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Psycho-educational programs: Enhancing coping strategies and mitigating anxiety in chemotherapy patients

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Abstract
Objective: This study aims to assess the impact of psycho-educational programs on enhancing coping strategies and mitigating anxiety in chemotherapy patients.
Methods: A quasi-experimental design was employed using a non-randomised purposive sample of 225 patients receiving chemotherapy at the outpatient oncology clinic in Nasiriyah, Iraq. Data were collected using three tools: (I) an interviewing questionnaire for demographic and clinical data, (II) the Spielberger State-Trait Anxiety Inventory (STAI), and (III) the Coping Strategies Adjustment to Cancer Patients Questionnaire (CSARQ).
Results: The study reveals that 85% of patients report high levels of anxiety pre-program, which improved to 70% reporting low levels post-program. Regarding coping strategies, 82% of participants reported increased use of proactive coping strategies post-program, while approximately two-thirds continued to use passive strategies. Overall, 70.7% demonstrated high levels of total coping following the program compared to 29.3% reporting lower levels ($p < 0.001$). Significant differences were observed in total anxiety, coping strategies, and demographic characteristics pre- and post-intervention.
Conclusion: These findings highlight that psycho-educational programs incorporating coping strategies effectively reduce anxiety and enhance coping among chemotherapy patients. The development of standardised screening tools to assess the psychological status and mental well-being of all patients undergoing chemotherapy is strongly recommended.

Keywords: Psycho-educational programs, Coping strategies, Anxiety reduction, Chemotherapy

Plain English summary

Cancer and its treatment, especially chemotherapy, can cause intense stress and anxiety for patients. These emotional struggles can make it harder for patients to cope with treatment and affect their overall quality of life. This study looked at whether a structured psycho-educational program could help patients undergoing chemotherapy feel less anxious and cope better. Researchers worked with 225 patients at a cancer centre in Nasiriyah, Iraq. Patients took part in an educational program that included information sessions, coping skills training, group discussions, and emotional support. The program focused on both proactive strategies (such as staying positive, being active, praying, and setting goals) and passive

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strategies (such as avoiding stress or relying on others for help). Before the program, most patients reported high levels of anxiety. After the program, many showed lower anxiety levels and improved coping skills, especially in areas like staying hopeful, relying on family support, and finding comfort through faith. The study shows that providing cancer patients with structured support and coping tools can make a big difference in how they handle stress and navigate treatment. The findings suggest that hospitals should include similar programs as part of routine cancer care to support patients' emotional and psychological well-being.

Introduction

Cancer is the cause of more than 10 million deaths in 2018 around the world, and generally it is the second leading cause of death after cardiovascular diseases. It kills one from one from each six people in general it can be divided into both genders, as for male among each five men there is one with cancer and for female from each 6 women there is one with cancer this is percent for the total life time, and from 8 men who get cancer will die while one from each 11 women will die. The most affected countries are low- and middle-income countries, as they constitute two-thirds of the total population (1). According to the World Health Organisation, new cases of cancer will be 22 million worldwide in 2032, which creates a significant health burden (1). Moreover, the first-line treatment of cancer is Chemotherapy, which is a systemic therapy used to stop or slow the growth of rapidly dividing cancer cells. "Chemo" is the common abbreviation used for chemotherapy, which involves chemical substances to stop cell replication or to decrease that replication (2). It affects every cell in the body, which divides and grows rapidly. Cancerous and healthy cells are included in this. Also, it can cure cancer and extend a person's life. The kind of chemotherapy medication a person is taking will determine the unpredictable side effects. Among the most frequent adverse effects are hair loss, easy bruising or bleeding, and illness. Other typical adverse effects include constipation, diarrhoea, neuropathy, nausea, and vomiting (3).

Adverse effects of chemotherapy are numerous and varied; it can also be linked to harming healthy cells that replicate quickly and are, therefore, vulnerable to anti-mitotic medications. All of these will lead to the greatest typical adverse effects of chemotherapy, including hair loss, inflammation of the lining of the digestive tract, and decreased production of blood cells, so the result in immunosuppression. Due to their impact on immune cells, particularly lymphocytes, chemotherapeutic medications are frequently used to treat a variety of illnesses caused by the immune system's detrimental overreaction to the self (4).

A patient who receives chemotherapy suffers constantly from stress, anxiety, tension, and a constant feeling of frustration with the results of the treatment, and a constant feeling that death is near. Therefore, a patient suffering from cancer who receives chemotherapy needs a psycho-educational program on coping strategies to reduce stress and anxiety and adapt to the current situation on an ongoing basis to reduce stress and anxiety and raise the patient (5). Anxiety and stress are common among cancer patients. About 15-28% of the patients have anxiety, stress, or both. Furthermore, it has been found in some studies that the 15-28% could reach 44% with anxiety, which is not much different, and 23% have a significant level of anxiety. Despite this fact, researchers suggest that these disorders are common among patients with other diseases. Anxiety rates range from 7% to more than 15% among primary care outpatients, while they could reach 20% or more among general medical inpatients. In fact, in both situations, these rates are lower than the rates of psychological disorders among cancer patients (6).

The process of the psycho-education program involves knowledge sharing, problem-solving, discussion, stress reduction, symptom management, the development of skills like relaxation and adaptability, in addition to, expression of emotion guidance, with the help of social support. Patients may benefit from psychoeducation to cope with stress, anxiety, and emotional shifts (7, 8).

The term "coping" describes the set of behavioural, emotional, and cognitive techniques used to manage, reduce, or tolerate stress and conflict. The two primary categories of strategies of coping are emotion-focused coping and problem-focused coping, which they call passive coping and proactive coping, respectively. Proactive coping involves concentrating on the issue, coming up with other ideas, and responding appropriately to solve, rethink, or lessen the effects of a stressful circumstance. However, passive coping involves techniques aimed at changing how people react emotionally to situations to lessen negative emotions (9).

Another definition of coping is a conscious, organised, and psychological attempt to control psychosocial issues. The natural impulse to act may be suppressed or overridden by the coping

mechanism. Positive coping also promotes adaptation, which is defined by a sense of well-being, optimal social functioning, and a balance between health and disease. Negative coping leads to maladaptive behaviours that can tip the scales in favour of disease, a weakened sense of self, and a decline in social functioning (10).

Cancer patients often complain of both physical and psychological issues, so I believe that different coping mechanisms are needed at different times. One may adopt a proactive approach before switching to a passive one, or the other way around. Cancer patients experience significant changes in their social, psychological, and economic circumstances; they also have to stop their current way of living and start a new one. Therefore, patients need to be able to handle changes during different stages of treatment (11).

There are four parts to the coping process. The first is evaluation, which is figuring out what an event or circumstance means and how it affects one's well-being. The second phase is evaluating one's coping resources and the probability that different coping mechanisms will work, which leads to the choice of a coping mechanism. The final phase is putting the chosen coping mechanism into practice. The fourth and final step entails assessing how well one's coping mechanisms control one's reaction to a stressful situation or how well they eliminate or lessen stressors. Assessment events are a key part of the coping process. (see Figure 1) (12).

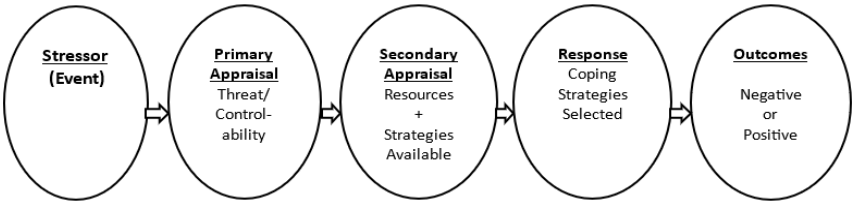

Figure 1: The process of Coping (12)

Problem-focused coping strategies, also known as proactive coping strategies, focus on identifying the problem or threat, coming up with solutions, evaluating the options, and selecting one before taking action to address the threat. The person, the surroundings, or both may be the target of the coping mechanisms. Planning, logical analysis, and problem-solving are examples of coping mechanisms that are more likely to take over when a person believes that the demands of a situation, whether internal or external, are controllable (13). As patients with cancer have diagnosed, adaptive coping strategies should use, patients believe they can control stress effect and side effect, they will use these strategies, as indicated by studies, they have significant effect on stress and anxiety patient have once diagnosed with cancer, they will improve mental adjustment, social reaction, and will participate in improving of life quality (14).

Cancer constitutes a significant health burden. Every year, millions of people are diagnosed with it, and year by year, it increases and creates an enormous burden on health systems. Iraq is one of the developing countries which they have the highest percentage of cancer rates (15)**.**

Psychological problems are common and serious with cancer and its treatment. The most common psychological problems are stress and anxiety; feeling stressed or anxious will negatively affect patient adherence with treatment and quality of life. Psycho- educational strategies are a cornerstone in building strength and coping. There is a gap between physical treatment and emotional well-being among cancer patients, but by empowering them to participate in their treatment, this will bridge the gap (16).

For healthcare providers, this study offers practical insights into integrating evidence-based psychoeducation strategies into routine cancer care (17). Health care providers often lack standardised tools to address patients' psychological needs, despite clear evidence linking depression to poorer treatment outcomes (18). This research provides a framework for oncologists, nurses, and mental health professionals to deliver structured interventions that complement medical treatment. For example, a study's evaluation of program effectiveness could inform oncology staff training protocols, ensuring consistent implementation of psychosocial care by the oncology staff (19). Such integration is essential for achieving comprehensive, patient-centred care.

At the systemic level, this study strengthens the economic and political argument for prioritising psychoeducational programs in cancer care. Emphasise that psychosocial interventions reduce healthcare costs by reducing hospitalisations and improving treatment adherence (20). By demonstrating the tangible benefits of these

programs, this research can guide policymakers in allocating resources to support their widespread implementation, particularly in underserved populations. Furthermore, the study paves the way for future research on scalable, culturally adapted interventions, ensuring equal access to mental health support across oncology settings. Ultimately, this work evolves the cancer care model from a purely biomedical to a biopsychosocial model that prioritises both survival and quality of life (21).

The study aims to assess the effectiveness of psycho-educational programs in enhancing coping strategies and reducing anxiety levels among patients undergoing chemotherapy by

1 Assessing patients' anxiety levels while undergoing chemotherapy according to patient needs.

2 Implementing Psycho-educational Programs to enhance coping strategies and reduce anxiety Levels in patients on chemotherapy.

3 Evaluating the effect of the Psycho-educational Programs on coping strategies to reduce patient anxiety.

We hypothesised that participating in a psycho-educational program using Coping Strategies leads to a reduction in anxiety in patients receiving chemotherapy.

Materials and Methods

Research Design

A quasi-experimental design was applied to complete this study.

Setting of the study

The current study was conducted at the Oncology Centre in Nasiriyah, Iraq, which is the only Oncology centre in Nasiriyah, serving patients from various areas of Thi-Qar governorate between August 2024 to the end of January 2025. The Oncology Outpatient Clinic comprises two separate units. The first section features a physician's office, an examination room, and a room designated for male patients undergoing chemotherapy. The second section is for female patients receiving chemotherapy. Each section has recliners, where patients can sit in a comfortable position during chemotherapy. Additionally, there are beds for severely fatigued patients and chairs.

Subject

Two hundred and twenty-five patients undergoing chemotherapy from both genders were selected in a non-random (purposive sample) sampling method. Cancer patients who underwent at least a third cycle of chemotherapy, but for no more than eight hours, were included in the study. Those having the first chemotherapy cycle, with a history of chronic diseases like heart disease or psychiatric illness, like mood disorders, anxiety, or having ever been treated with psychotropic drugs, were excluded from the study.

Data collection instruments

The current study variables were measured using three instruments.

Tool 1

A structured interview schedule. It was created by the researcher and consists of two sections:

Part I: Patient sociodemographic information, including age, sex, marital status, occupation, education, and cancer type.

Tool II

Spielberger State-Trait Anxiety Inventory (STAI): Comprising two subscales, it was taken from Spielberger, Gorsuch, Lushene, Vagg, and Jacobs (22). First, the State Anxiety Scale (S-Anxiety) assesses the present level of anxiety by asking respondents how they feel "at this moment." It does this by measuring subjective sensations of tension, anxiety, worry, apprehension, and autonomic nervous system activation or arousal. Anxiety proneness's more stable components, such as overall feelings of security, confidence, and serenity, are assessed by the Trait Anxiety Scale (T-Anxiety). STAI was utilised in this investigation. To assess respondents' present anxiety levels, the State Anxiety Inventory was designed to ask them how they feel "right now" or "at this moment." The following are the possible answers:

(1) Not at all (2) A little bit (3) Moderately so (4) Extremely so

T-Anxiety scale responses evaluate the frequency of emotions "in general":

1) infrequently 2) occasionally 3) frequently 4) nearly constantly.

The State Anxiety Scale (S-Anxiety), which has 20 items, is used as the scoring mechanism. Subtest total scores are calculated by adding item scores. For items (10 out of 20) that are anxiety-absent, the scoring should be inverted. Scores vary from 20 to 80. The anxiety level increases with a higher score. To identify symptoms that are clinically meaningful, a cut point of 39-40 has been proposed.

Tools III

Concerned with the Sharpley & Yardley (23) adaptation of the Adaptive Coping Strategies Scale for Adjustment to Cancer Patients Questionnaire (CSARQ). Coping mechanisms were measured

using this scale. Seven of the ten strategies were classified as proactive (avoid stress, set goals, stay active, maintain a positive outlook, exercise, maintain family relationships, believe in God, and pray), while the remaining three were classified as passive (deny the existence of stress, rely on backup care, and use no strategies). These ten strategies were divided into two main categories: proactive and passive coping strategies. The 10 techniques were divided into three domains: emotive, cognitive, and behavioural. Thirty items, ten behavioural, ten cognitive, and ten affective, were used to evaluate the ten techniques.

A. Proactive
Strategy 1: Avoid stress (covered questions from 1 to 3)
Strategy 2: Set goals (covered questions from 4 to 6)
Strategy 3: Keeping active (covered questions from 7 to 9)
Strategy 4: Have a positive outlook (covered questions from 10 to 12)
Strategy 5: Maintain family contacts (covered questions from 13 to 15)
Strategy 6: Believe in God and pray (covered questions from 16 to 18)
Strategy 7: Exercise (covered questions from 19 to 21)

B. Passive
Strategy 8: Rely on backup care (covered questions from 22 to 24)
Strategy 9: Deny the existence of stress (covered questions from 25 to 27)
Strategy 10: Use no strategies (covered questions from 28 to 30)
The investigator of the present study categorised the respondents' answers to the scale questions into a three-point Likert scale instead of the seven-point Likert scale used by the tool developer, Sharpley and Yardley (1999). This modification was done because a seven-point Likert scale is too detailed for patients to answer. Then, the tool's reliability was examined. (r = 0.83).

Scoring system
Items with the responses "agree," "unsure," and "disagree" received scores of 3, 2, and 1, respectively. To determine the mean score for each coping area, the sum of the item scores was divided by the total number of items. Percentage scores were generated from these scores. If the percentage score was 60% or higher (54 to 90 points), the patients were deemed to have a high coping level; if it was less than 60% (<54 points), they were deemed to have a low coping level.
To construct methods for data collecting, the preparatory phase involves reading relevant literature and theoretical understanding about many elements of the study using books, papers, periodicals, magazines, and the internet.
Validity: To ascertain whether the instrument measures what it is intended to measure, content validity was carried out. Three Sumar University medical surgery professors were among the five specialists who served on the jury that updated the instruments. The tools' content was examined by the experts for thoroughness, accuracy, clarity, relevance, and usefulness. Small changes were made.
Reliability: To ascertain the consistency of the measuring device, the tool's reliability was examined. The extent to which an instrument is measured consistently when it is used with the same participants and under the same circumstances. Tool dependability was assessed using the internal consistency model known as Cronbach's alpha. The State-Coping Strategies Scale (0.83) is the first tool's reliability factor, and STAI (0.85) was the second instrument. Higher values (greater than 0.7) indicate adequate reliability. The Cronbach's alpha reliability coefficient statistical equation typically falls between 0 and 1.
Pilot study: To test the tools' effectiveness, clarity, and applicability, a pilot study involving 10% of the sample (23 patients) was conducted. Patients who participated in the pilot trial were excluded from the sample, and the instruments were not changed in response to the findings.
Field Work: Before any data was collected, the patients and their families who consented to participate in the study were given a brief explanation of its goal. Each participant gave their written and verbal informed consent after being informed of the study's purpose. The sampling process began in September 2024 and was finished by the end of January 2025, a period of six months.

Psycho-educational Programs
A four-phase structure was employed for the Psycho-educational program, encompassing assessment, planning, implementation, and evaluation.
Assessment phase: Psycho-educational program has been constructed based on the evaluation results, which included a pre-test and an interview questionnaire.

Planning of the educational program: During this step, pre-test results have been analysed, and the Psychoeducational session's content has been designed to meet the specific needs of cancer patients. A pamphlet was created to document the goals and objectives of the academic program sessions, which were derived from the identified needs, requirements, and weaknesses. The pamphlet provides comprehensive information regarding coping strategies with patients receiving chemotherapy treatment, encompassing various aspects such as the passive coping strategies, which are considered proactive, and the other three strategies are considered passive. These strategies have behavioural, cognitive, and affective domains, respectively. And strategies comprising ten behavioural, ten cognitive, and ten affective.

Participating in a psycho-educational program using Coping Strategies leads to reducing anxiety in patients while receiving chemotherapy.

Seven of the ten strategies were classified as proactive (avoid stress, set goals, stay active, maintain a positive outlook, exercise, maintain family relationships, believe in God, and pray), while the remaining three were classified as passive (deny the existence of stress, rely on backup care, and use no strategies). These ten strategies were divided into two main categories: proactive and passive coping strategies. The 10 techniques were divided into three domains: emotive, cognitive, and behavioural. Thirty items, ten behavioural, ten cognitive, and ten affective, were used to evaluate the ten techniques. The State Anxiety Scale (S-Anxiety) measures subjective sensations of apprehension, tension, uneasiness, worry, and activation/arousal of the autonomic nervous system. It asks respondents how they feel "right now" to assess their present level of anxiety. General feelings of tranquillity, confidence, and security are among the relatively consistent components of "anxiety proneness" that are assessed by the Trait Anxiety Scale (T-Anxiety). The STAI was utilised in this investigation. To assess respondents' present anxiety levels, the State Anxiety Inventory was designed to inquire about how

The methods and teaching strategies include lecture/discussion, role play, demonstration, and brainstorming. The researcher employed a range of audiovisual aids, such as a data projector, a booklet, audio recordings, photographs, and physical objects.

Implementation phase: The psycho-educational program was executed over six months, consisting of 8 sessions (3 theory and 5 practice). Each session lasted between 20 and 30 minutes. The academic program was administered either on a patients basis or in small groups composed of 2 to 4; patients at the commencement of each session, the researchers started with a recapitulation of the content covered in the preceding session while ensuring the use of uncomplicated and lucid language to cater to the educational proficiency of the patients following the completion of each session, the examined sample was provided with information on the content and schedule of the subsequent session.

Program evaluation: The psycho-educational program was assessed immediately post-program application. The evaluation used the same pre-program framework.

Statistical Analysis

As needed, the data was examined and displayed as tables, figures, and diagrams with percentages and numbers. Appropriate statistical tests were employed to determine the significance of the findings. After data collection was completed, Version 26 of the Statistical Package for the Social Sciences (SPSS) was used to enter and analyse the data. P-values below 0.05 were regarded as significant. The results were described using descriptive statistics, such as mean, standard deviation (SD), percentages, and numbers. Appropriate inferential statistics, such as t-tests, were also applied. Consequently, the data was organised, analysed, and tabulated. P-value < 0.01 indicates high significance, while a p-value of less than 0.05 was deemed statistically significant. P-value> 0.05 indicates non-significant results.

Results

Table 1 illustrates the demographic profile of the studied sample (N = 225). The results indicate that the majority of participants were older than 20 years (69.8%), with a mean age of 33.35 ± 6.39 years, suggesting that the sample was predominantly composed of adults in their early thirties. In terms of marital status, nearly three-quarters (72.9%) were married, whereas only a small proportion were single (2.2%) or divorced (7.1%). Educational attainment varied, with a relatively high proportion (34.2%) having a university-level education or higher, while 20% were illiterate. Employment status reveals that most participants (81.3%) were not working, which may reflect the physical and emotional burden of chemotherapy treatment. Social support appeared substantial, as 71.1% lived with a spouse, and only 7.1% lived alone. Financially, a majority (65.7%) reported their monthly income as "not enough,"

highlighting a significant socioeconomic challenge among the patients.

Table 1: Demographic characteristics

Characteristics	Frequency	%
Age		
≤20 years	86	30.2
>20 years	157	69.8
Mean ± SD	33.35 ± 6.39	
Marital status		
Single	5	2.2
Married	164	72.9
Divorced	16	7.1
Widowhood	40	17.8
Educational level		
Illiterate	45	20.0
Primary education	11	4.9
Preparatory education	43	19.1
Secondary education	49	21.8
University or more	77	34.2
Work		
Working	42	18.7
Not working	183	81.3
Living with (social support)		
Spouse/wife	160	71.1
Sons	49	21.8
Lonely	16	7.1
Monthly income		
Enough	55	24.5
Enough and saved	22	9.8
Not enough	148	65.7

Figure 1 shows that most of the studied patients were males (70.2%), while females accounted for only 29.8% of the total sample.

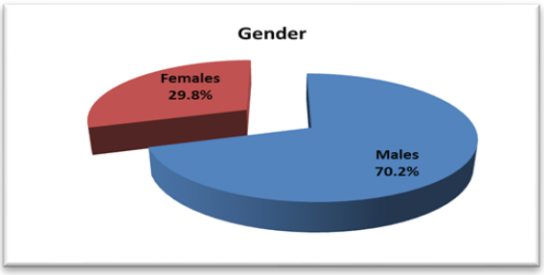

Figure 1: **Distribution of the patients studied regarding their gender (n=225)**

Figure 2 demonstrates that breast cancer constituted the largest proportion of cases among the samples studied (40.0%), followed by Hodgkin's disease (30.0%). Gastrointestinal tract cancers and leukaemia each accounted for 10.0% of cases, while lung cancer represented 6.0% and liver cancer 4.0%. The predominance of breast cancer cases aligns with global and regional cancer prevalence trends, where breast cancer remains the most common malignancy, particularly among women.

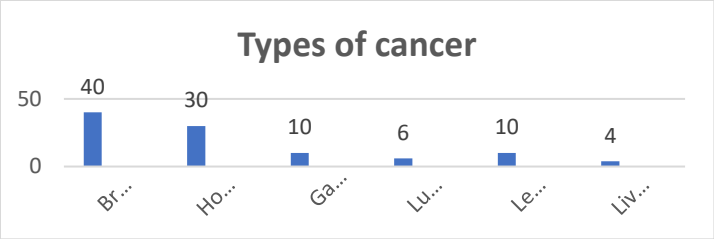

Figure 2: Distribution of the patients studied regarding Types of cancer (n=225)

Figure 3 demonstrates a marked improvement in patients' anxiety levels following the implementation of the psycho-educational program. Before the intervention, the majority (85.0%) of patients reported high levels of anxiety, indicating a significant psychological burden. Following the program, there was a substantial shift, with 70.0% of patients reporting low levels of anxiety. This notable reduction suggests that the psycho-educational program was effective in alleviating anxiety, potentially enhancing patients' emotional well-being and coping abilities. Such findings emphasise the importance of structured educational and supportive interventions in reducing psychological distress among patients.

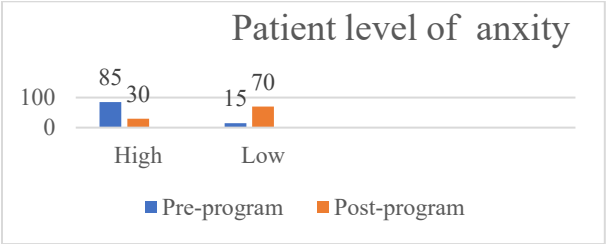

Figure 3: distribution of the patients studied regarding level of anxiety pre- and post-psycho-educational program (n=225)

Coping Scale for Adjustment Patients during Chemotherapy

Table 2 reveals that participants adopted a wide range of proactive coping strategies following the psycho-educational program. The majority (98.7%) reported avoiding physically stressful situations, and all patients (100%) indicated that they prayed regularly, reflecting the centrality of spirituality as a coping mechanism. Moreover, a high proportion (97.8%) maintained close family contact, valuing the emotional support provided by relatives. While 68.0% reported feeling pleasure after a short walk, regular exercise was less common (5.8%), indicating potential barriers to physical activity. Goal-setting behaviours were inconsistent, with 58.7% expressing uncertainty regarding the importance of life goals during illness. Importantly, 92.0% stated they did not focus on the negative aspects of daily life, suggesting a positive outlook post-intervention. Overall, these findings highlight a reliance on spiritual practices, family support, and positive reframing as dominant coping mechanisms, while physical activity and goal-setting strategies may be required.

Table 2: Coping Scale for Adjustment to Patients during Chemotherapy (Proactive Coping Strategies) post-psycho-educational program (n=225)

Proactive Coping Strategies	Agree		unsure		Disagree	
	No.	%	No.	%	No.	%
A) Avoid stress						
1. Avoid physically stressful situations.	222	98.7	3	1.3	0	0.0
2. It is best for me not to think about stressful situations.	185	82.2	36	16.0	4	1.8
3. Try to avoid feeling bad about stressful situations.	205	91.1	4	1.8	16	7.1
B) Set goals						
4. I do not set goals for my life now than during the pandemic. Just let things happen.	113	50.2	11	4.9	101	44.9
5. Do not believe it is important to set goals for life	132	58.7	71	31.5	22	9.8

6. I do not feel comfortable when I plan what I am going to do after recovery	97	43.1	68	30.2	60	26.7
C) Keeping active						
7. Participate in several activities	93	41.3	62	27.6	70	31.1
8. I think it is time to be involved in activities**.**	114	50.7	59	26.2	52	23.1
9. Feel good about being active	92	40.9	54	24.0	79	35.1
D) Have a positive outlook						
10. Everyday activities indicate I do not have a very positive outlook.	137	60.9	26	11.6	62	27.5
11. Concentrate on the negatives of everyday life.	13	5.8	5	2.2	207	92.0
12. Keeping a positive outlook day to day is not enough to make me feel happy.	159	70.7	29	12.9	37	16.4
E) Maintain family contact						
13. Keep in close contact with my family.	220	97.8	5	2.2	0	0.0
14. Value family contact.	220	97.8	5	2.2	0	0.0
15. I am comforted by family contact.	220	97.8	5	2.2	0	0.0
F) Believe in God and pray						
16. Pray regularly.	225	100.0	0	0.0	0	0.0
17. Have faith in God or another Supreme Being.	222	98.7	3	1.3	0	0.0
18. A belief in God or another Supreme Being makes me feel happy.	217	96.4	0	0.0	8	3.6
Exercise						
19. Exercise regularly.	13	5.8	67	29.8	145	64.4
20. I believe regular exercise contributes to a healthy lifestyle.	152	67.6	46	20.4	27	12.0
21. I feel exhilarated after a pleasant walk.	153	68.0	26	11.6	46	20.4

Table 3 demonstrates that a considerable proportion of the participants continued to employ passive coping strategies following the psycho-educational program. The majority (96.9%) believed that living a stress-free life is beneficial, and 94.2% preferred to take on only what they could easily manage. Additionally, 84.0% agreed with the belief that fate rather than personal choices controls life, reflecting a sense of external locus of control. Notably, 86.7% disagreed with the statement that they did not feel happy receiving help from others, indicating a generally positive attitude toward support. However, 68.0% felt uneasy using structured coping strategies, and 67.6% reported using no specific strategies to guide them through treatment. These findings suggest that while participants value reducing stress and accept external support, a substantial number may lack confidence in employing structured coping methods, highlighting the need for continued skill-building interventions.

Table 3: Studied Sample Distribution regarding the Coping Scale for Adjustment to Patients during Chemotherapy (Passive Coping Strategies) post-program (n=225)

Passive Coping Strategies	Agree		Unsure		Disagree	
	No.	%	No.	%	No.	%
Passive coping strategies						
H) Rely on back-up care						
22. Never call on others for help.	34	15.1	5	2.2	186	82.7
23. I am not convinced that backup help is necessary.	30	13.3	6	2.7	189	84.0
24. Don't feel happy about receiving help from others.	21	9.3	9	4.0	195	86.7
I) Deny the existence of stress						
25. I take on only what I can easily cope with.	212	94.2	6	2.7	7	3.1
26. Believe a stress-free life is beneficial.	218	96.9	0	0.0	7	3.1
27. I feel better about myself when there are no unwarranted demands on me.	212	94.2	6	2.7	7	3.1
J) Use no strategies						
28. Use no strategies to guide me through the stage of treatment.	152	67.6	27	12.0	46	20.4
29. Fate rather than my choices controls life.	189	84.0	30	13.3	6	2.7
30. I feel uneasy using strategies to help me.	153	68.0	26	11.6	46	20.4

Table 4 highlights the overall distribution of coping strategies adopted by patients post-program. The vast majority (98.2%) reported a strong reliance on belief in God and prayer, while 97.8% maintained close family contact, indicating that spiritual and familial support remain central coping mechanisms. Additionally, 95.1% denied the existence of stress to cope during chemotherapy, reflecting a form of psychological avoidance. Proactive strategies such as avoiding stress (90.7%) and goal setting (50.7%) were moderately used, whereas strategies like keeping active (44.4%), maintaining a positive outlook (45.8%), and exercise (46.7%) were less consistently practised. Passive coping behaviours such as relying on back-up care (12.9%) were reported by fewer patients, while nearly half (48.9%) admitted to using no structured strategies at times. These findings suggest that while patients strongly depend on spiritual faith and family ties for coping, there remains variability and underutilization of more structured and self-directed coping strategies

Table 4: Studied Sample Distribution regarding Total Sub-items Scale Coping for Adjustment to Patients during Chemotherapy post-program (n=225)

	Agree		Unsure		Disagree	
Coping strategies	**No.**	**%**	**No.**	**%**	**No.**	**%**
Proactive coping strategies						
1. Avoid stress	204	90.7	14	6.2	7	3.1
2. Set goals	114	50.7	50	22.2	61	27.1
3. Keep active	100	44.4	58	25.8	67	29.8
4. Have a positive outlook	103	45.8	20	8.9	102	45.3
5. Maintain family contact	220	97.8	5	2.2	0	0.0
6. Believe in God and prayer	221	98.2	2	0.9	2	0.9
7. Exercise	105	46.7	46	20.4	74	32.9
Passive coping strategies						
8. Rely on back-up care	29	12.9	7	3.1	189	84.0
9. Deny the existence of stress	214	95.1	4	1.8	7	3.1
10. Use no strategies	110	48.9	68	30.2	47	20.9

Table 5 demonstrates that most patients (82.2%) employed proactive coping strategies at a high level following the psycho-educational program, with a mean score of 62.46±5.50. Similarly, 68.9% of participants reported using passive coping strategies at a high level, with a mean score of 12.75±73.25. Overall, 70.7% of the sample achieved a high total coping score, indicating that most patients effectively utilised a range of coping mechanisms to manage chemotherapy-related stress. These findings suggest that the intervention positively influenced the patients' ability to engage in both proactive and passive coping strategies, leading to improved adjustment during treatment.

Table 5: Studied Sample Distribution related to the Total Coping Scale for Adjustment to Patients during Chemotherapy post-program (n=225)

Total Coping Scale for Adjustment to Patients During Chemotherapy		**(n=225)**
Proactive coping strategies	Low	40 (17.8%)
	High	185 (82.2%)
	Mean ± SD	5.50 ±62.46
	Range	21-63
Passive coping strategies	Low	70 (31.1%)
	High	155 (68.9%)
	Mean ± SD	73.25 ± 12.75
	Range	9– 27
Total coping strategies	Low	66 (29.3%)
	High	159 (70.7%)
	Mean ± SD	65.69 ± 5.81
	Range	30 – 90

Figure 4 demonstrates that the psycho-educational program positively impacted various coping domains among patients undergoing chemotherapy. A large proportion of the sample (92%) exhibited a high level of coping in the cognitive domain, reflecting improved

understanding and thought processes related to disease management. Additionally, 72.5% achieved a high level of behavioural coping, indicating enhanced engagement in adaptive behaviours. In the affective domain, 64.8% reported a high level of coping, although this domain showed the lowest proportion compared to the others, with 35.2% still demonstrating low coping. These findings suggest that while the program was most effective in improving cognitive coping, ongoing support may be required to further strengthen affective and behavioural coping responses.

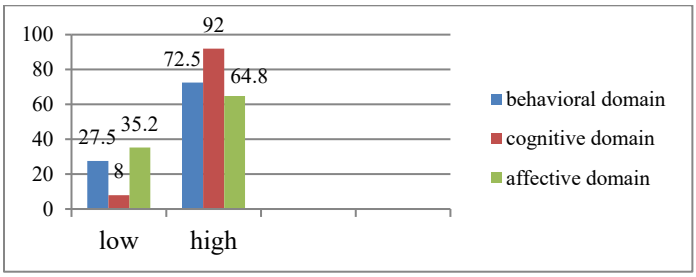

Figure 4: Distribution related to coping subscale items for adjustment to patients during chemotherapy post-program (n=225)

Table 6 indicates a statistically significant relationship between several demographic characteristics and the total coping scale among patients undergoing chemotherapy. Females, patients with adequate monthly income, and those living with a spouse demonstrated significantly higher coping levels (p = 0.02) and (p=0.013), respectively. Marital status and educational level were highly significant factors (p = 0.00), with married and more educated patients exhibiting stronger coping abilities. Conversely, age did not show statistically significant associations with coping levels (p > 0.05) (p= 0.27). These findings suggest that socio-economic stability, family support, and higher education play a pivotal role in enhancing patients' coping capacities during chemotherapy.

Table 6: Relation between Demographic Characteristics of the Studied Sample and Total Coping Scale for Adjustment to Patients during Chemotherapy (n=225)

Demographic characteristics	Total coping scale for adjustment to Patients during Chemotherapy				χ^2	P
	Low (n=66)		High (n=159)			
	No.	%	No.	%		
Age						
<20	22	14.0	135	86.0	1.173	0.27
>20	44	64.7	24	35.3		NS
gender:						
Male	55	34.8	103	65.2	11.453	0.01*
Female	11	16.4	56	83.6		
Marital status:						
Single	4	80.0	1	20.0	28.699	0.00**
Married	25	15.2	139	84.8		
Divorced	11	68.7	5	31.3		
Widowhood	26	65.0	14	35.0		
Educational level						
Illiterate	25	55.6	20	44.4		
Primary education	5	45.5	6	54.5		
Preparatory education	15	34.9	28	65.1	55.005	0.00**
Secondary education	10	20.4	39	79.6		
University and more	11	14.3	66	85.7		
Monthly income						
Enough	6	6.0	93	94.0	15.315	0.02*
Not enough	60	47.6	66	52.4		

Living with (social support)						
Spouse/wife	40	25.0	120	75.0		
Sons	16	32.7	33	67.3	2.522	0.013*
Lonely	10	62.5	6	37.5		

(**) Statistically significant at p=0.00; (*) statistically significant at p≤0.05

Discussion

The case mix seen in this cohort, breast cancer representing the largest fraction (40.0%), followed by Hodgkin's disease (30.0%), with cancers of the GI tract and leukaemia each 10.0%, lung cancer 6.0%, and liver cancer 4.0%, is partially consistent with both global and regional epidemiology but also reflects probable site- and system-level selection factors. The predominance of breast cancer is consistent with international patterns: breast cancer has been the most frequently diagnosed malignancy in women globally since at least 2020 and continues to be a major cause of cancer-related morbidity (and, in many settings, mortality) despite progress in early detection and systemic treatment (24, 25, 26). Conversely, the comparatively modest proportions of lung and liver cancers in this series are lower than would be expected from population data, where lung cancer is among the top cancers by incidence and mortality globally and primary liver cancer is a major cause of cancer deaths across most of the low- and middle-income world, suggesting that referral patterns, service availability, and inclusion criteria (e.g., dominance of specific clinics or treatment modalities) conditioned the observed distribution (24, 26). Of interest, the high proportion of Hodgkin's disease (30.0%) is atypical at a population level, insofar as Hodgkin lymphoma constitutes a small fraction of all cancers globally, with a distinctive young-adult peak and considerable regional variation (27, 28). This distribution could indicate a younger case-mix, local epidemiologic features (including Epstein–Barr virus–related disease), or centre-specific expertise in lymphomas. Taken together, these patterns underscore the importance of interpreting case distributions in the context of setting, demographics, and health system structure as opposed to presuming direct inference to population prevalence from clinic-based samples.

The psycho-educational intervention was linked with a significant anxiety reduction: before the intervention, 85.0% of patients indicated high anxiety, while following the intervention, 70.0% indicated low anxiety. The size and direction of change are in keeping with a considerable clinical gain and agree with a strong evidence base showing that psychoeducational and wider psychosocial interventions minimise anxiety and depression and enhance quality of life in individuals with cancer (29). Meta-analyses and guidelines suggest that structured interventions comprising information provision, coping-skills training, cognitive–behavioural techniques and facilitated problem solving can yield moderate anxiety symptom reductions across cancer types and stages (30, 29, 31). Plausible mechanisms comprise improvements in illness representations and predictability, greater self-efficacy for symptom control, and increased perceived social support, mechanisms firmly founded in stress and coping theory and social-cognitive models (32).

These results have practical applications. Firstly, the inclusion of brief, structured psychoeducation as part of standard oncology care, especially at diagnosis and at transition points during treatment, may significantly reduce distress. Secondly, routine screening for distress (31) can be used to triage patients to stepped-care psychosocial services, where psychoeducation is an initial modality (31). Thirdly, because of the unusually high percentage of Hodgkin's disease in the sample, consideration of the developmental needs of adolescents and young adults (AYAs) and coverage of survivorship concerns (e.g., fertility, return to work/study) may further increase relevance in similar patient populations.

Several factors moderate causal inference. In the absence of a concurrent control group, gains may partially represent regression to the mean, natural habituation over time, or nonspecific attention effects. The use of self-reported anxiety (scale not defined) may be a source of measurement bias; future research should utilise validated measures (e.g., HADS, STAI) and report effect sizes with confidence intervals. Longer-term follow-up is needed to determine durability, and stratified analyses (by type and stage of cancer and phase of treatment) might illuminate for whom psychoeducation is most helpful. However, the pre–post change from predominantly high to predominantly low anxiety is both statistically plausible and clinically significant, supporting guideline calls to integrate psychoeducational supports into comprehensive cancer care

Table 2 shows that participants used a constellation of proactive coping strategies following the psycho-educational intervention, with specific recourse to spirituality, family support, and

positive cognitive reframing. The almost universal reporting of regular prayer (100%) and the extremely high level of avoidance of physically stressful situations (98.7%) suggest culturally and contextually relevant coping modalities. Spirituality and religious observance have been repeatedly implicated in the literature as a paramount coping resource in chronic illness, providing meaning, emotional regulation, and perceived control when there is high biomedical uncertainty (32). In most non-Western and religious populations, spiritual engagement is associated with improved psychological adjustment, enhanced hope, and less distress, even in the absence of changes in objective health status.

Close family contact, as reported by 97.8% of participants, highlights the role of social support in stress buffering and adjustment to illness. Social support, emotional, informational, and instrumental, has well-documented links with better mental health outcomes and self-management in chronic disease situations (33). Family involvement can enhance adherence to behavioural prescriptions, offer practical support, and reinforce a sense of belonging that is particularly vital in conditions such as PCOS with psychosocial burdens of body image issues and fertility-related anxieties.

The cognitive-emotional position of not dwelling on negative everyday life details (92.0%) indicates positive reframing or benefit-finding, coping strategies associated with resilience and psychological well-being in a wide range of studies (34). Positive appraisal can buffer the effect of stressors by changing their subjective meaning, an essential factor in adaptive coping models. However, the discrepancy in goal-related commitment, where 58.7% were unsure about the significance of life goals during illness, indicates a deficit in meaning-making or future orientation that may compromise motivation for long-term self-care. Illness uncertainty and disruptions in one's perceived life course can undermine goal-setting effectiveness, and interventions incorporating structured, values-based goal clarification have been found to enhance coping and long-term health behaviours (35).

Physical activity results are especially insightful: whereas a moderate percentage (68.0%) described enjoying a brief walk, just 5.8% participated in regular exercise, suggesting barriers between intent/affect and long-term behavioural implementation. This gap is in line with chronic illness literature in which fatigue, body image issues, absence of personalised counselling, and low self-efficacy stymie physical activity adoption. In populations with illnesses such as PCOS, where exercise has measurable metabolic and psychological gains, remedying these barriers through graded activity scheduling, self-efficacy development, and culturally appropriate motivation is paramount (36).

The prevalence of spiritual practices, family support, and positive cognitive reappraisal indicates that the psycho-educational program effectively enlisted socio-emotional and meaning-based spheres of coping, but low participation in regular exercise and ambivalence regarding life goals indicate areas requiring reinforcement. Subsequent versions of the program should include formal goal-setting modules (e.g., SMART goals linked to personal values), culturally responsive behavioural activation to decrease inertia surrounding physical activity, and processes to convert positive affect (e.g., enjoyment of walking) to habitual exercise routines. Incorporating family in goal planning and using spiritual framing (e.g., health stewardship as a valued obligation) may also further concord intervention components with participants' pre-existing coping schema, contributing to increased uptake and sustainability.

Table 3 also underscores the prevalence of passive coping styles among respondents despite having been exposed to the psycho-educational intervention. Most of them (96.9%) recognised the value of leading a stress-free life, and 94.2% wanted to do only those things that they could do comfortably, indicating a preference for stress avoidance. These tendencies are consistent with avoidance-oriented coping, which may yield immediate relief but potentially restrict the use of proactive and problem-solving approaches essential for psychological adjustment in the long run (37).

A significant percentage of participants (84.0%) believed in fate as a main controller of life events, suggesting a high external locus of control. This belief is commonly described in populations with chronic illness and can serve as a deterrent to health-promoting behaviours, with patients attributing health consequences to uncontrollable external forces instead of personal agency (38). In the setting of illnesses like PCOS or cancer treatment, this attitude can decrease participation in self-care practices, such as dietary change, exercise, or compliance with medical guidelines.

In spite of this, a supportive social dimension was present: 86.7% of participants were pleased to receive assistance from others, in line with collectivist cultural norms in which social interdependence is a fundamental coping

resource. Literature indicates that the acceptance of social support can cushion psychological distress and enhance treatment adherence, especially in groups under high illness-related stress (39).

Yet, a considerable percentage, 68.0%, reported discomfort with using structured coping methods, and 67.6% said they had no strategies to help them through treatment. This indicates that although participants appreciate the value of stress reduction and support, they may not feel confident using systematic coping skills. Deficits in problem-focused coping skills or structured self-regulation are well-established barriers in chronic illness management and underscore the need for ongoing, skill-building interventions (40). Cognitive-behavioural training, guided goal-setting, and repetitive reinforcement of coping skills may be necessary to convert knowledge into effective behavioural habits.

Table 4 provides a general overview of coping mechanisms that have been employed by the patients after the psycho-educational program. Excessive reliance on spiritual faith (98.2%) and regular prayer, and close family interaction (97.8%), indicates the dominance of socio-spiritual support in the coping mechanism of patients. These findings are consistent with evidence demonstrating that religiosity and religious activity produce meaning, comfort, and perceived mastery in the face of life-threatening illness, particularly in culturally and religiously structured societies. Family support also serves to mitigate risk, conferring emotional reassurance, practical assistance, and enhancing treatment compliance (39).

A high proportion of patients (95.1%) reported denial of stress experience during chemotherapy as a coping mechanism, which is a form of psychological avoidance. Avoidant coping styles may provide short-term emotional alleviation but are associated with low long-term resilience and may obstruct active problem-solving of chronic disease (41). While such cognitive minimisation can protect against emotional equanimity in acute stress, overreliance may compromise adaptive coping with treatment concerns.

Moderate activity was also observed in adaptive coping styles such as stress avoidance (90.7%) and goal-setting (50.7%) since these were partial adopters of problem-focused strategies encouraged by the psycho-educational intervention. A comparatively lower adoption of physical activity (46.7%), positive thinking (45.8%), and remaining active (44.4%) indicates gaps in knowledge translation into action. Literature documents that obstacles such as fatigue, treatment side effects, low self-efficacy, and culturally influenced perceptions of illness may interfere with chronic adherence to physically and cognitively active coping behaviour (42).

Passive coping strategies, such as the use of backup care (12.9%), were not highly prevalent. However, nearly half of the sample (48.9%) reported some practice of not applying any formal strategies at times, reflecting variability in coping and continued risk for psychological vulnerability. The trend here is that while patients make significant use of socio-spiritual frameworks, ignoring structured and self-regulated coping approaches such as physical activation, goal-setting systematically, and cognitive-behavioural means is an area for directed intervention.

Fig. 4. Multidimensional impact of psycho-educational intervention on coping areas in chemotherapy patients. The findings reveal that cognitive coping improved most, with 92% of the sample experiencing a high level following the intervention. This suggests enhanced understanding of the disease, the ability to reinterpret illness experiences, and internalisation of the means to cognitively manage stressors. Cognitive coping tends to be the most responsive domain to systematic psycho-educational interventions because education, reflection, and guided discussion facilitate knowledge acquisition and restructuring of illness perceptions (40).

Behavioural coping also improved significantly, with 72.5% of the subjects reporting a high degree of engagement in adaptive behaviours such as compliance with treatment routines, stress management, and selected lifestyle changes. The results indicate that the program was successful in translating cognitive gains into some behavioural changes, an area that is critical in improving treatment adherence and health outcomes. However, behavioural activation tends to lag behind cognitive change due to barriers such as fatigue, physical limitations, or scepticism about the efficacy of new routines, as observed in past studies of chronic illness management (37).

Conversely, affective coping showed the lowest rate of high-level coping (64.8%), with 35.2% of patients remaining in the low range. Affective coping refers to the ability to manage emotional responses, including fear, anxiety, and depression, which are prevalent during chemotherapy. Emotional adjustment tends to require longer intervention lengths and can be assisted by targeted psychological care, peer communication, and stress management techniques (43). The relatively lower affective gains suggest that while

the psycho-educational program was effective in increasing understanding and some behaviours, ongoing emotional support, through counselling, support groups, or mindfulness-based interventions, may be necessary for overall coping improvement.

Table 6 shows the influence of socio-demographic factors on coping ability in chemotherapy patients, and there were high correlations between coping ability and some attributes. Female patients, those with adequate monthly income, and those who were cohabiting with a spouse had significantly higher coping abilities ($p \leq 0.05$). Furthermore, marital status and educational attainment were associated ($p = 0.00$) with married and highly educated patients having superior coping skills. On the other hand, both perceived social support and age were not statistically significant ($p > 0.05$), which means that coping is more determined by socio-economic and family background rather than just age.

These conclusions are consistent with the literature that emphasises the importance of socio-economic security and education in adaptation to chronic illness. They can have less stress related to treatment cost and care arrangement, and they can afford to devote more to emotional and behavioural adaptation [47]. Education contributes to coping through more health literacy, improved treatment compliance, and mastery of problem-focused strategies, which are the core of adaptive coping (37).

The robust influence of cohabiting with the spouse and marital status highlights the buffering function of intimate social support. Married individuals are more likely to obtain emotional reassurance, instrumental aid, and encouragement in engaging proactive coping mechanisms. Several studies have revealed that involvement of the family in cancer treatment is linked to favourable psychological adjustment and reduced distress (49).

Not surprisingly, age and perceived social support did not predict coping in this study. Age effects on coping are mixed in the literature, with some studies showing that older adults employ more use of acceptance and spirituality, and younger adults more problem-solving (34). The lack of significance in perceived social support can be explained by the overall high baseline level of support in the population in question, limiting variation in its association with coping outcomes.

Importantly, the effectiveness of the psycho-educational program may be attributed in part to its cultural relevance. In the Iraqi context, where religious belief and family structures play a central role in daily life, coping strategies anchored in spirituality, such as prayer and faith in God, resonated deeply with participants. The near-universal engagement in spiritual practices and strong reliance on family support highlight the value of culturally tailored interventions. Programs that align with patients' cultural and religious values are more likely to be accepted, practised, and sustained. Future interventions in similar settings should integrate these elements explicitly, recognising spirituality and familial bonds as key assets in psychological resilience and cancer care.

Conclusion

This study demonstrates that the psycho-educational intervention significantly enhanced patients' coping abilities in cognitive, behavioural, and affective dimensions during chemotherapy. The participants applied spirituality and family support as primary coping mechanisms in most instances, consistent with the psychosocial and cultural context of the sample. While cognitive coping was enhanced the most, affective coping was comparatively low, indicating the need for ongoing emotional support and structured interventions.

Socio-demographic factors, spousal cohabitation, education, adequate income, and marital status were significantly correlated with higher coping levels, underscoring family involvement and socio-economic security as factors inducing resilience. Age and self-reported social support, however, did not turn out to be significantly influential regarding coping, suggesting that structured, skill-oriented intervention could be more important than demographic factors themselves.

Generally, the outcomes affirm the effectiveness of psycho-educational treatments in enabling adaptive coping and place particular emphasis upon the requirement for ongoing, skill-focused, and family-centred interventions addressing residual emotional and behavioural weaknesses. The inclusion of culturally adapted interventions, augmenting physical activation, and leveraging existing spiritual and familial reserves can further augment patients' capacity to adapt to chemotherapy difficulties and maximise overall quality of life.

Based on the findings of this study, several key recommendations are proposed to strengthen patient coping and psychological well-being during chemotherapy. Firstly, healthcare systems should prioritise the development of structured psycho-educational and counselling interventions. These programs should particularly target patients who demonstrated lower coping scores, such as

unmarried individuals, those with lower educational attainment, and younger patients. Tailored support for these subgroups can help close the observed coping gap. Secondly, the role of marital and family support must be actively harnessed. Encouraging the involvement of spouses and close family members in the care process can provide crucial emotional and social reinforcement. Given the strong association between marital status and enhanced coping, such familial integration should form a central component of supportive care strategies.

Thirdly, hospitals should implement socioeconomic support initiatives, including economic counselling and resource referral services. As patients with adequate income levels were found to cope better, addressing financial stressors may contribute significantly to improved psychological outcomes. Fourthly, patient education programs should be customised to match individuals' levels of comprehension and literacy. Educational workshops focused on stress management and coping strategies should use clear, culturally appropriate language and teaching methods to ensure relevance and accessibility. Fifthly, it is recommended that coping assessment tools be routinely integrated into oncology care. Regular screening can help identify patients at risk of poor psychological adjustment, allowing for timely intervention and personalised psychosocial support.

Finally, further research is needed to explore the effectiveness of integrated, multi-component interventions. Studies examining the combined impact of psycho-educational support, financial guidance, and family involvement will provide deeper insights into how best to optimise coping and enhance the overall quality of life for patients undergoing cancer treatment.

List of Abbreviations

STAI: Spielberger State-Trait Anxiety Inventory (STAI)
CSARQ: Coping Strategies Adjustment to Cancer Patients Questionnaire
T-Anxiety: Trait Anxiety Scale.
S-Anxiety: State Anxiety Scale.
SPSS: Statistical Package for the Social Sciences.
SD: Standard deviation
PCOS: Polycystic ovary syndrome

Declaration

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Scientific Research Ethics Committee of the College of Medicine, University of Sumer (Approval Number: 8/12/494, dated April 28, 2024). In addition, formal administrative approval was secured from the Director of the Oncology Centre in Nasiriyah, as well as the Head of the Outpatient Oncology Unit. These approvals followed a formal request letter issued by Sumar University outlining the study objectives and data collection procedures.

Before data collection, all participants were provided with a clear and comprehensive explanation of the study's aims, methods, and their rights as participants. Written and verbal informed consent was obtained from each participant. Confidentiality and anonymity were strictly upheld, and participants were assured that their involvement was entirely voluntary, with the freedom to withdraw from the study at any time without any negative consequences. All ethical principles, including respect for patients' dignity, autonomy, and cultural values, were fully observed throughout the research process.

Consent for Publication

The work was published under the Creative Commons Attribution-Non-Commercial 4.0 license with the participation of both authors.

Availability of data and materials

All data required that have been used to complete this study are available to be sent by the corresponding author.

Competing interest

No competing interest.

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Nill.

Authors contributions

Both authors participated in the same way by designing the study and collecting data together. Both authors wrote the main context of the study after SMJ completed the statistical analysis. AJS. Designed the program and wrote the discussion section. Both authors reviewed the study and approved the publication.

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