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Review

Individual Rumination in Adult Cancer Care: A Concept Analysis

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ABSTRACT

Objective: To conceptualize rumination in adult cancer care.
Methods: Walker and Avant's concept analysis method was used to examine rumination in adults with cancer. A systematic search was conducted across psychology, nursing, medicine, and public health disciplines in PsycINFO, PubMed, Web of Science, CINAHL, and Scopus databases from their inception to April 2024. Additional records were identified by manually searching reference lists of relevant studies.
Results: Analysis of 50 articles identified rumination's three defining attributes (intrusions, brooding, instrumentality), antecedents (cancer-related adversity, pre-existing susceptibilities), and consequences (psychophysiological functioning impairments, long-term adaptation). Key features included trait-state duality, internal variability, external cyclicality, and high emotional correlation.
Conclusions: This concept analysis establishes a preliminary conceptual model of rumination in adult cancer care, integrating its attributes, antecedents, and consequences. The model offers insights into rumination mechanisms, highlighting its complexity and variability, and may inform the development of targeted interventions and theoretical development for cancer population. Further research is needed to validate the model and explore its clinical applications.
Implications for Nursing Practice: Understanding rumination in adult cancer care helps nurses identify and support at-risk patients. By recognizing key signs, nurses can implement targeted interventions to improve patients' emotional and psychological well-being, ultimately enhancing their long-term adaptation and quality of life.

Cancer remains one of the most significant health burdens facing worldwide.[1,2] This life-threatening disease is not only associated with high mortality rates but also profoundly affects the physical, psychological, and social functioning of individuals with cancer.[3-5] Following a cancer diagnosis, individuals typically undergo a series of complex psychosocial reactions and engage in various coping processes.[6,7] Among these coping mechanisms, rumination, as a key cognitive process, plays a crucial role in individuals' psychological adaptation to their cancer experience.[8,9]

Rumination, characterized by its core feature of repetitive thinking, is recognized as a transdiagnostic symptom prevalent in various mental disorders, including depression, generalized anxiety disorder, and post-traumatic stress disorder (PTSD).[10,11] Notably, rumination has also directly been associated with suicidal ideation.[12,13] However, emerging research indicates that rumination has a potential role in facilitating post-traumatic growth (PTG),[14] suggesting a more complex relationship between this cognitive process and psychological adaptation.[15] Cann et al. identified two types of ruminations: intrusive and deliberate.[16] Intrusive ruminations are largely uncontrollable and occur unintentionally right after an event, often leading to psychological issues like worry, helplessness, and fear.[16-19] These ruminations aim to find meaning in experiences, but excessive focus on them can impair functionality.[19,20] On the other hand, deliberate ruminations help individuals positively interpret their experiences, reduce worries, rebuild beliefs, and regulate emotions.[16,21] Given that rumination is a factor that can be modulated positively by activating deliberate ruminations and this can be achieved through psychological interventions,[22,23] rumination holds significant theoretical and practical importance in psychooncology research.[24]

In the context of cancer, the individual experience's uniqueness is demonstrated in various aspects, such as the urgency of survival threats,[25] the uncertainty of disease progression,[26] the complexity of medical decision-making,[27] and the potential long-term impacts on quality of life.[4] These distinctive features of the cancer journey create a complex cognitive and emotional

Abbreviations: FCR, Fear of Cancer Recurrence; PTG, Post-Traumatic Growth; PTSD, Post-Traumatic Stress Disorder; QoL, Quality of Life

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Layperson Summary

What we investigated and why

Cancer can be a challenging experience for individuals. One important mental process that can shape how people cope with cancer is called rumination. Rumination involves repeatedly thinking about the cancer and its effects, which can lead to both negative and positive outcomes. This study aimed to better understand the concept of rumination in the context of cancer care for adults.

How we did our research

The researchers conducted a comprehensive review of the existing research on this topic across different academic fields.

What we have found

This analysis identified three key components of rumination in adult cancer care:

- intrusions – uncontrollable thoughts and images related to cancer;
- brooding – passively focusing on past, present, and future concerns about cancer;
- instrumentality – purposefully thinking about cancer and how to manage it.

Rumination was found to be influenced by the significant challenges and adversity that cancer brings, as well as pre-existing stress in the individual. It can then lead to impairments in physical and mental functioning, as well as influencing how the person adapts to cancer in the long term.

What it means

Overall, this study provides a conceptual model for understanding the complex and variable nature of rumination in adult cancer care. This model could help guide the development of interventions and further research to support people with cancer more effectively.

What is already known about the topic

- Rumination is a crucial and modifiable psychological variable in oncological nursing care.
- Current research on rumination in cancer contexts primarily focuses on its relationships with other variables and psychological interventions.
- The concept and the internal mechanisms of rumination in the context of adult cancer remain unclear.
- Key characteristics and features of rumination in adult cancer patients have not been comprehensively examined.

What this paper adds

- We propose a preliminary conceptual model of individual rumination in adult cancer care.
- Three attributes of rumination in adults with cancer were intrusions, brooding, and instrumentality.
- Cancer-related adversity and its interactions with pre-existing susceptibilities were identified as antecedents.
- Consequences include psychophysiological functioning impairments and long-term adaptation.
- Four key features of rumination were trait-state duality, internal variability, external cyclicality, and high emotional correlation.

background for individuals, therefore, cancer-related rumination presents unique contents, forms, and impacts. The content of rumination is relatively specific, focusing primarily on disease diagnosis, treatment, and prognosis; the threat of mortality; changes in physical symptoms; and related external environmental factors.[19,28,29] Structurally, cancer-related rumination exhibits significant dynamic characteristics, its intensity and frequency often fluctuate with disease progression, treatment stages, and changes in physical condition.[30-32] Certain specific events, such as surgeries, complications, or symptom changes, may trigger intense bouts of rumination.[33,34] Eventually this persistent process of rumination can greatly impact the overall quality of life.[35-37]

The concepts of rumination in psychology have evolved significantly, shifting from a one-dimensional, static, and predominantly negative view to a multidimensional, dynamic understanding that acknowledges potential positive aspects.[38,39] A Japanese nursing study offered a definition of rumination as thoughts that may negatively impact mental and physical health,[40] however, they did not explore potential positive aspects of rumination, and its publication in Japanese may limit its broader applicability.[41] The emergence of contextualism has offered a novel perspective for concept analysis in nursing science, emphasizing the necessity of re-examining and defining concepts within specific contexts.[42,43] Considering the unique nature of cancer and the complexity of rumination, a comprehensive analysis and definition of rumination within the cancer context holds significant value. Hence, this concept analysis aims to critically examine and redefine rumination within the cancer context, providing a clear and operational conceptual framework for cancer care, which could inform targeted interventions and advance the theoretical development of psycho-oncology nursing.

Methods

Concept Analysis Method

This study adopted Walker and Avant's[44] eight-step concept analysis framework (Fig. 1), chosen for its structured approach examining to complex healthcare concepts.

Data Sources

Literature Search Strategy

We conducted a systematic search and screening process. Two reviewers independently completed the initial work before engaging in discussion and then reached a comprehensive consensus, thereby minimizing potential bias. The electronic databases searched (from the earliest date available to April 2024) included PubMed, PsycINFO, CINAHL, Web of Science, and Scopus. To complement the electronic search, we conducted a manual review of citations found in key studies. Each step of the concept analysis employed specific search strategies aligned with its core objectives.[44] This tailored approach ensured a comprehensive and focused exploration of rumination across all aspects of the concept analysis in adult cancer care.

- For Step 3, we combined ('ruminat*') AND ('defin*', 'concept*') using Boolean operators and consulted dictionaries to scope potential uses and definitions.
- Steps 4 and 7, focusing on conceptualizing rumination in adult cancer care, utilized Boolean operator AND to combine "cancer" and "rumination" with their synonyms.
- For Steps 5 and 6, four types of cases were generated by carefully integrating qualitative data from included studies and clinical experience.

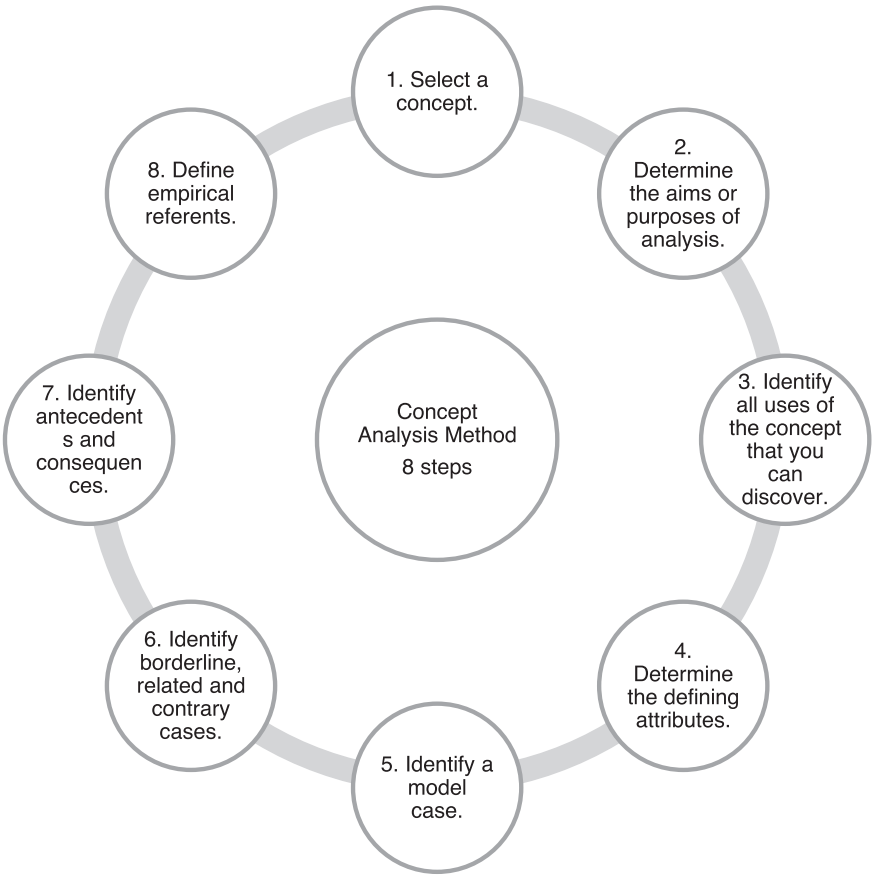

Fig 1. Concept analysis process.

- Step 8 involved combining ('cancer') AND ('ruminat*') AND ('scales', 'measure*', 'instrument*') with their synonyms to review measures of rumination in the cancer context.

Inclusion and Exclusion Criteria

Inclusion criteria encompassed quantitative and qualitative studies, as well as systematic reviews, that explicitly defined rumination, its antecedents, and consequences in cancer care. Only peer-reviewed articles in English involving adult cancer patients (over 18 years old) were considered. We excluded case studies, literature reviews, conference abstracts, and studies examining co-rumination or involving patient dyads. The central study selection process is illustrated in Fig. 2.

Results

Use of the Concept

Rumination in Different Disciplines

The term 'rumination' encompasses diverse definitions and applications across multiple disciplines. Despite this variability, the core mechanism of rumination consistently emerges as a repetitive and persistent pattern of internal processing. Etymologically, 'rumination' derives from the Latin 'rūminārī', originally describing the process of animals repeatedly chewing food.[45] The Oxford English Dictionary defines rumination as “the action of revolving something in one's mind; meditation, contemplation”[46] while the American Psychological Association (APA) Dictionary of Psychology characterizes it as "obsessional thinking involving excessive, repetitive thoughts or themes that interfere with other forms of mental activity".[47] In agriculture, rumination refers to animals' repeated chewing and regurgitation of food to aid digestion.[48] Medically, rumination syndrome is a digestive disorder characterized by effortless, repetitive postprandial food regurgitation, primarily caused by a reversal of the gastroesophageal pressure gradient.[49] Furthermore, Buddhism denotes a state of repeatedly pondering past events, often leading to distress.[50]

The Theoretical Development of Rumination

There is a noticeable evolution of rumination-related theories in general psychology.[38,39] The development began with Nolen-Hoeksema's (1991) Response Styles Theory, defining rumination as depression-related negative repetitive thinking. Subsequent theories expanded this understanding: Goal Progress Theory linked rumination to goal pursuit[51]; the Self-Regulatory Executive Function (S-REF) model emphasized the importance of metacognition and executive functions[52]; the Impaired Disengagement Hypothesis focused on specific cognitive mechanisms of rumination[53]; the Habit-Goal Framework of Depressive Rumination viewed rumination as a combination of habitual and goal-directed behaviors[54]; while the Self-Regulation Risk Phenotype hypothesis attempted to explain individual differences and mechanisms by which rumination leads to various mental health issues.[55] Besides, the H-EX-A-GO-N model integrated key variables like habit development, executive control, and goal discrepancy to explain state and trait rumination.[8] Latest research employs dynamic systems perspectives and network analysis to explore associations between rumination and factors such as metacognition, depression, and perfectionism.[38,56]

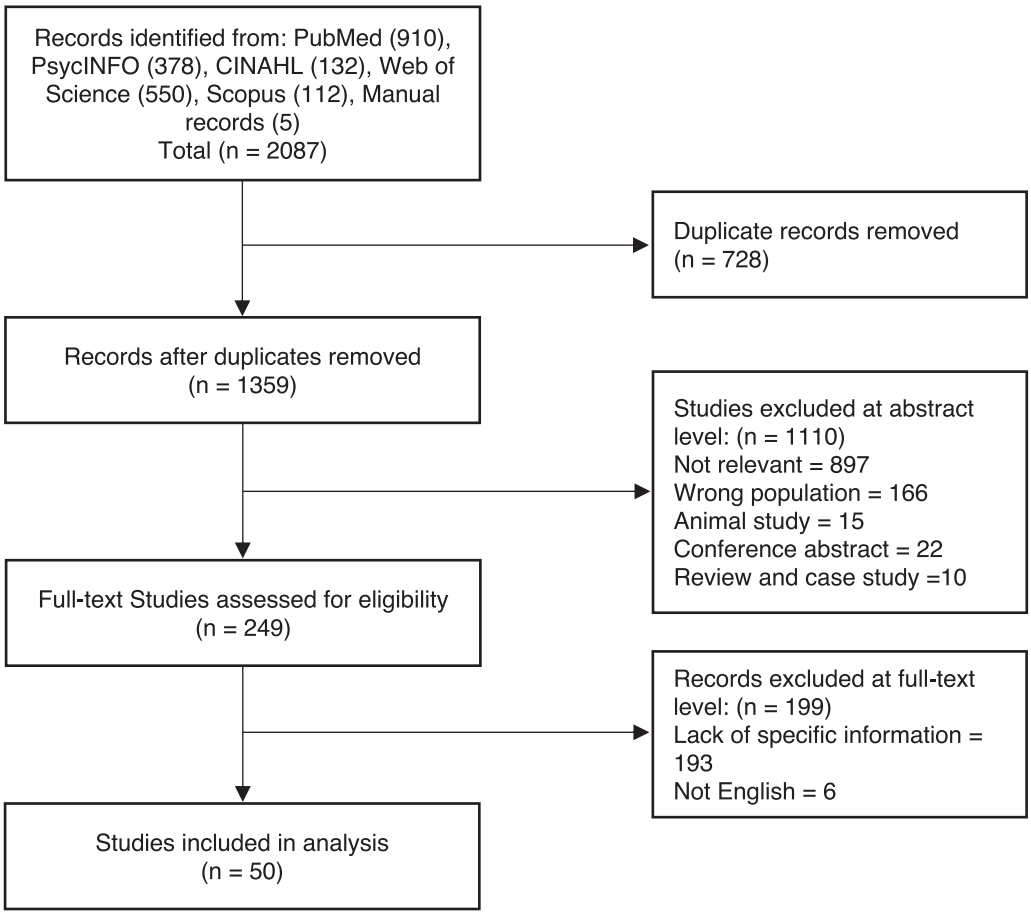

Fig 2. Study selection process for steps four and seven.

Understanding Rumination in Nursing Practice

The concept of rumination in nursing practice requires understanding mainly from professional and patient care perspectives. Its inherent complexity necessitates transforming abstract psychological constructs into operational and measurable clinical concepts.[57] Within the nursing profession, practitioners frequently encounter rumination when confronting patient suffering, existential challenges, and professional complexities.[58] This cognitive process not only predicts depression and anxiety but also systematically undermines emotional regulation and professional resilience.[59,60] A comprehensive analysis involves precisely identifying rumination's triggers, manifestations, and potential psychological risks to develop targeted intervention strategies. From a patient care perspective, clinical considerations on rumination are multidimensional. These include evaluating rumination intensity,[16] analyzing psychological state interactions,[10] exploring neuroendocrine regulatory mechanisms,[53] and implementing evidence-based interventions.[61] In oncological contexts, rumination demands more specifically clinical concerns because of the complexities of cancer experiences.[6] This requires holistic tracking of patients' psychological trajectories from diagnosis through survivorship,[29] with strategic identification of potential psychological disruptions.[22] Notably, co-rumination represents a unique interpersonal phenomenon where individuals mutually amplify negative emotional experiences,[62] warranting careful extra attention across clinical domains.

Nursing Research on Cancer-Related Rumination

Nursing research on rumination in cancer care has undergone significant conceptual and methodological transformation over the past two decades. Early research predominantly conceptualized rumination as a negative cognitive process associated with depression, equating it with negative psychological states.[63,64] As research advanced, scholars progressively expanded their investigative perspective, transitioning from the pathological to the positive psychological lens, broadening the research scope beyond depression symptoms to multidimensional domains including life quality, psychological adaptation, and PTG.[65,66] Methodologically, researchers evolved from initial descriptive analyses to binary analytical models, then integrated multidisciplinary research approaches. Recent studies have become increasingly deepened, exploring complex relationships between rumination and other psychological variables,[67] investigating potential impacts on cancer treatment outcomes,[14] and actively developing targeted psychological intervention strategies.[61] Despite significant research advancements, existing studies reveal limitations, such as inadequate and insufficient in-depth longitudinal and cross-cultural investigations. In the data-driven future, nursing research on rumination is likely to become more precise and individualized.

Defining Attributes

Rumination research in oncology context primarily adopts two perspectives. The predominant approach, grounded in psychological studies, categorizes rumination into intrusive and deliberate types,[16] focusing on its manifestation and outcomes. Extant literature posits that rumination's impact derives principally from its form and partially from its content.[67-69] Scholarly debate persists regarding the relationship between these types, with hypotheses of sequential occurrence versus simultaneous presence. The alternative perspective, based on clinical outcomes, classifies rumination as positive or

negative,[70] directly addressing its impact on patients' health and quality of life. However, both perspectives primarily describe rumination externally. From a nursing perspective, revealing rumination's internal mechanisms is crucial for comprehending its impact on adult cancer patients. By mainly analyzing qualitative studies which can elucidate multidimensional concept manifestations in practical contexts,[71] integrating form, content, and dynamic processes, three defining attributes of rumination were recognized (Table 1). Walker and Avant[44] posit that these attributes may evolve across contexts and time.

Intrusions

Intrusions are commonly considered as unwanted, involuntary thoughts, images, or memories that enter consciousness in general psychology.[35,74,75] According to Wells and Matthews,[52] awareness intrusions originate from three distinct sources: information from external stimuli, cognitive states, and bodily states. In the context of cancer, qualitative studies have revealed that intrusions primarily manifest in two forms: questioning and comparison.[19,20,28,29,67] These intrusions, ranging from seemingly unconstructive thoughts like "what did I do wrong to get cancer?"[28] to potentially constructive ones such as "how has this experience changed my priorities?",[19] demonstrate both maladaptive and potentially adaptive traits. During the initial diagnosis phase, intrusive questioning and comparison predominate,[28] aligning with the shock/denial, anger, and bargaining stages of Kübler-Ross's grief model.[76] The treatment phase often sees a coexistence of intrusive and constructive intrusions, influenced by fluctuating external factors and emotional states.[29] In the post-treatment survival phase, a transition towards predominantly constructive intrusions is frequently observed as immediate external threats subside.[19] Notably, when individuals actively engage in questioning and problem-solving, this cognitive activity may transform into reflective processes.[77] Intrusions are identified as a core attribute of rumination as they serve as the cognitive inception for ruminative thoughts, capturing the essence of involuntariness, both intrusive and constructive traits, and dynamicity in the rumination process.

Brooding

Brooding, traditionally conceptualized in depression as passive, intrusive, and repetitive thoughts dwelling upon negative past events,[78] assumes a more complex role in the cancer context. While retaining its passive and repetitive nature, cancer-related brooding encompasses a broader content range with pronounced emotional connections. Its content spans three temporal domains: (1) Past-oriented rumination, including repetitive thoughts about the cancer diagnosis process, treatment decisions, and past health behaviors. Patients might dwell on questions like "Could I have detected the cancer earlier?" or "Did I make the right treatment choice?"[19,20] (2) Present-focused challenges, centering on current difficulties such as ongoing symptoms, treatment side effects, and disruptions to daily life. Patients often feel trapped in their current situation, repeatedly thinking about how cancer has altered their normal routines and relationships.[20,28,29] (3) Future-oriented concerns, involving apprehension about potential cancer recurrence, long-term health implications, and the impact on future quality of life. Patients might repetitively worry about their prognosis or how cancer will affect their life plans.[19,67] Brooding demonstrates strong associations with various negative emotions and psychological experiences,[32,79] exemplifying the more negative and maladaptive aspects of rumination. Brooding is identified as a core attribute of rumination due to its embodiment of passive and repetitive thought processes, the complexity of content spanning various aspects of the cancer experience, and the significant negative emotional backdrop.

Table 1
Defining Attributes of Rumination in Adult Cancer Care

Defining attributes	*Descriptions*
Intrusions	• **Questioning**[19,20,28,29,67] • **Comparisons**[19,20,28]
Brooding	• **Going over negative experiences**[19,20] • **Dilemmas and feeling trapped**[20,28,29,67] • **Focus on ongoing/unresolved/future issues**[19,67]
Instrumentality	**Coping** • Avoiding[20,28,30] • Distracting attention[19,28] • Self-examination[19,20] • Inward self-motivation[19] • Seeking resolution and closure[19,67] • Positivity and resilience[19,20,72] • Emotion regulation[20,29] **Restructuring** • Attributed Meanings[28] • Beliefs, values and priorities change[20,28,29,73]

Instrumentality

Instrumentality in rumination refers to the goal-oriented, purposeful aspect of repetitive thinking that individuals believe beneficial for problem-solving, insight-gaining, or emotional regulation.[80] Characterized by perceived utility, cognitive investment, persistence, and adaptability in challenging situations,[81] it manifests in cancer contexts through three coping strategies. First, maladaptive approaches like avoidance[20,28,30] or distraction,[19,28] where patients might repeatedly attempt to channel thoughts away from worst-case scenarios, providing temporary relief but failing to address underlying issues. Second, through continuous rumination, individuals may develop adaptive mechanisms such as self-examination, self-motivation, and emotion regulation.[19,20,29,72] These strategies can enhance problem-solving abilities, facilitate emotional processing, and foster more balanced perspectives, enabling patients to confront and process their cancer-related thoughts and feelings more effectively.[19,67] Finally, reconstructing, a crucial phase for long-term adaptation, involves attributing new meanings to the illness experience and altering beliefs, values, and priorities[20,28,29,73]; for instance, patients might view cancer as a catalyst for personal growth, leading to a deeper appreciation of life or renewed sense of purpose.[28] Instrumentality is linked to metacognitive beliefs about rumination's usefulness, often leading to sustained engagement.[82,83] It is considered a core attribute of rumination due to its role in maintaining ruminative processes, its active and intentional aspects, and its potential for both adaptive and maladaptive outcomes.

Case of Rumination

The following cases, developed from qualitative data and practical experience, illustrate the defining attributes of rumination and distinguish it from related concepts. Following Walker and Avant's framework,44 we present four case types: model cases demonstrating all defining attributes, borderline cases lacking some attributes, related cases sharing similarities but remaining distinct, and contrary cases contrasting with the concept. These cases collectively highlight rumination's essential features and boundaries.

Model Case

Laura, 45, was diagnosed with early-stage gastric cancer. "Why me? What did I do wrong?" she constantly asked herself (unconstructive intrusions). Sleepless nights followed as she dwelled on these thoughts (brooding). Laura withdrew from friends and family, avoiding conversations about her condition (instrumentality). One day, during a support group meeting, Laura heard a cancer survivor's story that resonated with her. She began to wonder, "How can I make the most of my treatment?" (constructive intrusions). Laura started researching recovery strategies and reaching out to other patients

(instrumentality). Gradually, she found new meaning in her experiences, reprioritizing her life and relationships (instrumentality). Six months after her diagnosis, Laura returned to work with a renewed perspective on life and her cancer journey.

Borderline Case

Mr. Green is a 34-year-old IT engineer. Five years after completing his colorectal cancer treatment, he occasionally experiences intrusive thoughts about his diagnosis and treatment, particularly when alone (intrusion). These infrequent recollections sometimes trigger mild anxiety but don't significantly impact his daily life. To manage these thoughts, Mr. Green effectively employs coping strategies like reading, walking, or talking with his wife (instrumentality).

Related Case

Dr. Chen, a 50-year-old oncologist with extensive clinical experience, was recently diagnosed with early-stage lung cancer. Drawing on her professional knowledge, she approached her diagnosis with clinical understanding, though still experiencing occasional anxiety. She intentionally scheduled weekly reflections to review her treatment progress and emotional state. During these sessions, she critically examined her experience, balancing challenges with growth opportunities, and consistently redirected her thoughts towards problem-solving. Her medical expertise combined with purposeful reflection enhanced her psychological adaption.

Contrary Case

Mr. Wilson, a 75-year-old man with advanced Parkinson's disease, was recently diagnosed with early-stage prostate cancer. Already dependent on caregivers, he demonstrated complete absence of ruminative thinking about his cancer diagnosis. Unlike typical cancer patients, he neither sought information nor discussed it, viewing it as minor compared to his Parkinson's condition. He displayed no noticeable signs of contemplation or emotional engagement, simply incorporating cancer management into his existing medical routine.

Antecedents

In the cancer context, the antecedents leading to rumination in the cancer population can be categorized into two main aspects: cancer-related adversity and pre-existing susceptibilities (Table 2). Cancer-related adversity serves as the primary and direct trigger to rumination, while pre-existing susceptibilities indirectly influence how individuals respond to this adversity. These two categories are not mutually exclusive but rather interact to shape the development and nature of ruminative thinking in cancer individuals. For instance, individuals with high neuroticism traits may be more sensitive to cancer-related threat information and, thus, more prone to engage in repetitive thinking.[84] Concurrently, cancer-related adversity may make latent vulnerabilities more pronounced when facing this significant life event.[85] Conversely, while cancer-related adversity does not directly alter pre-existing susceptibilities, it may indirectly influence individual cognitive patterns and coping strategies through long-term psychological adaptation processes. Through the process of PTG, individuals may develop new belief systems or enhance psychological resilience, which in turn may alter their response patterns to future adversities.[14,19,79,86,87]

Table 2
The Antecedents of Rumination in Adult Cancer Care

Antecedents	*Descriptions*
Cancer-related adversity	• Diagnosis and treatments[19,30,88-90] • Quality of sleep[91] • Fear of Cancer Recurrence (FCR)[92,93] • Body image concern[34] • Pain[94]
Pre-existing susceptibilities	Internal susceptibilities: • Personality[84,86] • Core beliefs[24] • Attention bias[70,90] • Dysfunctional attitude[90] • Disengaging coping[95] • Self-compassion[96] • Emotional processing deficits[97] External susceptibilities: • Pre-existing life stress[20] • Social constraints[20,89,95] • Social support[91,98]

Cancer-Related Adversity

Cancer-related adversity serves as a direct antecedent to rumination, exerting distinct and persistent influences across various stages following cancer diagnosis. This influence creates a dynamic and uncertain cognitive and emotional environment, providing a continuous impetus for rumination. Cancer diagnosis, as an acute traumatic event, directly causes an existential crisis, intensely triggering repetitive thinking about life.[30,88,89] This initial impact lays the foundation for subsequent rumination, and the treatment phase further increases this influence. In cancer treatment, beyond the inherent symptoms of cancer, various medical interventions (including surgery, chemotherapy, radiotherapy, and diverse examinations) impose substantial physical and psychological burdens on patients.[85] The resulting physical changes and side effects not only cause physiological frailties but also profoundly affect patients' self-identity and perception of social roles.[30,34] Concurrently, the pressure of treatment decisions and the uncertainty of therapeutic efficacy further exacerbate the tendency for rumination.[20,28,29] After treatment, although direct medical pressure may alleviate, the fear of cancer recurrence (FCR) persists.[92] Cancer survivors may constantly revisit their past cancer experiences while closely observing current life and future possibilities.[19] This state could continually nurture ongoing rumination. Notably, sleep disturbance is a common issue throughout the entire cancer trajectory,[91] which indirectly yet persistently increases the tendency for rumination by affecting cognitive function and emotional regulation capacity.

Pre-Existing Susceptibilities

Pre-existing susceptibilities, comprising both internal and external factors, reflect an individual's baseline coping capacity and serve as indirect antecedents to rumination. These susceptibilities influence how individuals perceive, interpret, and respond to cancer-related adversity, thereby affecting the formation and maintenance of repetitive thinking patterns.

Internal susceptibilities encompass factors such as personality traits, core beliefs, attention bias, and emotional processing deficits. Neuroticism correlates with intrusive rumination, exacerbating PTSD[84] and reducing PTG[86]. While extraversion and openness reduce rumination and alleviate PTSD,[84] and conscientiousness is linked to PTG through deliberate rumination.[86] Moreover, core beliefs are associated with both types of rumination, with new beliefs in the deliberate rumination stage being crucial for PTG.[24] Attention bias and rumination play dual roles: their negative aspects contribute to PTSD, while their positive counterparts facilitate PTG.[70] Additional factors influencing rumination and its outcomes include dysfunctional attitudes [90], disengaging coping[95], self-compassion[96], and emotional processing deficits[97]. Lastly, empirical evidence suggests that sociodemographic characteristics, particularly gender and educational attainment, may serve as significant predictors of both the frequency and severity of ruminative patterns.[15,91,99]

External susceptibilities primarily involve social environmental factors. Individuals with pre-existing competing life stress are more susceptible to developing long-term distress,[20] and those

experiencing social constraints after trauma are more likely to rumination.[89] Social constraints affect psychological adjustment through intrusive rumination[95] but have little impact on post-rumination outcomes like PTG.[89] Another significant factor is financial burden, a form of social constraint, that triggers rumination by affecting treatment outcomes[29,100] and causing short-term high stress[20,101]. Lack of social support increases stress, leading to emotional suppression and catastrophic thoughts, which exacerbate rumination.[20,91] Conversely, good social support reduces intrusive rumination and stress while promoting better mental health through deliberate rumination,[20,98] aligning with Social-Cognitive Processing Theory, which suggests that supportive social support facilitates positive trauma processing and adaptation.[102]

Consequences

Consequences are outcomes resulting from a phenomenon.[44] In rumination, these consequences are diverse, complex, and often cyclical, arising through direct effects, mediation, or prediction.[18,92,93] Throughout the cancer trajectory, rumination's effects exhibit dynamic adaptability, encompassing positive, negative, and mixed outcomes. To capture this complexity, this review categorizes rumination's consequences into two domains: psychophysiological functioning impairments and long-term adaptation (Table 3).

Psychophysiological Functioning Impairments

Cancer-related rumination significantly impairs an individual's physical and psychological functioning. These impairments manifest as both immediate reactions and ongoing challenges, characterized by their sustained and fluctuating nature. A complex bidirectional relationship exists between physical symptoms and psychological responses, creating a self-perpetuating cycle. For instance, cancer-related worries often peak at night, affecting sleep quality.[28] Conversely, poor sleep and chronic fatigue can exacerbate emotional distress, impair emotional regulation, and increase vulnerability to negative thought patterns, perpetuating the rumination cycle.[8] This interplay between physical and psychological domains complicates the overall adaptation process.

Table 3
The Consequences of Rumination in Adult Cancer Care

Consequences	*Descriptions*
Psychophysiological Functioning Impairments	**Physical functioning** • Fatigue[72] • Sleep disorder[91,103,104] **Psychological functioning** • Anxiety (symptoms)[18,31,72,96,105-108]; Surgery-related anxiety[33]; Social anxiety[109] • Distress: Distress[20,67,79,108,110]; Partially distress symptoms[30]; Psychological distress[33,105,111]; Emotional distress[28,34] • Depression: Depression[72,79,92,96,108]; Depression symptoms[18,30-32,105,112]; Non-somatic depression symptoms[90] • Trauma-related stress: Post-traumatic stress symptoms (PTSS)[19]; Posttraumatic stress disorder (PTSD) symptoms[70,84,97,113] • Fear of Cancer Recurrence (FCR)[18,92,93]
Long-term Adaptation	• Psychological well-being[111] • Spiritual well-being[98] • Emotional well-being[114] • Subjective well-being[115] • Psychological adjustment[95] • Post-traumatic growth (PTG)[14,15,19,21,24,70,79,86-88,111,113,116] • Quality of life[15,35-37,114]

Physical functioning impairments caused by cancer-related rumination primarily manifest as fatigue and sleep disorders. Fatigue shows as a persistent, debilitating exhaustion that significantly impairs daily functioning, potentially exacerbated by rumination's depletion of cognitive resources.[72] Sleep disorders present as difficulties in sleep onset, maintenance, and achieving restorative sleep, stemming from various factors, including physical discomfort, anxiety, and rumination.[91,103,104]

Rumination significantly impacts psychological functioning, demonstrating various forms of emotional distress. Anxiety emerges as a dominant emotional response characterized by persistent unease, future-oriented fears, and increased irritability,[18,31,72,96,105-108] with surgery-related anxiety particularly underscores the additional psychological burden in the treatment process,[33] social anxiety may lead to social withdrawal, difficulties in maintaining relationships, and challenges in fulfilling social roles.[109] Distress encompasses general, psychological, and emotional aspects,[20,67,79,110] stems from ongoing disease concerns, treatment uncertainties, and life role changes.[34] Depression exhibits both clinical depression and depressive symptoms, typically involving sustained negative mood states, reduced interest in daily activities or non-somatic depressive symptoms.[90] Trauma-related symptoms range from post-traumatic stress symptoms (PTSS) to full PTSD, varying in prevalence across cancer populations and potentially persisting long-term.[19,70,84,97,113] Additionally, FCR presents another persistent challenge, mild FCR can be considered a normal emotional reaction, while severe FCR may provoke serious clinical issues.[18,92,93]

Long-Term Adaptation

Long-term adaptation, emerging after an extended period, represents the potential outcomes of the rumination process, reflecting a relatively stable psychological state that can be positive, negative, or mixed. Positive outcomes include improvements in various aspects of well-being: psychological,[111] spiritual,[98] emotional,[114] and subjective,[115] as well as overall psychological adjustment.[95] PTG stands out as the most notable positive outcome, reflecting beneficial psychological changes following traumatic experiences. PTG can manifest in various ways, including a heightened appreciation for life, strengthened interpersonal connections, increased personal resilience, recognition of new life opportunities, and advancement in spiritual understanding.[14,15,19,21,24,70,79,86-88,111,113] This aligns with qualitative findings of changes in core beliefs and the formation of new values, reflecting profound psychological transformations.[29] However, long-term adaptation is not uniformly positive. Research on overall quality of life (QoL) has yielded conflicting results, with study reporting improvements[15] and others noting declines.[35,37] Importantly, individuals may simultaneously experience both positive and negative adaptation outcomes, mirroring the complexity and specificity of the cancer experience.

Empirical Referents

There are various tools for measuring rumination, each developed based on specific theories and thus possessing unique focuses and strengths. In the context of cancer, rumination may involve disease-specific themes and unique stressors and potentially serve both short-term and long-term adaptive functions. Table 4 lists commonly used rumination scales in cancer care, including one specifically designed for cancer care. These scales often adopt a two-factor model,[16,70,77,117-119] reflecting the different types of the rumination process, such as adaptive versus maladaptive rumination or problem-solving-oriented versus emotion-focused rumination. They assess ruminative tendencies over specific periods, are sensitive to contextual factors, and reflect the state-like characteristics of rumination. Additionally, three-factor model scales capture the negative aspects of rumination and recognize its potential adaptive functions,

Table 4
Involved Attributes in Adult Rumination Measures Used in Cancer Studies

Measures	Author(s)	Target population	Dimensions (Items)	Involved Attributes
Ruminative Response Scale	Nolen-Hoeksema and Morrow (1991)[117]	Adult (Non-cancer)	2(22)	• Brooding • Reflection
Rumination Reflection Questionnaire	Trapnell and Campbell (1999)[77]	Adult (Non-cancer)	2(24)	• Rumination • Reflection
Ruminative Responses Scale-Revised	TreynorGonzalez and Nolen-Hoeksema (2003)[118]	Adult (Non-cancer)	2(10)	• Brooding • Reflective Pondering
The Rumination Scale	Armey et al. (2009)[119]	Adult (Non-cancer)	2(10)	• Brooding • Pondering
Chinese Cancer-Related Rumination Scale	Chan et al. (2011)[70]	Adult (Cancer)	2(12)	• Negative Cancer-Related Rumination • Positive Cancer-Related Rumination
Event-Related Rumination Inventory	Cann et al. (2011)[16]	Adult (Non-cancer)	2(20)	• Intrusive Rumination • Deliberate Rumination
Multi-dimensional Rumination in Illness Scale	SooSherman and Kangas (2014)[120]	Adult (Non-cancer)	3(41)	• Intrusion • Brooding • Instrumentality

providing a more comprehensive assessment framework.[120] This diversity highlights the complexity of rumination in cancer individuals while also suggesting directions for further optimization of assessment tools.

Existing cancer-related rumination scales each have their strengths and limitations. The Cancer-Related Rumination Scale employs a two-factor model, primarily assessing the frequency of positive and negative experiences. While it demonstrates good reliability and validity in Chinese populations,[70] its evident outcome orientation may oversimplify the complex process of rumination. The widely used Event-Related Rumination Inventory, based on Post-traumatic Growth Theory, focuses on cognitive processes related to post-traumatic growth,[16] it only indirectly measures certain dimensions (e.g., maladaptive coping and reconstructing). The Multi-dimensional Rumination in Illness Scale (MRIS) provides a more comprehensive and balanced understanding of illness-related rumination by evaluating intrusive, brooding, and instrumentality dimensions,[120] which are largely aligned with the results of this analysis. MRIS excels in reflecting intrusive thoughts and constructive thinking, especially in finding meaning and personal growth, but may still have room for improvements in assessing maladaptive coping and cognitive reconstruction. Furthermore, from a methodological perspective, the samples of developing existing scales may not adequately represent the diversity of the cancer population and scale items are often based on experiences from the general population or other mixed clinical groups, which lack specificity to cancer-specific contexts. These limitations underscore the necessity of optimizing existing tools or developing more comprehensive, specialized cancer rumination assessment tools to more accurately reflect the psychological experiences of cancer patients.

Conceptualization of Rumination in Adult Cancer Care

Drawing from the identified attributes, antecedents, and consequences in our analysis, we have formulated a definition and developed a preliminary conceptual model of individual rumination (Fig. 2).

Rumination in adult cancer care is a cognitive tendency and process comprising intrusions, brooding and instrumentality. It is initially triggered by cancer-related adversity and its interaction with individuals' pre-existing susceptibilities, potentially resulting in psychophysiological functioning impairments and/or facilitating long-term adaptation. Fig. 3

The Characteristics of Rumination

Trait-State Duality

Rumination exhibits both trait-like and state-like characteristics.[32,68] The response styles theory proposed by Nolen-Hoeksema emphasizes rumination as a comparatively enduring pattern of response.[121] This is supported by longitudinal studies indicating a degree of stability in individuals' tendency to ruminate over time.[32,122] Rumination is associated with certain personality traits, such as neuroticism [84,86], and research suggests that the propensity to ruminate may have a genetic component.[8,123] However, rumination also demonstrates significant state-like properties. Rumination levels typically increase in response to stressful events, such as severe cancer treatment complications,[32] and the content and intensity of rumination can vary with disease stages or life events,[19] and psychological interventions can alter rumination levels.[61] Consequently, individuals could have a baseline tendency to ruminate (trait-like), which may explain why some cancer patients are more prone to

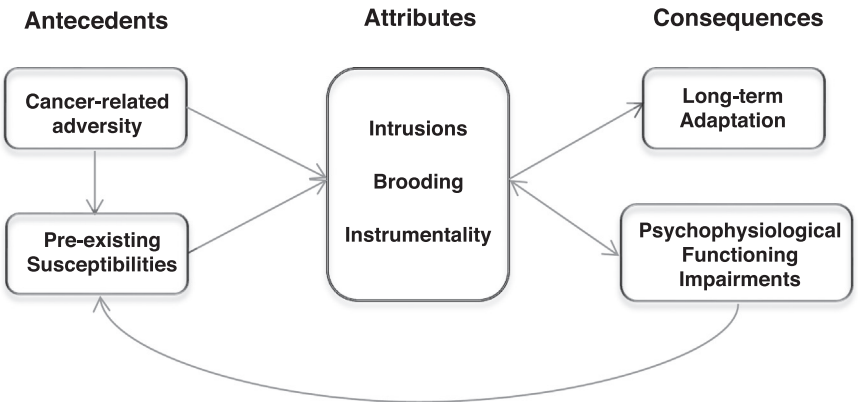

Fig 3. Preliminary conceptual model of individual rumination. This figure was created using PowerPoint. The arrows indicate relationships: Single arrows represent unidirectional influence; Double arrows represent bidirectional influence.

persistent rumination than others. Simultaneously, this baseline tendency is influenced by situational factors, leading to fluctuations in rumination levels (state-like), which can account for changes in rumination patterns at different stages of the disease. These characteristics help explain both individual differences in rumination tendencies and the variability in rumination patterns observed throughout the cancer journey. When confronted with major life events, such as cancer, more pronounced state-like changes in rumination are often observed.

Internal Variability

The literature proposes that rumination's impacts stem mainly from its form and partially from its content,[67-69] thus it is necessary to identify how the attributes display into different forms. Current research on rumination in cancer patients presents controversies regarding the relationship between intrusive and deliberate rumination. Some argue they emerge sequentially,[37,84,113,116] while others consider they exist simultaneously.[21] These discrepancies may stem from variations in assessment timing, methodological differences, or the inherent oscillation between rumination forms.[70,124] Our analysis suggests that these controversies might be attributed to the internal variability among three core attributes of rumination: intrusions, brooding, and instrumentality, with different ratios and severities of these internal attributes resulting in different external presenting forms of rumination. These attributes coexist continuously, with their relative intensities fluctuating in response to internal factors such as attention bias[125] and emotional aspects.[126,127] This dynamic process may explain why individuals may exhibit different rumination patterns at various stages of cancer.[20,28,29] When intrusive intrusions and brooding predominate, an intrusive form of rumination emerges, characterized by uncontrollable, recurring negative thoughts.[16] Conversely, when constructive intrusions and instrumentality dominate, a deliberate form manifests, featuring purposeful problem-solving and meaning-seeking.[16] This process enables individuals to transition between various rumination types, influenced by both intrinsic and extrinsic factors.

External Cyclicality

Research has identified two key mechanisms contributing to the external cyclicality of cancer-related rumination. Firstly, there are notable repetitions between the consequences and direct antecedents (cancer adversity) of rumination, indicating a transformative nature. Such as FCR and sleep disturbances can serve as new triggers,[91-93] initiating further cycles of rumination. Secondly, the psychological functioning impairments resulting from rumination, such as depression[128] can increase pre-existing vulnerabilities in indirect antecedents. Specifically, individuals experiencing rumination tend to become more sensitive to new cancer-related issues and negative stimuli.[129] This increased sensitivity can, in turn, exacerbate pre-existing susceptibilities,[85] potentially lowering the threshold for initiating new rounds of rumination.[84] This intricate external cyclicality may explain why some cancer patients fall into persistent rumination patterns and emphasize the close interplay between rumination and its antecedents and consequences.[28] The self-perpetuating nature of this cycle is consistent with Ogińska-Bulik's view that rumination persists when discrepancies remain unresolved, but ceases once a resolution is achieved.[88]

High Emotional Correlation

The relationship between emotional factors and rumination is intricate and subtle,[67] which cannot be ignored when exploring rumination. The Cognitive Emotion Regulation Theory considers rumination as a cognitive strategy that may potentially exacerbate negative emotions.[130] Notably, current research on cancer-related rumination has predominantly focused on negative emotions, such as worry,[28] depression,[72,79,92,96] FCR,[18] and loneliness.[29] Emotions and rumination interact in a complex manner. Emotional processing deficits can exacerbate intrusive rumination.[19,97] Conversely, the process of rumination itself can intensify negative emotions.[114] However, some studies have captured positive emotions related to rumination, particularly in the case of deliberate rumination, which can foster positive emotions and meaning-making.[79,131] This mutual influence between rumination and emotions[8] potentially explains both the persistent distress[67] and the potential for post-traumatic growth[132] experienced by cancer individuals. The impact of this emotional-ruminative mechanism profoundly affects patients' long-term adaptation,[133] overall quality of life,[114] and potential for positive psychological changes.[134]

Discussion

This review employed the concept analysis framework developed by Walker and Avant[44] to examine individual rumination within adult cancer care method. Through this approach, we identified its antecedents, defining attributes, and consequences. This analysis uncovered several significant features of rumination that have not been previously highlighted in existing definitions. This expanded conceptualization provides a more comprehensive understanding of rumination as it occurs in practical settings, thereby extending the potential applications of this concept.

To our knowledge, this research represents a pioneering effort to integrate the antecedents, defining attributes, and consequences into a comprehensive framework of individual rumination within the adult cancer care context. This synthesis provides valuable insights to guide the practical application and research of rumination in future clinical and nursing contexts.[42] Firstly, this conceptual model offers multiple pathways to guide intervention strategies for disrupting the rumination cycle in cancer care. Interventions can target antecedents by reducing cancer's impact and enhancing coping skills, address attributes by promoting instrumental thinking over maladaptive rumination, and focus on consequences to prevent self-perpetuation, and consider rumination's key features in design, by synthesizing these approaches, health providers could develop more effective, personalized interventions for cancer-related rumination. Secondly, future research should focus on validating and expanding the current concept of rumination in cancer care. Qualitative studies are needed to refine the operational definition,[135] while further investigation into the internal dynamics of rumination attributes and the interaction between consequences and antecedents is crucial. Longitudinal studies will be particularly valuable in verifying causal relationships[136] and understanding rumination's evolving nature over time. Thirdly, based on our findings, there appears to be a need to develop or refine rumination scales specific to the cancer context. An ideal measurement tool should assess both the internal forms and content of rumination, as well as related external factors. It should capture both trait and state characteristics of rumination, providing an interpretable and operational assessment of its nature and intensity. Such a comprehensive tool would effectively guide clinical interventions by offering a comprehensive understanding of rumination in cancer patients.

This review has several limitations. The analysis was restricted to English literature, potentially introducing language bias.[137] The search and screening process may have led to unintentional bias.[138] Most included studies focused on relationships between rumination and other variables, only a minority of qualitative studies investigated the internal nature and underlying characteristics of rumination. However, individual rumination processes may vary due to diverse cancer experiences and personal factors,[20] suggesting a need for more qualitative research in this area. Furthermore, the proposed conceptual model, based on current evidence, is subject to temporal limitations and may require refinement as new supportive evidence

emerges.[44] There's also a possibility of including superfluous antecedents, attributes, and consequences due to the lack of standardized criteria for determining the threshold of associative strength required for inclusion.[44,139] While constrained by the existing knowledge base, this contextual preliminary conceptualization provides a foundation for future empirical scrutiny and theoretical advancement.[140] Thus, ongoing research is crucial to reevaluate and update the conceptual parameters as new insights emerge. Despite these limitations, this paper provides a thorough and precise analysis of rumination within oncological contexts. By incorporating real-world examples from the literature and practical clinical observations, we have deepened the understanding of rumination's manifestations in the cancer context.

Implication for Cancer Nursing

Understanding rumination has important implications for cancer nursing. Nurses should assess rumination patterns in cancer patients to understand its impact on mental health and develop personalized strategies, such as cognitive-behavioral therapy and mindfulness, to help manage it. Training in emotional regulation can help nurses manage their own ruminative thoughts and reduce burnout, while strong support systems in healthcare settings can provide resources for coping with emotional challenges. Educating patients about rumination and teaching coping mechanisms can empower them to manage their thoughts, and involving family members can create a supportive environment and reduce co-rumination. Conducting long-term studies can provide insights into the effects of rumination on cancer patients, and including diverse cultural contexts in research can lead to more inclusive nursing practices. Integrating insights from various disciplines can enhance the management of rumination in cancer care, ensuring comprehensive support for patients. These steps can improve patient care, foster better psychological outcomes, and enhance the effectiveness of cancer treatment.

Conclusion

This concept analysis significantly enhances our understanding of rumination in adults with cancer by proposing a comprehensive conceptual model. This model holds substantial value for both psycho-oncology nursing research and clinical practice. For researchers, the conceptual model provides a robust theoretical foundation for further exploring the intricate mechanisms underlying rumination, such as its internal and external cyclical processes and complex relationships with emotions. It also offers a blueprint for developing and refining cancer-specific rumination assessment tools, which can enable more precise measurement and tracking of this phenomenon. In terms of clinical application, the model offers a more operational conceptual framework, with its pathways of influence providing a solid theoretical basis for developing targeted intervention strategies. By continuing to build on this framework, we can enhance our ability to support patients in navigating the complex psychological challenges associated with cancer diagnosis and treatment, ultimately improving their quality of life and mental well-being.

Declaration of competing interest

The authors declare no potential conflicts of interest.

CRediT authorship contribution statement

Jinyong Cao: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Yeter Sinem Üzar–Özçetin:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization.

Disclaimers

This conceptual analysis is based on English-language nursing literature available up to April 2024. It may not represent all perspectives, particularly those in non-English publications. Readers should consider the evolving nature of nursing concepts and potential limitations of the literature search.

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