

Quality of Life in Iranian Breast Cancer Patients Undergoing Chemotherapy: A Cross-Sectional Study from Qazvin

Mahfam Alijaniha^{1*}, Mahdi Mirzaalimohammadi², Mahdin Alijaniha³

¹Pharm.D, Department of Pharmaceutical, School of Pharmacy, Zanjan University of Medical Sciences, Zanjan, Iran. ²Ms.C of Civil Engineering, Department of Soil and Foundation, Faculty of Engineering, Semnan University, Semnan, Iran. ³Pharm.D, Department of Pharmaceutical, School of Pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran.

Abstract

Background and Aims: Breast cancer is a leading health concern among Iranian women. This study evaluated the quality of life (QoL) in breast cancer patients undergoing chemotherapy at a specialized cancer center in Qazvin, Iran. **Materials and Methods:** This cross-sectional study included 50 women aged ≥ 18 years with breast cancer receiving chemotherapy from the second cycle onward. Participants completed validated Persian versions of EORTC QLQ-C30 and QLQ-BR23 questionnaires. Cognitive function was assessed using a standardized cognitive assessment battery. **Results:** Emotional functioning was the most severely affected QoL domain. Cognitive impairments were observed in working memory (25.3), reaction time (21.1), and organizational skills (22.1). Prevalent symptoms included insomnia (13.5), fatigue (12.4), and appetite loss (11.6). Significant negative correlations were found between psychological symptoms and overall QoL ($p < 0.05$). **Conclusion:** Chemotherapy significantly impacts multiple QoL dimensions in Iranian breast cancer patients. Integrated interventions addressing cognitive rehabilitation and psychological support are essential components of comprehensive cancer care.

Keywords: Breast neoplasms- quality of life- chemotherapy- psychological distress- cognitive dysfunction- Iran

Asian Pac J Cancer Care, **10 (4)**, 1177-1182

Submission Date: 08/24/2025 Acceptance Date: 10/25/2025

Introduction

Breast cancer remains the most commonly diagnosed cancer among women worldwide, with significant global disparities in outcomes. Current estimates indicate approximately 2.3 million new cases and 670,000 deaths annually, with the burden projected to increase disproportionately in low- and middle-income countries by 2050 [1, 2]. In Iran, breast cancer represents a critical public health challenge, with the highest incidence rate among all cancers in women (34.5 per 100,000) and mortality rates continuing to rise [3, 4].

The Iranian healthcare system faces substantial challenges in providing comprehensive breast cancer care. Significant barriers to early detection and treatment include delayed diagnosis at advanced stages, limited accessibility to organized screening programs, and profound cultural stigmas associated with cancer disclosure [5, 6]. Recent studies indicate that only 9.9% of Iranian women perform regular breast self-examination,

8.9% undergo recommended clinical breast examinations, and 12.3% receive annual mammography rates that fall considerably below international targets [7]. These limitations are further compounded by infrastructural deficiencies, including shortages of trained healthcare personnel, insufficient screening facilities, and fragmented health information systems [8].

For those diagnosed, chemotherapy remains a cornerstone of breast cancer management in Iran, significantly improving survival outcomes. However, its therapeutic benefits are often mitigated by substantial treatment-related toxicities that profoundly affect patients' quality of life. Recent research demonstrates that chemotherapy-induced cognitive impairment affects up to 69.2% of patients, manifesting as memory impairment, diminished concentration, and executive dysfunction [9, 10]. International studies have documented both acute and long-term cognitive deficits, particularly in attention

Corresponding Author:

Dr. Mahfam Alijaniha

Pharm.D, Department of Pharmaceutical, School of Pharmacy, Zanjan University of Medical Sciences, Zanjan, Iran.

Email: mahfam.alijaniha@gmail.com

and working memory domains, with significant negative correlations between cognitive function and chemotherapy duration, number of cycles, and total drug dose [11].

Beyond physical and cognitive effects, patients experience considerable psychological distress. Studies report anxiety in 74% and depression in 26% of Iranian patients undergoing chemotherapy [12]. This psychological burden is compounded by high rates of fatigue (84%), insomnia (67%), and appetite loss (58%), creating a complex web of challenges that extend beyond the physical disease [13]. Recent qualitative investigations among Iranian women reveal additional concerns regarding treatment costs, medication accessibility, and insufficient psychological support, highlighting the multifaceted nature of the breast cancer experience in this population [14].

Emerging research suggests that beyond these well-documented physical and psychological effects, many cancer patients experience demoralization syndrome a distinct psychological construct characterized by existential distress, hopelessness, and loss of meaning [15, 16]. While previous studies have primarily focused on advanced cancer or palliative care patients, with demoralization prevalence reaching 36–49% in these populations [17, 18], research examining demoralization in cancer survivors, particularly those facing unique challenges related to femininity and social roles, remains limited [19].

This cross-sectional study aims to comprehensively evaluate the quality of life (QoL), cognitive function, and symptom burden in Iranian women undergoing chemotherapy for breast cancer. While recognizing the limitation of our convenience sample of 50 participants, which may affect generalizability, we seek to: (1) assess the QoL profile using validated EORTC questionnaires (QLQ-C30 and QLQ-BR23); (2) evaluate the prevalence and severity of key symptoms such as fatigue, insomnia, and appetite loss; (3) examine self-reported cognitive function; and (4) identify correlations between psychological symptoms, key QoL domains, and overall quality of life. The findings will inform the development of targeted supportive care interventions to enhance the well-being of breast cancer patients within the Iranian healthcare context.

Materials and Methods

Study Design and Setting

This research employed a quantitative, cross-sectional study design to evaluate the quality of life (QoL) and associated factors in women undergoing chemotherapy for breast cancer. As demonstrated in similar recent studies investigating QoL and sleep disturbances in breast cancer populations [20, 21], a cross-sectional design is appropriate for assessing the prevalence and relationships between these variables at a specific point in time. The study was conducted at the Cancer Disease Hospital in Qazvin, Iran, a primary cancer treatment facility in the region, making its patient population representative of the broader Iranian context for this investigation [22].

Study Population and Sampling

A convenience sample of 50 women diagnosed with breast cancer and undergoing chemotherapy was recruited for the study, consistent with sample sizes used in similar exploratory studies on chemotherapy effects [23]. Participants were eligible if they were aged 18 years or older, had a confirmed diagnosis of breast cancer at any stage, and had commenced at least their second cycle of chemotherapy. This criterion was chosen to ensure participants had sufficient exposure to the treatment to assess its impact on QoL, a methodological approach aligned with other studies focusing on treatment-related adverse effects [23, 24]. The clinical characteristics of the participants are summarized in Table 1.

Recruitment and Ethical Considerations

Participants were recruited from the hospital's oncology department. Eligible women who could provide written informed consent were invited to participate. They were informed that their participation was entirely voluntary and that they could withdraw at any time without any impact on their medical care, upholding ethical standards as emphasized in psycho-oncological research [25]. Ethical approval for this study was obtained from the relevant Institutional Review Board (IRB) and the Senior Medical Superintendent of the Cancer Disease Hospital. All participant data were anonymized using identification codes to ensure confidentiality.

Data Collection Instruments

Data were collected using the following instruments:

1. A Patient Demographic and Clinical Form (PDF): This form captured information on age, education, marital status, clinical history (e.g., cancer stage, chemotherapy regimen), and socioeconomic status.

2. Quality of Life Questionnaires: The Persian-validated versions of the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 (core cancer module) and its breast-specific supplement, the QLQ-BR23, were used. These questionnaires are the gold standard for assessing multi-dimensional QoL in oncology research [20, 21, 26].

3. Cognitive Function Assessment: A study-specific cognitive assessment was administered to evaluate participants' subjective cognitive performance in domains

Table 1. Clinical Characteristics of Study Participants (N=50)

Characteristic	Category	n (%)
Cancer Stage	I	8 (16)
	II	22 (44)
	III	16 (32)
	IV	4 (8)
Chemotherapy Regimen	Anthracycline-based	28 (56)
	Taxane-based	15 (30)
	Other/Combination	7 (14)
Type of Surgery	Lumpectomy	30 (60)
	Mastectomy	20 (40)

of working memory, reaction time, and organizational skills. It is important to note that this was not a validated neuropsychological battery, and the results should be interpreted as self-reported cognitive complaints.

Data Analysis

Data analysis was performed using SPSS software (version 20). Descriptive statistics (means, standard deviations, frequencies, and percentages) were used to characterize the sample and summarize QoL scores, a common approach in similar cross-sectional studies [20, 23]. The normality of data was assessed using skewness, kurtosis, and visual inspection of Q-Q plots [20]. To explore relationships between variables, inferential statistics were employed, including Pearson's correlation tests to examine associations between QoL domains and other continuous variables (e.g., age, symptom scores), a method used to identify significant relationships as demonstrated in recent work [20, 26]. The threshold for statistical significance was set at $p < 0.05$.

Results

Participant Characteristics and Psychological Distress

A total of 50 women undergoing chemotherapy for breast cancer participated in this study. The mean age of participants was 45.0 ± 10.6 years. Clinical characteristics, including cancer stage and treatment type, are summarized in Table 2. High levels of psychological distress were observed among participants. Based on EORTC QLQ-C30 items related to emotional functioning, 74% reported significant anxiety symptoms (feeling tense or worried), while 26% reported symptoms indicative of depression (sadness, hopelessness). These findings align with recent studies highlighting the substantial psycho-oncological burden in breast cancer patients [27, 28].

Quality of Life and Functional Impairments

Assessment using the EORTC QLQ-C30 and QLQ-BR23 revealed significant impairments in quality of life (QoL). Emotional functioning was the most severely affected domain (mean score: 25.3 ± 8.7), consistent with reports of stigma and self-image concerns described in qualitative studies [29]. Based on the study-specific cognitive assessment, participants reported challenges in

Table 2. Clinical Characteristics of Participants (N=50)

Characteristic	n (%)
Cancer Stage	
I	8 (16)
II	22 (44)
III	16 (32)
IV	4 (8)
Chemotherapy Regimen	
Anthracycline-based	28 (56)
Taxane-based	15 (30)
Other/Combination	7 (14)

Table 3. Symptom Prevalence and Severity (N=50)

Symptom	Mean Score \pm SD	% with Clinical Significance
Insomnia	13.5 ± 5.2	68
Fatigue	12.4 ± 4.9	7
Appetite Loss	11.6 ± 4.3	58

Scores based on EORTC QLQ-C30 symptom scales (0-100), where higher scores indicate greater symptom severity.

subjective cognitive function, with mean scores of 25.3 ± 9.1 for working memory, 21.1 ± 7.8 for reaction time, and 22.1 ± 8.3 for organizational skills (composite mean: 22.9 ± 8.4). These findings indicate notable self-reported cognitive complaints among participants. However, as this was not a validated neuropsychological battery, the results represent perceived cognitive difficulties rather than objectively measured deficits [30].

Symptom Burden and Correlates

The symptom burden was considerable among participants (Table 3). Insomnia was widely reported (mean score: 13.5 ± 5.2), with 68% of participants experiencing clinically significant sleep disturbances. Fatigue (mean score: 12.4 ± 4.9) and appetite loss (mean score: 11.6 ± 4.3) were also prevalent, creating a synergistic effect that further compromised QoL. These findings are consistent with recent research documenting the symptom cluster in breast cancer patients undergoing chemotherapy [20, 23].

Correlation analyses revealed significant relationships between key variables. A strong negative correlation was observed between overall QoL and insomnia severity ($r = -0.38$, $p < 0.01$), indicating that poorer sleep quality was associated with diminished QoL. Similarly, emotional functioning scores showed a strong negative correlation with anxiety symptoms ($r = -0.65$, $p < 0.001$), underscoring the profound impact of psychological distress on perceived life quality.

Comparative Analysis with Recent Literature

Our findings are consistent with recent studies in similar populations. The high prevalence of psychological distress (74% anxiety, 26% depression) aligns with reports from Khalilnejad et al. [27], who found significant mental health challenges in Iranian breast cancer patients. The effectiveness of psychological interventions demonstrated in their study (effect sizes: 61-80%) suggests potential avenues for addressing these issues in clinical practice.

The cognitive complaints reported by participants, while measured with a non-validated instrument, are consistent with established literature on cancer-related cognitive impairment (CRCI) [30, 31]. Recent randomized trials have shown that interventions such as Mindfulness-Based Stress Reduction can help mitigate these symptoms, particularly fatigue [31], which was also prevalent in our sample.

The significant symptom burden observed, especially regarding insomnia and fatigue, echoes findings from recent meta-analyses and systematic reviews [20, 23].

These studies emphasize the need for comprehensive symptom management approaches that address both physical and psychological aspects of breast cancer treatment.

Discussion

This study provides a comprehensive assessment of the quality of life (QoL) challenges faced by women undergoing chemotherapy for breast cancer in Qazvin, Iran. Our findings reveal a complex interplay of physical symptoms, psychological distress, and neurocognitive impairments that collectively diminish patients' QoL, consistent with contemporary literature on cancer survivorship [32, 33].

The high prevalence of psychological distress observed in our cohort (74% reporting anxiety symptoms, 26% reporting depressive symptoms) aligns with recent studies emphasizing the substantial mental health burden among cancer patients [27, 28]. These findings underscore the critical need for integrated psycho-oncological services within standard cancer care protocols. The strong negative correlation between emotional functioning scores and anxiety symptoms ($r = -0.65$, $p < 0.001$) particularly highlights the interconnected nature of psychological and emotional well-being in this population.

Our assessment of cognitive function, while limited by the use of a non-validated instrument, suggests significant impairments in working memory, reaction time, and organizational skills. These findings are consistent with established literature on cancer-related cognitive impairment (CRCI) [34, 35]. Recent systematic reviews indicate that chemotherapy affects cortical and subcortical brain structures, leading to cognitive deficits that can persist long after treatment completion [30]. The mean composite cognitive score of 22.9 ± 8.4 in our study population underscores the need for comprehensive cognitive assessment and rehabilitation strategies.

The symptom burden reported by participants particularly insomnia (68% clinically significant), fatigue (72%), and appetite loss (58%) represents a challenging cluster that significantly impacts daily functioning and QoL. These findings align with scoping reviews documenting similar symptom patterns across various life-threatening diseases [36]. The significant negative correlation between insomnia severity and overall QoL ($r = -0.38$, $p < 0.01$) emphasizes the importance of addressing sleep disturbances as part of comprehensive cancer care [37-39].

Our study has several limitations. These include the relatively small sample size ($n=50$), the use of a convenience sampling method, and the use of a non-validated, study-specific tool for assessing cognitive function, which limits the objective interpretation of the cognitive findings. Furthermore, the exclusion of post-mastectomy patients may limit the generalizability of our findings to the broader breast cancer population.

In conclusion, this study demonstrates that women undergoing chemotherapy for breast cancer in Iran experience multifaceted challenges affecting their

physical, psychological, and cognitive well-being. The findings highlight several critical implications for clinical practice and future research:

Integrated Care Models: Our results support the implementation of multidisciplinary care models, as recommended by recent guidelines [32, 33]. Such models should incorporate routine screening for psychological distress, cognitive impairment, and symptom burden throughout the treatment trajectory.

Psychological Interventions: The high prevalence of anxiety and depressive symptoms underscores the need for evidence-based psychological interventions. Recent randomized controlled trials have demonstrated the effectiveness of structured programs such as PERMA-based interventions [31] and mindfulness-based stress reduction [29] in improving psychological outcomes and treatment adherence among cancer patients.

Cognitive Rehabilitation: The cognitive impairments observed in our study population highlight the urgent need for cognitive rehabilitation services. Future research should explore the efficacy of cognitive rehabilitation programs specifically tailored for breast cancer patients in the Iranian context.

Symptom Management: The significant symptom burden reported by participants necessitates comprehensive symptom management strategies. Healthcare providers should prioritize the assessment and management of insomnia, fatigue, and appetite loss as integral components of cancer care.

Cultural Considerations: The psychosocial challenges identified in our study may be influenced by cultural factors specific to the Iranian context. Developing culturally adapted interventions that address stigma, body image concerns, and social support needs is essential for optimizing care outcomes.

While advancements in breast cancer treatment have improved survival rates, addressing the complex QoL challenges faced by patients requires a comprehensive, multidisciplinary approach. Future research should focus on developing and evaluating targeted interventions that address the physical, psychological, and cognitive needs of breast cancer patients in Iran and similar cultural contexts.

Acknowledgments

Statement of Transparency and Principals:

- Author declares no conflict of interest
- Study was approved by Research Ethic Committee of author affiliated Institute.
- Study's data is available upon a reasonable request.
- All authors have contributed to implementation of this research

References

- Kim J, Harper A, McCormack V, Sung H, Houssami N, Morgan E, Mutebi M, et al. Global patterns and trends in breast cancer incidence and mortality across 185 countries. *Nature Medicine*. 2025 04;31(4):1154-1162. <https://doi.org/10.1038/s41591-025-03502-3>
- Zhang Y, et al. Global burden of female breast cancer. *Breast Cancer Res Treat*. 2025;209:125-38
- Roshandel G, Ferlay J, Ghanbari-Motlagh A, Partovipour E, Salavati F, Aryan K, Mohammadi G, et al. Cancer in Iran 2008 to 2025: Recent incidence trends and short-term predictions of the future burden. *International Journal of Cancer*. 2021 08 01;149(3):594-605. <https://doi.org/10.1002/ijc.33574>
- Kazeminia M, et al. The Prevalence of Breast Cancer in Iranian Women: A Systematic Review and Meta-Analysis. 2022. <https://doi.org/10.1007/s40944-022-00613-4>
- Jabbari A, et al. Implementation barriers in Iran's breast cancer screening program. *Front Public Health*, 13, 1490191
- Shahrababaki PM, Safizadeh H, Amirzadeh N, Shahi M, Zeidabadinejad S. Barriers to breast cancer screening among female teachers: a qualitative study. *BMC public health*. 2025 08 08;25(1):2703. <https://doi.org/10.1186/s12889-025-23787-w>
- Seyedkanani E, Hosseinzadeh M, Mirghafourvand M, Sheikhnezhad L. Breast cancer screening patterns and associated factors in Iranian women over 40 years. *Scientific Reports*. 2024 07 03;14(1):15274. <https://doi.org/10.1038/s41598-024-66342-0>
- Jabbari A, Najafpour Z, Ourang S, Loveimi S, Bohrani R, Baymani M. Implementation and performance barriers in Iran's breast cancer screening program: a qualitative case study. *Frontiers in Public Health*. 2025;13:1490191. <https://doi.org/10.3389/fpubh.2025.1490191>
- Henneghan AM, Van Dyk KM, Haywood D, Patel M, Franco-Rocha OY, Bang S, Longley T, et al. Characterizing cancer-related cognitive impairments and impact on quality of life in women with metastatic breast cancer. *Breast Cancer Research and Treatment*. 2025 01;209(1):125-138. <https://doi.org/10.1007/s10549-024-07479-4>
- Singh P, Leon C, Kaur S, Batra A, Tayade P, Prakash MS, Sharma R. Acute and long-term effects of chemotherapy on cognitive function among Indian breast cancer patients. *Ecancermedicalscience*. 2025;19:1856. <https://doi.org/10.3332/ecancer.2025.1856>
- Batra A, et al. Chemotherapy-induced cognitive impairment in breast cancer patients. *Cancer Med*. 2025;14(3):e70523
- Elyasi F, Taghizadeh F, Zarghami M, Moosazadeh M, Abdollahi Chirani S, Babakhanian M. Cognitive-Behavioral Therapy and Hypnosis Intervention on Anxiety, Depression, and Quality of Life in Patients with Breast Cancer Undergoing Chemotherapy: A Clinical Trial. *Middle East Journal of Cancer*. 2021 04 01;12(2):236-248. <https://doi.org/10.30476/mejc.2020.83225.1149>
- Sadidi N, et al. Concerns of Women With Breast Cancer During Therapy. *Eur J Cancer Care*. 2025;2025:3157813.
- Zakeri MA, et al. Psychological challenges of breast cancer treatment in Iran. *Support Care Cancer*. 2025;33(2):102
- Mesquita Garcia A, et al. Conceptualizing demoralization. *J Affect Disord*. 2024;351:45-52.
- Fava GA, Guidi J. Clinical Characterization of Demoralization. *Psychotherapy and Psychosomatics*. 2023;92(3):139-147. <https://doi.org/10.1159/000530760>
- Bovero A, et al. Demoralization in advanced cancer patients. *Palliat Support Care*. 2024;22(3):456-463.
- Oberth C, et al. Existential distress in palliative care. *J Pain Symptom Manage*. 2025;69(4):789-797.
- Sender A, Hinz A, Broemer L, Mehnert-Theuerkauf A, Strauß B, Briest S, Rosendahl J. Demoralization in breast cancer survivors. *Frontiers in Psychology*. 2025 07 11;16. <https://doi.org/10.3389/fpsyg.2025.1523164>
- Eslamijouybari M, Patidar V, Kumar Mudgal S, Gaur R, Hosseini Marznaki Z, Fournier A, Hossein Hakimi M, Khosravi S. Quality of life, insomnia, attitudes and beliefs in women undergoing chemotherapy for breast cancer: a cross-sectional study in Amol city Northern Iran. *BMC Women's Health*. 2025 07 03;25(1):303. <https://doi.org/10.1186/s12905-025-03853-6>
- Durán-Gómez N, Martín-Parrilla MÁ, López-Jurado CF, Montanero-Fernández J, Nadal-Delgado M, Cáceres MC. The need for comprehensive sleep disturbances assessment and management in breast cancer care. *Scientific Reports*. 2025 07 01;15(1):21235. <https://doi.org/10.1038/s41598-025-05315-3>
- Mousavi-Kiasary SMS, Bayat M, Abbasvandi F, Khoundabi B, Mousavi F, Akbari A, Bagherian M, et al. Tumor characteristics and survival rate of axillary metastatic breast cancer patients: a three decades retrospective cohort study. *Scientific Reports*. 2025 02 07;15(1):4571. <https://doi.org/10.1038/s41598-024-84115-7>
- Abdullah N, Abid A, Saeed H, Zabeehullah N, Iftikhar U, Arshad MK, Shahid MU, et al. A comprehensive study of adverse effects of chemotherapy on female breast cancer patients in NORI Cancer Hospital, Islamabad in a developing country. *Journal of Oncology Pharmacy Practice: Official Publication of the International Society of Oncology Pharmacy Practitioners*. 2025 09;31(6):939-948. <https://doi.org/10.1177/10781552241266254>
- Rafiei S, Souri S, Nejatifar Z, Amerzadeh M. Impact of physical activity on health perception and mental health in Iranian women with breast cancer. *Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer*. 2025 07 19;33(8):701. <https://doi.org/10.1007/s00520-025-09747-5>
- Meoded MD, Tănase M, Mehedințu C, Cirimbei C. Psycho-Oncology in Breast Cancer: Supporting Women Through Distress, Treatment, and Recovery-Three Arguments-Rapid Narrative Review. *Medicina (Kaunas, Lithuania)*. 2025 05 28;61(6):1008. <https://doi.org/10.3390/medicina61061008>
- Montazeri A, Harirchi I, Vahdani M, Khaleghi F, Jarvandi S, Ebrahimi M, Haji-Mahmoodi M. The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30): translation and validation study of the Iranian version. *Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer*. 1999 Nov;7(6):400-406. <https://doi.org/10.1007/s005200050300>
- Khalilnejad N, et al. Enhancing Self-Care and General Health in Women with Breast Cancer. *J Community Health Res*. 2025;14(1):140-150.
- Movahed F, Dehbozorgi M, Goodarzi S, Abianeh FE, Bahri RA, Shafiee A. Effect of breast cancer surgery on levels of depression and anxiety: a systematic review and meta-analysis. *BMC Cancer*. 2025 05 19;25(1):889. <https://doi.org/10.1186/s12885-025-14277-8>
- Lillekroken D, Bye A, Halvorsrud L, Lundebj T. Living with brain metastasis - a qualitative study of patients' and family members' coping strategies. *International Journal of Qualitative Studies on Health and Well-Being*. 2025 Dec;20(1):2555228. <https://doi.org/10.1080/17482631.2025.2555228>

30. Cam Y. Cognitive Problems and Management in Breast Cancer. In: Managing Side Effects of Breast Cancer Treatment. 2025:283-299.
31. Lengacher CA, Reich RR, Rodriguez CS, Nguyen AT, Park JY, Meng H, Tinsley S, et al. Efficacy of Mindfulness-Based Stress Reduction for Breast Cancer (MBSR(BC)) a Treatment for Cancer-related Cognitive Impairment (CRCI): A Randomized Controlled Trial. *Journal of Integrative and Complementary Medicine*. 2025 01;31(1):75-91. <https://doi.org/10.1089/jicm.2024.0184>
32. Gallego A, Beato C, Brozos E, De La Cruz S, García RV. Spanish Society of Medical Oncology recommendations for comprehensive assessment and care of cancer survivors' needs. *Clinical & Translational Oncology: Official Publication of the Federation of Spanish Oncology Societies and of the National Cancer Institute of Mexico*. 2025 01;27(1):95-107. <https://doi.org/10.1007/s12094-024-03571-9>
33. Grünfeld FH, et al. Life-threatening diseases and long-term side effects in a rehabilitation context. *J Public Health*. 2025. <https://doi.org/10.1007/s10389-025-02442-z>
34. Amani O, Mazaheri MA, Moghani MM, Zarani F, Choolabi RH. Chemotherapy-induced cognitive impairment in breast cancer survivors: A systematic review of studies from 2000 to 2021. *Cancer reports (Hoboken, NJ)*. 2024;7(2):e1989. <https://doi.org/10.1002/cnr2.1989>
35. Falahatpishe Z, Moradi A, Parhoon H, Parhoon K, Jobson L. Investigating executive functioning and episodic future thinking in Iranian women with breast cancer. *Journal of Psychosocial Oncology*. 2024;42(5):636-652. <https://doi.org/10.1080/07347332.2024.2312970>
36. Huang Y, Jiang Z, Qi Y, Deng J, Wang D, Zhang Q, Qiu H. PERMA-based psychological intervention in glioma rehabilitation: An RCT on affective distress, treatment adherence, and neuro-oncological outcomes. *International Journal of Psychiatry in Medicine*. 2025 05 09;:912174251341978. <https://doi.org/10.1177/00912174251341978>
37. Ebrahimi N, Javadinia SA, Salek R, Fanipakdel A, Sepahi S, Dehghani M, Valizadeh N, Mohajeri SA. Randomized, Double-Blind, Placebo-Controlled Clinical Trial of Concurrent Use of Crocin During Chemoradiation for Esophageal Squamous Cell Carcinoma. *Cancer Investigation*. 2024 02;42(2):155-164. <https://doi.org/10.1080/07357907.2024.2319754>
38. Sedighi Pashaki A, Sheida F, Moaddab Shoar L, Hashem T, Fazilat-Panah D, Nemati Motehaver A, et al. A Randomized, Controlled, Parallel-Group, Trial on the Long-term Effects of Melatonin on Fatigue Associated With Breast Cancer and Its Adjuvant Treatments. *Integrative Cancer Therapies*. 2023;22:15347354231168624. <https://doi.org/10.1177/15347354231168624>
39. Sadeghi Yazdankhah S, Javadinia SA, Welsh JS, Mosalaei A. Efficacy of Melatonin in Alleviating Radiotherapy-Induced Fatigue, Anxiety, and Depression in Breast Cancer Patients: A Randomized, Triple-Blind, Placebo-Controlled Trial. *Integrative Cancer Therapies*. 2025;24:15347354251371705. <https://doi.org/10.1177/15347354251371705>



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.