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Anxiety, Depression, Fear of Progression and Illness Adaptation in Breast Cancer Patients

Gabriela Rahnea-Nita

Specific Disciplines Department, The Faculty of Nursing and Midwifery, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania; M Hospital, Bucharest, Romania.
gabriela.rahnea-nita@umfcd.ro, <https://orcid.org/0000-0002-5705-8348>

Alexandru Bogdan Ciubara *

Clinic Surgical Department, "Dunărea de Jos" Faculty of Medicine and Pharmacy, University of Galați, Galați, Romania.
bogdan.ciubara@ugal.ro, <https://orcid.org/0000-0002-8037-6002>

Laura-Florentina Rebegea *

The Clinical Department, "Dunărea de Jos" Faculty of Medicine and Pharmacy, University of Galați, Galați, Romania; The Department of Radiotherapy, "St. Apostol Andrei" Hospital, Galați, Romania.
laura.rebegea@ugal.ro, <https://orcid.org/0000-0002-8187-7984>

Mihai-Teodor Georgescu *

The Clinical Department, The Faculty of Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania; The Department of Radiotherapy, "Prof. Dr. Alexandru Trestioreanu" Oncological Institute, Bucharest, Romania. mihai.georgescu@umfcd.ro, <https://orcid.org/0000-0003-1601-0580>

Dan Ilie-Damboiu

M Hospital, Bucharest, Romania. iliedan1@yahoo.com

Anamaria Ciubara *

The Clinical Department, "Dunărea de Jos" Faculty of Medicine and Pharmacy, University of Galați, Galați, Romania.
anamaria.ciubara@ugal.ro, <https://orcid.org/0000-0003-0740-3702>

Rares Nicolae Vadana

The Department of Radiotherapy, "St. Apostol Andrei" Hospital, Galați, Romania. vadana.rares@yahoo.com, <https://orcid.org/0009-0007-5881-5594>

Laurentiu Tony Hangan *

4th Department Medical Clinical Disciplines II, Ovidius University, Constanta, Romania. tony@medcon.ro, <https://orcid.org/0009-0004-0902-337X>

Andreea Georgia Cernea

The Department of Radiotherapy, "St. Apostol Andrei" Hospital, Galați, Romania. cernea_georgia@yahoo.com

Ionut Simion Coman

The Clinical Department, The Faculty of Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania; The Department of General Surgery, "Bagdasar-Arseni" Clinical Emergency Hospital, Bucharest, Romania. ionut.coman@umfcd.ro, <https://orcid.org/0000-0002-0535-7100>

Roxana-Andreea Rahnea-Nita

M Hospital, Bucharest, Romania; The Clinical Department, The Faculty of Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania. roxana.rahnea-nita@umfcd.ro, <https://orcid.org/0009-0002-2589-6627>

* Corresponding authors

Abstract:

Introduction: Fear of progression, anxiety and depression are highly interconnected in breast cancer patients and survivors, and they shape adaptation to the disease.

Materials and Methods: This observational, cross-sectional, multicentre, non-interventional study was conducted in two hospitals in Romania during one month (July 2026). A total of 120 patients with breast cancer were assessed with three questionnaires: the Hospital Anxiety and Depression Scale (HADS), the Illness Cognition Questionnaire (ICQ) and the Short Fear of Progression Questionnaire (FoP-12).

Results: Anxiety reached at least the borderline band in 58 patients (48.3%) and depression in 59 patients (49.2%). Fear of progression was dysfunctional in 46 patients (38.3%). High acceptance (64, 53.3%) and high perceived benefits (61, 50.8%) each described about half the sample, whereas high helplessness was uncommon (10, 8.3%).

Discussion: Anxiety and depression were strongly related ($p = .77$, 95% CI [.67, .84], $p < .001$). Helplessness, anxiety, depression and fear of progression were all significantly and positively intercorrelated, with coefficients from .27 to .77, all $q < .01$.

Conclusions: Anxiety, depression and fear of progression were common and closely interrelated, whereas differences between patient subgroups were few and modest once multiple testing was taken into account. These findings are exploratory and support routine psychological screening of breast cancer patients, but they do not identify established risk factors.

Keywords: breast cancer; anxiety; depression; fear of progression; illness adaptation.

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1. Introduction

Breast cancer is a traumatic experience due to its impact on self-image as well as the psychological reactions and fear that arise during the course of the disease and oncological treatment (Tsaras et al., 2018; Piroth et al., 2022; Konieczny et al., 2025). Anxiety and depression are the most prevalent psychiatric conditions among female breast cancer patients, affecting their quality of life and complicating therapeutic management (Piroth et al., 2022; Konieczny et al., 2025; Rahnea-Nita et al., 2024; Puigpinós-Riera et al., 2018).

Adaptation to breast cancer depends on the patient (sociodemographic and psychological characteristics, pre-existing psychological characteristics, social context and available support), and on the disease itself (the time since cancer diagnosis, stage of the disease, surgical operability, need for adjuvant therapy and rehabilitation measures (Holland & Mastrovito, 1980; Niemiec et al., 2026; Pettini et al., 2022; Heppner et al., 2009). Predictive factors for adaptation to the disease include monthly income, type of surgery, and pathological stage (Li et al., 2026). Emotional and financial support from family members is also an important source of emotional support for breast cancer patients (Ding et al., 2024).

Fear of disease progression (FoP) is one of the most prevalent feelings among breast cancer patients, affecting health and quality of life (Zhuang et al., 2024; Mehnert et al., 2006; Lim et al., 2025; Ban et al., 2021). The results of Zhuang J et al. from a cross-sectional survey of 151 breast cancer patients showed that 62.9% of the patients experienced moderately high levels of fear of progression (Zhuang et al., 2024). The multidisciplinary team should alleviate patients' FoP in order to improve their quality of life (QOL) (Ban et al., 2021; Priambodo et al., 2026; Zaouali et al., 2023).

2. Literature Review

2.1. Anxiety and Depression

Hessami et al.(2025), in their study of 283 breast cancer patients, revealed that prevalence rates of depression and anxiety were high (46.6% and 56.9%, respectively). 94.3% of patients received chemotherapy, 30.4% of patients were at stage I and 43.1% had grade 2 tumours. The prevalence of psychological distress was higher among patients who had undergone mastectomy, those without second-degree family history, those living in urban areas, and those with low income (Hessami et al., 2025).

Piroth et al. (2022), in their observational longitudinal study design with 25 women with a first diagnosis of nonmetastatic breast cancer, measured anxiety and depression before, during, and after radiotherapy of the breast. They found that anxiety levels were highest immediately before the start of radiation therapy, while the anxiety levels were lowest on the day that therapy was completed.

Wang et al. (2025), in a prospective study of 504 patients, conducted over one year (August 2022- August 2023), measured anxiety and depression before, during, and after radiotherapy (RT), 1 month after RT, and 6 months after RT. The authors found that the prevalence of depression and anxiety decreased over time. The results of the study revealed that the risk factors for anxiety and depression were family history of cancer, low income, premenopausal status, or menopausal symptoms.

Konieczny et al. (2025), in their study of 211 women with stage I-III breast cancer, measured anxiety and depression one week before and three weeks after chemotherapy, and revealed that chemotherapy in breast cancer patients was associated with a significant increase in anxiety and depression severity. High levels of anxiety and depression appeared among women reporting financial difficulties, while no clear associations were found with cancer stage, life environment or marital status.

Parpori et al. (2024), published the results of a cross-sectional study of 120 female patients (60 with type 2 diabetes mellitus and 60 with type 2 diabetes mellitus and breast cancer). The

authors found that, among patients with type 2 diabetes mellitus and breast cancer, treatment was positively correlated with the occurrence of anxiety and depression, while cancer was negatively correlated with mental health. Marital status did not influence the mental health of the participants.

Lopes et al. (2022), in a study of 506 women admitted in 2012, evaluated symptoms of anxiety and depression before treatment and after one, three, and five years. The five-year prevalence of anxiety and/or depression was 55.4%. Higher education, higher income, and a healthy lifestyle were protective factors against anxiety and/or depression. Job and income loss and mastectomy were associated with higher levels of anxiety and/or depression.

Sharif et al. (2026), conducted a cross-sectional study of 96 female breast cancer survivors receiving treatment (October 2023 - May 2024). The prevalence of anxiety and depression was very high (41.7% and 79.2%, respectively). Younger age and stage IV cancer were predictive factors.

Msenga et al. (2025), published an analytical quantitative cross-sectional study conducted between May and June 2023 among 384 women diagnosed with breast cancer. The authors found a relatively high prevalence of anxiety (44.8%) and depression (50.5%). Patients with early-stage cancer had significantly higher levels of anxiety, while patients without partners, who did not know their stage of cancer or who were receiving radiotherapy were significantly associated with depression.

Wang et al. (2020), based on a systematic literature search, found 17 eligible studies involving 282,203 breast cancer patients regarding the prognostic value of depression and anxiety for breast cancer recurrence and mortality. The results of the study highlighted the important role of depression/anxiety as an independent factor in predicting breast cancer recurrence and survival. Depression was associated with cancer recurrence, all-cause mortality and cancer-specific mortality, while anxiety was associated with recurrence and all-cause mortality but not with cancer-specific mortality. An increase in mortality and suicidal tendencies associated with alcohol consumption was also observed (Iliescu-Bulgaru et al., 2015).

Zaouali et al. (2023), in a cross-sectional descriptive study including 50 outpatients followed for breast cancer, revealed a high prevalence of anxiety and depression.

2.2. Adaptation to the Disease

Li et al. (2026), in a study on psychosocial adaptation in breast cancer patients from the diagnosis through surgery and chemotherapy, identified characteristics and periods of low adaptation levels. This study revealed the facilitators (personal, family and social resources) and barriers (treatment complications, cognitive changes and economic burden) influencing psychosocial adaptation.

Niemiec et al. (2026), in a study of 522 women diagnosed with breast cancer, revealed that a longer time since breast cancer diagnosis was associated with lower levels of anxiety. Patients who had undergone radiotherapy had a lower level of anxiety, also, while patients who had not undergone chemotherapy had a destructive coping style.

Simancas Fernández et al. (2023), in a study of 116 patients, found that there was no significant relationship between resilient and optimistic characteristics and adaptation to the disease.

Pettini et al. (2022), in a study of 660 women with breast cancer from five European cancer centres (January 2019 -November 2021), assessed the combination of biological, clinical, lifestyle-related and cognitive-emotional factors, contributing to the identification of individual resilience trajectories along the care process.

Farnicka et al. (2026), conducted a cross-sectional study among 30 women aged 22–66 undergoing treatment. The conclusions of the study were that psychological adaptation to breast cancer was multidimensional and individualised. Younger women showed higher acceptance. A high level of acceptance of the illness can coexist with significant body image distress.

Bayrak et al. (2026), in a study of 20 patients (May-July 2025) found that patients experienced physical and emotional challenges during the adaptation process.

Patients reported lifestyle changes, focusing on living in the moment and self-care. Family members were identified as being an important factor of support (Bayrak et al., 2026).

Lai et al. (2020), in a descriptive, cross-sectional study of 175 patients with breast cancer, revealed that resilience can strengthen breast cancer-related adaptation.

Chen and Zhao (2021) published an article reporting 1443 online breast cancer users emotional experiences and adjustment during the course of illness. Patients reached a peak in despair and self-focus at Stage III and reported a desire for connections with others at Stage IV.

2.3. Fear of Progression

Lim et al. (2025), in a cross-sectional survey conducted among 242 female breast cancer patients revealed that higher levels of FoP were associated with the utilization of avoidant coping strategies, higher educational levels and advanced cancer stage.

Zhuang et al. (2024), in a cross-sectional survey of 151 breast cancer patients, revealed that greater FoP was associated with younger age and poorer family functioning.

Ban et al. (2021), in a cross-sectional study conducted of 244 female breast cancer patients (October 2019 -May 2020), revealed that social support partly mediated the association between FoP and QOL (proportion: 25%).

Miller et al. (2025), in a study of 997 patients, revealed that although medical misinformation was common, fear of recurrence was not associated with misinformation.

Lu et al. (2024), in their observational study (October 2020 -January 2021) of 200 stage IV breast cancer patients, revealed that ECOG performance status was positively correlated with FoP.

Hassani Alimolk et al. (2024), in a clinical trial involving 80 stage I-III breast cancer patients undergoing active-treatment with scores greater than 34 on the Fear of Progression Questionnaire-Short Form scale. They assessed the efficacy of the Acceptance and Commitment Therapy (ACT)-based intervention in reducing FoP.

3. Methodology

3.1. Study design, setting and participants

This was an observational, cross-sectional, multicentre, non-interventional study. This study was conducted in two hospitals in Romania (M Hospital Bucharest and “St. Apostol Andrei” Hospital, Galati) during one July 2026. A number of 120 patients with breast cancer who presented at the hospital were evaluated, regarding anxiety, depression, adaptation to the disease (helplessness, acceptance and perceived benefits) and fear of progression, using three questionnaires: Hospital of Anxiety and Depression Scale (HADS), Illness Cognition Questionnaire (ICQ) and Short Fear of Progression Questionnaire (FoP-12). The number of participants was determined based on the calculation of the minimum sample size required for statistical significance ($N > 85$).

The Romanian adaptation of the **Illness Cognition Questionnaire** was used to evaluate how a patient reconstructs the meaning of their illness. **Subscales Covered:** The 18 items are split into **Helplessness** (focusing on the aversive nature of the disease), **Acceptance** (diminishing its negative impact), and **Perceived Benefits** (finding positive life changes despite the disease). **Research Context:** In Romanian research, the tool has been used by teams assessing psycho-emotional adaptation during chronic treatments. Academic validations (such as those involving cohorts in clinical settings) have recorded usage rights linked to local psycho-oncology investigators (Subtirelu et al., 2019). The **Fear of Progression Questionnaire** is highly favoured in Romanian clinical psychology because existential fear of recurrence is one of the most prominent unmet needs among local patients. **Adaptation and Scope:** While the original full-length questionnaire features 43 items across five domains, researchers in Romania often use both the full version and the **12-item Short Form (FoP-Q-SF)** to reduce the survey burden on patients. **Validation Evidence:**

The instrument has been formally adapted for the Romanian cancer population (Vâlcu et al., 2023). It has featured prominently in nationwide studies evaluating the interaction between distress, quality of life, and healthcare systemic barriers in Romania.

3.2. Measures

Three self-report instruments were administered. The Hospital Anxiety and Depression Scale (HADS), developed by Zigmond and Snaith (1983), comprises 14 items scored 0–3 and yields two 7-item subscales, anxiety (HADS-A) and depression (HADS-D), each ranging from 0 to 21 and interpreted according to the conventional ranges: 0–7 normal, 8–10 borderline, 11–14 moderate and 15–21 severe (Zigmond & Snaith, 1983; Snaith, 2003; Pais-Ribeiro et al., 2018; Soltaninejad et al., 2025). The Illness Cognition Questionnaire (ICQ), developed by Evers et al. (2001), comprises 18 items scored 1–4 and yields three 6-item subscales — helplessness, acceptance and perceived benefits — each ranging from 6 to 24, with a subscale score of 18–24 treated as high (Evers et al., 1998; Evers et al., 2001; Lauwerier et al., 2010; Sint Nicolaas et al., 2016). The short form of the Fear of Progression Questionnaire (FoP-Q-SF, abbreviated FoP-12 throughout), developed by Mehnert et al. (2006), comprises 12 items scored 1–5, giving a total between 12 and 60, a total of 34 or above indicating a dysfunctional level of fear of progression (Mehnert et al., 2006; Hassani Alimolk et al., 2024; Kállay et al., 2024; Pop, 2019; Herschbach et al., 2005). In addition to the 18–24 band, the number of patients with an acceptance score below 14 is reported. Elevated anxiety or depression was defined as a score of 11 or more on either HADS subscale, that is, the moderate-to-severe range, which is a stricter criterion than the ≥ 8 threshold used for the band distributions. The scales used have been validated and demonstrate a high level of reliability. Specifically, for the HADS-A (Anxiety), the Cronbach's alpha coefficient typically ranges from 0.68 to 0.93, with an overall mean of 0.83; for the ICQ, the alpha coefficient generally falls between 0.79 and 0.80; and the FoP-Q-SF is a highly reliable instrument, with an alpha coefficient reaching 0.95.

The HADS questionnaire is widely available online in romanian language for free as informal self-assessment tools, academic documents, and study guides.

The principal author of the study obtained permission via e-mail to translate in Romanian language and use the Illness Cognition Questionnaire and the Fear of Progression Questionnaire - Short Form (FoP-Q-SF) for academic research.

3.3. Data Preparation

Categorical entries were harmonised across the two centres before analysis. Histopathology was resolved into ductal, lobular and other, the site-specific synonyms for invasive ductal carcinoma being mapped to ductal. Marital status was categorised as partnered or unpartnered. Where Ki-67 was reported as a range or as two values for a bilateral tumour, the upper limit was used. Molecular subtype was derived twice from the same receptor data, once as the three-group NCCN classification and once as the five-group St. Gallen classification. Time since diagnosis was derived from the recorded year of diagnosis against a 2026 reference year: “<1 year” covers diagnoses July 2025 and 2026, “1–5 years” covers 2021 to July 2025, and “>5 years” covers 2020 and earlier. Tumour grade, Ki-67 and molecular subtype had an explicit Unspecified category where the pathology result was not stated; that category was reported descriptively and never served as a comparison arm. Questionnaire totals and item responses were constrained to the possible range of their instrument.

Complete socio-demographic data, complete treatment data and complete totals on all three questionnaires were available for all 120 patients. The six comparisons involving the NCCN classification excluded the single unspecified case and were run on 119 patients; every other comparison used all 120.

3.4. Statistical Analysis

Continuous scores are summarised as mean and standard deviation together with median and interquartile range, categorical variables as counts and percentages. The normality of each psychological score was assessed with the Shapiro–Wilk test, and that classification governed the choice of test for every group comparison of that outcome. All analyses reported below were performed on the full sample of 120 patients, apart from the six comparisons involving the NCCN classification noted in Section 2.3.

A continuous score was compared across a two-level factor with the Welch t test and Hedges' g when the score was normally distributed and with the Mann–Whitney U test and the rank-biserial correlation otherwise, and across three or more levels with one-way analysis of variance and eta squared (Tukey HSD post hoc) or the Kruskal–Wallis test and epsilon squared (Dunn–Bonferroni post hoc). Homogeneity of variance was checked with the median-centred Levene test, the Welch analysis of variance replacing the ordinary F test where variances differed. A factor level had to contain at least five patients to serve as a comparison arm; smaller levels, and the Unspecified category, were excluded from testing and were reported descriptively only. For both Hedges' g and the rank-biserial correlation a positive value means that the first group listed scored higher.

Associations among the psychological scores were quantified with Spearman's rho, with confidence intervals obtained by the Fisher z transformation using the Bonett–Wright variance correction. Associations between the dichotomised high-burden indicators were tested with the Fisher exact test and reported with the odds ratio and the signed phi coefficient. Differences between the two centres in categorical characteristics used the chi-squared test with Cramér's V, replaced by an exact permutation test ($B = 20,000$) where the expected-count assumption failed.

The primary family comprised six pre-specified patient factors: age group, time since diagnosis, disease stage, ECOG performance status, NCCN molecular classification and life environment. Study centre, a design variable, formed a separate pre-specified family, and all remaining variables were tested as a supplementary family. The p values were adjusted with the Benjamini–Hochberg false discovery rate procedure, applied within each outcome across the six factors in the patient family, across the six outcomes in the study-centre family, and within each outcome in the supplementary family. Adjusted values are reported as q; significance for the six psychological outcomes is claimed on q alone, and pairwise post hoc tests were computed only where the omnibus test survived adjustment. Analyses were performed in Python 3 with pandas, SciPy, statsmodels, pingouin and scikit-posthocs; the significance level was .05, two-tailed.

3.5. Inclusion and Exclusion Criteria

The inclusion criteria were:

- patients at least 18 years of age, with histologically confirmed breast cancer
- cancer stage I, II, III and IV
- ECOG Performance Status: 0-3
- patients who agreed to be evaluated with the three questionnaires
- patients who provided the informed consent to participate in this research.

The exclusion criteria were:

- patients under 18 years of age;
- ECOG Performance Status: 4
- patients who did not agree to be evaluated with the three questionnaires
- patients who met the medical inclusion criteria, but did not agree to participate in the study.

4. Results

4.1. Sample Characteristics

The sample comprised 120 women, 70 (58.3%) recruited in Galati and 50 (41.7%) in Bucharest (Table 1). Mean age was 64.03 years (SD 12.94; median 66.5, interquartile range [55, 73], range 26–89), and 68 patients (56.7%) were 65 years or older. Ductal carcinoma predominated (99, 82.5%). Disease stage was distributed across all four categories, with 35 patients (29.2%) at stage IV, and performance status was ECOG 0 or 1 in 102 patients (85.0%). The HR+/Luminal group was the largest molecular category (72, 60.0%) (Table 1).

Table 1. Socio-demographic, clinical and treatment characteristics of the sample (N = 120)

Characteristic	n (%) unless stated
Age, years, mean (SD)	64.03 (12.94)
Median [IQR]	66.5 [55, 73]
Study centre	
Galati	70 (58.3)
Bucharest	50 (41.7)
Age group, years	
<65	52 (43.3)
≥65	68 (56.7)
Level of education	
Elementary	17 (14.2)
High school	87 (72.5)
University	16 (13.3)
Marital status	
Partnered	110 (91.7)
Unpartnered	10 (8.3)
Life environment	
Urban	82 (68.3)
Rural	38 (31.7)
Histopathology	
Ductal	99 (82.5)
Lobular	13 (10.8)
Other	8 (6.7)
Tumour grade	
G1	16 (13.3)
G2	53 (44.2)
G3	28 (23.3)
Unspecified	23 (19.2)
Disease stage	
I	18 (15.0)
II	36 (30.0)
III	31 (25.8)
IV	35 (29.2)
ECOG performance status	
0	48 (40.0)
1	54 (45.0)
2	14 (11.7)
3	4 (3.3)
Time since diagnosis	
<1 year	56 (46.7)
1–5 years	46 (38.3)
>5 years	18 (15.0)
Ki-67	
≤20%	55 (45.8)
>20%	45 (37.5)
Unspecified	20 (16.7)
Molecular classification (NCCN)	
HR+/Luminal	72 (60.0)
HER2-positive	37 (30.8)

Characteristic	n (%) unless stated
Triple-negative	10 (8.3)
Unspecified	1 (0.8)
Molecular subtype (St. Gallen)	
Luminal A	32 (26.7)
Luminal B (HER2-negative)	22 (18.3)
Luminal B (HER2-positive)	28 (23.3)
HER2-positive (non-luminal)	9 (7.5)
Triple-negative	10 (8.3)
Unspecified	19 (15.8)
Treatment received	
Breast-conserving surgery	38 (31.7)
Mastectomy	48 (40.0)
Breast reconstruction	4 (3.3)
Radiotherapy after surgery	77 (64.2)
Radiotherapy, locally advanced or metastatic	14 (11.7)
Chemotherapy	69 (57.5)
Anti-HER2 therapy	14 (11.7)
CDK4/6 inhibitor with hormone therapy	32 (26.7)
Hormone therapy without CDK4/6 inhibitor	54 (45.0)

Note: Percentages are of the full sample of 120; the first two rows give the mean (SD) and the median [IQR] of age in years. "Unspecified" denotes a characteristic not recorded in the source pathology report; it is reported descriptively and never serves as a comparison arm. The NCCN and St. Gallen classifications are two alternative groupings of the same receptor data and therefore both sum to 120. Treatments are not mutually exclusive. Both molecular classifications identify the same 10 triple-negative tumours; the two Unspecified counts differ because the classifications require different information, the single NCCN unspecified case being the one patient whose HER2 result was not recorded.

4.2. Score Distributions

Anxiety reached at least the borderline band in 58 patients (48.3%), distributed as 34 borderline (28.3%), 19 moderate (15.8%) and 5 severe (4.2%). Depression reached at least the borderline band in 59 patients (49.2%): 39 borderline (32.5%), 18 moderate (15.0%) and 2 severe (1.7%). Fear of progression was dysfunctional in 46 patients (38.3%). High acceptance (64, 53.3%) and high perceived benefits (61, 50.8%) each described about half the sample, whereas high helplessness was uncommon (10, 8.3%). An acceptance score below 14 was recorded for 22 patients (18.3%).

4.3. Associations with the Pre-Specified Patient Factors

Table 2 gives the adjusted p value of every comparison in the pre-specified patient family and of the six centre comparisons; the two are separate Benjamini–Hochberg families and their q values are not on a common footing. Three of the 36 patient comparisons were significant after correction; the remaining 33 were not, the smallest adjusted value among them being $q = .118$.

Perceived benefits were higher in patients under 65 years than in those aged 65 or older (18.75 (3.52) versus 16.81 (3.06); Welch t (101.20) = 3.17, $p = .002$, $q = .012$; Hedges' $g = .59$, mean difference 1.94, 95% CI [0.73, 3.16]; Figure 1B). Acceptance was likewise higher in the younger group (median 18.0 [17.0, 20.0] versus 16.0 [14.0, 19.0]; Mann–Whitney $U = 2296.0$, $p = .005$, $q = .029$, rank-biserial $r = .30$; Figure 1A). Both scores were lower in the older stratum. The two effect sizes, a Hedges' g of .59 and a rank-biserial correlation of .30, are not on a common scale and should be read against their own conventions;

Helplessness differed across ECOG performance status; Kruskal–Wallis test, ($H(2) = 11.14$, $p = .004$, $q = .023$, $\varepsilon^2 = .09$; Figure 1C). The Dunn–Bonferroni tests located the difference in the contrasts between ECOG 0 (median 11.0 [8.8, 14.0]) and each of the other two levels (ECOG 0 versus 1, $p = .007$; ECOG 0 versus ≥ 2 , $p = .045$, the latter in an arm of 18 patients), while ECOG 1

and ECOG ≥ 2 shared the same median of 14 and were not distinguished by the test ($p = 1.000$, which with these group sizes is not evidence of equality).

None of the 84 testable comparisons in the supplementary family — education, marital status, histopathology, tumour grade, Ki-67, the St. Gallen classification and each individual treatment — survived correction (smallest $q = .115$; this family was adjusted separately).

The study centre was analysed as a pre-specified family of six comparisons. One difference was substantial and statistically significant: fear of progression was higher in Galati (median 32.0, $M = 33.40$, $SD = 9.35$) than in Bucharest (median 27.0, $M = 26.20$, $SD = 11.08$) This significant difference between the centers may result from cultural differences and varying levels of education between the two populations, as well as the easier access to psychological counseling services enjoyed by the population served by the Bucharest center.

Mann–Whitney test, $U = 2410.50$, $p < .001$, p (FDR) = .003, rank-biserial $r = .38$ (Figure 1D). This was the largest centre difference and the only one to survive adjustment. No other psychological score differed significantly between the centres after adjustment; the depression difference was significant before adjustment but not after ($p = .035$, p (FDR) = .104) (Table 2).

Table 2. (The additional dates can be requested from laura.rebegea@ugal.ro) Benjamini–Hochberg adjusted p values (q) for every comparison of a psychological score with a pre-specified patient factor and with study centre

Outcome	Age	Time since dx	Stage	ECOG	NCCN group	Residence	Centre
Anxiety	.803	.803	.803	.248	.841	.803	.243
Depression	.543	.574	.836	.203	.836	.876	.104
Helplessness	.279	.881	.713	.023 ($\epsilon^2 = .09$)	.713	.144	.818
Acceptance	.029 ($r = .30$)	.906	.810	.118	.810	.906	.818
Perceived benefits	.012 ($g = .59$)	.936	.936	.186	.407	.936	.243
Fear of progression	.672	.649	.508	.336	.734	.508	.003 ($r = .38$)

Note: The q values in the two blocks are therefore not on a common footing. All comparisons used 120 patients except those in the NCCN column, which excluded the single unspecified case and used 119. ECOG performance status entered as the collapsed 0 / 1 / ≥ 2 grouping (Section 3.4). Bold marks $q < .05$ and is accompanied by the effect size: g is Hedges' g , r the rank-biserial correlation, signed so that a positive value means the first group listed scored higher, and ϵ^2 epsilon squared. The three are on different scales and are not comparable across cells.

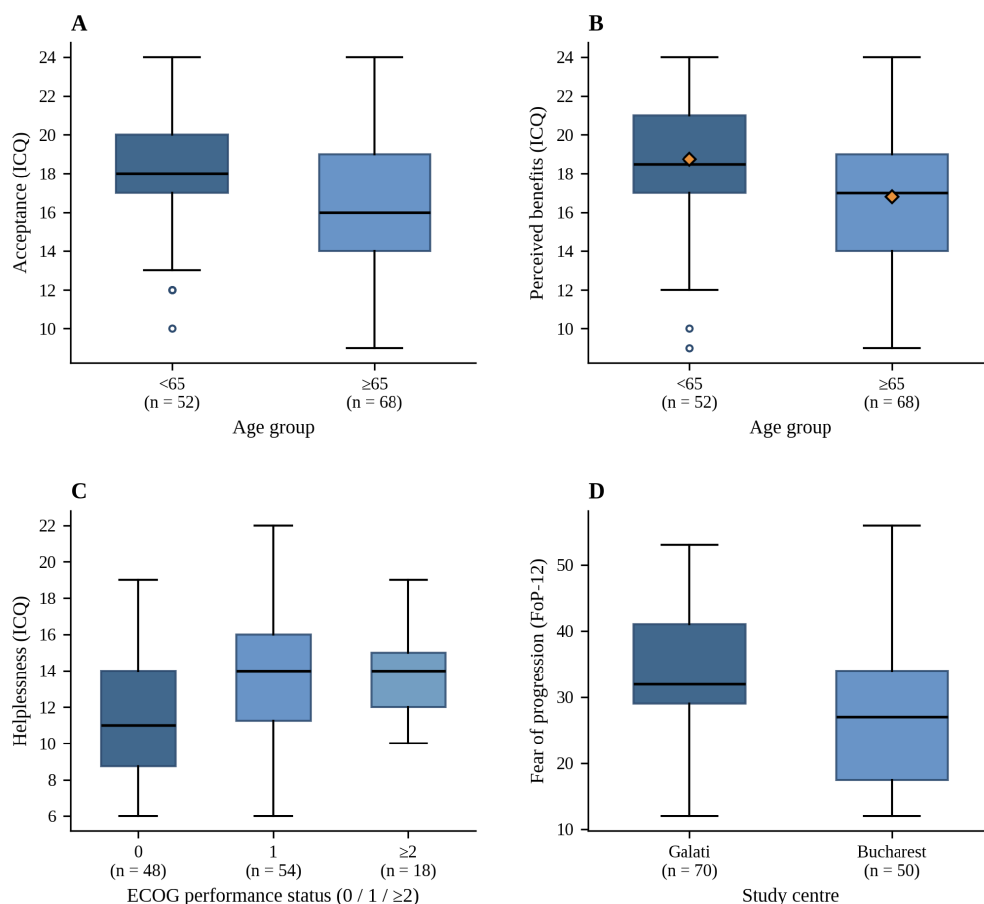


Figure 1. Group differences that reached significance after correction for multiple testing.

(A) Acceptance by age group; (B) perceived benefits by age group; (C) helplessness by ECOG performance status; (D) fear of progression by study centre. The horizontal line marks the group median, the box spans the interquartile range, the whiskers extend to 1.5 times the interquartile range and the circles are individual values beyond that span; group sizes are given on the horizontal axis. The diamond in panel B marks the group mean.

Panels A–C belong to the pre-specified patient family and panel D to the separate study-centre family.

4.4. Associations Among the Psychological Scores

Age was correlated with two of the six scores: negatively with acceptance ($\rho = -.21$, $q = .026$) and with perceived benefits ($\rho = -.34$, $q < .001$). It was not significantly correlated with anxiety, depression, helplessness or fear of progression (all $q \geq .096$). These six correlations belong to the same Benjamini–Hochberg family as the 15 correlations among the scores.

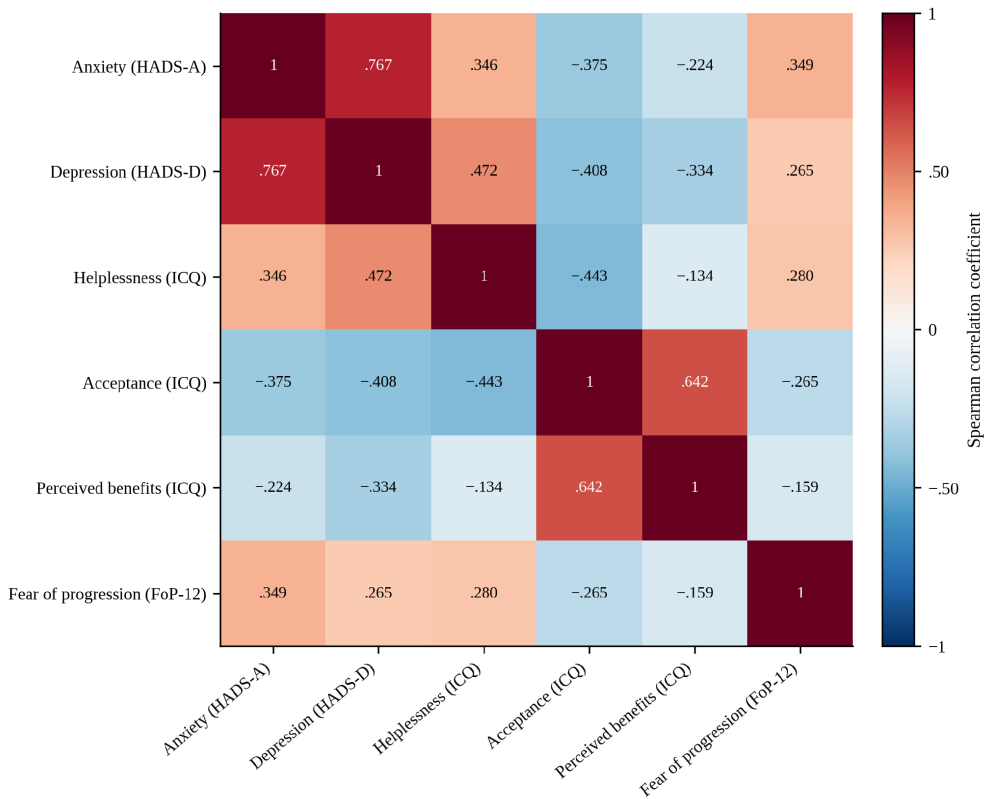


Figure 2. Spearman correlation matrix of the six psychological scores. Cell shading is proportional to the coefficient; positive values indicate that the two scores increase together.

4.5. Co-occurrence of the High-Burden States

Three dichotomous indicators of high burden were derived: abnormal anxiety or depression, defined as a score of 11 or more on either HADS subscale (36 patients, 30.0%); high helplessness (10, 8.3%); and dysfunctional fear of progression (46, 38.3%). All three pairwise associations were positive and significant: abnormal anxiety or depression with high helplessness (7 patients had both; odds ratio 6.52, 95% CI [1.58, 26.9], $p = .008$, $q = .012$, $\phi = .26$), abnormal anxiety or depression with dysfunctional fear of progression (21 both; odds ratio 3.30, 95% CI [1.47, 7.43], $p = .004$, $q = .012$, $\phi = .27$), and high helplessness with dysfunctional fear of progression (7 both; odds ratio 4.25, 95% CI [1.04, 17.4], $p = .043$, $q = .043$, $\phi = .20$).

5. Limitations and Discussion

Our study revealed that elevated symptoms were common but rarely severe. Anxiety exceeded the normal band in 58 of 120 patients and depression in 59, with only 5 and 2 patients, respectively, in the severe range.

Our study revealed that fear of progression reached the dysfunctional level in 46 patients (38.3%).

Our study also revealed that high helplessness was comparatively uncommon (10 patients), while high acceptance and high perceived benefits each described about half the sample.

Perceived benefits were higher in patients under 65 years than in those aged 65 or older.

Acceptance was likewise higher in the younger group.

Helplessness differed significantly by ECOG performance status; there was a contrast between ECOG 0 and ECOG 1 ($p = .007$) and, more weakly, between ECOG 0 and ECOG ≥ 2 ($p = .045$); ECOG 1 and ECOG ≥ 2 did not differ ($p = 1.000$) and their medians were identical.

The life environment was recorded for all 120 patients and was analysed on the whole sample. 82 patients (68.3%) lived in an urban environment and 38 (31.7%) in a rural environment. No difference between urban and rural patients was statistically significant after adjustment.

Fear of progression was also higher in rural patients without approaching significance.

No other pre-specified comparison reached statistical significance after adjustment. The two closest were acceptance by ECOG performance status and helplessness by life environment, both of which crossed the conventional threshold before adjustment but not after it.

Neither time since diagnosis, disease stage nor molecular classification was significantly associated with any psychological score.

The group differences that reached significance after correction for multiple testing were: (A) Acceptance by age group; (B) perceived benefits by age group; (C) helplessness by ECOG performance status; (D) fear of progression by study centre. The difference between the centers may result from cultural differences and varying levels of education between the two populations, as well as the easier access to psychological counseling services enjoyed by the population served by the Bucharest center.

The correlation analysis produced the clearest and most consistent findings in the study. Anxiety and depression were strongly related ($\rho = .77$, 95% CI [.67, .84], $p < .001$, p (FDR) $< .001$). Each of helplessness, anxiety, depression and fear of progression was significantly and positively correlated with each of the others, with coefficients from .27 to .77, all p (FDR) $< .01$. In the opposite direction, acceptance was significantly and negatively correlated with helplessness ($\rho = -.44$, 95% CI [-.58, -.28], $p < .001$, p (FDR) $< .001$) and moved together with perceived benefits ($\rho = .64$, 95% CI [.51, .74], $p < .001$, p (FDR) $< .001$). The dichotomised analysis agreed with the continuous one: all three high-burden indicators co-occurred significantly more often than chance would predict (odds ratios 3.30 to 6.52, all p (FDR) $< .05$).

Following statistical analysis, the results of our study are similar to those of the majority of articles published to date (Bentley et al., 2026; Ding et al., 2026; Krok et al., 2026).

Limitations of the Study

The design is cross-sectional and observational, so no statement about causal direction or about change over time is supported by these data.

The number of positive findings is small relative to the number of tests: 4 of the 126 full-sample group comparisons that could be tested were significant after correction. The Benjamini–Hochberg procedure controls the expected proportion of false discoveries among the comparisons declared significant, but at this ratio the analysis should be read as hypothesis-generating rather than confirmatory.

The modest sample size and the resulting limited statistical power for subgroup analyses—particularly regarding smaller categories—must be taken into account. Consideration must also be given to potential residual confounding and differences in case mix between the two recruitment centers. It should be noted that there are significant cultural and educational differences, as well as disparities in access to specialized psychological services, among the populations served by the two centers.

6. Conclusions

Anxiety and depression were common in this group of 120 women with breast cancer. About half reached at least the borderline band on each HADS subscale, and fear of progression was dysfunctional in 38.3%, although severe scores were rare. The measures were closely related to one another: patients with higher anxiety also reported more depression, more helplessness and more fear of progression, while those who accepted their illness reported less helplessness and greater perceived benefit.

Few patient characteristics distinguished one group from another. Acceptance and perceived benefits were lower in women aged 65 years and over, helplessness was lowest in patients with ECOG performance status 0, and fear of progression was higher in Galati than in Bucharest. These were the only differences to survive correction for multiple testing, and the study assessed each

patient once. They are therefore exploratory and hypothesis-generating rather than established risk factors, and confirming them would require larger prospective studies.

Symptoms of this frequency support routine psychological assessment of patients with breast cancer, so that anxiety, depression and fear of progression are identified and those affected are offered psycho-oncological support. Whether such support improves quality of life or adaptation to the disease was not tested in this study.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committees of the two hospitals: No 1004/06.07.2026 — M Hospital, Bucharest and No. 14471/10.07.2026 — “St. Apostol Andrei” Hospital, Galati.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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Conflicts of Interest: The authors declare no conflict of interest.

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