated using independent samples t-tests.

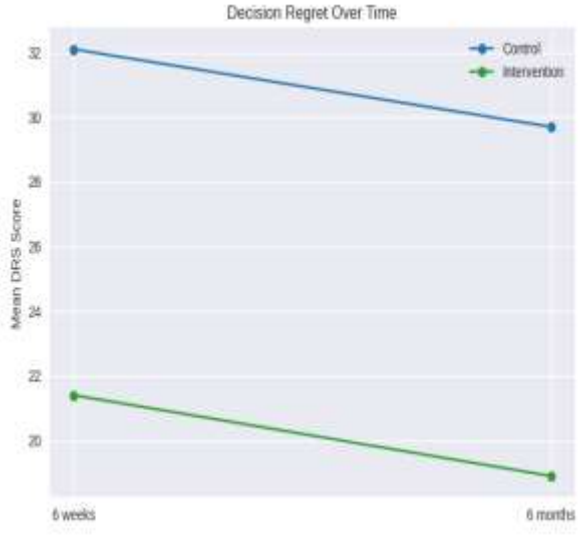

Figure 2: Decision Regret Scores at 6 Weeks and 6 Months

Table 4. Depicting Predictors of Higher Decisional Conflict and Regret		
Predictor	**β Coefficient**	**p-value**
Postoperative complications	+7.4	0.01
Need for re-excision	+9.1	0.002
Family-dominated decision-making	+6.8	0.03
Unexpected radiotherapy burden	+8.5	0.01

*β coefficients indicate increase in DCS/DRS scores in association with each predictor.

Discussion

In line with results from randomized trials in breast cancer surgery that demonstrated significant decreases in decisional conflict and regret when structured aids were employed, this study also shows that low-cost decision aids are practical and effective in LMIC settings, such as Pakistan's public-sector institutions.8–10 Decision aids successfully tackle constraints including low literacy, limited consultation time, and family involvement, which are well-documented issues in LMIC (low-to-medium income countries), by simplifying difficult information and promoting values clarification for the patients.[11,12]

Recent global analyses confirm that inequities in breast cancer outcomes remain stark. These comparative analyses confirm that breast cancer incidence rates are higher in developed countries (54.1 per 100,000) but mortality is disproportionately elevated in developing countries (15.3 vs. 11.3 per 100,000), reflecting systemic inequities in access to care.13 In high-income countries(HICs), structured SDM(shared decision-making) tools are embedded into multidisciplinary care pathways, contributing to higher patient satisfaction, lesser postoperative regret and declining mortality rates. In contrast, LMICs face younger age at diagnosis and advanced disease stages, with limited access to targeted therapies, mainly because of poorly structured care pathways, leading to higher regret among patients, underscoring the need for culturally adapted decision aids.[14]

The work of Iqbal et al. on women-centric breast cancer care shows that LMICs account for 62% of global breast cancer deaths, largely due to fragmented survivorship care and underfunded prevention efforts. Fewer than 10% of women in LMICs have access to regular screening and preventive care, leading to late-stage diagnoses and higher decisional uncertainty. In contrast, HICs integrate holistic support patient centered

management, mental health, rehabilitation, and fertility preservation into routine care, reducing long-term regret. Thus, while decision aids in HICs refine patient autonomy within already structured systems, in LMICs they serve as critical tools to overcome systemic barriers and empower patients in resource-limited settings.[15]

Global oncology initiatives emphasize that harmonizing cancer care standards is essential. The American Society of Clinical Oncology (ASCO) highlights that while HICs have advanced frameworks for survivorship and psychosocial support, LMICs often lack even basic palliative services, leaving patients vulnerable to regret and decisional conflict.[16] This underscores the importance of culturally adaptive, low-cost decision aids that address literacy barriers, family involvement, and financial toxicity in LMICs.

Our findings are consistent with previous data from Asia, where ambiguity and a lack of support were highly linked to decisional conflict among cancer patients receiving innovative treatments like immunotherapy.17 Likewise, data from Pakistan emphasizes the need for customized decision aid tools for breast cancer patients to improve patient satisfaction.[3,4,18,19]

The significance of local adaptation of shared decision-making tools, such as translation, cultural customization, and incorporation into regular procedures, is emphasized by LMIC-focused assessments.11, 12 Urdu and local language option grids, which provide awareness for patients with low literacy, as well as family-centered values checklists, that embrace the concept of collective decision-making in South Asian cultures, are examples of useful adaptations for Pakistan. Similarly, connecting counseling to radiotherapy guidance services is especially important in light of Pakistan's limited radiotherapy infrastructure and significant patient travel burden.[4,18]

Major strengths of the study are that the results imply that organized decision aids can be expanded throughout Pakistan's tertiary hospitals in order to improve patient autonomy, standardize counseling, and lessen decisional conflict and help in health policy making. Being a single center study with a small sample size and a relatively short follow-up period are the limitations of present study.

Conclusion

The systematic decision aid substantially minimized decisional conflict prior to surgery and decision regret following surgery. Due to its impact and simplicity of the aid, it is advised to use decision aids into routine breast cancer counseling in order to enhance patient outcomes and to improve shared decision-making in settings with limited resources.

Recommendations: Future studies could investigate implementation techniques, such as training clinicians, integrating them into electronic health records, and assessing long-term results like quality of life.

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References

1. Ferlay J, Ervik M, Lam F, Laversanne M, Colombet M, Mery L, et al. Global Cancer Observatory: Cancer Today [Internet]. Lyon, France: International Agency for Research on Cancer; 2024. Available from: https://gco.iarc.who.int/today
2. Bajwa MH, Shah M, Mustansir F, Gauhar F, Baig E, Zafar S, et al. A guideline on guidelines: neuro-oncology guideline standards for low- and middle-income countries. J Pak Med Assoc. 2024;74:S87-S92. https://doi.org/10.47391/JPMA.S3.GNO-10
3. Siddiqui R, Mehmood MH, Khan NA. An overview of breast cancer in Pakistan. Discov Med. 2024;1:82. https://doi.org/10.1007/s44337-024-00089-5
4. Shaukat Khanum Memorial Cancer Hospital and Research Centre. Cancer statistics [Internet]. Lahore (PK): Shaukat Khanum Memorial Cancer Hospital and Research Centre; [cited 2026 Jun 23].
5. Calderon C, Ferrando PJ, Lorenzo-Seva U, Higuera O, y Cajal TR, Rogado J, et al. Validity and reliability of the decision regret scale in cancer patients receiving adjuvant chemotherapy. J Pain Symptom Manage. 2019;57(4):828-34. https://doi.org/10.1016/j.jpainsymman.2018.12.331

6. Hild S, Teigné D, Ferrat E, Banaszuk AS, Berquet K, Lebon A, et al. Breast cancer: a randomized controlled trial assessing the effect of a decision aid on mammography screening uptake: study protocol. Front Oncol. 2023;13:1128467. https://doi.org/10.3389/fonc.2023.1128467
7. Wehking F, Debrouwere M, Danner M, Gieger F, Buenzen C, Lewejohann JC et al. Impact of shared decision making on healthcare in recent literature: a scoping review using a novel taxonomy. J Public Health (Berl). 2024;32:2255-2266. https://doi.org/10.1007/s10389-023-01962-w
8. Joshi S, Ramarajan L, Ramarajan N, Lee SS, Deshpande O, Fernandes E, et al. Effectiveness of a Decision Aid Plus Standard Care in Surgical Management Among Patients with Early Breast Cancer: A Randomized Clinical Trial. JAMA Netw Open. 2023 Oct 2;6(10):e2335941.. https://doi.org/10.1001/jamanetworkopen.2023.35941
9. Wang Y, Zhang Q, Cheng C, Wang X, Yin J, Qiang W. Effects of a web-based decision aid on breast cancer patients considering breast reconstruction: randomized controlled trial. BMC Womens Health. 2025; 25:217. https://doi.org/10.1186/s12905-025-03680-1
10. Jansen BAM, Henskens IJ, Bargon CA, Teunis T, Braakenburg A, Young-Afat DA, et al. Effectiveness of a patient decision aid for women considering post-mastectomy breast reconstruction: randomized controlled trial. Br J Surg. 2025 Aug 1;112(8):znaf151. https://doi.org/10.1093/bjs/znaf151
11. Aivalli P, Dada S, Gilmore B, Srinivas PN, De Brún A. Power dynamics and intersectoral collaboration for health in low- and middle-income countries: a realist review. Health Policy Plan. 2025 Jun 12;40(6):661-683. https://doi.org/10.1093/heapol/czaf022
12. Ingenhoff R, Sarker M, Hanson K, Rashid SF. Advancing equity in global health research partnerships. BMJ Glob Health. 2025;10(6):e019601. https://doi.org/10.1136/bmjgh-2025-019601
13. Martin Quesada A. Current status of breast cancer: a comparative analysis between developed and developing countries. Ann Oncol. 2024;35(Suppl):S957. https://doi.org/10.1016/j.annonc.2024.05.1596
14. Chotai N, Renganathan R, Uematsu T, Wang J, Zhu Q, Rahmat K, et al. Breast Cancer Screening in Asian Countries: Epidemiology, Screening Practices, Outcomes, Challenges, and Future Directions. Korean J Radiol. 2025 Aug;26(8):743-758. https://doi.org/10.3348/kjr.2025.0338
15. Iqbal J. Women-centric breast cancer care in low- and middle-income countries: challenges, solutions, and a roadmap for equity. Cancer Control. 2025;32:10732748251378804. https://doi.org/10.1177/10732748251378804
16. Wiernik A, Rogado A, O'Mahony D, Abdul Razak AR. Elevating cancer care standards worldwide: an analysis of global initiatives and progress. JCO Glob Oncol. 2024;10:e2400199. https://doi.org/10.1200/GO.24.00199
17. Lee YH, Chou XY, Lai YH, Liang YH, Hung CT, Hsaio CC, et al. Decisional conflict and its determinants among patients with cancer undergoing immunotherapy combined with chemotherapy or targeted therapy: a cross-sectional study. Sci Rep. 2023;13:12715. https://doi.org/10.1038/s41598-023-39280-6
18. International Agency for Research on Cancer (IARC). Globocan Pakistan Fact Sheet. Lyon, France: WHO; 2022. Available from: https://gco.iarc.fr/today/data/factsheets/populations/586-pakistan-fact-sheets.pdf
19. Si J, Guo R, Lu X, Han C, Xue L, Xing D. et al. Decision aids on breast conserving surgery for early-stage breast cancer patients: a systematic review. BMC Med Inform Decis Mak. 2020; 20:275. https://doi.org/10.1186/s12911-020-01295-8