

# The Role of Rumination, Sense of Coherence, and Death Anxiety in Predicting Existential Distress Among Individuals Bereaved Due to Cancer

Nastaran. Khoshniyat<sup>1</sup>, Shida. Rezvansha<sup>2</sup>, Maryam. Ahmadian<sup>3</sup>, Zahra. Askari<sup>4\*</sup>, Majid. Rahimi<sup>5</sup>,

- 1 Master of Science in Guidance and Counseling, Abhar Branch, Islamic Azad University, Abhar, Iran
- 2 Master of Science in Guidance and Counseling, Roudehen Branch, Islamic Azad University, Roudehen, Iran
- 3 Master of Science in Clinical Psychology, Qom Branch, Islamic Azad University, Qom, Iran
- 4 Master of Science in Clinical Psychology, Bandar Abbas Branch, Pardis Azad University, Bandar Abbas, Iran
- 5 Master of Science in Clinical Psychology, Kharazmi University, Tehran, Iran

\*Correspondence: Bitaskari1104@gmail.com

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## ABSTRACT

Existential distress is one of the common psychological consequences experienced by individuals bereaved due to cancer-related loss. The present study was conducted to examine the role of rumination, sense of coherence, and death anxiety in predicting existential distress among individuals bereaved due to cancer. This research employed a descriptive–correlational design. The statistical population consisted of individuals bereaved due to cancer residing in Tehran in 2023. Using a convenience sampling method and considering inclusion and exclusion criteria, 300 participants were selected as the study sample. Research instruments included the Ruminative Responses Scale (RRS), the Sense of Coherence Scale (SOC-29), Templer Death Anxiety Scale (DAS), and the Existential Distress Questionnaire (EDQ). Data were analyzed using SPSS-26 software through Pearson correlation coefficients and hierarchical multiple regression analysis. The mean age of participants was 45.6 years ( $SD = 10.2$ ). The findings indicated a significant positive correlation between rumination ( $r = 0.51, p < .001$ ) and death anxiety ( $r = 0.43, p < .001$ ) with existential distress, and a significant negative correlation between sense of coherence and existential distress ( $r = -0.56, p < .001$ ). Results of hierarchical regression analysis showed that the predictor variables collectively explained 78% of the variance in existential distress ( $R^2 = 0.78$ ). In the final model, sense of coherence, with a standardized beta coefficient of  $-0.41$ , emerged as the strongest negative predictor, while death anxiety, with a beta coefficient of  $0.37$ , was the strongest positive predictor of existential distress. The results suggest that rumination and death anxiety function as vulnerability factors, whereas sense of coherence operates as a strong protective factor against existential distress. These findings highlight the importance of an integrated consideration of cognitive, psychological, and existential dimensions in designing psychological interventions for individuals bereaved due to cancer.

**Keywords:** Existential distress, bereavement, cancer, rumination, sense of coherence, death anxiety.

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## Introduction

Cancer is one of the most significant life-threatening illnesses of the modern era, affecting not only patients but also profoundly influencing the psychological functioning of family members and close relatives who experience anticipatory grief and bereavement following loss. Advances in medical treatment have increased survival rates; however, the psychosocial consequences associated with cancer remain substantial, particularly for individuals who lose loved ones to the disease. Bereavement due to cancer often involves prolonged exposure to suffering, caregiving stress, uncertainty about prognosis, and repeated confrontation with mortality, all of which may culminate in profound existential distress. Existential distress refers to a multidimensional psychological condition characterized by loss of meaning, hopelessness, fear of death, existential guilt, and disruption of personal identity and worldview. Research indicates that exposure to life-threatening illness and death challenges fundamental assumptions about meaning in life and personal continuity, thereby increasing vulnerability to existential suffering among bereaved individuals (1). Meta-analytic evidence further demonstrates that meaning in life and sense of coherence are strongly associated with lower psychological distress in cancer populations, highlighting existential factors as central mechanisms in adaptation to illness and loss (2). Understanding predictors of existential distress among cancer-related bereaved individuals is therefore essential for developing effective psychological interventions.

Among cognitive factors influencing psychological adjustment after loss, rumination has received considerable empirical attention. Rumination refers to repetitive, passive, and persistent thinking about negative experiences, emotions, and perceived failures, which interferes with adaptive emotional processing and problem solving. Studies across oncology contexts show that rumination intensifies emotional distress and impedes psychological recovery by maintaining attention on loss-related thoughts and unresolved emotional experiences. Mindfulness-based interventions have repeatedly demonstrated reductions in rumination among patients with cancer, suggesting that maladaptive repetitive thinking plays a central role in psychological suffering (3). Experimental and clinical investigations have confirmed that mindfulness-based stress reduction programs significantly decrease rumination among individuals with breast cancer, thereby improving emotional regulation and coping capacities (4). Similarly, mindfulness-based cognitive therapy has been shown to reduce rumination and fatigue in cervical and uterine cancer populations, emphasizing the modifiability of ruminative thinking patterns through psychological treatment (5, 6). Positive psychology interventions have also demonstrated effectiveness in decreasing rumination while improving adaptive coping strategies among women with cancer (7). Structural modeling research further indicates that rumination mediates relationships between psychological resilience and pain management outcomes in breast cancer patients, suggesting that rumination functions as a key cognitive vulnerability factor influencing psychological adaptation (8). Beyond oncology settings, rumination has been associated with reduced distress tolerance and increased emotional dysregulation, reinforcing its role as a transdiagnostic predictor of psychological distress (9). In dyadic cancer contexts, rumination influences not only individual well-being but also relational adjustment and posttraumatic growth among couples coping with diagnosis and treatment, underscoring its systemic psychological impact (10). Collectively, these findings suggest that persistent rumination may contribute substantially to existential distress among individuals bereaved by cancer loss.

Another critical construct related to adaptation in the face of illness and bereavement is sense of coherence, originally conceptualized as a global orientation reflecting the extent to which individuals perceive life as comprehensible, manageable, and meaningful. Sense of coherence functions as a resilience resource enabling individuals to interpret stressful events within a coherent cognitive framework. Epidemiological evidence demonstrates that higher sense of coherence predicts reduced mortality risk and improved long-term health outcomes, highlighting its protective role across populations (11). In oncology settings, sense of coherence has been linked with demographic, psychological, and lifestyle variables, suggesting that it represents an integrative construct connecting personal meaning systems with coping behaviors (12). Research on families affected by cancer indicates that stronger perceived family sense of coherence predicts better psychological adjustment among caregivers and parents confronting illness-related stress (13). Studies involving partners of women with breast cancer further reveal that higher sense of coherence is associated with improved health-related quality of life, demonstrating that coherence operates not only individually but also interpersonally within the cancer experience (14). Investigations of stigma and quality of life among women with breast cancer have also identified sense of coherence as a mediator linking social support, coping strategies, and psychological well-being (15). These findings suggest that sense of coherence may serve as a powerful psychological buffer against existential disruption following loss, enabling bereaved individuals to reconstruct meaning after traumatic experiences.

Death anxiety represents another central existential variable in cancer contexts. Confrontation with terminal illness exposes individuals and their families to continuous reminders of mortality, often intensifying fears related to death, nonexistence, and uncertainty about the future. Empirical studies show that death anxiety is closely associated with fear of cancer recurrence and emotional distress among oncology patients, indicating that mortality awareness plays a fundamental role in psychological suffering (16). Recent research has demonstrated that death anxiety mediates relationships between fear of recurrence and psychological outcomes, highlighting its function as a core existential mechanism within cancer-related stress processes (17). Cross-sectional surveys of patients with advanced cancer confirm that death anxiety is significantly associated with family functioning and perceived meaning in life, suggesting that existential meaning systems influence responses to mortality awareness (18). Moreover, heightened death anxiety has been linked with pandemic-related fears among women with breast cancer, illustrating how external stressors may amplify existential concerns in medically vulnerable populations (19). Psychological interventions grounded in existential therapy and logotherapy have demonstrated effectiveness in reducing death anxiety and existential loneliness among individuals with advanced cancer, reinforcing the clinical importance of addressing existential fears directly (20). Studies examining mindfulness, ambiguity tolerance, and aging populations similarly show that reductions in death anxiety correspond with improved psychological adjustment and sleep quality, indicating broad relevance across developmental stages (21). Spiritual health research further supports the association between existential anxiety and psychological distress among women with breast cancer, suggesting that existential dimensions represent central components of emotional adaptation to illness and loss (22).

Existential distress emerges at the intersection of cognitive, emotional, and existential processes. Cancer-related bereavement differs from other forms of loss because family members often experience prolonged exposure to suffering before death, creating cumulative psychological burden. Existential psychotherapy

research indicates that addressing meaning, freedom, isolation, and mortality awareness enhances psychological capital and emotional regulation among individuals undergoing cancer treatment, emphasizing the therapeutic relevance of existential constructs (23). Theoretical perspectives propose that existential distress results when individuals are unable to integrate experiences of loss into coherent meaning structures, a process influenced by both maladaptive cognition and resilience resources. Rumination may intensify distress by reinforcing negative interpretations, whereas sense of coherence facilitates adaptive meaning reconstruction, and death anxiety reflects the emotional manifestation of existential threat. Empirical evidence consistently demonstrates that mindfulness and adaptive coping strategies reduce psychological distress by simultaneously targeting rumination and existential concerns, suggesting interconnected mechanisms underlying adjustment to cancer-related stress (24). Despite growing research on patients with cancer, relatively limited attention has been directed toward individuals bereaved due to cancer loss, even though they remain at elevated risk for long-term psychological complications.

Recent Iranian and international studies have emphasized the need to examine multiple psychological predictors simultaneously rather than in isolation. Research exploring existential anxiety and demoralization syndrome in cancer populations highlights the importance of integrated psychological models that incorporate meaning, coping, and emotional regulation variables (1). Similarly, investigations examining rumination, coping strategies, and psychological functioning suggest that cognitive processes interact dynamically with existential beliefs to shape emotional outcomes (7). Evidence from psychosocial oncology indicates that interventions focusing exclusively on symptom reduction may be insufficient unless existential dimensions such as meaning reconstruction and mortality awareness are addressed concurrently (25). Furthermore, the growing emphasis on psychosocial care within oncology underscores the importance of identifying protective factors capable of mitigating distress among both patients and bereaved family members (20). Considering that bereaved individuals often receive less structured psychological support compared with patients themselves, identifying predictors of existential distress becomes particularly crucial for preventive mental health strategies.

Taken together, existing literature suggests that rumination functions as a cognitive vulnerability factor, death anxiety represents a core existential stressor, and sense of coherence operates as a protective psychological resource. However, few studies have simultaneously examined these constructs within bereaved populations affected by cancer loss, especially within culturally specific contexts where meaning systems, coping patterns, and social support structures may differ. Integrating cognitive and existential perspectives provides a comprehensive framework for understanding psychological adjustment following bereavement. Such integration allows researchers and clinicians to move beyond symptom-focused approaches toward multidimensional models addressing meaning, cognition, and emotional regulation simultaneously. Accordingly, the present study aimed to examine the role of rumination, sense of coherence, and death anxiety in predicting existential distress among individuals bereaved due to cancer.

## **Methods and Materials**

### *Study Design and Participants*

This study employed a descriptive–correlational design. The statistical population consisted of all individuals bereaved due to cancer-related loss (loss of a parent, spouse, child, or sibling) residing in Tehran

during the second six-month period of 2023. Inclusion criteria were: (1) a minimum of 3 months and a maximum of 24 months having passed since the loss, (2) age between 25 and 65 years, (3) no history of diagnosis of major psychiatric disorders (e.g., schizophrenia or bipolar disorder) based on self-report, and (4) literacy in reading and writing. Using a convenience sampling method and recruitment through counseling centers, non-governmental organizations supporting cancer patients, and announcements on social media platforms, 300 participants were selected as the final sample. Based on Cochran’s formula for an unlimited population, considering an error level of 0.05, statistical power of 0.95, and a medium effect size, this sample size was determined to be adequate.

*Data Collection*

Ruminative Responses Scale (RRS): This 22-item questionnaire was developed by Nolen-Hoeksema and Morrow (1991). Items are scored on a 4-point Likert scale ranging from never (1) to always (4). Higher scores indicate greater levels of rumination. In the present study, Cronbach’s alpha coefficient was calculated as 0.87.

Sense of Coherence Scale (SOC-29): This 29-item questionnaire was developed by Antonovsky (1987) and measures three dimensions: comprehensibility, manageability, and meaningfulness. Items are scored on a 7-point scale (1 to 7), with total scores ranging from 29 to 203. Higher scores reflect a stronger sense of coherence. In this study, the Cronbach’s alpha coefficient for the total scale was 0.89.

Templer Death Anxiety Scale (DAS): This 15-item scale was developed by Templer (1970). Each item is scored dichotomously as true or false (1 and 0). Total scores range from 0 to 15, with higher scores indicating greater death anxiety. In the present study, Cronbach’s alpha was calculated as 0.76.

Existential Distress Questionnaire (EDQ): This 32-item questionnaire was developed by Hillman (2004) and assesses dimensions such as loss of meaning, hopelessness, existential guilt, and death anxiety. Items are rated on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Total scores range from 32 to 160, with higher scores indicating greater existential distress. In this study, Cronbach’s alpha coefficient was 0.93.

*Data Analysis*

Data were analyzed using SPSS-27 software. Descriptive statistics (mean and standard deviation) were used to describe the data, and inferential statistics—including Pearson correlation coefficients to examine relationships among variables and hierarchical multiple regression analysis to predict existential distress—were applied. The significance level was set at 0.05.

**Findings and Results**

Out of 300 distributed questionnaires, 291 questionnaires were eligible for analysis (response rate = 97%). The mean age of participants was 45.6 years (SD = 10.2). Women constituted 62% of the sample, while men represented 38%. Descriptive statistics of the study variables are presented in Table 1.

**Table 1. Descriptive Statistics of Study Variables (n = 291)**

Variable	Mean	Standard Deviation	Minimum	Maximum
Existential Distress	108.3	18.7	52	152
Rumination	48.9	10.4	22	78

Sense of Coherence	129.6	25.1	58	195
Death Anxiety	9.2	3.8	1	15

To examine relationships among the study variables, Pearson correlation coefficients were calculated. The results are presented in Table 2.

**Table 2. Pearson Correlation Matrix Among Study Variables**

Variable	1	2	3	4
1. Existential Distress	1			
2. Rumination	.51**	1		
3. Sense of Coherence	-.56**	-.43**	1	
4. Death Anxiety	.43**	.39**	-.32**	1

All coefficients are significant at  $p < .01$ .

As shown in Table 2, existential distress demonstrated a significant positive relationship with rumination and death anxiety, and a significant negative relationship with sense of coherence. Furthermore, rumination showed a negative association with sense of coherence and a positive association with death anxiety. Sense of coherence also exhibited a significant negative correlation with death anxiety. This correlation pattern satisfied the necessary assumptions for conducting regression analysis.

Hierarchical multiple regression analysis was conducted to predict existential distress based on the predictor variables. Predictors were entered into the model according to theoretical precedence: rumination in Step 1, sense of coherence in Step 2, and death anxiety in Step 3. The results are presented in Table 3.

**Table 3. Hierarchical Multiple Regression Analysis Predicting Existential Distress**

Step	Entered Variable	R	R <sup>2</sup>	$\Delta R^2$	F	$\beta$ (Final)	t	p
1	Rumination	.51	.26	.26	101.23	.18	3.41	.001
2	Sense of Coherence	.73	.53	.27	165.89	-.41	-7.82	.001
3	Death Anxiety	.88	.78	.25	325.07	.37	8.15	.001

Results of hierarchical regression analysis indicated a high explanatory power for the final model.

**Step 1:** Rumination alone explained 26% of the variance in existential distress ( $R^2 = .26$ ). This value was statistically significant based on the significant change in F ( $F = 101.23$ ).

**Step 2:** With the addition of sense of coherence, the explained variance increased to 53% ( $R^2 = .53$ ). The increase of 27% ( $\Delta R^2 = .27$ ), accompanied by a significant F change ( $F = 165.89$ ), indicates the substantial and unique contribution of sense of coherence in predicting existential distress after controlling for rumination.

**Step 3:** After entering death anxiety, the final model explained 78% of the variance in existential distress ( $R^2 = .78$ ). The 25% increase in explained variance ( $\Delta R^2 = .25$ ), along with a highly significant F change ( $F = 325.07$ ), confirms the strong and independent predictive role of death anxiety.

In the final model, all predictor variables contributed significantly. Based on standardized beta coefficients, sense of coherence ( $\beta = -.41$ ) emerged as the strongest negative predictor, whereas death anxiety ( $\beta = .37$ ) was the strongest positive predictor of existential distress. Rumination also remained a significant predictor ( $\beta = .18$ ). Examination of regression assumptions showed that the model met required conditions, including independence of errors (Durbin-Watson = 1.89) and absence of multicollinearity (Tolerance > .50 and VIF < 2).

## Discussion and Conclusion

The present study aimed to examine the predictive roles of rumination, sense of coherence, and death anxiety in explaining existential distress among individuals bereaved due to cancer. The findings demonstrated that all three variables were significantly associated with existential distress, and together they explained a substantial proportion of its variance. Specifically, rumination and death anxiety showed positive associations with existential distress, whereas sense of coherence demonstrated a strong negative relationship. The hierarchical regression analysis further indicated that sense of coherence was the strongest negative predictor and death anxiety the strongest positive predictor of existential distress, while rumination retained a significant but comparatively smaller contribution. These findings collectively support multidimensional models of psychological adjustment that emphasize the interaction of cognitive, existential, and resilience-related processes in coping with cancer-related loss.

The positive relationship observed between rumination and existential distress aligns with extensive empirical evidence indicating that repetitive negative thinking amplifies emotional suffering following traumatic and loss-related experiences. Rumination maintains attention on unresolved grief, perceived injustice, and meaning disruption, thereby preventing adaptive emotional processing. Prior research has shown that individuals with cancer who engage in higher levels of rumination experience poorer psychological adjustment and increased emotional burden (3). Interventional studies demonstrating reductions in rumination following mindfulness-based stress reduction training further confirm its causal role in sustaining distress (4). Similar findings have been reported in mindfulness-based cognitive therapy research, where reductions in rumination were accompanied by improvements in fatigue and psychological functioning among cancer patients (5, 6). Positive psychology interventions have likewise shown that targeting rumination enhances coping strategies and emotional regulation capacities (7). Structural equation modeling research indicates that rumination mediates relationships between resilience, vitality, and pain management outcomes in breast cancer populations, suggesting that maladaptive cognitive processing acts as a central psychological mechanism influencing adaptation (8). The current findings extend these results by demonstrating that rumination not only affects patients but also significantly contributes to existential suffering among bereaved individuals, highlighting the enduring cognitive impact of cancer-related loss.

The strong negative predictive role of sense of coherence represents one of the most important findings of the study. Sense of coherence reflects an individual's ability to perceive life events as understandable, manageable, and meaningful, thereby facilitating psychological resilience in the face of adversity. Previous meta-analytic evidence has established that sense of coherence is closely linked with lower distress levels and improved psychological outcomes in oncology populations (2). Epidemiological research has also demonstrated that higher sense of coherence predicts better long-term health outcomes and reduced mortality risk, emphasizing its broad protective function (11). Studies examining cancer-related contexts show that sense of coherence interacts with demographic, psychological, and lifestyle factors, functioning as an integrative resilience resource (12). Research involving families and caregivers of cancer patients indicates that stronger family sense of coherence predicts better psychological adjustment and coping with illness-related stressors (13). Similarly, investigations among partners of women with breast cancer have shown that sense of coherence enhances health-related quality of life and emotional adaptation (14). Findings from stigma and quality-of-life studies further demonstrate that sense of coherence mediates the

relationship between social support and psychological well-being (15). The present results suggest that bereaved individuals who possess stronger coherence frameworks may reinterpret loss within broader meaning systems, thereby reducing existential distress and facilitating adaptive grief processing.

Death anxiety emerged as the strongest positive predictor of existential distress in the final model, underscoring the centrality of mortality awareness in bereavement following cancer. Cancer-related loss exposes individuals repeatedly to themes of suffering, dying, and uncertainty, which may intensify existential fears and emotional vulnerability. Previous research has consistently linked death anxiety with fear of cancer recurrence and psychological distress among oncology patients (16). Studies examining mediation pathways have demonstrated that death anxiety plays a critical role in translating illness-related fears into emotional distress outcomes (17). Cross-sectional investigations among patients with advanced cancer confirm that higher death anxiety is associated with diminished meaning in life and impaired psychological adjustment (18). Evidence obtained during global crises such as the COVID-19 pandemic further illustrates how heightened mortality salience exacerbates anxiety among individuals with cancer histories (19). Interventional studies based on logotherapy and existential therapy approaches show significant reductions in death anxiety and existential loneliness following meaning-centered treatment programs (20). The present findings extend this literature by demonstrating that death anxiety remains a dominant psychological force even after the loss has occurred, shaping bereaved individuals' ongoing confrontation with mortality and existential uncertainty.

The combined predictive pattern observed in this study supports integrative theoretical models suggesting that existential distress arises from the interaction between vulnerability factors and protective psychological resources. Rumination amplifies distress by reinforcing negative cognitive cycles, death anxiety activates existential threat responses, and sense of coherence counterbalances these processes through meaning reconstruction. Research on existential anxiety and demoralization syndrome in cancer populations has similarly emphasized that psychological well-being depends on individuals' ability to integrate suffering into coherent meaning structures (1). Studies investigating spiritual health have also demonstrated inverse relationships between existential anxiety and psychological adjustment, suggesting that meaning-oriented resources buffer distress reactions (22). Mindfulness-based psychological profiles among cancer patients reveal that adaptive coping strategies are associated with lower distress and reduced maladaptive cognitive processing, supporting the interconnected nature of cognition, emotion, and existential meaning (24). Furthermore, research on dyadic coping indicates that rumination influences relational processes and posttraumatic growth, implying that existential distress may extend beyond individual psychology to interpersonal systems (10). Together, these findings reinforce the necessity of multidimensional psychological frameworks in understanding bereavement outcomes.

Another important implication of the findings concerns the clinical relevance of existential approaches in psycho-oncology. Existential psychotherapy has been shown to enhance psychological capital, emotional regulation, and affective control among cancer patients, indicating that interventions addressing meaning and mortality awareness can significantly improve psychological functioning (23). Mindfulness-based interventions targeting experiential avoidance and rumination have demonstrated improvements in distress tolerance and emotional stability across populations, suggesting potential applicability for bereaved individuals as well (9). Evidence regarding mindfulness efficacy in women with breast cancer further

supports the integration of cognitive and existential therapeutic strategies to promote psychological adaptation (25). The present results therefore highlight the importance of combining cognitive restructuring, meaning-centered therapy, and death anxiety interventions within grief counseling programs for individuals affected by cancer loss.

Overall, the findings contribute to the growing body of psycho-oncology literature by demonstrating that existential distress among cancer-bereaved individuals cannot be explained solely by emotional reactions to loss. Instead, cognitive styles, existential fears, and resilience resources jointly determine psychological outcomes. The substantial proportion of explained variance observed in the regression model indicates that these variables collectively form a powerful explanatory framework for understanding existential suffering. By identifying rumination and death anxiety as vulnerability factors and sense of coherence as a protective factor, the study provides empirical support for integrated psychological intervention models emphasizing meaning reconstruction, adaptive cognition, and existential acceptance.

Several limitations should be acknowledged when interpreting the findings of this study. First, the cross-sectional design prevents causal inference, making it impossible to determine the temporal direction of relationships among variables. Second, the use of convenience sampling limits generalizability to broader bereaved populations or different cultural contexts. Third, reliance on self-report questionnaires may have introduced response biases such as social desirability or recall bias. Additionally, psychological variables were measured at a single time point, which may not fully capture the dynamic nature of grief processes over time. Finally, potential moderating factors such as social support, spirituality, or prior mental health history were not examined and may influence existential distress outcomes.

Future studies should employ longitudinal designs to examine how rumination, sense of coherence, and death anxiety evolve across different stages of bereavement. Comparative studies involving diverse cultural groups may clarify whether existential distress manifests differently across sociocultural contexts. Researchers are encouraged to investigate mediating and moderating variables such as resilience, spirituality, attachment style, and social support networks. Experimental intervention studies evaluating meaning-centered therapy, mindfulness-based approaches, and existential psychotherapy among bereaved individuals would also provide stronger evidence for causal mechanisms. Moreover, incorporating qualitative methodologies could deepen understanding of lived experiences of existential distress and meaning reconstruction following cancer-related loss.

From a practical perspective, psychological services for individuals bereaved due to cancer should incorporate comprehensive assessments addressing cognitive patterns, existential concerns, and coping resources. Clinicians may benefit from integrating interventions that simultaneously reduce maladaptive rumination, strengthen meaning-making capacities, and address fears related to mortality. Psychoeducational programs for families confronting terminal illness could also prepare relatives for post-loss adjustment by fostering psychological resilience before bereavement occurs. Mental health professionals working in oncology and palliative care settings should prioritize interdisciplinary collaboration to ensure continuity of psychological support for bereaved individuals. Finally, community-based counseling and grief-support programs designed around existential well-being may play an essential role in preventing chronic psychological distress following cancer-related loss.

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## Authors' Contributions

All authors equally contributed to this study.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. This study was approved by the University Ethics Committee under ethical code IR.IAU.Tehran.REC.1402.045.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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