DOI:10.31557/APJCC.2025.10.3.765

RESEARCH ARTICLE

Coping Strategies Practiced by Breast Cancer Survivors in Duhok City, Iraq

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Abstract

Background: In 2022, 8,626 new breast cancer (BC) cases were reported in Iraq, accounting for 40% of all newly diagnosed cancers. While some women learn to adapt well, others continue to struggle with the impact of the disease. Thus, we aimed to investigate the coping strategies among breast cancer survivors (BCSs) and examine their association with sociodemographic and clinical characteristics. **Material and Methods:** A cross- sectional study was conducted among 319 BCSs attending Azadi Hematology-Oncology Center in Duhok City, Iraq, from December 2024 to March 2025. Data on sociodemographic and clinical characteristics were collected using a structured questionnaire, and coping strategies were assessed using the Coping Orientation to Problems Experienced Inventory (Brief-COPE) questionnaire. Because the data were not normally distributed, non-parametric tests (Kruskal–Wallis and Mann–Whitney U) were used. **Results:** The mean age of participants was 48 years. 92.8% of the BC cases were HR-positive, and 34.5% were HER2-positive. The mean Brief-COPE score was 32.19 ± 4.23. Emotion-focused coping had the highest mean score and was significantly associated only with current BC therapy ($p<0.01$). Problem-focused coping came next, and was significantly associated with time since diagnosis, family monthly income, comorbidities and family history of BC (all $p<0.01$), as well as with menopausal status ($p=0.01$), age and BC stage at diagnosis ($p=0.04$). Lastly, avoidant coping was significantly associated with age, menopausal status, and current BC therapy (all $p<0.01$), as well as time since diagnosis ($p=0.01$) and employment status ($p=0.02$). **Conclusion:** Emotion-focused coping was the predominant coping style employed by breast cancer survivors in Duhok City, Iraq. Statistically significant associations were identified between specific coping styles and various sociodemographic and clinical characteristics, where individual differences, cultural context, and available social support systems shape survivors' adaptation. These findings highlight the need for holistic BCSs care that addresses both medical and psychosocial needs.

Keywords: Breast Cancer Survivors- Coping Strategies- Brief-COPE- Iraq

Asian Pac J Cancer Care, **10 (3)**, 765-773 Submission Date: 07/04/2025 Acceptance Date: 08/12/2025

Introduction

Breast cancer (BC) is the most common cancer among women worldwide [1] and accounted for 40% of all newly diagnosed cancer cases in Iraq in 2022 [2]. Although survival rates have improved in high-income countries, the incidence and mortality of BC continues to rise in low- and middle-income countries (LMICs), where it remains a leading cause of cancer-related deaths among women [3-5].

In Iraq, BC is frequently diagnosed at a relatively advanced stages, which contributes to poorer outcomes and presents unique challenges for affected women [6]. Diagnosis and treatment of BC can be profoundly distressing [7], and although some women persevere through this difficult period and learn to adapt over time, others continue to struggle [8-10]. Each breast cancer survivor (BCS) has a unique capacity to cope, often by employing a range of strategies to manage the stress associated with this disease [11].

Coping is defined as the emotional, behavioral, and cognitive responses that individuals use to manage stressful situations [12]. According to the Coping Orientation to Problems Experienced Inventory (Brief-COPE) [13, 14],

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coping strategies can be categorized into three styles: (1) Problem-focused coping style, where behavior is directed toward solving the problem or situation via active coping, positive reframing, and the use of informational support [15, 16]. (2) Emotion-focused coping style, which attempts to manage the emotional impact of a situation, by seeking emotional or religious support, and/or through acceptance of the situation and even self-blame [15, 17]. (3) Avoidant coping style, where behavior is directed toward escaping from the situation, through behavioral disengagement, denial, and self-distraction [15]. The selection of coping style is influenced by individual characteristics including personality type, prior experiences and perceived support, as well as temporal factors such as disease progression and treatment course [18]. Although BCSs commonly employ various coping strategies, those in the Middle East, including Iraq, often face obstacles that hinder their ability to cope effectively, such as cultural beliefs, cancer-related stigma, limited access to healthcare, and economic hardships [19, 20].

Research focusing on BCSs in Iraq is crucial for enhancing global understanding of cancer survival in low- and middle-income countries, where healthcare resources are frequently limited and cultural understandings of BC remains poor. The present study aimed to investigate coping strategies employed by BCSs, and examine their association with sociodemographic and clinical characteristics.

Materials and Methods

Study design and setting

A cross-sectional study was conducted at Azadi Hematology-Oncology Center in Duhok City, Kurdistan Region of Iraq, from December 2024 until the beginning of March 2025, after obtaining ethical approval from the Research Ethics Committee at the Duhok Directorate General of Health. The authors obtained verbal informed consent from all 319 BCSs who participated in the study.

Participants

Inclusion criteria: BCSs who have completed primary BC treatment (surgery, chemotherapy, and/or radiotherapy), BCSs on hormonal therapy (HR+ve), adjuvant targeted therapy (HER2+ve) or both.

Exclusion criteria: active BC patients receiving chemotherapy, radiotherapy or immediately post-operation were excluded from the study, as well as BC patients with comorbid psychiatric conditions, and recurrent or metastatic BC.

Data collection tools

Sociodemographic and clinical characteristics

Sociodemographic data were obtained from BCSs using a structured questionnaire, and clinical characteristics were obtained from the cancer database at Azadi Hematology-Oncology Center, Duhok City.

Brief-COPE questionnaire

A translated version of the Brief-COPE questionnaire in the Kurdish language was used for the assessment of coping styles utilized by BCSs in Duhok city, Kurdistan region of Iraq, where the primary language is Kurdish. This assessment tool has been widely utilized in the medical setting, particularly among cancer patients [13]. The original Brief-COPE questionnaire consists of 28 items covering three different coping styles, and is designed to assess how individuals respond to and manage stressful situations [14]. In this study, 10 items related to the three coping styles in the Brief-COPE were assessed. Specifically, emotion-focused coping style involved 4 items (seeking emotional support, returning to religion, acceptance, and self-blame), problem-focused coping style involved 3 items (active coping, positive reframing, and use of informational support), and avoidant coping style involved 3 items (behavioral disengagement, denial and self-distraction). An external item related to the social media was also included under avoidant coping, since social media has a high impact on an individual's ability to cope and manage stressful situations by providing an escape from reality. Items were rated according to a 4-point Likert scale, where (1) indicates "I haven't been doing this at all", (2) indicates "a little bit", (3) indicates "a medium amount" and (4) indicates "I've been doing this a lot". Thus, all items have a normal scoring pattern ranging from 1 to 4 [14]. The Brief-COPE questionnaire was translated using a forward and backward translation process to ensure linguistic accuracy [21], and the final version was reviewed and validated by medical experts to establish face-content validity [22].

Statistical analysis

Descriptive and inferential statistics were used to analyze the data. Calculations were carried out using the Package for Social Science (SPSS) program, version 27. Frequencies, percentages, means, SDs and medians, were used to describe the study population. Because the data was not normally distributed, non-parametric (Kruskal-Wallis and Mann–Whitney U) tests were used to check for the significance of associations ($p \leq 0.05$) between different survivors' characteristics and coping styles used by BCSs based on the Brief-COPE scale. Post-hoc Bonferroni correction by repeated Mann-Whitney U tests was performed when overall significance was found, to check for the significance of in-between-groups.

Results

Descriptive of the survivors' sociodemographic data

Of the 319 BCSs participating, the mean age was 48.18 ± 9.43 years, with the majority between 40-59 years. A total of 81.8% were married, and 62.7% lived in urban areas. Nearly half (49.5%) of the participants had no formal education, and 83.7% were unemployed. Regarding work hours, 33.9% worked less than 3 hours/day and 25.4% worked more than 6 hours/day. In terms of income, 49.2% reported a medium family monthly income, as shown in Table 1.

Table 1. Sociodemographic Characteristics of Breast Cancer Survivors and Their Association with Brief-COPE Scores

Survivors' socio-demographics	N	%	Mean ±SD (Median)	P-value
Age *				
Less than 40 y.	46	14.4	32.96 ± 3.77 (33.00)	<0.001
40 - 59 y.	234	73.4	32.49 ± 4.13 (32.50)	
60 y. and above	39	12.2	29.51 ± 4.48 (29.00)	
Marital status *				
Single	44	13.8	32.57 ± 4.83 (33.50)	0.66
Married	261	81.8	32.10 ± 4.13 (32.00)	
Divorced	4	1.3	34.25 ± 4.34 (35.50)	
Widow	10	3.1	32.10 ± 4.50 (33.00)	
Religion *				
Muslim	284	89	32.24 ± 4.24 (32.00)	0.9
Christian	13	4.1	32.23 ± 4.10 (32.00)	
Yazidi	22	6.9	31.50 ± 4.40 (32.50)	
Residence **				
Urban	200	62.7	32.43 ± 4.37 (32.50)	0.15
Rural	119	37.3	31.80 ± 3.98 (32.00)	
Educational level *				
No formal education	158	49.5	31.91 ± 4.93 (32.00)	0.24
Primary	63	19.7	32.32 ± 3.68 (32.00)	
Secondary	39	12.2	31.79 ± 3.13 (31.00)	
University	59	18.5	33.08 ± 3.25 (33.00)	
Employment status *				
Employee	46	14.4	33.35 ± 2.93 (33.00)	0.03
Unemployed	267	83.7	32.04 ± 4.38 (32.00)	
Retired	6	1.9	30.17 ± 4.83 (29.50)	
Job types *				
Housewives	273	85.6	32.00 ± 4.39 (32.00)	0.05
Office work	17	5.3	32.82 ± 2.55 (32.00)	
Non-office work	29	9.1	33.66 ± 3.14 (34.00)	
Current work hours (hrs./day) *				
Not at all	48	15	31.25 ± 5.26 (32.00)	0.58
< 3 hrs./d.	108	33.9	32.19 ± 4.33 (32.00)	
3-6 hrs./d.	82	25.7	32.84 ± 4.24 (33.00)	
>6 hrs./d.	81	25.4	32.09 ± 3.29 (32.00)	
Number of children *				
Single	48	15	32.77 ± 4.71 (33.50)	0.1
0-3	102	32	32.82 ± 4.01 (32.50)	
4-8	146	45.8	31.77 ± 4.19 (32.00)	
9-13	23	7.2	30.87 ± 4.07 (32.00)	
Menopausal status *				
Premenopausal	10	3.1	34.40 ± 3.77 (33.00)	<0.001
Primary menopause	58	18.2	30.14 ± 4.06 (29.00)	
Secondary menopause	251	78.7	32.58 ± 4.15 (33.00)	
Family monthly income *				
Low (< 500,000 ID)	99	31	32.65 ± 4.46 (33.00)	0.01
Medium (500,000-1 million ID)	157	49.2	32.43 ± 4.25 (33.00)	
High (>1 million ID)	63	19.7	30.89 ± 3.57 (30.00)	
Comorbidities *				
None	184	57.7	32.76 ± 4.14 (33.00)	0.01
One comorbidity	81	25.4	31.80 ± 4.25 (32.00)	
Two and more comorbidity	54	16.9	30.85 ± 4.24 (31.00)	

*Kruskal–Wallis test, **Mann–Whitney test, significant $p \leq 0.05$

Descriptive of the survivors' clinical characteristics

The clinical characteristics of BCSs are shown in Table 2. As can be seen, most participants were diagnosed with unilateral BC. 37.3% had Stage 2 BC, 33.2% had Stage 3, and 60.2% were within 10–40 months post-diagnosis. Combined chemotherapy, radiotherapy, and surgery were the most common treatment modality (69.9%). 92.8% had HR-positive BC, and 34.5% had HER2-positive BC. While 33.9% of participants reported a family history of BC.

Coping styles used by BCSs as measured by the Brief-COPE scale

Brief-COPE scores ranged from 18 to 43, with a mean score of (32.19 ± 4.23). Among the different coping styles, emotion-focused coping was the most commonly utilized, with scores ranging from 10 to 16 and a mean of (13.71 ± 1.29). Problem-focused coping ranked second with a mean score of (9.86 ± 2.01), and a range of 3 to 12. In contrast, avoidant coping style had the lowest mean score of (8.61± 2.61), with a minimum of 4 and a maximum of 15.

Association between Brief-COPE scores and sociodemographic data among BCSs

In Table 1, significant associations between sociodemographic factors and Brief-COPE scores are shown. Age and menopausal status were significantly associated with Brief-COPE scores (both $p < 0.001$). Employment status showed a significant association with Brief-COPE scores with a p-value of (0.03). Family monthly income was significantly related to coping ($p = 0.01$). However, survivors with higher incomes reported lowest coping scores. Additionally, comorbidity

Table 2. Clinical Characteristics of Breast Cancer Survivors and Their Association with Brief-COPE Score

Survivors' clinical characteristics	N	%	Mean± SD (Median)	P-value
Laterality*				
Right	155	48.6	31.95 ± 4.29 (32.00)	0.09
Left	157	49.2	32.25 ± 4.09 (33.00)	
Bilateral	7	2.2	36.14 ± 4.91 (40.00)	
BC stage *				
Unknown	57	17.9	31.89 ± 4.20 (32.00)	0.04
Stage 1	37	11.6	31.62 ± 4.15 (32.00)	
Stage 2	119	37.3	31.67 ± 4.77 (31.00)	
Stage 3	106	33.2	33.13 ± 3.48 (33.00)	
Time since diagnosis (months) *				
10-40 m.	192	60.2	32.28 ± 4.19 (32.00)	<0.01
41-70 m.	67	21	30.88 ± 3.71 (30.00)	
>70 m.	60	18.8	33.37 ± 4.59 (33.00)	
Management modalities received *				
None of chemo/ Radio/ Surgery	3	0.9	30.33 ± 4.93 (28.00)	0.18
Chemo/ radiation	2	0.6	36.50 ± 2.12 (36.50)	
Chemo/ surgery	45	14.1	31.84 ± 4.19 (32.00)	
Surgery/ radiation	26	8.2	33.50 ± 4.59 (33.50)	
Chemo/ radiation/ surgery	223	69.9	32.26 ± 4.15 (32.00)	
Chemo alone	8	2.5	30.75 ± 5.60 (31.00)	
Surgery alone	12	3.8	30.17 ± 3.51 (30.00)	
Surgery type *				
No	13	4.1	31.54 ± 5.25 (32.00)	0.27
Mastectomy	144	45.1	31.83 ± 4.40 (32.00)	
Breast conserving surgery	162	50.8	32.56 ± 3.98 (33.00)	
Current cancer therapy *				
Hormonal therapy with tamoxifen	55	17.2	32.60 ± 3.85 (33.00)	<0.01
Hormonal therapy with goserelin and others	53	16.6	30.34 ± 4.25 (29.00)	
Mixed hormonal therapy	145	45.5	32.77 ± 3.79 (32.00)	
Targeted therapy	28	8.8	32.39 ± 5.63 (33.00)	
Targeted therapy + Hormonal therapy	38	11.9	31.82 ± 4.63 (33.00)	
Family history of BC *				
Yes	108	33.9	32.54 ± 4.39 (32.00)	0.01
No	178	55.8	32.37 ± 4.12 (33.00)	
Unknown	33	10,3	30.12 ± 3.84 (30.00)	

Table 2 Continued.

Survivors' clinical characteristics	N	%	Mean± SD (Median)	P-value
HR-status **				
Positive	296	92.8	32.22 ± 4.11 (32.00)	0.88
Negative	23	7.2	31.87 ± 5.69 (32.00)	
HER-2 status **				
Positive	113	35.4	31.93 ± 4.58 (32.00)	0.51
Negative	206	64.6	32.33 ± 4.04 (32.00)	

*Kruskal–Wallis test, **Mann–Whitney test, significant p ≤ 0.05, (HR)-hormonal receptor status, (HER-2)-human epidermal growth factor receptor-2.

status had p-value of (0.01), where survivors without comorbidities had higher coping scores than other groups.

Association between Brief-COPE scores and clinical factors among BCSs

As shown in Table 2, variations in Brief-COPE scores were significantly associated with BC clinical factors. BC stage was found to be significantly associated with coping (p = 0.04), where BCSs diagnosed at stage 3 reported the highest mean Brief-COPE scores. Time since diagnosis showed a significant association with coping (p < 0.01), where individuals diagnosed more than 70 months ago had the highest Brief-COPE scores. Current BC therapy was significantly associated with coping (p < 0.01), with participants receiving mixed hormonal therapies reporting the highest Brief-COPE scores. A significant association was also identified between family history of BC and Brief-COPE scores (p = 0.01), where survivors with a known family history reported the highest scores.

Differences in coping styles scores based on survivor's sociodemographic and clinical characteristics

Significant differences in coping style scores were identified across many variables, as shown in Table 3. Problem-focused coping was significantly associated with time since diagnosis, family monthly income, comorbidities and a family history of BC (all p<0.01), as well as with menopausal status (p=0.01), age and BC stage at diagnosis (p=0.04). Avoidant coping style was significantly associated with age, menopausal status, and current BC therapy (all p<0.01), as well as time since diagnosis (p=0.01) and employment status (p=0.02). In contrast, emotion-focused coping scores did not differ significantly across most of the examined variables, with exception of current BC therapy (p < 0.01).

Discussion

As a result of early diagnosis and effective therapeutic management, women with a history of BC constitute the largest group of cancer survivors in developed nations [19]. Therefore, we investigated the coping styles used by BCSs from Duhok City, Kurdistan Region of Iraq during this challenging period, and examine their association with sociodemographic and clinical characteristics.

Surprisingly, based on clinical data collected during the study, HER2-positive BC cases were found to exceed 35%, which is notably higher than the globally reported range of 15–20% [23]. A similar trend was observed in Saudi Arabia, where a previous study [24] reported that 29.9% of BC cases were HER2-positive BC. In contrast, a study [25] conducted in Jordan reported a lower proportion (23.8%) of HER2-positive BC. These variations suggest potential regional differences that may be influenced by genetic, environmental, or healthcare-related factors.

The study revealed a significant association between age and different coping style scores, where younger BCSs reported use of both problem and avoidant-focused coping styles more than older BCSs. These findings are in contrast with published results from Ghana [26], where, based on Brief-COPE questionnaire responses from 202 participants, age was not significantly associated with problem-focused coping; however, older age was associated with less frequent use of avoidant coping. Another study [27] of 489 young survivors (≤45 years) conducted using the Brief-COPE showed greater use of problem-focused coping styles. This difference may be attributed to stressors such as career disruption, family responsibilities, body image fears, and worries about fertility. In contrast, older survivors might view illness as an expected part of aging, potentially reducing the intensity of their coping responses.

Employment status was significantly associated with practicing avoidant coping styles, where employed survivors reported the highest avoidant coping scores than other groups. This aligns with a previous study showing that practice of avoidant and problem-focused coping styles were more frequently associated with employed than unemployed BCSs [26], this may be due to the fact that employed individuals often have greater access to social support networks than unemployed individuals, which are crucial for effective coping and emotional resilience.

Menopausal status was also significantly associated with different coping styles, with premenopausal BCSs reporting greater use of both problem and avoidant coping styles compared to postmenopausal BC survivors. This is consistent with a previous study [28], which reported that premenopausal women practice different coping styles, like active coping and avoidance, compared to their postmenopausal counterparts, who often face deeper psychological challenges that hinder their coping responses.

Interestingly, BCSs with lower family monthly income had higher Brief–COPE scores, and relied more on problem–focused coping styles than the higher–

Table 3. Differences in Coping Styles Scores Based on Survivor's Sociodemographic and Clinical Characteristics

Survivors' characteristics	Problem focused coping style		Emotion focused coping style		Avoidant coping style	
	Mean ± SD (Median)	P-value	Mean ± SD (Median)	P-value	Mean ± SD (Median)	P-value
Age groups						
Less than 40 y.	9.97 ± 1.80 (10.00)	0.04 *	13.63 ± 1.23 (13.00)	0.2	9.34 ± 2.53 (9.00) [ab]	<0.001*
40 - 59 y.	9.96 ± 1.99 (10.00) [c]		13.77 ± 1.32 (13.00)		8.74 ± 2.55 (9.00)	
60 y. and above	9.19 ± 2.28 (9.00)		13.46 ± 1.16 (13.00)		6.94 ± 2.48 (6.00)	
Employment status						
Employee	10.21 ± 2.03 (11.00)	0.25	13.80 ± 1.10 (13.50)	0.62	9.32 ± 2.03 (9.50) [ab]	0.02*
Unemployed	9.80 ± 2.02 (10.00)		13.70 ± 1.33 (13.00)		8.52 ± 2.68 (8.00)	
Retired	9.66 ± 1.75 (9.50)		13.50 ± 1.22 (13.00)		7.00 ± 2.19 (7.00)	
Menopausal status						
Premenopausal	11.10 ± 0.99 (11.00) [a]	0.01*	13.80 ± 1.54 (13.00)	0.23	9.50 ± 2.50 (10.00) [a]	<0.001*
Primary menopause	9.48 ± 1.85 (9.00) [c]		13.44 ± 1.09 (13.00)		7.20 ± 2.44 (7.00) [c]	
Secondary menopause	9.90 ± 2.06 (10.00)		13.77 ± 1,32 (13.00)		8.90 ± 2.55 (9.00)	
Family monthly income						
Low (< 500,000 ID)	8.83 ± 2.73 (8.00) [b]	<0.01*	13.85 ± 1.48 (13.00)	0.25	9.94 ± 2.10 (10.00)	0.29
Medium (500,000-1 million ID)	8.66 ± 2.71 (8.00) [c]		13.70 ± 1.28 (13.00)		10.06 ± 1.97 (10.00)	
High (>1 million ID)	8.14 ± 2.08 (8.00)		13.52 ± 0.96 (13.00)		9.22 ± 1.87 (9.00)	
Comorbidities						
None	10.14 ± 1.90 (10.00) [ab]	<0.01*	13.78 ± 1.38 (13.00)	0.46	8.83 ± 2.57 (9.00)	0.14
One comorbidity	9.70 ± 1.81 (10.00)		13.65 ± 1.14 (13.00)		8.44 ± 2.74 (8.00)	
Two and more comorbidity	9.14 ± 2.46 (9.50)		13.57 ± 1.19 (13.00)		8.12 ± 2.49 (8.00)	
BC stage						
Unknown	9.94 ± 1.90 (10.00)	0.04*	13.66 ± 1.13 (13.00)	0.9	8.28 ± 2.38 (8.00)	0.1
Stage 1	9.97 ± 1.53 (10.00)		13.56 ± 0.83 (13.00)		8.08 ± 3.04 (8.00)	
Stage 2	9.43 ± 2.27 (10.00) [d]		13.69 ± 1.48 (13.00)		8.53 ± 2.66 (8.00)	
Stage 3	10.25 ± 1.84 (11.00)		13.81 ± 1.29 (13.00)		9.06 ± 2.48 (8.50)	
Time since diagnosis (months)						
10-40 m.	9.89 ± 2.11 (10.00) [a]	<0.01*	13.72 ± 1.36 (13.00)	0.84	8.66 ± 2.65 (8.00) [a]	0.01*
41-70 m.	9.34 ± 1.84 (9.00) [c]		13.62 ± 1.21 (13.00)		7.91 ± 2.16 (7.00)	
>70 m.	10.33 ± 1.76 (11.00)		13.78 ± 1.18 (13.00)		9.25 ± 2.78 (9.00) [c]	
Current BC therapy						
Hormonal therapy (tamoxifen)	10.00 ± 1.83 (10.00)	0.26	14.00 ± 1.17 (14.00) [ac]	<0.01*	8.60 ± 2.46 (8.00) [a]	<0.01*
Hormonal therapy (goserelin and others)	9.49 ± 1.91 (9.00)		13.39 ± 0.94 (13.00) [c]		7.45 ± 2.64 (7.00) [cf]	
Mixed hormonal therapy	9.93 ± 2.00 (10.00)		13.82 ± 1.27 (13.00) [h]		9.01 ± 2.51 (9.00)	
Targeted therapy	10.17 ± 2.37 *11.00)		13.96 ± 1.68 (13.50) [i]		8.25 ± 3.02 (8.00)	
Targeted & Hormonal therapy	9.65 ± 2.19 (10.00)		13.15 ± 1.46 (13.00)		9.00 ± 2.42 (8.50)	
Family history of BC						
Yes	9.97 ± 1.87 (10.00) [b]	<0.01*	13.80 ± 1.27 (13.00)	0.47	8.75 ± 2.82 (8.00)	0.46
No	10.03 ± 1.92 (10.00) [c]		13.70 ± 1.33 (13.00)		8.62 ± 2.55 (8.00)	
Unknown	8.54 ± 2.52 (9.00)		13.48 ± 1.17 (13.00)		8.09 ± 2.18 (8.00)	

Kruskal–Wallis test performed for whole variables, *significant $p \leq 0.05$, [Bonferroni correction by repeated Mann Whitney test was performed for only those variables showed significant association, where [a] (significant difference between group 1 and 2), [b] (significant difference between group 1 and 3), [c] (significant difference between group 2 and 3), [d] (significant difference between group 3 and 4), [e] (significant difference between group 1 and 5), [f] (significant difference between group 2 and 5), [h] (significant difference between group 3 and 5), [i] (significant difference between group 4 and 5)].

income groups. This is in agreement with another study [29], on a larger sample, which assessed coping based on annual household income, where low-income BCSs relied on problem-focused coping and sought help for their concerns, despite facing challenges in obtaining assistance.

BC survivors without comorbidities tended to rely more on problem-focused coping styles, since they reported the highest coping score for this category compared to other groups. In contrast with a previous study [30], which found that survivors with comorbidities were more likely to employ maladaptive coping strategies, such as helplessness and hopelessness.

BC stage at diagnosis was significantly associated with coping styles. Where, survivors diagnosed at stage 3 predominantly practiced problem-focused coping styles

more than those at other stages. Conversely, a study [31] conducted on a large population of black and white US women showed that survivors with early-stage BC at diagnosis were associated with more avoidant coping style practice, highlighting the variability of coping strategies across different populations.

Time since diagnosis was another important variable associated with coping styles. Long-term survivors diagnosed over 70 months ago reported the highest problem and avoidant-focused coping scores compared to short-term survivors diagnosed between 10 and 40 months ago. In contrasts, a study of predominantly long-term BC survivors who had not received treatment in the last month showed lower coping scores over all coping styles compared to short-term survivors [32].

Emotion-focused coping styles were significantly associated only with the type of current BC therapy. BC survivors receiving hormonal therapy (Tamoxifen) reported higher emotion-focused coping scores, followed by avoidant coping scores. This result is in line with a study conducted in Sweden [33], where survivors with endocrine therapy often relied on "acceptance" as an emotional coping style and, to some extent, "thinking of something else" as an avoidant coping style.

Although a family history of BC was associated with differences in coping style preferences, this relation has not been extensively investigated in previous studies. This study indicates that problem-focused coping styles were practiced more by survivors without a family history of BC, suggesting that survivors with a family history of BC may carry emotional burdens from seeing relatives' hardships that could reduce their use of active coping strategies.

Strength

This study is the first to examine coping styles among breast cancer survivors in Duhok City, Kurdistan Region of Iraq, and thus offers novel insights into a previously unexplored aspect of BC survival in this region.

Limitations

The study has several limitations. First, the cross–sectional design of the study makes it impossible to determine the causality of the different coping styles practiced by BCSs. Nevertheless, this design was appropriate for the primary aim of the study. Second, the study was conducted only in Duhok City, which may limit the generalizability of results to other regions or cultural settings within Iraq.

Implications

The predominance of emotion-focused coping styles among BCSs in this study emphasizes the importance of addressing psychological and social needs in addition to medical treatment. Physicians should recognize that effective BC management extends beyond pharmacological treatment and standard clinical interventions to include rehabilitation and palliative care, ensuring a holistic approach that supports both physical and psychosocial well-being.

Future research

Building on these findings, future research should employ longitudinal designs to assess changes in coping styles over different survivorship periods, explore causal relationships with psychosocial and clinical outcomes, and assess the effectiveness of culturally adapted interventions. Expanding future research to include additional regions of Iraq, as well as inclusion of a larger, more diverse sample will enhance generalizability and provide a more comprehensive understanding of coping strategies practiced by BCS's.

In conclusion, Emotion-focused coping was the predominant coping style employed by breast cancer survivors in Duhok City, Iraq. Statistically significant associations were identified between specific coping styles and various sociodemographic and clinical characteristics, where individual differences, cultural context, and available social support systems shape survivors' adaptation. These findings highlight the need for holistic BCSs care that addresses both medical and psychosocial needs.

Acknowledgements

We would like to thank Dr. Rezvan Faisal Abduljabbar (Consultant Medical Oncologist at Azadi Hematology-Oncology Center) and all BC survivors who participated. Without their participation this study could not have been completed, and we appreciate all those who have contributed to this study directly or indirectly.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflict of interest.

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