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# Coping skills and associated sociodemographic, clinical, and psychological factors among women with breast cancer in Iraq: a cross-sectional study"

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## Abstract

**Background** Coping skills play a vital role in managing the physical and psychological effects of breast cancer (BC). Despite improvements in early detection and treatment, Breast cancer survivors continue to face long-term challenges after diagnosis. Therefore, this study aims to evaluate the coping skills employed by breast cancer women in Iraq and to identify the sociodemographic, clinical, and psychological factors associated with these coping skills.

**Methods** A cross-sectional study was conducted among 244 breast cancer women in The Medical City Teaching Oncology Hospital, Baghdad, Iraq, from August 2023 to October 2023, coping skills and psychological factors were assessed using the BRIEF COPE-28, and Hospital Anxiety Depression scale (HADS), respectively. Sociodemographic and clinical characteristics were also assessed. The associations between the associated factors and coping skills were assessed using multiple linear regression.

**Results** Mean (SD) coping skills for active coping, passive coping, and seeking support were 5.96 (1.31), 4.00 (1.10), and 7.58 (0.84), respectively. Multiple linear regression analysis indicated that active coping was significantly influenced by hormonal therapy, anxiety, and depression ( $p < 0.05$ ), while type of surgery and anxiety were associated with passive coping ( $p < 0.05$ ), whereas seeking support was affected by disease stage, duration surgery, and anxiety ( $p < 0.05$ ).

**Conclusion** This study highlights the associated factors influencing the coping skills among breast cancer women in Iraq, and the need for targeted psychological and clinical interventions to improve coping skills.

**Keywords** Breast cancer, Coping skills, Psychological factors, Associated factors, *Iraq*, *Cross-sectional study*

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## Introduction

Breast cancer (BC) remains the most common cancer among women worldwide. In 2020, BC caused the death of approximately 685,000 women worldwide and was detected in about 2.2 million women [31]. Moreover, over 100 countries report it as the leading cause of cancer-related deaths [24]. In Iraq, BC was the most prevalent cancer in 2020 [35] despite advancements in early detection and treatment [29]. BC survivors often experience long-term physical, social, emotional, and psychological challenges that persist well beyond treatment [18].

Women in developing countries, including Iraq, encounter additional challenges following a BC diagnosis. These challenges range from managing physical symptoms to coping with the emotional distress brought about by their diagnosis and treatment [22]. Thus, coping with a BC diagnosis and the use of different strategies is key to overcoming this stressful situation [20]. Therefore, many women adopt coping skills to address these physical and psychological burdens. Indeed, the process of adapting to BC involves managing a wide range of stressors, including the effects of surgery, the side effects of adjuvant therapies, and changes in life circumstances [25].

Furthermore, research has shown that coping skills vary significantly among individuals, shaped by factors such as personality, prior experiences, and environmental influences [38]. According to Lazarus and Folkman's stress and coping theory, coping is defined as the cognitive and behavioural efforts people make to manage specific demands perceived as stressful. Generally, coping skills are categorized into active coping that involve taking direct action to manage the disease and maintaining a healthy lifestyle, and this approach is associated with better psychological adaptation [7], passive coping that characterized by avoidance, denial, or reliance on others without proactive engagement [28]. It is linked to higher distress levels and poorer quality of life [20], and seeking support which involves reaching out to family, friends, or healthcare providers for emotional, or practical assistance. This strategy can reduce psychological distress and enhance quality of life [25].

Thus, the critical role of coping in adapting to BC women adapt to the challenges of their diagnosis and treatment [26], significant gaps exist in the literature, especially regarding the simultaneous examination of all three coping types and their association with sociodemographic, clinical, and psychological factors in breast cancer (BC) patients, particularly in Iraq [21]. No previous studies have comprehensively explored these interactions in this unique sociocultural and healthcare context. This study aims to fill this gap by assessing the coping skills of Iraqi women with breast cancer and their associated sociodemographic, clinical, and psychological factors,

providing insights for culturally appropriate psychosocial interventions and support systems.

## Methods of study

### Study setting

This study was conducted in the Medical City Oncology Hospital in Baghdad, Iraq, from August 1, 2023, to October 1, 2023. It was chosen because it has the largest oncology hospital in attendance of patients from all the governorates of Iraq to receive treatment and follow-up.

### Study design

A cross-sectional survey was conducted among BC women. The sample method was selected using a universal convenient sampling technique. The sample size calculation for identifying socio-demographic, clinical, and psychological factors associated with coping skills among BC women. The sample size was calculated by using F tests, multiple linear regression fixed model by G power software. A total of 244 participants were included, the inclusion criteria included women aged 18 to 70 years diagnosed with BC (at least 6 to 24 months before the interview), in stages I to IV, who had undergone breast surgery and received chemotherapy and radiotherapy, proficient in reading and understanding Arabic. Written informed consent was used in this study. Participants were informed that they had the right to withdraw from the study at any time without affecting medical services.

### Study instruments

The study instrument includes a questionnaire to collect socio-demographic and clinical data, the Hospital Anxiety and Depression Scale (HADS) was used to assess the psychological level, and the Brief COPE- 28 scale was used to determine the coping skills.

The socio-demographic variable includes (age, marital status, level of education, employment status, financial perception, number of children). Clinical data were obtained from the medical records. Clinical characteristic variables include history of chronic disease, menopausal status, family history of BC, duration of BC diagnosis, stage of disease, affected breast(s), metastasis BC, duration since surgery, type of surgery, breast reconstruction, Chemotherapy treatment line, hormonal therapy.

The Hospital Anxiety and Depression Scale (HADS), was adapted from [39] to assess the psychological levels of BC women. This self-report scale comprises 14 items on a 4-point Likert scale (range 0–3), with seven items each for anxiety and depression subscales, each subscale score ranging from 0 to 21. Anxiety and depression values were calculated using cut-off scores [6], including the classification proposed by Terkaw [36, 36], scores of 0–7 are considered normal, 8–10 indicate a borderline case, and 11–21 suggest the presence of anxiety or depression.

Studies consistently demonstrate the robust internal consistency of HADS, validating its reliability in clinical practice, including applications in Arab populations [36]. The Cronbach's  $\alpha$  for the HADS anxiety subscale was 0.83 at time 1 (The initial assessment ()) and 0.87 at time 2 (subsequent assessment), while for the depression subscale, it was 0.77 at time 1 and 0.80 at time 2. These results indicate adequate internal consistency among patients for both HADS subscales at both time points.

The Brief COPE-28 scale was used to assess the coping skills of BC women. Developed by Carver [8, 8], it consists of 14 subscales, including (self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioural disengagement, venting, positive reframing, planning, humour, acceptance, religion, and self-blame), each evaluating specific coping behaviours with scores ranging from 2 to 8. Higher scores indicate increased utilization of that particular coping skills [10]. Responses to the items of the Brief COPE were rated on a four-point scale, with 1= 'I have not been doing this at all, 2= 'I have been doing this a little bit, 3= 'I have been doing this a medium amount' and 4= 'I have been doing this a lot [10].

The validity and the internal reliability of the Brief-COPE- 28 questionnaires for Arabic society were established in several studies, and the validity and reliability records for the Brief-COPE questionnaire were considerably adequate [2]. The Arabic version of the brief cope used in this study is based on a 3-factor structure that is active coping, passive coping, and seeking support. It has been shown to be both valid and reliable within the Arab population, making it a useful tool for both clinical practice and research [2].

The overall Cronbach's alpha for the coping skills subscales for the current pilot study ( $n=25$ ) was 0.76, indicating acceptable reliability. Subscales like active coping and positive reframing showed strong internal consistency, while substance use and behavioural disengagement had negative correlations, suggesting lower reliability for these subscales.

#### Data collection and procedures

Written informed consent was obtained, and data were collected through face-to-face interviews, with clinical details extracted from medical records. The supervisor trained data collectors to ensure quality, and the principal investigator monitored the process. As outlined in Fig. 1. Participants were recruited through face-to-face interviews conducted by Arabic-speaking researchers. The BC women scheduled for admission and referral in the ward who met the inclusion criterion were recruited as study participants.

#### Statistical methods

Data analysis was conducted using SPSS version 26.0. Descriptive statistics, including mean, standard deviation (SD), frequency, and percentages, were calculated for central tendency and categorical variables. Simple and multiple linear regressions were performed on all independent variables, with variables having a  $p$ -value  $< 0.025$  selected for inclusion in the multivariate analysis. Assumptions for linear regression were met, including the absence of significant multicollinearity, verified through correlation matrices and variance inflation factors (VIF), and homoscedasticity, confirmed by graphical methods and statistical tests. Forward selection in multiple linear regression was employed to identify the most relevant predictors of coping skills, ensuring model parsimony and interpretability. The normality of residuals was also verified. The beta coefficient,  $t$ -value, and  $p$ -value were reported for each dependent variable, with statistical significance set at  $p \leq 0.05$ .

#### Result

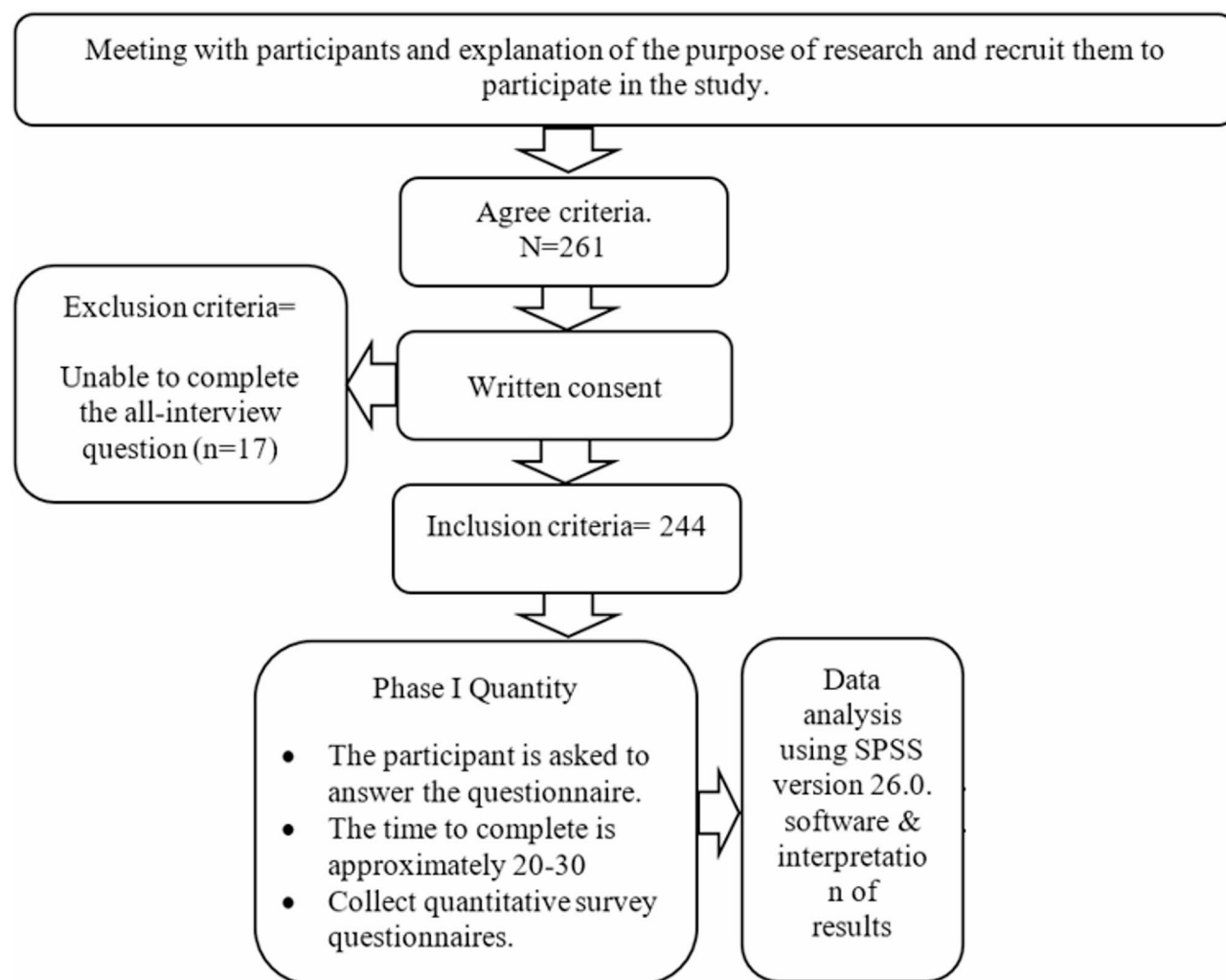
Out of 261 eligible participants, 244 completed the questionnaires, resulting in a response rate of 93.48%. The primary reasons for dropout included time constraints, survey fatigue, lack of interest or perceived relevance, and emotional distress.

Table 1: illustrated the sociodemographic, clinical, coping skills, and psychological characteristics of BC women. The mean age of the participants was 49.31. Clinically, 53.7% had been diagnosed for over 12 months, and majority (89.8%) were in stages I and II of BC, in terms of coping skills, the mean score with a standard deviation for active coping, passive coping, and seeking support was 5.96 (1.31), 4.00 (1.10), and 7.58 (0.84), respectively. Furthermore, Significant associations were found between coping strategies and factors like diagnosis duration, hormonal therapy, financial perception, chronic disease, cancer stage, and surgery type.

Table 2 demonstrates the results of the simple linear and multiple linear regression analysis for associated factors for coping skills in BC women. The multiple regression analyses showed that women who did not undergo hormonal therapy experienced a 0.35 decrease in active coping strategies scores compared to those who did receive hormonal therapy. Women with anxiety and depression were negatively associated with active coping.

Women who had a mastectomy were more likely to engage in passive coping than those who had a lumpectomy. Additionally, for each unit increase in anxiety score, the passive coping score increased by 0.06.

The final results of analysis showed that women with stage I and II BC had a 0.87 higher score in the seeking support domain compared to those with stage III and IV BC. Additionally, women who had surgery more than six



**Fig. 1** Data collection process of the study>

months before the interview had a 0.55 higher score in this domain compared to those who had surgery within six months. Furthermore, for each unit increase in anxiety score, there was a 0.20 increase in the seeking support domain.

## Discussion

This study highlighted the findings on the coping skills of women with BC in Iraq, as assessed by the Brief Cope Instrument. It reveals significant insights into their psychological resilience and support mechanisms. We found that women in the early stages of BC (stages I and II) tend to seek more social support compared to those in advanced stages (III and IV). Additionally, those who had surgery more than six months prior to the assessment showed higher levels of seeking support. Anxiety also plays a crucial role, with higher anxiety levels correlating with increased use of support-seeking strategies. These findings highlight the importance of tailored

psychosocial interventions that consider the stage of disease, time since surgery, and anxiety levels to effectively support Iraqi women coping with BC.

The mean score for active coping suggests that BC women in Iraq predominantly engage in proactive strategies, such as planning, problem-solving, and acceptance, which help foster a sense of control and reduce distress [2]. Conversely, the lower mean score for passive coping indicates that avoidance and denial are less commonly used. However, reliance on passive coping can lead to feelings of helplessness and increased psychological distress, as supported by O'smiałowska et al. [26, 38], who found that passive coping often exacerbate mental health issues and symptom burden [26, 38]. In contrast, our study does not align with the findings of Kelkil et al., (2022) study, which indicated that the majority of BC women in the Ethiopia experienced negative coping strategies [16].

**Table 1** Descriptive and simple linear regression analysis of factors associated with coping skills among BC Women (n = 244)

Variables	n (%)	Mean (SD)	P value for active coping	P value for passive coping	P value for seeking support
<b>Sociodemographic Characteristics</b>					
<b>Age (years)</b>		49.31 (9.08)	0.436	0.074	0.773
<b>Marital status</b>					
Single	43 (17.6)				
Married or cohabiting	201 (82.4)	0.501	0.718	0.248	
<b>Education level</b>					
Low education	164 (67.2)				
High education	80 (32.8)	0.423	0.094	0.452	
<b>Employed status</b>					
Employed (or retired)	57 (23.4)	0.179	0.798	0.012	
Unemployed	187 (76.6)				
<b>Financial perception</b>					
Not enough	178 (73.0)				
Enough	66 (27.0)	0.116	0.049	0.629	
<b>Number of children</b>					
0–3	115 (47.1)	0.872	0.345	0.279	
>3	129 (52.9)				
<b>Duration of BC diagnosis</b>					
≤ 12 months	113 (46.3)				
> 12 months	131 (53.7)	0.034	0.099	0.279	
<b>Menstrual status</b>					
Menstrual interruption	206 (84.4)	0.695	0.292	0.721	
No interruption	38 (15.6)				
<b>Stage of disease</b>					
Stage (I and II)	219 (89.8)	0.942	0.558	0.001	
Stage (III and IV)	25 (10.2)				
<b>Affected breast</b>					
Unilateral	235 (96.3)	0.067	0.678	0.012	
Bilateral	9 (3.7)				
<b>Family history of BC</b>					
Yes	108 (44.3)	0.590	0.883	0.881	
No	136 (55.7)				
<b>History of chronic disease</b>					
Yes	104 (42.6)	0.938	0.045	0.130	
No	140 (57.4)				
<b>Type of surgery</b>					
Mastectomy	221 (90.6)	0.161	0.007	0.062	
Lumpectomy	23 (9.4)				
<b>Duration since surgery</b>					
At least six months	55 (22.5)				
More than six months	189 (77.5)	0.279	0.537	< 0.000	
<b>Metastatic BC</b>					
Yes	39 (16.0)				
No	205 (84.0)	0.743	0.054	0.041	
<b>Breast reconstruction</b>					
Yes	11 (4.5)				
No	233 (95.5)	0.481	0.589	0.012	
<b>Hormonal therapy</b>					
Yes	129 (52.9)				
No	115 (47.1)	0.024	0.985	0.032	
<b>Chemotherapy treatment line</b>					
Chemotherapy only	118 (48.4)				
Chemotherapy + radiation	126 (51.6)	0.332	0.204	0.083	

**Table 1** (continued)

Variables	n (%)	Mean (SD)	P value for active coping	P value for passive coping	P value for seeking support
<b>Brief COPE-28</b>					
Active coping		5.96 (1.31)			
Passive coping		4.00 (1.10)			
Seeking support		7.58 (0.84)			
<b>The Hospital Anxiety and Depression Scale (HADS)</b>					
Anxiety	145(59.4)		< 0.001	< 0.000	0.408
Depression	138(56.6)		< 0.001	< 0.000	0.775

**Table 2** Regression analysis findings on factors associated with coping skills in BC women (N = 244)

Variable	Simple linear regression			Multiple linear regression		
	b(95%CI)	t-statistic	P value	Adjusted b(97.5%CI)	t-statistic	P value
<b>Factor associated with active coping among BC women</b>						
<b>Had Hormonal therapy for BC</b>						
Yes	-	-	-	-	-	-
No	-0.37 (-0.75, -0.00)	-2.27	0.024	-0.35 (-0.68, -0.02)	-2.43	0.016
<b>Diagnosed Anxiety</b>	-0.09 (-0.12, -0.06)	-7.35	≤ 0.001	-0.04 (-0.08, -0.00)	-2.47	0.014
<b>Diagnosed Depression</b>	-0.13 (-0.16, -0.009)	-8.32	≤ 0.001	-0.08 (-0.13, -0.03)	-4.04	≤ 0.001
<b>Factor associated with passive coping among BC women</b>						
<b>Type of surgery</b>						
Mastectomy	-0.64 (-1.18, -0.10)	-2.70	0.007	0.60 (0.10, 1.11)	2.71	0.007
Lumpectomy	-	-	-	-	-	-
<b>Diagnosed Anxiety</b>	0.06 (0.04, 0.09)	06.18	≤ 0.000	0.06 (0.04, 0.09)	6.10	≤ 0.000
<b>Diagnosed Depression</b>	0.07 (0.04, 0.11)	5.60	≤ 0.000	-	-	-
<b>Factor associated with seeking support among BC women</b>						
<b>Stage of BC</b>						
Stage I II	-0.85 (-1.05, -0.64)	-9.47	≤ 0.001	0.87 (0.71, 1.03)	12.41	≤ 0.001
Stage III IV	-	-	-	-	-	-
<b>Duration since of surgery since the time of interview</b>						
< 6 months	-	-	-	-	-	-
≥ 6 months	0.47 (0.32, 0.63)	6.82	0.000	0.55 (0.43, 0.66)	10.63	≤ 0.001
<b>Diagnosed Anxiety</b>	0.00 (-0.00, 0.01)	0.82	0.408	0.20 (0.14, 0.25)	7.69	≤ 0.001
<b>Diagnosed Depression</b>	-0.00 (-0.01, 0.01)	-0.28	0.775	-	-	-

\*Dependent variable: Active coping skills, Passive coping skills, seeking support, \*Independent variable: sociodemographic, clinical characteristics, and psychological factors., \*Forward multiple linear regression methods were applied. Model assumptions are fulfilled, and no multicollinearity is detected, \*The coefficient of determination (R<sup>2</sup>) for Active coping skills, Passive coping skills, and seeking support were (25.7%), (22.8%), and (56.7)

The high mean score for seeking support emphasizes the critical role of social support in coping. Emotional and instrumental support from family, friends, and healthcare providers enhances emotional well-being and resilience [21]. This is consistent with other studies conducted in Spain and Iran, showing that seeking support reduces isolation and fosters psychological resilience [17, 33].

Our findings are consistent with Roszkowska & Białczyk [32], in where active coping and social support were the most frequently used strategies. It highlighted that planning, focusing/venting emotions, and seeking instrumental support were the most common coping methods, with active coping also being widely utilized. In contrast, alcohol/substance use and humor were the least adopted strategies. Additionally, the study revealed that, compared to healthy controls, breast cancer patients

scored lower across all three major coping styles [32], further emphasizing the significance of adaptive coping mechanisms in managing psychological distress.

In the present study, none of the demographic variables were associated with any coping skills in patients with BC. This is supported by study conducted in in Tehran, Iran by Mohammadipour and Pidad, who found in their study that none of the demographic variables were significantly associated with coping skills [21].

Regarding active coping skills and clinical characteristics, women who did not undergo hormonal therapy experienced a decrease in active coping skills scores compared to those who did receive hormonal therapy. This decrease could be the effect of hormonal treatment on hormonal balance. Hormonal therapy may contribute to stimulating behaviors that enhance active coping, such as developing relaxation skills and changing harmful



behaviors, thus potentially having a positive effect on active coping skills. This result aligns with a study conducted by Gutiérrez-Hermoso et al. [12] in Mexico, they reported that women who did not undergo hormonal therapy showed a decrease in active coping skills, possibly due to the positive effects of hormonal balance on coping behaviors [12]. This interpretation is supported by [23], who stated that the types of treatment to which the patient is subjected play a fundamental role in the strategy [23].

On the other side, active coping skills significantly moderate the relationship between psychological stress, anxiety, and depressive symptoms in women with BC. Wang et al. [37] reported a negative association between active coping behaviors and anxiety symptoms. Furthermore, Wang noted that combining “worrying about health” with “self-relaxation coping behaviors” significantly decreases anxiety, underscoring the importance of active coping in managing psychological distress [37], this finding is consistent with our current study, which highlights the crucial role of active coping in reducing psychological distress among BC women.

Breast cancer Patients often engage in negative coping skills, including forgetfulness, frustration, and fear [38], as noted Crosthwaite et al., [9] in their study that conducted in India, that the individuals attempted to escape anxiety-inducing thoughts related to their diagnosis. While this strategy may provide temporary relief, it can result in obsessive and intrusive thoughts over time, ultimately hindering survivors’ adherence to essential health behaviors, such as surveillance guidelines [9]. According to Hanoach [13], mastectomy-treated BC survivors generally use a combination of coping skills to deal with the wide range of stressful situations they report facing [13]. Some examples of coping skills include avoiding or escaping stressful situations as observed among BC women in Egypt [4], as in the current study identified a significant positive relationship between passive coping skills and the type of surgery patients undergo.

Moreover, the study found that increased anxiety scores were associated with a greater reliance on passive coping skills. Typically, passive coping involves avoiding or ignoring stressors rather than actively confronting them. This indicates that individuals with higher anxiety levels are more inclined to withdraw from challenges instead of addressing them directly. Supporting this Dev et al., [11] demonstrated that American Cancer patients who utilized passive coping mechanisms such as alcohol, opioids, and other drugs experienced greater psychological distress [11].

In addition, this study found that women diagnosed with early-stage BC (Stages I and II) are more likely to seek emotional or social support than those with later-stage diagnoses (Stages III and IV). Women in advanced

stages may feel more hopeless, reducing their motivation to seek support, whereas early-stage patients are more likely to seek support as they adjust to their diagnosis and treatment. The study by Sørensen et al., [34] at a university-based cancer center in Norway showed the role of social support in managing fatigue among early-stage BC patients in alleviating fatigue symptoms and overall recovery [34]. Additionally, this study found that cancer patients’ use of coping skills tends to decline as treatment duration increases. Initially, patients feel optimistic about dealing with their diagnosis, but this positivity wanes after several treatments. This finding is consistent with a previous study conducted on patients with advanced cancer across six European countries, which highlighted those feelings of loneliness are prevalent among these patients and significantly hinder their coping abilities. The study emphasized that social isolation exacerbates psychological distress, thereby negatively affecting patients’ capacity to manage the challenges associated with their illness [14].

The diagnosis requires women to transition from being healthy to facing a life-threatening disease, with coping styles and illness perception playing crucial roles in this adjustment. Psychological stress often accompanies diagnosis and treatment, and supportive coping styles and social support can mitigate this distress [1]. There is a positive correlation between anxiety and seeking support; as anxiety levels rise, so does the tendency to seek support. This relationship was confirmed by multivariate analysis, showing that anxiety and depression are significant predictors of coping styles [27]. Therefore, Kavitha and Jayan, showed with their patients in India that psychological disorders in people with cancer are significantly affected by social support. Patients with good social support have fewer emotional and psychosocial problems and can better cope with their illness [15].

Therefore, BC women often face significant disruptions in both personal and family life, primarily due to cancer-related uncertainty and fear of recurrence. These psychological stressors tend to increase reliance on emotion-focused coping skills, which are associated with heightened anxiety [3]. Similarly, social support plays a critical role in mitigating these effects, as it promotes functional coping skills and helps reduce symptoms of depression and anxiety [30]. Adequate perceived social support encourages individuals to seek reassurance from others regarding their health concerns, whereas insufficient support is linked to greater levels of health anxiety [19].

As Rosberger et al. (2020) identified seeking social support as a coping skill among women with BC. They emphasized the necessity of supportive care in mitigating psychological distress and enhancing patients’ ability to adapt to their condition. Furthermore, they highlighted

that supportive care fosters interpersonal relationships and contributes to both physical and psychosocial well-being [5].

## Conclusion and recommendations

This study highlights the diverse coping strategies employed by women with breast cancer (BC) in Iraq, emphasizing the significant role of active coping and social support in managing psychological distress. Women in the early stages of BC and those who had surgery more than six months prior to the assessment were more likely to seek social support, which is crucial for emotional well-being and resilience. Conversely, passive coping strategies, such as avoidance and denial, were more prevalent among women who underwent mastectomy and those with higher anxiety levels, leading to increased psychological distress. The findings underscore the importance of tailored psychosocial interventions that consider the stage of disease, time since surgery, and anxiety levels to effectively support BC patients.

To support women with breast cancer in Iraq, it is recommended to develop culturally appropriate psychosocial interventions that enhance active coping and social support, especially for those in advanced stages and with high anxiety. Early intervention programs should promote active coping skills and reduce passive coping. Support groups can provide emotional and instrumental support, reducing isolation and fostering resilience. Tailored counseling services should address unique clinical needs, and continuous monitoring of coping strategies and psychological well-being is essential. Increasing education and awareness about the benefits of active coping and social support among patients and their families can further improve their psychological well-being and quality of life.

## Limitations of study

The study's cross-sectional nature provides only a snapshot of the participants' experiences, limiting the ability to assess changes over time or causality between factors and quality of life. Additionally, the use of convenience sampling may have introduced selection bias, potentially affecting the representativeness of the sample. Furthermore, the reliance on self-reported data may have introduced recall or response bias, influencing the accuracy of participants' responses. Therefore, further research, including qualitative methods, is needed to address these limitations and gain deeper insights into the quality of life and coping skills of BC patients in Iraq.

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## Author contributions

RMJ conceived and conducted this study. AAK, MNN, and MBAA assisted in the analysis and interpretation of data, and in the revision of the manuscript. All authors read and approved the final manuscript.

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## Data availability

The datasets analyzed during the current study are not publicly available due to ethical restrictions. but are available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

The trial was approved by the Human Research Ethics Committee, Universiti Sains Malaysia (USM/JEPeM/KK/23030229), and the Iraqi Ministry of Health was performed in compliance with the Helsinki Declaration. Written informed consent was obtained from all participants prior to data collection. Participants were informed that their involvement was voluntary and that they could withdraw from the study at any time without any consequences.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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