JHWCR JOURNAL OF HEALTH, WELLNESS AND COMMUNITY RESEARCH 3007-0570

https://doi.org/10.61919/zrc3yx54

Original Article

Comparative Assessment of Quality of Life in Urban Versus Rural Breast Cancer Survivors in Pakistan

Bushra Kamal[1], Rana Dawood Naseer[2], Rafia Imtiaz[3], Iqra Ray[1], Arslan Khan Barozai[1]

[1] Department of Epidemiology and Public Health, Faculty of Health and Pharmaceutical Science, University of Agriculture, Faisalabad, Pakistan
[2] Department of Pharmacy, Faculty of Health and Pharmaceutical Science, University of Agriculture, Faisalabad, Pakistan
[3] College of Physical Therapy, Government College University, Faisalabad, Pakistan

***Corresponding author: Bushra Kamal, bushiraja22@gmail.com**

"Cite this Article" **Received**: 23 January 2026; **Accepted**: 14 June 2026; **Published**: 01 July 2026
Author Contributions: Concept: BK, RDN; Design: BK, RI; Data Collection: BK, IR, AKB; Analysis: BK, RDN; Drafting: BK, RI, IR, AKB.. **Ethical Approval**: University of Agriculture, Faisalabad, Pakistan. **Informed Consent**: Written informed consent was obtained from all participants; **Conflict of Interest**: The authors declare no conflict of interest. **Funding**: No external funding; **Data Availability**: Available from the corresponding author on reasonable request; **Acknowledgments**: N/A.

ABSTRACT

Background: Breast cancer survival has improved, but long-term quality of life remains an important survivorship concern, particularly in settings where rural and urban populations experience unequal access to oncology follow-up, rehabilitation, and psychosocial support. Objective: This study aimed to compare breast-cancer-specific quality-of-life domains between rural and urban breast cancer survivors in Faisalabad, Pakistan. Methods: A descriptive analytical cross-sectional study was conducted among 309 breast cancer survivors attending the outpatient departments of Allied Hospital and Punjab Institute of Nuclear Medicine Hospital, Faisalabad. Participants were selected using purposive sampling. Quality of life was assessed using the EORTC QLQ-BR42 questionnaire. Descriptive statistics summarized participant characteristics and domain scores, while independent-sample t-tests compared rural and urban survivors. Statistical significance was set at $p < 0.05$. Results: The mean age of participants was 44.19 ± 11.28 years. Of 309 survivors, 165 (53.4%) were from rural areas and 144 (46.6%) from urban areas. Urban survivors had significantly higher scores for sexual functioning ($p = 0.040$), sexual enjoyment ($p = 0.028$), and future perspective ($p = 0.010$), while rural survivors had significantly higher systemic therapy side effects, breast symptoms, arm symptoms, hair-loss distress, targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and extended BR42 composite scores. Body image did not differ significantly between groups ($p = 0.865$). Conclusion: Rural breast cancer survivors experienced greater symptom burden, whereas urban survivors reported better selected functional and psychosocial domains. These findings support decentralized survivorship care, rural rehabilitation services, symptom-management pathways, and culturally sensitive psychosocial support in Pakistan. Keywords: Breast cancer survivors; quality of life; EORTC QLQ-BR42; rural-urban disparity; Pakistan; survivorship.

INTRODUCTION

Breast cancer remains one of the most common malignancies affecting women worldwide and represents a major public health concern in Pakistan, where delayed diagnosis, limited oncology infrastructure, financial constraints, and sociocultural barriers continue to influence both treatment access and survivorship outcomes. Although advances in surgery, chemotherapy, radiotherapy, endocrine therapy, and targeted treatment have improved survival, the growing population of breast cancer survivors faces persistent physical, psychological, sexual, social, and functional consequences that extend beyond completion of active treatment. These survivorship-related problems include fatigue, arm morbidity, lymphedema, pain, systemic treatment-related symptoms, hair-loss distress, body image concerns, sexual dysfunction, anxiety about recurrence, and reduced confidence about the future. Therefore, survival alone is no longer an adequate outcome for breast cancer care; health-related quality of life has become an essential survivorship endpoint because it captures how patients experience disease, treatment, recovery, and reintegration into family and community life (1).

In low- and middle-income settings, quality-of-life outcomes among breast cancer survivors are shaped not only by clinical factors but also by social position, health-service access, geographic residence, and continuity of follow-up care. Pakistani women with breast cancer often encounter late presentation, high out-of-pocket expenditure, stigma, fear, and limited rehabilitation or psychosocial support, all of which may adversely affect long-term wellbeing after diagnosis and treatment (2,3). These challenges may be more pronounced among rural survivors because tertiary oncology services, diagnostic facilities, specialist follow-up, rehabilitation clinics, and psycho-oncology resources are concentrated mainly in urban centers. Rural women may also face additional barriers such as longer travel distance, transport costs, limited health literacy, dependence on family decision-making, delayed recognition of treatment complications, and reduced access to structured survivorship counseling. Consequently, place of residence may influence not only treatment access but also post-treatment symptom burden, functional recovery, sexual wellbeing, and future outlook.

The quality-of-life burden among breast cancer survivors is multidimensional. International survivorship literature has shown that breast cancer and its treatments may affect physical functioning, emotional wellbeing, body image, sexual health, arm function, fatigue, and treatment-related symptoms long after active therapy has ended (4,5). In South Asian contexts, these problems may be intensified by cultural silence around sexuality, marital concerns, stigma attached to cancer, and limited open discussion of body image and psychosocial distress (6). Evidence from rural–urban comparative studies in other countries also suggests that geographic disparities may contribute to differences in survivorship experiences, although the magnitude and direction of these differences vary according to health-system organization, access to rehabilitation, social support, and survivorship-care infrastructure (7,8). These findings support the need for context-specific evidence from Pakistan, where rural and urban populations often experience markedly different pathways to diagnosis, treatment, follow-up, and supportive care.

Despite the clinical relevance of survivorship outcomes, comparative evidence on rural–urban differences in breast cancer survivor quality of life in Pakistan remains limited. Existing local literature has largely focused on disease burden, delayed presentation, clinical management, mortality, or general psychosocial distress, while fewer studies have examined domain-specific quality-of-life outcomes using a breast-cancer-specific instrument among survivors from both rural and urban backgrounds. This evidence gap is important because global or urban tertiary-care findings may not adequately represent the symptom burden and functional challenges experienced by rural survivors. Understanding these differences can help guide survivorship-care planning, rehabilitation services, telehealth follow-up, community-based counseling, and targeted symptom-management interventions.

Therefore, this study aimed to compare health-related quality-of-life domains between rural and urban breast cancer survivors attending tertiary-care oncology services in Faisalabad, Pakistan, using the EORTC QLQ-BR42 questionnaire. The study specifically assessed whether functional domains, including body image, sexual functioning, sexual enjoyment, and future perspective, and symptom domains, including systemic therapy side effects, breast symptoms, arm symptoms, hair-loss distress, targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and the extended BR42 composite, differed according to place of residence. The study was based on the hypothesis that rural breast cancer survivors would report greater symptom burden and poorer functional quality-of-life outcomes than urban survivors.

MATERIALS AND METHODS

A descriptive analytical cross-sectional study was conducted among breast cancer survivors attending the outpatient departments of Allied Hospital and the Punjab Institute of Nuclear Medicine Hospital, Faisalabad, Punjab, Pakistan. These tertiary-care facilities receive patients from Faisalabad city as well as surrounding rural areas, making them suitable settings for examining rural–urban differences in survivorship-related quality-of-life outcomes. The study population comprised women with a confirmed diagnosis of breast cancer who had received treatment for at least one year, including those receiving ongoing or palliative care. Eligible participants were women aged 18 years or older who were able to provide informed consent and respond to the study questionnaire. Women were excluded if they had cognitive or speech impairment that prevented valid questionnaire completion, had no previous treatment history, or had a previous clinical diagnosis of depression, because these factors could substantially affect self-reported quality-of-life assessment.

Participants were selected using a purposive sampling technique from the outpatient clinical flow of the two participating hospitals. Eligible survivors were approached after confirmation of eligibility, informed about the study objectives and voluntary nature of participation, and enrolled after written informed consent. A total of 390 questionnaires were distributed, and 309 completed questionnaires were included in the final analysis. The final analytical sample consisted of 165 rural survivors and 144 urban survivors. Place of residence was categorized as rural or urban according to the participant's reported residential background. Sociodemographic variables included age, marital status, socioeconomic status, and place of residence. The main outcome variables were breast-cancer-specific quality-of-life domain scores measured using the EORTC QLQ-BR42 questionnaire.

Data were collected using a standardized, pre-structured questionnaire consisting of a demographic section and the EORTC QLQ-BR42 instrument. The demographic section recorded age, marital status, socioeconomic status, and residence. The EORTC QLQ-BR42 was used to assess functional and symptom-related quality-of-life domains among breast cancer survivors. Functional domains included body image, sexual functioning, sexual enjoyment, and future perspective. Symptom domains included systemic therapy side effects, breast symptoms, arm symptoms, and distress related to hair loss. Extended domains included targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and the extended BR42 composite. Items were scored on a four-point Likert scale ranging from "not at all" to "very much." Higher functional-scale scores indicated better functioning, whereas higher symptom-scale scores indicated greater symptom burden. Questionnaires were administered in Urdu with assistance from trained research assistants, and participants who were unable to read independently were interviewed using structured verbal administration to reduce response loss while maintaining consistency in item delivery.

Several steps were taken to reduce information bias and improve data quality. The same questionnaire structure was used for all participants, and trained research assistants provided standardized assistance during administration. Participants were informed that their responses would remain confidential to reduce social desirability bias, particularly for sensitive domains such as sexual functioning, sexual enjoyment, body image, and distress. Completed questionnaires were checked for completeness before data entry. Data were coded and entered into IBM SPSS Statistics, and the dataset was reviewed for missing or inconsistent entries before analysis. Missing responses were handled by available-case analysis for the relevant domain, which explains minor variation in denominator across selected quality-of-life domains.

The sample size was based on the number of eligible and analyzable responses obtained during the study period from the two participating hospitals. Descriptive statistics were used to summarize participant characteristics and quality-of-life scores. Continuous variables were presented as mean and standard deviation, while categorical variables were presented as frequency and percentage. Independent-sample t-tests were used to compare mean quality-of-life domain scores between rural and urban survivors. Levene's test was used to assess equality of variances before selecting the appropriate t-test output. Chi-square analysis was used for associations between categorical variables where applicable. Statistical significance was set at $p < 0.05$. Because multiple quality-of-life domains were compared, the findings were interpreted with attention to the exploratory nature of domain-wise comparisons. The primary comparison variable was place of residence, and the primary outcomes were functional, symptom, and extended EORTC QLQ-BR42 domain scores.

Ethical approval was obtained from the Faculty of Health and Pharmaceutical Sciences, University of Agriculture, Faisalabad, and permission was taken from the administrations of the participating hospitals. All participants provided written informed consent after receiving information about the study purpose, voluntary participation, confidentiality, and anonymized use of data for research. Participant identities were not included in the analytical dataset, and all collected information was handled confidentially according to institutional data-management procedures.

RESULTS

A total of 390 questionnaires were distributed, of which 309 were complete and suitable for final analysis, giving an analyzable response proportion of 79.2%. The mean age of participants was 44.19 ± 11.28 years. Most participants were married, and the largest socioeconomic category was medium socioeconomic status. Rural survivors represented 53.4% of the sample, while urban survivors represented 46.6%.

Table 1. Sociodemographic Characteristics of Breast Cancer Survivors Included in the Analysis

Variable	Category	n	%
Age, years	Mean ± SD	44.19	11.28
Marital status	Single	9	2.9
Marital status	Married	253	81.9
Marital status	Divorced	38	12.3
Marital status	Widowed	9	2.9
Socioeconomic status	High	42	13.6
Socioeconomic status	Medium	198	64.1
Socioeconomic status	Low	69	22.3
Residence	Rural	165	53.4
Residence	Urban	144	46.6

SD, standard deviation.

The study population was predominantly married, with 253 participants representing 81.9% of the sample. Medium socioeconomic status was the most frequent category, reported by 198 participants, corresponding to 64.1%. Rural survivors formed the larger residence group, with 165 participants compared with 144 urban survivors.

Mean scores across the EORTC QLQ-BR42 functional domains were in the mid-range. Functional scale scores ranged from 52.92 ± 13.95 for sexual enjoyment to 53.74 ± 13.78 for future perspective. Body image and sexual functioning showed similar mean values, with scores of 53.23 ± 13.89 and 53.41 ± 14.21, respectively.

Table 2. EORTC QLQ-BR42 Functional Scale Scores

Domain	N	Mean	SD
Body image	309	53.23	13.89
Sexual functioning	309	53.41	14.21
Sexual enjoyment	308	52.92	13.95
Future perspective	309	53.74	13.78

SD, standard deviation.

Functional scores were clustered within a narrow range, suggesting broadly comparable mid-range functioning across body image, sexual functioning, sexual enjoyment, and future perspective. Sexual enjoyment had one missing domain-level response, with 308 participants contributing to that score.

Symptom scale scores were also in the mid-range. The lowest mean symptom score was observed for breast symptoms at 53.52 ± 13.78, while the highest was observed for distress related to hair loss at 54.47

± 14.09. Arm symptoms had a mean score of 54.30 ± 14.35, and systemic therapy side effects had a mean score of 53.83 ± 14.01.

Table 3. EORTC QLQ-BR42 Symptom Scale Scores

Domain	N	Mean	SD
Systemic therapy side effects	309	53.83	14.01
Breast symptoms	309	53.52	13.78
Arm symptoms	309	54.30	14.35
Upset by hair loss	309	54.47	14.09

SD, standard deviation.

Among the symptom scales, distress related to hair loss and arm symptoms showed the highest mean scores. Because higher symptom-scale scores indicate greater symptom burden, these domains represented the relatively more affected symptom areas in the overall sample.

Extended EORTC QLQ-BR42 domain scores ranged from 53.45 ± 14.16 for endocrine therapy symptoms to 54.17 ± 13.88 for targeted therapy symptoms. The extended BR42 composite was calculated for 308 participants and showed a mean score of 53.82 ± 14.15.

Table 4. EORTC QLQ-BR42 Extended Domain Scores

Domain	N	Mean	SD
Targeted therapy symptoms	309	54.17	13.88
Endocrine therapy symptoms	309	53.45	14.16
Mucosal symptoms	309	53.87	13.85
Extended BR42 composite	308	53.82	14.15

SD, standard deviation.

The extended domains showed similar mid-range values across targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and the extended composite. One participant had incomplete data for the extended BR42 composite, resulting in an analyzable denominator of 308 for that variable.

Independent-sample t-tests were used to compare functional quality-of-life domain scores between rural and urban breast cancer survivors. No significant rural–urban difference was observed for body image. Urban survivors had higher scores than rural survivors for sexual functioning, sexual enjoyment, and future perspective, as indicated by negative mean differences for rural minus urban comparisons.

Table 5. Rural–Urban Comparison of Functional Scale Domains

Domain	t	df	Mean Difference	95% CI	p-value
Body image	-0.17	307	-0.25	-3.19, 2.68	0.865
Sexual functioning	-2.07	307	-2.96	-5.79, -0.14	0.040
Sexual enjoyment	-2.20	307	-3.32	-6.28, -0.36	0.028
Future perspective	-2.60	307	-3.72	-6.54, -0.90	0.010

CI, confidence interval. Mean difference represents rural minus urban score. Independent-sample t-test.

Body image scores did not differ between rural and urban survivors, with a mean difference of -0.25 and a 95% CI ranging from -3.19 to 2.68. In contrast, sexual functioning, sexual enjoyment, and future perspective showed statistically significant rural–urban differences. The largest functional difference was observed for future perspective, with a mean difference of -3.72 and a 95% CI from -6.54 to -0.90.

Rural survivors reported higher symptom burden than urban survivors across all symptom domains. Positive mean differences indicated higher symptom scores among rural survivors for systemic therapy side effects, breast symptoms, arm symptoms, and distress related to hair loss.

Table 6. Rural–Urban Comparison of Symptom Scale Domains

Domain	t	df	Mean Difference	95% CI	p-value
Systemic therapy side effects	3.60	307	5.59	2.53, 8.64	<0.001

Domain	t	df	Mean Difference	95% CI	p-value
Breast symptoms	2.84	307	4.30	1.32, 7.28	0.005
Arm symptoms	3.81	307	6.00	2.91, 9.10	<0.001
Upset by hair loss	2.71	307	4.19	1.15, 7.23	0.007

CI, confidence interval. Mean difference represents rural minus urban score. Independent-sample t-test.

The greatest rural–urban symptom difference was observed for arm symptoms, with a mean difference of 6.00 and a 95% CI from 2.91 to 9.10. Systemic therapy side effects also showed a marked difference, with a mean difference of 5.59 and a 95% CI from 2.53 to 8.64. Breast symptoms and distress related to hair loss were also higher among rural survivors, with mean differences of 4.30 and 4.19, respectively.

Extended EORTC QLQ-BR42 domains also differed significantly between rural and urban survivors. Rural survivors had higher scores for targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and the extended BR42 composite.

Table 7. Rural–Urban Comparison of Extended BR42 Domains

Domain	t	df	Mean Difference	95% CI	p-value
Targeted therapy symptoms	3.51	307	5.47	2.40, 8.54	0.001
Endocrine therapy symptoms	2.80	307	4.37	1.30, 7.43	0.005
Mucosal symptoms	4.26	307	6.49	3.49, 9.49	<0.001
Extended BR42 composite	2.40	307	3.73	0.67, 6.78	0.017

CI, confidence interval. Mean difference represents rural minus urban score. Independent-sample t-test.

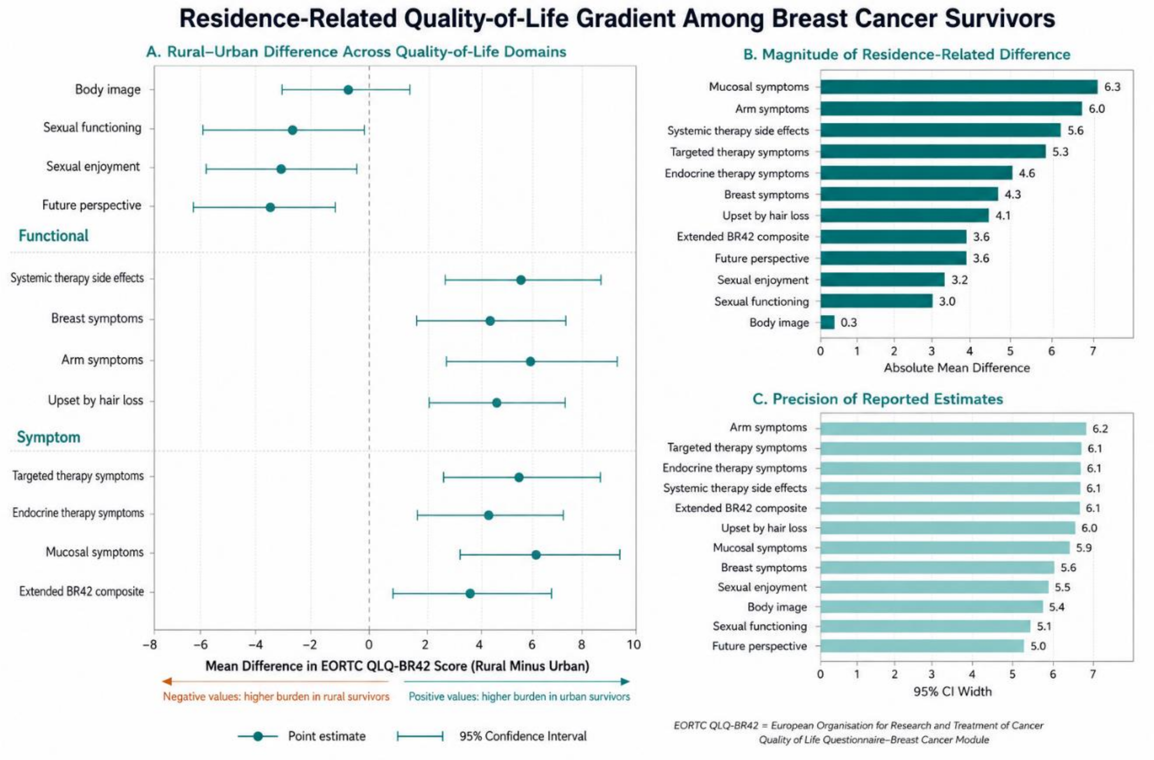

Figure 1. Residence-Related Quality-of-Life Gradient Among Breast Cancer Survivors

The panelled figure demonstrates a clear residence-related quality-of-life gradient across EORTC QLQ-BR42 domains. Functional outcomes favored urban survivors for sexual functioning, sexual enjoyment, and future perspective, with rural-minus-urban mean differences of -2.96, -3.32, and -3.72, respectively, while body image showed minimal difference between groups with a mean difference of -0.25 and a 95% CI crossing zero. In contrast, rural survivors consistently reported higher symptom burden across systemic therapy side effects, breast symptoms, arm symptoms, hair-loss distress, targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and the extended BR42 composite. The largest rural excess was observed for mucosal symptoms, with a mean difference of 6.49, followed by arm symptoms at 6.00, systemic therapy side effects at 5.59, and targeted therapy symptoms at 5.47. The confidence intervals for all symptom and extended domains remained above zero, supporting a consistent rural disadvantage in treatment-related and survivorship symptom burden.

The largest difference among the extended domains was observed for mucosal symptoms, with a mean difference of 6.49 and a 95% CI from 3.49 to 9.49. Targeted therapy symptoms also showed a notable rural excess, with a mean difference of 5.47 and a 95% CI from 2.40 to 8.54. The extended BR42 composite differed by 3.73 points between rural and urban survivors.

Overall, the findings showed that rural and urban breast cancer survivors had similar body image scores, but differed across several functional, symptom, and extended quality-of-life domains. Urban survivors reported better sexual functioning, sexual enjoyment, and future perspective, whereas rural survivors reported greater systemic therapy side effects, breast symptoms, arm symptoms, hair-loss distress, targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and overall extended BR42 symptom burden. These findings indicate that rural residence was associated with a higher symptom burden across multiple survivorship domains, while selected psychosocial and sexual-function domains were more favorable among urban survivors.

DISCUSSION

This cross-sectional study compared breast-cancer-specific quality-of-life domains between rural and urban breast cancer survivors attending tertiary-care oncology services in Faisalabad, Pakistan. The findings showed a clear rural–urban quality-of-life gradient. Overall domain scores were in the mid-range, suggesting persistent survivorship-related functional and symptom burden in the total sample. However, the direction of domain-specific differences varied by scale type. Urban survivors reported better sexual functioning, sexual enjoyment, and future perspective, whereas rural survivors reported higher systemic therapy side effects, breast symptoms, arm symptoms, hair-loss distress, targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and extended BR42 symptom burden. Body image was the only functional domain that did not differ significantly between rural and urban survivors. These findings indicate that place of residence may be an important contextual factor in breast cancer survivorship, particularly for symptom recognition, access to supportive care, rehabilitation, and psychosocial recovery.

The absence of a significant rural–urban difference in body image suggests that visible and embodied consequences of breast cancer and its treatment may affect survivors across geographic settings. Surgical scarring, altered breast appearance, treatment-related weight changes, hair loss, fatigue, and concerns about femininity may influence self-perception irrespective of residence. This finding is broadly consistent with evidence indicating that body image in breast cancer survivorship is shaped by multiple interacting clinical, psychological, relational, and cultural factors rather than by residence alone (9). In the Pakistani context, body image concerns may also be shaped by marital expectations, modesty norms, stigma around cancer disclosure, and limited access to structured counseling, which may reduce the likelihood of open discussion even when distress is present. Therefore, the non-significant difference in body image should not be interpreted as absence of concern, but rather as evidence that body image may represent a shared survivorship challenge among both rural and urban women.

Urban survivors had significantly better scores for sexual functioning, sexual enjoyment, and future perspective. These domains are particularly sensitive to psychosocial support, privacy, marital communication, education, symptom management, and confidence in follow-up care. Sexual health after breast cancer is often affected by endocrine therapy, chemotherapy-induced menopausal symptoms, fatigue, altered body image, vaginal dryness, dyspareunia, anxiety, and relational distress (10). Urban survivors may have comparatively better access to specialist consultation, survivorship education, diagnostic follow-up, and psychosocial resources, which may improve their confidence in discussing intimate concerns and planning future life after cancer. However, because this study did not directly measure stigma, marital communication, psycho-oncology access, or recurrence anxiety, these explanations should be interpreted as plausible mechanisms rather than confirmed causal pathways.

The higher symptom burden among rural survivors was one of the most consistent findings of this study. Rural participants reported significantly higher systemic therapy side effects, breast symptoms, arm symptoms, and hair-loss distress. Arm symptoms showed one of the largest rural–urban differences, suggesting possible gaps in postoperative rehabilitation, lymphedema screening, shoulder mobility management, pain education, and early referral to physiotherapy services. Previous survivorship research has shown that treatment-related late effects can persist long after active treatment and may substantially affect physical function, daily activity, and quality of life (11). In rural communities, these symptoms may remain under-recognized or undertreated because of distance from tertiary-care facilities, lack of local rehabilitation services, cost of repeated follow-up visits, and limited awareness of survivorship complications. These findings support the need to integrate physiotherapy, lymphedema education, pain management, and functional rehabilitation into routine breast cancer follow-up, particularly for rural survivors.

The extended BR42 domains further reinforced the rural disadvantage in treatment-related symptom burden. Rural survivors reported significantly higher targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and extended BR42 composite scores, with mucosal symptoms showing the largest mean difference. This pattern may reflect differences in follow-up continuity, medication counseling, oral care advice, management of endocrine-related adverse effects, nutritional support, and timely recognition of treatment toxicity. Distress and symptom persistence among breast cancer survivors are known to be influenced by clinical factors, social support, comorbidity, psychological vulnerability, and treatment exposure (12). The present findings suggest that rural residence may intensify these challenges by reducing access to structured symptom-management pathways. In high-resource settings where survivorship care is more systematized, rural–urban differences in symptoms may be less pronounced, which may explain why some international findings differ from those observed in low- and middle-income healthcare contexts (13).

The findings also have important sociocultural implications. Breast cancer survivorship in Pakistan occurs within family-centered decision-making structures where women may depend on spouses or relatives for travel, treatment costs, and follow-up attendance. Qualitative evidence from Pakistan has shown that families play a central role in managing advanced breast cancer care, but this support may be accompanied by emotional, financial, and practical burden (14). Rural survivors may therefore experience a double burden: persistent treatment-related symptoms and dependence on family support to access care. This may affect their ability to report symptoms, seek rehabilitation, discuss sexual health, or return for follow-up visits. Survivorship programs should therefore be patient- and family-centered, culturally sensitive, and accessible outside major urban hospitals.

The study contributes context-specific evidence to breast cancer survivorship literature by using a breast-cancer-specific quality-of-life instrument and comparing rural and urban survivors within a Pakistani tertiary-care setting. The findings are clinically relevant because they identify specific domains where intervention is needed. Rural survivors may benefit most from decentralized symptom-management clinics, lymphedema and shoulder rehabilitation services, structured adverse-effect counseling, telehealth follow-up, and referral pathways between tertiary hospitals and peripheral health facilities. Urban survivors also require supportive care, particularly for body image and sexual health, but the rural excess in symptom domains indicates an urgent need to reduce geographic barriers to survivorship services.

Several limitations should be considered when interpreting these findings. The cross-sectional design does not allow causal inference or assessment of quality-of-life changes over time. The purposive sampling strategy and recruitment from two tertiary-care hospitals may limit generalizability to all breast cancer survivors in Pakistan, especially those who do not reach tertiary-care services. The analysis was based primarily on unadjusted rural–urban comparisons, and residual confounding may be present because clinical stage, treatment type, time since diagnosis, comorbidities, social support, health literacy, distance from hospital, and follow-up frequency were not included in the available comparative models. Multiple domain comparisons were performed, so the results should be interpreted with attention to the exploratory nature of the analysis. Self-reported responses may also be affected by recall bias, social desirability bias, and reluctance to discuss sensitive domains such as sexuality and body image. Despite these limitations, the study provides useful preliminary evidence for rural–urban survivorship disparities and identifies priority domains for future intervention and longitudinal research.

Future studies should use longitudinal designs to examine how quality-of-life trajectories differ between rural and urban breast cancer survivors from diagnosis through active treatment and survivorship. Larger multicenter studies should include clinical variables, treatment exposures, comorbidities, social support, marital functioning, distance to care, and access to rehabilitation services. Adjusted regression models would help clarify whether rural residence independently predicts symptom burden after accounting for socioeconomic and clinical factors. Qualitative research may also be valuable to explore how rural women understand, report, and manage symptoms, sexual concerns, family expectations, and future-related uncertainty after breast cancer treatment.

CONCLUSION

This study found that breast cancer survivors in Faisalabad, Pakistan, experienced mid-range quality-of-life scores across EORTC QLQ-BR42 domains, with significant rural–urban differences in several functional, symptom, and extended survivorship outcomes. Urban survivors reported better sexual functioning, sexual enjoyment, and future perspective, while rural survivors reported higher systemic therapy side effects, breast symptoms, arm symptoms, hair-loss distress, targeted therapy symptoms, endocrine therapy symptoms, mucosal symptoms, and extended BR42 symptom burden. Body image did not differ significantly between rural and urban survivors, suggesting that some survivorship concerns may be shared across geographic settings. These findings support the need for equitable, decentralized, and culturally sensitive survivorship care in Pakistan, with particular emphasis on rural oncology follow-up, lymphedema and rehabilitation services, treatment-toxicity management, telehealth-supported monitoring, and psychosocial counseling for sensitive domains such as sexuality, body image, and future-related concerns.

REFERENCES

1. Nardin S, Mora E, Varughese FM, D'Avanzo F, Vachanaram AR, Rossi V, et al. Breast cancer survivorship, quality of life, and late toxicities. Front Oncol. 2020;10:864.

2. Azam M, Aslam M, Basharat J, Mughal MA, Nadeem MS, Anwar F. An empirical study on quality of life and related factors of Pakistani breast cancer survivors. Sci Rep. 2021;11:24391.

3. Gulzar F, Akhtar MS, Sadiq R, et al. Identifying the reasons for delayed presentation of Pakistani breast cancer patients at a tertiary care hospital. Cancer Manag Res. 2019;11:1087-1096.

4. Mols F, Vingerhoets AJ, Coebergh JW, van de Poll-Franse LV. Quality of life among long-term breast cancer survivors: a systematic review. Eur J Cancer. 2005;41(17):2613-2619.

5. Park J, Rodriguez JL, O'Brien KM, Nichols HB, Hodgson ME, Weinberg CR, et al. Health-related quality of life outcomes among breast cancer survivors. Cancer. 2021;127(7):1114-1125.

6. Bedi M, Devins GM. Cultural considerations for South Asian women with breast cancer. J Cancer Surviv. 2016;10(1):31-50.

7. Tulk J, Wurz A, Hou SH, et al. Rural-urban differences in distress, quality of life, and social support among Canadian young adult cancer survivors. J Rural Health. 2024;40(1):121-127.

8. El Battioui F, El Malki F, Barrijal S. Quality of life assessment of breast cancer survivors in Northern Morocco: Rural-urban disparity. Breast Dis. 2023;42(1):291-298.

9. An J, Zhou K, Li M, Li X. Assessing the relationship between body image and quality of life among rural and urban breast cancer survivors in China. BMC Womens Health. 2022;22:61.

10. Boquiren VM, Esplen MJ, Wong J, Toner B, Warner E, Malik N. Sexual functioning in breast cancer survivors experiencing body image disturbance. Psychooncology. 2016;25(1):66-76.

11. Yfantis A, Sarafis P, Moisoglou I, Tolia M, Intas G, Tiniakou I, et al. How breast cancer treatments affect the quality of life of women with non-metastatic breast cancer one year after surgical treatment. BMC Surg. 2020;20:210.

12. Syrowatka A, Motulsky A, Kurteva S, Hanley JA, Dixon WG, Meguerditchian AN, et al. Predictors of distress in female breast cancer survivors: a systematic review. Breast Cancer Res Treat. 2017;165(2):229-245.

13. Zahnd WE, Gorzelitz J, Charlton ME, et al. Rural-urban differences in the symptoms, side effects, and physical activity of cancer survivors in the United States. Prev Med. 2025;199:108380.

14. Jabeen S, Zakar R, Zakar MZ, Fischer F. Experiences of family caregivers in dealing with cases of advanced breast cancer: a qualitative study of the sociocultural context in Punjab, Pakistan. BMC Public Health. 2024;24:1030.

15. Bodai BI, Tuso P. Breast cancer survivorship: a comprehensive review of long-term medical issues and lifestyle recommendations. Perm J. 2015;19(2):48-79.

16. Bibi A, Khalid MA. Death anxiety, perceived social support, and demographic correlates of patients with breast cancer in Pakistan. Death Stud. 2020;44(12):787-792.

17. Chakma SK, Ahedulla M, Saha S, et al. Rural-urban disparity in anxiety and depression among cancer patients in Bangladesh. Discov Public Health. 2025;22:727.

18. Costa WA, Eleutério J Jr, Giraldo PC, Gonçalves AK. Quality of life in breast cancer survivors. Rev Assoc Med Bras. 2017;63(7):583-589.

19. Fearon D, Hughes S, Brearley S. Experiences of breast cancer in Arab countries: a thematic synthesis. Qual Life Res. 2020;29(2):313-324.

20. Ganz PA, Goodwin PJ. Breast cancer survivorship: where are we today? In: Ganz PA, editor. Improving outcomes for breast cancer survivors. Cham: Springer; 2015. p. 1-8.

21. Heidary Z, Ghaemi M, Hossein Rashidi B, Kohandel Gargari O, Montazeri A. Quality of life in breast cancer patients: a systematic review of the qualitative studies. Cancer Control. 2023;30:10732748231168318.

22. Richardson LC, Wang W, Hartzema AG, Wagner S. The role of health-related quality of life in early discontinuation of chemotherapy for breast cancer. Breast J. 2007;13(6):581-587.

23. Shirazi B, Shekhani SS. Impact of the word “cancer”: a pilot study on breast cancer patients from Pakistan. Asian Bioeth Rev. 2017;9(3):229-238.

24. Singh K, Katoch K, Pal KM, Negi RR. Quality of life outcomes and determining factors in breast cancer patients reporting to a tertiary care centre in the sub-Himalayan region of India. Cureus. 2024;16.

25. Soto-Ruiz N, Escalada-Hernández P, Pimentel-Parra GA, García-Vivar C. Quality of life in long-term cancer-free breast cancer survivors in Spain: a descriptive study. Sci Rep. 2025;15:23817.

26. Talib Z, Amersi F, Harit A, Saleh M. Promoting breast cancer awareness and clinical breast examination in the LMIC: experiences from Tajikistan, Pakistan and Kenya. Curr Breast Cancer Rep. 2019;11:152-157.

27. Titi I, El Sharif N. Quality of life and coping strategies of Palestinian women with breast cancer in the West Bank: a cross-sectional study. Healthcare. 2025;13:1124.

28. Tomich PL, Helgeson VS. Five years later: a cross-sectional comparison of breast cancer survivors with healthy women. Psychooncology. 2002;11(2):154-169.

29. Zolfaghary F, MashaghiTabari R, Dezhman M, et al. Predictors of quality of life and mental health in breast cancer survivors in Northern Iran. BMC Womens Health. 2023;23:378.