RESEARCH ARTICLE

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Relationship Between Fear of Cancer Recurrence and Quality of Life in Patients Undergoing Active Cancer Treatment: The Mediating Role of Social Support

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Abstract

Introduction: Socio-psychological factors such as fear of recurrence and presence of social support may affect quality of life (QOL) of cancer patients. Identifying mediating factors that impact QOL are crucial for targeting vulnerability in patients undergoing cancer treatments. The study purpose was therefore to determine relationships between presence of fear of cancer recurrence and QOL of patients, with the mediating role of social support. **Methods:** A predictive correlational design was used to conduct the study with 300 patients with cancer who were undergoing chemotherapy, radiotherapy, or surgery at two medical centers in Tehran. Measures included a demographic information form, the Fear of Cancer Recurrence Inventory (FCRI), the European Organization for Research and Treatment of Cancer QOL Questionnaire (EORTC QLQ-C30), and the Multidimensional Scale of Perceived Social Support (MSPSS). Data analyses included descriptives, and path analysis analyses. **Results:** Higher fear of cancer recurrence predicted lower QOL ($\beta = -0.60$, $p < 0.001$). Moreover, individuals with lower fear of cancer recurrence also perceived higher social support ($\beta = 0.32$, $p < 0.001$). Additionally, individuals with higher perceived social support also reported better QOL ($\beta = 0.30$, $p < 0.001$). **Conclusion:** Perceived social support plays a significant mediating role in the relationship between the fear of cancer recurrence and QOL in patients undergoing active cancer treatment. Enhancing social support among cancer patients may contribute to enhanced QOL, and as does reducing fears associated with disease recurrence.

Keywords: Quality of life- cancer progression- social support- cancer- fear of disease recurrence

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Introduction

Cancers are a major contributor to mental and physical disability and death worldwide [1]. In 2020, approximately 3.19 million new cases and 10 million cancer-related deaths were reported globally, with half of all new cancer cases and 3.58% of the deaths occurring in Asia [2]. In the same year, Iran reported 131,191 new cases of cancer and 79,136 deaths due to cancers for both sexes across all age groups [3].

A cancer diagnosis is recognized to disrupt economic, social, occupational, and personal lives of the patient, impacting various aspects of their quality of life (QOL) [4]. QOL is defined as an individuals' perception of their position in life in the context of the culture and value systems in which they live. Quality of life is related to personal goals, expectations, standards, and concerns [5]. Identifying and researching factors that impact QOL is of paramount importance. One such factor that can significantly impact QOL is the fear of cancer recurrence. "Fear of cancer recurrence" refers to fears or worries that the cancer will return, that the treatment will not be effective, and/or the disease will progress [6]. Such fear of the cancer and potential life-threatening consequences, perpetuate worry that reinforces itself with imagined scenarios that may interrupt sleep and capacity to function effectively [7]. Fear of recurrence is relatively common in patients with cancer with prevalence rates ranging from 39% to 97% for any level of fear of cancer recurrence, 22% to 87% for "moderate to high" fear, and up to 15% for "high" fear [8]. In a study conducted by Tran and colleagues, higher fear of cancer recurrence was proportionately related to lowered QOL [9]. Cancer survivors experiencing fear of recurrence may also require more health monitoring, contributing to increased healthcare costs [10]. It is essential that fear of cancer

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recurrence be evaluated across the spectrum of cancer survivorship including during active treatment, given its' adverse impact on QOL.

Social support is another contributor that may impact QOL [11]. Studies indicate that positive perceived social support is associated with improved QOL in patients with cancer [12]. Social support is an interactive process that provides a safety net for the patient [13] involving supportive friends, family, neighbors, or healthcare providers, enabling an individual's capacity to cope with their psychological and physical challenges [14]. Studies have shown that social support can have a positive impact on cancer patients' ability to cope with their illness [15]. A cancer diagnosis can create various challenges in all aspects of individuals' personal and social life, especially during active treatment, increasing demands for active support [16, 17]. Thus, the presence of strong social support can provide a buffer against the demands of treatment while also contributing to better QOL.

Mediating role of social support

Stress and Coping Theory posits that social support serves as a buffer against stressors, potentially alleviating the negative impact of FCR on QoL. Social Cognitive Theory highlights how social factors shape individuals' beliefs and coping behaviors, suggesting that social support influences perceptions of self-efficacy in managing FCR and thus affects QoL outcomes [17]. Attachment Theory suggests that supportive relationships provide a secure base for individuals to manage cancer-related concerns, impacting their QoL through the alleviation of FCR-related distress. Additionally, the Transactional Model of Stress and Coping emphasizes the bidirectional nature of stress and coping processes, suggesting that seeking social support may be both a response to FCR and a mechanism through which individuals manage it, thereby influencing QoL [18]. Integrating these perspectives offers insights into how social support mechanisms operate in the context of cancer-related stressors and can inform interventions aimed at enhancing supportive networks and coping resources to improve QoL outcomes for patients undergoing active cancer treatment.

While research on fear of recurrence and its consequences has expanded in recent years [19], a notable research gap exists concerning the mediating role of social support in the relationship between fear of recurrence and QoL, particularly among patients undergoing active cancer treatment. Although social support has been recognized as a crucial determinant of adjustment and coping among cancer patients [17], its specific influence on the fear of recurrence-QoL association during active treatment remains underexplored.

Understanding the mechanisms through which social support influences the impact of fear of recurrence on QoL is vital for several reasons. First, elucidating the mediating role of social support can provide insights into the pathways through which psychosocial factors affect cancer patients' well-being, thereby informing targeted interventions to improve patient outcomes [9]. Second, given the inherent challenges and stressors associated with cancer treatment, identifying factors that mitigate the negative impact of fear of recurrence on QoL is paramount for optimizing patient care and enhancing treatment adherence.

Given the lack of research that has evaluated the role of fear of cancer recurrence on QOL of patients receiving cancer treatments, the study sought to evaluate whether the fear of recurrence was associated with QOL and the potential mediating role of social support.

Materials and Methods

A cross-sectional predictive research design was used.
Participants

In present study, 300 persons with cancer were recruited from two Tehran oncology clinics over a period of 9 months. Study inclusion criteria were: 1) a confirmed cancer diagnosis; 2) undergoing active treatment for cancer (surgical, chemotherapy, or radiotherapy treatments); 3) patients aged >18 years; and 4) willing and able to complete the study. Exclusion criteria were: 1) not in active cancer treatment.

Sample Size

The sample size was determined based on sample size estimates needed for structural equation modeling studies, considering 3 latent variables (fear of recurrence, QOL, social support), a significance level of less than 0.05, a power of 80%, and an effect size of 0.2 [20, 21].

Procedures

The study received approval from Iran university of medical sciences (Tehran, Iran). A signed informed consent was obtained from all the participants after the study was thoroughly explained by trained research assistants including rights as volunteering participants. Confidentiality was assured with numbers assigned to all materials. All questionnaires were completed in quiet private hospital clinic rooms with the research assistant present to answer questions. For those participants who could not read, all questions were read to them. Participants were counseled that they could decide to withdraw at any time, and that the study participation would not affect the care that they received.

Instruments

Demographic and health information obtained included age, sex, occupation, marital status, education level, economic status, and type of cancer treatment.

Fear of Cancer Recurrence was measured with the self-report survey developed by Simardand Savard [6]. The Fear of Cancer Recurrence Inventory originally consisted of 42 questions and was scored on a Likert scale from one to four. Recently, a shortened version of this tool was developed. This shortened version consists of 12 questions, each scored on a 5-point Likert scale: Never [1], Rarely [2], Sometimes [3], Often [4], and Always [5]. The total score on the Fear of Cancer Recurrence Inventory -12 (FoP-Q-12) ranges from 12 to 60, where a higher score indicates increased fear of cancer recurrence [22]. The reliability coefficient in this study was 0.93.

Quality of life was assessed with validated and reliable

EORTC QLQ-C30 questionnaire, version 3, consisting of 30 questions [23]. This questionnaire consists of three dimensions: functional, symptoms, and overall health. The functional dimension encompasses physical, role, emotional, cognitive, and social functioning. The symptoms dimension includes fatigue, nausea and vomiting, pain, shortness of breath, sleep disturbances, appetite loss, constipation, diarrhea, and financial difficulties arising from the illness. Questions 1 to 28 are answered on a 4-point Likert scale ranging from "not at all" [1] to "a lot" [4], whereas questions 29 and 30 are on a 7-point Likert scale from "very poor" [1] to "excellent" [7]. The scores for the functional dimension range from 15 to 60. The scores for the symptoms dimension range from 13 to 52, and the scores for the overall health dimension range from 2 to 14. A higher score in the functional and overall health dimensions indicates a better QOL for the individual, whereas a higher score in the symptoms dimension signifies more problems related to the illness [23]. Scores are combined across the three dimensions to obtain a composite score. In this study, the calculated Cronbach's alpha coefficient (α=0.86) and McDonald's omega (ω=0.91) were within a confidence interval for the reliability of this tool (95% CI=95.0% to 96.0%).

Social support was assessed with Zimet's Multidimensional Scale of Perceived Social Support (MSPSS), designed to assess perceived social support from three sources: family, friends, and significant others [24]. This scale measures an individual's perceived social support from the three sources on a likert scale from 0 = strongly disagree to 5 = strongly agree. The score range of this summed scale is from 0 to 60, and an increase in the score indicates an increase in perceived social support. In this study, the reliability coefficient was found to be 0.93.

Statistical analysis

Statistical analysis was conducted using SPSS 27 and AMOS 27 software. Descriptive statistics were used to characterize the data. The Pearson correlation coefficient was first tested using SPSS version 26 to assess the correlations between variables in this study. Next, the research model was tested through path analysis using AMOS version 27. Path analysis is a statistical technique for examining and assessing interrelationships among a set of observed variables directly and indirectly. Path analysis uses multiple regression techniques that allow a second dimension-time sequence to enter in the analysis. Path analysis utilizes a standardized multiple regression techniques to estimate the path coefficients. All tests in this study were two-tailed, and the p-values of less than 0.05 are considered statistically significant.

Results

Most of the participants ranged in age from 49 to 59-years (n = 102, 34%) and were primarily male (n = 162, 60.7%). See Table 1 for further demographic information.

Fear of disease recurrence had a significant and negative effect on QOL ($p<0.001$, $\beta=-0.60$). Further, fear of disease recurrence also had significant and negative direct effects on both the functional ($p<0.001$, $\beta=-0.60$) and symptom dimensions of QOL ($p<0.001$, $\beta=-0.60$). However, fear of disease recurrence had a significant and positive direct effect on the health dimension of QOL ($p<0.001$, $\beta=0.42$) (See Table 2).

Social support had a significant direct effect on overall QOL ($p<0.001$, $\beta=0.30$). Further, social support significantly and positively affected both the functional ($p<0.001$, $\beta=0.33$) and symptom dimensions of QOL ($p<0.001$, $\beta=0.26$). Interestingly, social support significantly and inversely affected the overall health dimension of QOL ($p<0.001$, $\beta=-0.24$) (See Table 3).

Table 1. Demographic Characteristics of Cancer Patients Participating in the Study

Variable	N (%)	Variable	N (%)
Sex		Level of Education	
Male	182 (60.7)	Illiterate	23 (7.66)
Female	118 (39.3)	Secondary School	63 (21)
Age		High school	48 (16)
18-28	32 (10.6)	Diploma	107 (35.66)
38-29	38 (12)	Bachelor	51 (17)
48-39	72 (24)	Master	8 (2.6)
59-49	102 (34)	Economic Status	
70-60	56 (18.7)	Low	70 (23.4)
Occupation		Moderate	189 (63)
Housewife	85 (28.4)	Good	41 (13.6)
Employee	49 (16.3)	Type of Treatment	
Freelance job	103 (34.3)	Surgery	10 (3.4)
Retired	54 (18)	Radiotherapy	16 (5.3)
Other	9 (3)	Chemotherapy	274 (91.3)
Marital status			
Single	45 (15)		
Married	234 (78)		
Divorced	5 (1.7)		
Widow	16 (5.3)		

Table 2. Relationship between Fear of Disease Recurrence and Quality of Life and Its Dimensions in Cancer Patients

Paths	Standardized direct effect	P-value	R^2
QOL * Fear of cancer recurrence	-0.6	<0.001	0.39
Functional QOL * Fear of cancer recurrence	-0.6	<0.001	0.36
Symptom QOL * Symptom QOL	-0.61	<0.001	0.37
Overall Health QOL * Fear of cancer recurrence	0.42	<0.001	0.17

Table 3. Determining the Relationship between Social Support and Quality of Life and Its Dimensions in Cancer Patients

Paths	Standardized direct Effect	P-value	R^2
QOL * Social Support	0.3	<0.001	0.09
Social Support * Functional QOL	0.33	<0.001	0.1
Symptom QOL * Social Support	0.26	<0.001	0.06
Overall Health QOL * Social Support	-0.24	<0.001	0.05

Table 4. Determining the Relationship between Social Support in Relation to Fear of Disease Recurrence

Paths	Standardized Indirect Effect	P-value
Functional QOL * Social Support * Fear of cancer recurrence	-0.04	0.008
Symptom QOL * Social Support * Fear of cancer recurrence	0.03	0.031
Overall Health QOL * Social Support * Fear of cancer recurrence and Quality of Life Dimensions in Cancer Patients	-0.02	0.149

Mediation analysis demonstrated that social support in relation to the fear of disease recurrence had a significant indirect relationship with the functional dimension of QOL ($p<0.05$, $\beta=0.04$) (Table 4). Social support in relation to the fear of disease recurrence also had a significant indirect relationship with the symptom dimension of QOL ($p<0.05$, $\beta=0.03$). However, social support in relation to the fear of disease recurrence did not have significant relationships with the overall health dimension of QOL ($p>0.05$, $\beta=-0.02$).

Discussion

This study aimed to determine relationships between fear of disease recurrence and QOL of cancer patients in active treatment; with the mediating role of social support investigated. Findings demonstrated that fear of disease recurrence had a negative impact on perceived functional and physical dimensions of individuals' QOL. Consistent with the results of the current study, Lee et al. [25] found that cancer-related fatigue and fear of disease recurrence were the most common symptoms in cancer survivors and strongly negatively affected their QOL. Furthermore, Tran et al. [9] indicated that increased fear of cancer recurrence was associated with worse physical symptoms and poorer QOL.

Fear of disease recurrence is a common experience among cancer patients and can have a significant impact on them [26]. The results of this study indicated a significant positive correlation between the fear of disease recurrence and the overall health dimension of QOL. It is plausible that fear of disease recurrence may orient individuals to pay more attention to their health.

The study found significant negative correlations between the fear of disease recurrence and social support. Thus, the greater the perceived social support available, the lower were their fears of disease recurrence. In line with these findings, the study by Pasek et al. [27] demonstrated that receiving support from family and friends, including emotional support, comfort, and problem-solving, during the post-diagnosis period, can have a positive impact on the psychological and emotional well-being of cancer patients. Furthermore, the study by Davis et al. [28] found that social support was associated with reduced stress among patients with advanced colorectal cancer through all phases of chemotherapy cycles.

The results of this study, demonstrated a significant positive correlation between social support and overall QOL, functional dimension of QOL, and symptom dimension of QOL. Additionally, social support was negative correlated with the general health dimension of QOL. In explaining these findings, it can be stated that social support can contribute to improvement and efficiency in an individual's functioning and physical condition [29, 30]. Luszczynska et al. [12] demonstrated the presence of a relationship between perceived social support and emotional aspects of QOL in lung cancer patients. Contrary results regarding the inverse correlation of social support with QOL, especially in the functional dimensions and QOL symptoms, were not found.

Social support was significantly and indirectly related to the fear of disease recurrence and QOL. In line with this, Yu et al. [31] demonstrated that social support has a considerable indirect impact on the relationship between the fear of disease recurrence and QOL. Furthermore, Yu et al. [31] study represents the inverse relationship between social support and uncertainty in illness and the fear of cancer recurrence. Our study, on the other hand, demonstrated that social support is crucial in reducing the fear of cancer recurrence. However, the results of the study by Ban et al. [32] indicated that social support does not have a significant impact on the relationship between the fear of disease recurrence and QOL. The study by Ban et al. [32] specifically focused on breast cancer patients, whereas the current study included various types of cancer. The results of this study showed that social support has a significant indirect relationship with the functional dimension of QOL and the symptom dimension of QOL. This means that social support has a meaningful indirect impact on the fear of disease recurrence concerning the functional and symptom dimensions of QOL. However, social support does not have a significant indirect relationship with the overall health dimension of QOL in the context of the fear of disease recurrence. This result suggests that social support has different associations with various dimensions of QOL concerning the fear of disease recurrence.

In present study fear of cancer recurrence and quality of life were associated to each other. Fear of cancer recurrence is often associated with heightened levels of psychological distress, including anxiety, depression, and intrusive thoughts. The constant fear of disease recurrence can lead to rumination, avoidance behaviors, and hypervigilance, which, in turn, can exacerbate emotional distress and compromise overall QoL [33]. Individuals may experience difficulty concentrating, disruptions in sleep patterns, and impaired social functioning due to the psychological burden of fear of cancer recurrence. Fear of cancer recurrence can impact physical health and functioning, contributing to symptoms such as fatigue, pain, and somatic complaints [34]. The stress response triggered by fear of cancer recurrence may compromise immune function, exacerbate existing health conditions, and impede recovery from treatment-related side effects. Consequently, individuals may experience limitations in their daily activities, decreased energy levels, and

diminished overall physical QoL [35].

In relation to the functional dimension and the symptom dimension of QOL, social support has a significant indirect relationship, meaning that increasing social support can reduce the fear of disease recurrence and consequently improve an individual's physical functioning and symptom status. However, concerning the overall health dimension of QOL, the results indicate that social support does not have a significant indirect relationship. This suggests that the overall health dimension of QOL might be influenced by other factors, and social support is just one of these factors that may not have a significant impact. In line with this, Yu et al. [31] stated in their study that social support has a significant indirect relationship with the functional and symptom dimensions of QOL concerning the fear of disease recurrence. However, social support does not have a significant indirect relationship with the overall health dimension of QOL. This result implies that social support can have a considerable impact on the functional and symptom dimensions of QOL, but it may not have a significant effect on the overall health dimension of QOL.

Limitations and strength

The finding of this study should be viewed with caution, given the convenience sample. The reliance on self-report measures for fear of cancer progression, quality of life, and social support may introduce response bias. Participants might provide socially desirable answers or may not accurately represent their experiences. While the study explores the mediating role of social support, it may not establish causation. Correlation does not imply causation, and there could be other unexplored factors influencing the relationship between fear of cancer progression and quality of life. The impact of fear of cancer progression and the role of social support can vary across different cultural and societal contexts. The study may not account for these variations, limiting the generalizability of the findings to diverse populations.

The study addresses an important issue relevant to cancer patients undergoing active treatment – fear of cancer recurrence and its impact on quality of life. Given the increasing focus on survivorship issues in oncology, this study is timely and addresses a pertinent concern. The study may have a diverse and representative sample of cancer patients undergoing active treatment, which enhances the generalizability of findings. This inclusivity ensures that the results are applicable across different demographic and clinical groups. By investigating the mediating role of social support, the study goes beyond merely establishing associations and explores potential mechanisms underlying the relationship between fear of cancer recurrence and quality of life. This adds depth to the understanding of these constructs and informs intervention strategies.

Clinical implications

The study highlights the potential mediating role of social support in mitigating the impact of fear of cancer progression on quality of life. Clinicians can develop and implement tailored psychosocial interventions that specifically address the enhancement of social support networks for these patients. Clinicians can educate patients about the potential emotional challenges associated with cancer progression and treatment. Providing information about the role of social support in coping with these challenges and maintaining a good quality of life can empower patients to seek and utilize available support networks. Routine screening for fear of cancer progression and psychological distress can be incorporated into the standard assessment protocols for cancer patients. This proactive approach allows for early identification of patients who may require additional support and intervention.

In conclusion, the results of this study indicate that the fear of cancer recurrence has a significant negative impact on the QOL in cancer patients. Additionally, this fear of recurrence was also adversely associated with social support. Social support, on the other hand, has a meaningful positive relationship with functional QOL and symptoms, but it has an indirect relationship with overall health. In other words, social support plays a meaningful mediating role in the relationship between the fear of cancer recurrence and QOL. Based on the findings of this research, it is recommended that supportive and social programs for cancer patients be strengthened and promoted. These initiatives should aim to reduce the fear of cancer recurrence on one hand and enhance social support on the other hand. These actions can lead to a significant improvement in the QOL for these individuals and assist them in better coping with the challenges and stresses arising from cancer.

Ethics approval

Ethical Committee of Iran University of Medical Sciences approved the study (Ethics code: IR.IUMS.REC.1401.311). All the participants signed the written consent forms. All the participants were assured regarding their privacy in this study and informed about volunteer entering the study and willingness to exclude from the study at any time.

Author Contribution Statement

Mahdi Zarei and Mansoureh Ashghali Farahani: Conceptualization, Methodology. Mahdi Zarei, Mansoureh Ashghali Farahani, Hamid Sharif-Nia, and Amir Hossein Goudarzian: Data curation, Writing-Original draft preparation. Hamid Sharif-Nia, Mansoureh Ashghali Farahani, and Rebecca H. Lehto: Writing- Reviewing and Editing.

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Approval

Approval by scientific body This study was approved by research committee of Iran University of medical sciences (Tehran, Iran).

Data Availability Statement

Data is available on demand by reaching out to the author Mansoureh Ashghali Farahani by email at: Farahani.ma@iums.ac.ir.

Conflicts of interest

There are no conflicts of interest by any of the authors of this study. All authors have participated in (a) conception and design, or analysis and interpretation of the data; (b) drafting the article or revising it critically for important intellectual content; and (c) approval of the final version. This manuscript has not been submitted to, nor is under review at, another journal or other publishing venue. The authors have no affiliation with any organization with a direct or indirect financial interest in the subject matter discussed in the manuscript.

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