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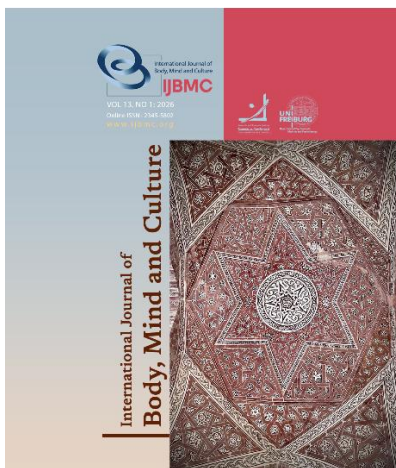
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Structural Model of Adjustment to Cancer based on Paradigm Scenarios and mediating Role of Illness Perception

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ABSTRACT

Objective: This study examined a structural model of cancer adaptation based on emotional macro-narratives, with illness perception as a mediating variable.

Methods and Materials: This descriptive-correlational study used structural equation modeling. The sample included 400 patients with cancer referred to medical centers in Tehran, Iran, in 2024, selected through convenience sampling. Data were collected using the Cancer Adjustment Questionnaire, Brief Illness Perception Questionnaire, and a researcher-designed Emotional Macro-Narratives Questionnaire. Data were analyzed using SPSS-24 and AMOS-24.

Findings: The model showed excellent fit: $\chi^2 = 1.789$, $df = 2$, $p = 0.621$, $CMIN/DF = 0.894$, $RMSEA = 0.001$, $SRMR = 0.008$, $CFI = 0.996$, $IFI = 0.993$, and $GFI = 0.923$. The model explained 67.8% of the variance in cancer adaptation. Heroic narrative ($\beta = 0.340$, $p < 0.001$), personal growth ($\beta = 0.553$, $p < 0.001$), solidarity ($\beta = 0.360$, $p < 0.001$), acceptance ($\beta = 0.384$, $p < 0.001$), and illness perception ($\beta = 0.503$, $p < 0.001$) positively predicted adaptation. Victim narrative ($\beta = -0.501$, $p < 0.001$) and emotional contradictions ($\beta = -0.284$, $p < 0.001$) negatively predicted adaptation. Illness perception significantly mediated the effects of all emotional macro-narratives on adaptation.

Conclusion: Emotional macro-narratives influence adaptation to cancer both directly and indirectly through illness perception. Strengthening adaptive narratives and modifying illness perceptions may improve psychosocial adjustment in patients with cancer.

Keywords: Neoplasms, Adaptation, Illness Perception, Emotions, Narration.

Introduction

According to research conducted on interpersonal and social issues, the most frequent complaints among cancer patients are feelings of rejection or, conversely, being excessively attended to (Flanagan & Holmes, 2000). These elements collectively form the foundation of the concept of *adaptation to cancer*. Cancer typically requires intensive and long-term treatment and is accompanied by multiple psychological and physical crises (Bray et al., 2018). Therefore, paying attention to the psychosocial adaptation of patients with cancer is of great importance (Senmar et al., 2020). Adaptation to cancer begins at diagnosis and continues throughout treatment, and is not limited to a specific stage (Senmar et al., 2020). Inadequate psychosocial adaptation to the disease can result in several complications, including poorer health outcomes, reduced adherence to treatment, and decreased compliance with disease-related care (Alrazaq et al., 2022). Thus, cancer cannot be regarded solely as a physical illness that can be studied in a reductionist manner; rather, it encompasses a wide range of factors that profoundly affect individuals' adaptation. Therefore, focusing on the concept of adaptation to disease and its determining components is essential.

One of the components that may explain how individuals adapt to cancer is the concept of *macro-narratives or emotional meta-narratives*. Before defining emotional macro-narratives, it is necessary to explain the concept of macro-narrative itself. Within critical theory approaches, particularly postmodernism, a meta-narrative (sometimes referred to as a grand narrative or master narrative) is an abstract idea that attempts to provide a comprehensive explanation of historical knowledge or lived experience. According to John Stephens, a macro-narrative is a broad cultural schema that encompasses individuals' knowledge and experience of various phenomena. The prefix *meta* means "beyond" and in this context is also understood as "about," while a narrative is a story. Therefore, a meta-narrative, or macro-narrative, is essentially a story about a story—one that integrates and subsumes "smaller stories" into a more overarching narrative (Kouta et al., 2016; Naus et al., 2009). To the best of the researcher's knowledge, there is no specific definition of *emotional macro-narratives* in the research literature. However, it

can be inferred that emotional macro-narratives are broad, collective emotional accounts that members of a society share and experience regarding a particular issue—an emotional story beyond the main story itself. But what could be the main story and emotional meta-narrative of cancer patients within society?

For example, a study by Walsh et al. (2002) showed that single patients, compared with those who had a partner, were more likely to present with advanced cancer symptoms at the time of diagnosis. Findings from Shang et al. (2024) indicated that common risk factors for both cancer and psychological disorders included older age, female gender, smoking, psychological distress, low educational level, low income, and a family history of depression. Similarly, Koyama et al. (2016) reported that women with cancer experienced more psychosocial problems such as changes in appearance, family conflicts, and sexual issues compared with men, while male patients suffered more frequently from spiritual distress.

Therefore, it would be simplistic to assume that cancer represents a uniform condition for all patients. It is necessary to recognize the hidden narrative differences surrounding this issue. Another important dimension related to cancer includes *protective factors*. Protective factors are those that positively influence recovery, prognosis, and treatment adherence while also moderating psychological distress in patients. Examples include *post-traumatic growth* and *resilience* (Seiler & Jenewein, 2019), *mindfulness* (Tian et al., 2022), *physical activity and healthy nutrition* (Lizama et al., 2020), and *receiving social support* (Roh et al., 2019). For instance, Tian et al. (2022) demonstrated that mindfulness helps improve mental health in cancer patients by moderating the negative effects of illness perception and perceived stress. In other words, mindfulness has been shown to be highly promising in alleviating psychological difficulties among cancer patients (Reed et al., 2012). Another key protective factor is social support, whereas perceived loneliness constitutes a major risk factor for exacerbating psychological problems (Cepeda-Trujillo et al., 2022). Part of this perceived loneliness is tied to *stigma* and *discrimination*, experiences highly prevalent among cancer patients (Yıldız & Koc, 2021), which can be considered as one of the most critical emotional macro-narratives surrounding cancer in society. These macro-narratives influence the process of adaptation to the

disease because negative and discriminatory feedback adversely affects patients' quality of life (Govina et al., 2019). For this reason, having a supportive social network that assists patients through these challenging stages is of great importance. Numerous studies have shown that cancer patients who receive adequate social support demonstrate better treatment trajectories compared with those deprived of such support (Mens et al., 2016).

However, a gap remains in the global research literature: no studies have specifically examined how stereotypes about cancer and its associated emotional macro-narratives might affect the mental health and adaptation processes of patients. Moreover, it is unclear whether these macro-narratives can explain illness perception and coping strategies. Finally, the question arises as to whether emotional macro-narratives surrounding cancer exert their influence on adaptation through illness perception and coping mechanisms. Accordingly, the present study, in a novel approach, aims to examine the fit of a model of adaptation to cancer based on emotional macro-narratives, with the mediating role of illness perception and coping strategies among cancer patients.

Methods and Materials

Study Design

The present study was fundamental in terms of its objective. From the perspective of data collection, it was survey-based, and methodologically, it was a descriptive-correlational study employing Structural Equation Modeling (SEM) to assess the model fit.

In the quantitative section, the statistical population consisted of all cancer patients undergoing treatment in medical centers of Tehran between July and September 2024. The sample was drawn from eligible cancer patients in Tehran hospitals using convenience sampling. To determine the appropriate sample size, the recommendations of Westland (2010) were followed, which provide an algorithm for calculating the "minimum sample size" in SEM studies, assuming data normality. In this calculation, the researcher specifies the statistical power (commonly set at 0.80), the number of latent and observed variables, and the confidence level (commonly 0.05). Accordingly, considering an effect size of 0.19 (the minimum effect size suggested by Chin

(1998) a statistical power of 0.80, and an alpha level of 0.05, the recommended sample size was calculated as 400 participants.

Inclusion criteria consisted of literacy (reading and writing ability), age range between 35 and 60 years, and willingness to complete the questionnaires. Exclusion criteria included age above 60 or below 35 years and a history of clinical disorders or chronic illnesses.

Instruments

Cancer Adjustment Questionnaire: This scale was developed by Derogatis et al. (1995) to evaluate psychosocial adjustment to illness in patients with chronic diseases. The questionnaire includes 46 items across seven domains: attitude toward illness (8 items), occupational/educational environment (6 items), family environment (8 items), sexual relations (6 items), extended family relations (5 items), social environment (6 items), and psychological distress (7 items). Responses are rated on a four-point Likert scale from 0 to 3 (completely = 0, somewhat = 1, slightly = 2, not at all = 3). Higher scores indicate better adjustment, while lower scores reflect poorer adjustment. The validity of the scale has been confirmed through convergent, predictive, and structural validity studies, and its dimensional structure has been widely supported (Derogatis & Fleming, 1996). Test-retest reliability was reported at 0.92, with subscale reliabilities ranging from 0.70 to 0.90. Faghihi et al. (2022), following translation and cultural adaptation, confirmed the content validity of the questionnaire through expert review by ten faculty members at Birjand University of Medical Sciences, and reported Cronbach's alpha reliability at 0.94.

Illness Perception Questionnaire (Brief Version): The brief illness perception questionnaire consists of nine items designed to evaluate patients' cognitive and emotional representations of illness. The items measure consequences, timeline, personal control, treatment control, identity, concern, illness understanding, emotional response, and causes. The first eight items are scored on a 1–10 scale, while the ninth item is open-ended, asking patients to list three perceived causes of their illness. (It should be noted that item 9 was excluded from analysis, as it does not yield a numerical score.) Broadbent et al. (2006) demonstrated concurrent validity of this scale with the revised illness perception questionnaire in patients with asthma, diabetes, and renal disease, reporting subscale correlations ranging

from 0.32 to 0.63. They also found correlations between subscale scores and disease-specific self-efficacy in asthma patients ranging from 0.47 to 0.53. In the Iranian context, Kalantari et al. (2012) reported Cronbach's alpha of 0.80 and test-retest reliabilities ranging from 0.42 to 0.75 over a six-week interval.

Data Analysis

Data analysis was performed at both descriptive and inferential levels. Prior to statistical analyses, data screening included checks for data integrity, handling of missing values, and evaluation of parametric assumptions (normality). Descriptive statistics were conducted using measures of mean, standard deviation, skewness, and kurtosis. SPSS-24 was used for data management, descriptive analyses, and exploratory factor analysis. Model evaluation was conducted using

covariance-based Structural Equation Modeling in AMOS-24.

Findings and Results

In this study, 400 cancer patients in 2024 were examined, with a mean age of 45.90 ± 6.91 years, ranging from 35 to 60 years. Among the 230 female participants, 150 had breast cancer, 60 had uterine or ovarian cancer, and 20 had gastrointestinal cancer. Among the 170 male participants, 130 were diagnosed with gastrointestinal cancers, 22 with prostate cancer, and 18 with lung cancer. Regarding education, most participants held a high school diploma (180 individuals, 48%). Socioeconomic status was reported as poor in 310 participants (78.5%).

Table 1

Descriptive indices (mean and standard deviation) of study variables

Variable	Mean	SD	Min-Max	Skewness	Kurtosis
Adaptation to illness	76.15	20.63	46-138	1.02	0.80
Illness perception	36.67	19.44	9-90	0.97	0.69
Problem-focused coping	89.23	10.34	33-132	-0.18	-0.10
Emotion-focused coping	81.50	11.65	33-132	-0.11	-0.17
Heroic narrative	5.91	3.13	3-10	0.05	-0.02
Victim narrative	6.25	1.13	2-10	-0.18	-0.10
Personal growth narrative	3.98	3.15	1-10	-0.11	-0.17
Solidarity narrative	5.25	3.84	4-10	-0.30	-0.37
Acceptance narrative	6.25	2.25	2-10	0.04	0.18
Emotional contradictions	5.25	3.18	1-10	-0.19	-0.03

Table 1 shows skewness and kurtosis indices of the research variables. The absolute value of skewness for all variables was less than 3, and the absolute value of

kurtosis was less than 10. According to Kline (2016), the assumption of univariate normality was met.

Table 2

Pearson correlation matrix between predictor, mediator, and dependent variables

Variable	1	2	3	4	5	6	7	8
1. Adaptation to illness	1							
2. Illness perception	0.54	1						
3. Heroic narrative	0.45	0.68	1					
4. Victim narrative	-0.39	-0.23	-0.29	1				
5. Personal growth	0.58	0.44	0.51	-0.27	1			
6. Solidarity	0.52	0.28	-0.20	-0.20	-0.30	1		
7. Acceptance	0.61	0.48	0.22	-0.19	0.36	0.58	1	
8. Emotional contradictions	-0.53	-0.41	-0.28	-0.22	0.19	-0.36	-0.58	1

As shown in Table 2, adaptation to illness was positively correlated with illness perception, heroic

narrative, personal growth, solidarity, and acceptance, while it was negatively correlated with the victim

narrative and emotional contradictions. Multivariate outliers were examined using Mahalanobis distance (d^2). No outliers were detected ($p > 0.05$). Multivariate normality was assessed using Mardia's coefficient and the critical ratio. Following [Chen et al. \(2011\)](#), values < 5 indicate no violation of multivariate normality. In this

study, Mardia's coefficient was 3.895 and the critical ratio was 1.905, both below 5, confirming multivariate normality. The proposed structural model was estimated using covariance-based SEM in AMOS-24 with maximum likelihood (ML) estimation.

Table 3

Goodness-of-fit indices of the research model

Fit Index	χ^2	df	P	CMIN/DF	RMSEA (90% CI)	CFI	IFI	GFI	SRMR
Model	1.789	2	0.621	0.894	0.001 (0.00-0.01)	0.996	0.993	0.923	0.008

Acceptable fit criteria: CFI, GFI, IFI ≥ 0.90 ; SRMR ≤ 0.08 ; RMSEA ≤ 0.10 acceptable, ≤ 0.08 good (Kline, 2016).

As shown in Table 3, all fit indices indicated good model fit: CMIN/DF = 0.894, SRMR = 0.008, RMSEA = 0.001, IFI = 0.993, CFI = 0.996, and GFI = 0.923.

The coefficient of determination (R^2) for adaptation to cancer was 0.678, indicating that exogenous and mediating variables explained 67% of the variance in adaptation, which is considered strong ([Chin, 1998](#)).

Table 4

Standardized path coefficients

Path	β	SE	CR	P
Heroic \rightarrow Illness perception	0.250	0.020	3.900	<0.001
Heroic \rightarrow Adaptation	0.340	0.045	3.212	<0.001
Victim \rightarrow Illness perception	-0.262	0.015	-1.973	<0.001
Victim \rightarrow Adaptation	-0.501	0.048	-3.350	<0.001
Personal growth \rightarrow Illness perception	0.280	0.049	3.810	<0.001
Personal growth \rightarrow Adaptation	0.553	0.088	3.001	<0.001
Solidarity \rightarrow Illness perception	0.442	0.100	3.905	<0.001
Solidarity \rightarrow Adaptation	0.360	0.098	3.011	<0.001
Acceptance \rightarrow Illness perception	0.492	0.093	4.001	<0.001
Acceptance \rightarrow Adaptation	0.384	0.051	3.040	<0.001
Emotional contradictions \rightarrow Illness perception	-0.325	0.125	-4.741	<0.001
Emotional contradictions \rightarrow Adaptation	-0.284	0.128	-2.013	<0.001
Illness perception \rightarrow Adaptation	0.503	0.054	3.587	<0.001
Problem-focused coping \rightarrow Adaptation	0.420	0.081	2.002	<0.001
Emotion-focused coping \rightarrow Adaptation	-0.301	0.090	-3.015	<0.001

Table 5

Bootstrap results for indirect effects

Indirect Path	Boot	SE	Lower CI	Upper CI	P
Heroic \rightarrow Adaptation (via Illness perception)	0.051	0.030	0.035	0.100	0.003
Victim \rightarrow Adaptation (via Illness perception)	-0.098	0.022	-0.147	-0.060	0.001
Personal growth \rightarrow Adaptation (via Illness perception)	0.085	0.019	0.048	0.120	0.005
Solidarity \rightarrow Adaptation (via Illness perception)	0.078	0.021	0.040	0.110	0.003
Acceptance \rightarrow Adaptation (via Illness perception)	0.090	0.020	0.050	0.125	0.004
Emotional contradictions \rightarrow Adaptation (via Illness perception)	-0.100	0.051	-0.158	-0.072	0.001

All direct effects of heroic narrative ($\beta = 0.340$, $p < 0.001$), victim narrative ($\beta = -0.501$, $p < 0.001$), personal growth ($\beta = 0.553$, $p < 0.001$), solidarity ($\beta = 0.360$, $p < 0.001$), acceptance ($\beta = 0.384$, $p < 0.001$), and emotional

contradictions ($\beta = -0.284$, $p < 0.001$) on adaptation to cancer were significant. Illness perception also had a significant direct effect on adaptation ($\beta = 0.503$, $p < 0.001$). Furthermore, indirect effects were significant:

heroic narrative ($\beta = 0.051$), personal growth ($\beta = 0.085$), solidarity ($\beta = 0.078$), and acceptance ($\beta = 0.090$) positively influenced adaptation via illness perception, whereas victim narrative ($\beta = -0.098$) and emotional contradictions ($\beta = -0.100$) negatively influenced adaptation via illness perception.

Discussion and Conclusion

As the findings revealed, all direct paths from the heroic, victim, personal growth, solidarity, acceptance, and emotional contradiction macro-narratives to cancer adaptation were significant. These results are implicitly consistent with the studies of [Duffy \(2010\)](#), [Hopman & Rijken \(2015\)](#), [Bashiri-Nejadian et al. \(2024\)](#), [HASAN et al. \(2022\)](#), [Kowal \(1955\)](#), [Moreno & Stanton \(2013\)](#), [Tavakol & Rad \(2012\)](#).

This finding can be explained by noting that macro-narratives, or overarching stories, are broad cognitive and meaning-making frameworks that help individuals interpret their life experiences and cope with challenges. In the context of cancer adaptation, emotional macro-narratives exert a direct effect because they enable patients to place their illness within a broader, more meaningful framework. For instance, a patient may view cancer as a life challenge to overcome, leading to personal growth. Such meaning-making reduces negative emotions and enhances motivation for fighting the disease ([Yilmaz et al., 2020](#)). Emotional experiences also play a fundamental role in confronting illness. Macro-narratives emphasizing acceptance, courage, or resilience can facilitate regulation of negative emotions (such as fear, despair, and anger) and promote positive emotions (such as hope and optimism) ([HASAN et al., 2022](#)).

Furthermore, cancer can affect one's identity, but positive macro-narratives—such as heroic narratives or stories of returning to life—can help patients redefine themselves as resilient and capable rather than weak ([Burgess et al., 2022](#)). Such redefinitions of identity directly affect adaptation capacity. These narratives are often reinforced through cultural, social, or family stories, which can connect patients to social support and reduce feelings of isolation. Narratives that highlight family or community support may encourage positive social interactions. Narratives that promote perseverance, resilience, and creative problem-solving

may lead to constructive coping behaviors, which in turn influence quality of life and the ability to cope with cancer challenges ([Kim et al., 2012](#)). Overall, emotional macro-narratives contribute to cancer adaptation through their influence on meaning, emotions, identity, and behaviors. They not only reduce stress and anxiety but also enhance resilience and quality of life.

The findings also showed that illness perception had a significant direct effect on adaptation to cancer, thus confirming the second hypothesis. This result is consistent with the findings of [Chen et al. \(2011\)](#), [Hopman & Rijken, \(2015\)](#), [Kalantari et al., \(2012\)](#), [Tian et al. \(2022\)](#).

Illness perception refers to an individual's beliefs, cognitions, and understanding of the nature, causes, duration, controllability, and consequences of illness. These perceptions directly influence adaptation to cancer because they shape emotional responses, behaviors, and decision-making in coping with the disease. For example, if a patient perceives cancer as uncontrollable and life-threatening, fear and despair are more likely to dominate. Conversely, if the illness is perceived as manageable and part of life's challenges, greater hope and courage are fostered ([Hopman & Rijken, 2015](#)).

Illness perception also determines coping behaviors. Believing that treatment and lifestyle changes can control cancer encourages patients to adhere to therapy, follow a healthy diet, and seek social support. By contrast, perceiving cancer as fate or punishment may lead to passive behaviors such as treatment abandonment or social withdrawal. Moreover, illness perception influences the meaning patients assign to cancer: those who view it as an opportunity for growth tend to adapt better, while those who regard it as a terminal end may experience hopelessness and despair. Illness perception also affects the degree to which patients seek family, peer, or support group resources, which in turn improves resilience and reduces stress. A positive perception of illness enhances quality of life even under difficult circumstances, whereas perceiving treatment as futile increases the likelihood of treatment discontinuation ([Tian et al., 2022](#)). In sum, illness perception directly shapes the emotional, cognitive, and behavioral responses of cancer patients. Positive and realistic illness perceptions regulate emotions, strengthen coping behaviors, and improve quality of life,

thereby facilitating better adaptation. Consequently, psychological interventions targeting illness perception can significantly enhance adaptation and treatment outcomes.

The mediation results confirmed that heroic narratives, personal growth, solidarity, and acceptance indirectly improved cancer adaptation via illness perception, while victim narratives and emotional contradictions exerted negative indirect effects. These findings align with [Moreno & Stanton \(2013\)](#); [HASAN et al. \(2022\)](#) and [Tavakol & Rad \(2012\)](#).

This can be explained by the mediating role of illness perception as a key psychological factor. Illness perception acts as a bridge between emotional macro-narratives and adaptation to cancer because the way patients interpret their illness strongly influences their emotional experiences and coping strategies. Positive macro-narratives (such as belief in hope or resilience) may shape more constructive illness perceptions (e.g., seeing cancer as manageable), which promote adaptive coping and positive emotional responses ([HASAN et al., 2022](#)). In contrast, negative macro-narratives may lead patients to view cancer as an uncontrollable threat, making adaptation more difficult. Thus, illness perception functions as the cognitive-emotional pathway through which emotional macro-narratives affect adaptation.

Limitations

Like all studies, the present research faced several limitations. The use of convenience sampling limits the generalizability of results. Cultural characteristics were not controlled. Recruiting and collaborating with cancer patients was challenging, particularly in advanced disease stages. Some participants refused or failed to complete questionnaires, prolonging data collection. Reliance on self-report questionnaires may have introduced response biases.

Practical Implications and Recommendations

Future studies could explore additional psychological factors such as self-efficacy, social support, emotion regulation, or psychological flexibility as potential mediators. Including perceived stress as a moderating variable may help clarify individual differences in illness perception and coping. Moderating roles of gender, age, cancer type, disease stage, and socioeconomic status also warrant investigation.

Practical applications include developing educational workshops to strengthen positive emotional macro-narratives in cancer patients, especially for those with poor treatment adherence. Recognizing and reshaping negative narratives may assist psychotherapists in guiding patients toward more adaptive coping strategies. Psychological interventions focusing on emotional macro-narratives, coping strategies, and illness perception should be integrated into holistic cancer care. Teaching adaptive coping strategies (problem-focused and emotion-focused) can empower patients to confront disease-related challenges and improve their quality of life.

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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. Ethical considerations in this study were that participation was entirely optional.

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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Authors' Contributions

All authors equally contribute to this study.

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