

Article

How awareness of death enhances the sense of meaning in life in breast cancer patients

Wang Li^{1,2,+}, Tianyu She^{3,+}, Ruining Liu⁴, Dajun Yang^{5,*}, Linli He^{1,2,*}

¹ Institute of Basic Medicine, North Sichuan Medical College, Nanchong 637000, Sichuan, China

² Department of Pathology, Affiliated Hospital of North Sichuan Medical College, Nanchong 637000, Sichuan, China

³ Xi'an Electric Power Central Hospital, Changying East Road, Xincheng District, Xi'an 710032, Shaanxi, China

⁴ Department of Clinical Medicine, Affiliated Hospital of North Sichuan Medical College, Nanchong 637000, Sichuan, China

⁵ School of Management, North Sichuan Medical College, Nanchong 637000, Sichuan, China

* Corresponding author: Linli He, linlihe2024@163.com; Dajun Yang, wanheydj@hotmail.com

+ These authors have contributed equally to this work and share first authorship.

CITATION

Li W, She T, Liu R, Yang D, He L. How awareness of death enhances the sense of meaning in life in breast cancer patients. *Psycho-Oncologie*. 2026; 20(5): 5773. <https://doi.org/10.18282/po5773>

ARTICLE INFO

Received: 19 March 2026

Accepted: 1 June 2026

Available online: 30 June 2026

COPYRIGHT



Copyright © 2026 by author(s).

Psycho-Oncologie is published by PiscoMed Publishing Pte Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license. <https://creativecommons.org/licenses/by/4.0/>

Abstract: Death is the natural endpoint of life, and cancer patients, due to the high mortality rate of their condition, often exhibit heightened awareness of death. While this awareness frequently leads to a significant reduction in their motivation to live, the impact of awareness of death on meaning in life and its underlying mechanisms remain underexplored. Based on Self-Determination Theory, this study investigates the chain mediational roles of mindfulness and death reflection in the relationship between awareness of death and meaning in life among breast cancer patients. Specifically, we recruited 404 breast cancer patients to explore how awareness of death influences meaning in life through mindfulness and death reflection. The results reveal that breast cancer patients' awareness of death, mediated by mindfulness and death reflection, can effectively enhance their sense of meaning in life. Among these, awareness of death was found to positively influence meaning in life in breast cancer patients. This study expands the research boundaries of Self-Determination Theory and addresses gaps in previous studies exploring the relationship between awareness of death and meaning in life. These findings provide valuable measures and suggestions for healthcare providers to enhance both the sense of meaning in life and quality of life among breast cancer patients.

Keywords: Mortality saliency; Meaning in life; Awareness of death; Mindfulness; Death reflection; Breast cancer; Self-Determination Theory.

1. Introduction

Breast cancer has surpassed lung cancer as the malignancy with the highest global incidence, according to data from international cancer research institutions [1, 2]. In China, the incidence rate of breast cancer among women is increasing annually by 2.6% [3, 4]. While advancements in diagnostic and therapeutic techniques have improved the five-year survival rate for early-stage breast cancer patients to over 90% [5, 6], the psychological and social challenges accompanying long-term survival have intensified. Traditional medical models, which overemphasize physical indicators, often overlook the profound impact of the threat of death on survivors' spiritual well-being. Existential psychology emphasizes that the awareness of death is a core driver in the human pursuit of meaning in life [7]. Among these, awareness of death has emerged as a significant factor influencing patients' mental health [8, 9]. Awareness of death is the cognitive recognition of life's finitude and encompasses a spectrum from fear and avoidance of death to eventual acceptance [10, 11]. For breast cancer patients, awareness of death is likely more pronounced due to their ongoing

risk of disease recurrence, metastasis, and death [12]. This awareness can profoundly influence patients' emotions, behaviors, and attitudes toward treatment [13]. For instance, excessive fear of death may lead to anxiety and depression, adversely affecting treatment adherence and quality of life [14, 15]. This is largely because awareness of death can evoke existential fear, exacerbating psychological distress [16, 17], while also potentially triggering meaning-reconstruction mechanisms that prompt individuals to reassess life's value [18]. For example, patients with advanced breast cancer often achieve spiritual growth through reflections on their life journey during the terminal phase [19]. Consequently, exploring the potential role of awareness of death in enhancing meaning in life is crucial for optimizing psychosocial intervention strategies.

Meaning in life refers to an individual's perception and understanding of their life's value and purpose [20]. Undoubtedly, meaning in life has garnered significant attention from scholars in recent years, becoming a prominent area of research in the medical field [21, 22]. For instance, presented two opposing views sense of meaning in life that cancer patients with a higher sense of meaning in life tend to exhibit greater psychological resilience and happiness. A review of existing literature reveals that studies on meaning in life among cancer patients focus on aspects such as treatment adherence [23], psychological stress [24], illness perception [25], family support [26], and suicidal tendencies [27]. Notably, prior research presents two opposing views on the relationship between meaning in life and awareness of death. According to terror management theory, the threat of death may induce existential anxiety, thereby reducing meaning [28]. In contrast, Awakening Theory Meaning-Construction Theory posits that awareness of death might foster a reevaluation of life priorities through an awakening effect, reinforcing intrinsic value pursuit [29]. However, scholars have primarily provided empirical evidence that a higher sense of meaning in life significantly reduces death anxiety [30, 31]. Few studies have explored the specific impact of awareness of death on meaning in life. This may stem from the fact that the relationship between awareness of death and meaning in life is not linear or oppositional. Neimeyer [32] meaning reconstruction model suggests that deep reflections on death can promote meaning generation by enhancing cognitive flexibility. Similarly, Aftab, Lee [33] conducted a longitudinal study revealing that breast cancer patients who experienced peak death anxiety within one year of diagnosis exhibited U-shaped changes in meaning in life scores over time. This dynamic relationship suggests that awareness of death may influence meaning in life through non-linear pathways. Therefore, this study seeks to address two critical questions: (1) What is the relationship between awareness of death and meaning in life? (2) What are the underlying mechanisms and boundary conditions of this relationship?

Mindfulness emphasizes an individual's ability to observe their present experiences, including thoughts, emotions, and physical sensations, with a non-judgmental and accepting attitude [34, 35]. As an evidence-based psychological intervention, mindfulness has been proven to significantly improve the psychological adaptation of cancer patients [36, 37]. Neuroimaging evidence suggests that mindfulness practice can enhance the prefrontal cortex's regulatory control over the amygdala, reducing the excessive activation of the default mode network triggered by death threats [38, 39]. In other words, mindfulness, through its enhancement of emotional regulation and cognitive flexibility, helps patients accept death threats, reduce rumination, and alleviate anxiety and depression [40, 41]. Therefore,

mindfulness enables patients to better perceive their awareness of death [42]. Through mindfulness practice, patients can approach death-related thoughts and emotions with a peaceful mindset rather than resorting to avoidance or suppression [43]. This positive awareness of death consciousness serves two purposes: it helps patients view death appropriately, avoiding excessive fear, and enhances their sense of meaning in life. In a mindful state, patients can focus more on their current life experiences and reassess their life's value.

Death reflection refers to an individual's profound thinking about death-related concepts, experiences, and emotions [44, 45]. Existing research has found that appropriate death reflection can prompt patients to reassess their life's value and adjust their life goals and values [46]. Specifically, when patients deeply reflect on death, they inevitably ponder the value and purpose of their lives. For instance, patients may reflect on their role within their family, unfinished career aspirations, or potential contributions to society and others. Such reflections help them clarify their life's meaning [47]. A clear sense of meaning in life can, in turn, guide patients toward more positive and constructive death reflections [48, 49]. Breast cancer patients who perceive their lives as meaningful are more likely to accept death calmly and reinterpret their life's significance from the perspective of death, thereby further enriching and deepening their understanding of meaning in life [50].

The extant literature exhibits considerable heterogeneity in delineating the association between mortality salience and meaning in life, a discrepancy largely attributable to the paucity of integrative models elucidating the full “cognitive triggering—psychological processing—meaning generation” pathway. Drawing on existential psychology, death awareness is not merely an emotional response, but a cognitive challenge to the common belief that death is a distant event (Skold, 2021). Within the context of breast cancer, the perceived imminence of disease recurrence and mortality constitutes a direct ontological threat, precipitating an instinctive, albeit often ambiguous, cognition of life's finitude. Absent adaptive regulatory mechanisms, such awareness is prone to devolving into maladaptive existential anxiety; conversely, it is only through specific intrapsychic processing—namely, the deliberate reappraisal of life's values and prior.

This study, grounded in Self-Determination Theory, investigates how awareness of death can enhance the sense of meaning in life among breast cancer patients. According to Self-Determination Theory, humans have three fundamental psychological needs: autonomy, competence, and relatedness [51, 52]. When these needs are satisfied, individuals are more likely to experience higher levels of mental well-being and happiness [53, 54]. In the context of breast cancer patients, awareness of death may prompt individuals to reevaluate their life circumstances, thereby triggering reflections on their autonomy needs [55]. For instance, patients may contemplate their independence in treatment decisions and autonomous planning for future life [56]. However, mindfulness—a psychological state characterized by non-judgmental awareness of the present moment—can assist patients in better fulfilling their autonomy needs [57]. Through mindfulness training, patients can gain clearer insights into their inner thoughts and emotions, thereby enabling them to adopt proactive coping strategies when confronting awareness of death. Such proactive approaches further facilitate patients' exploration and understanding of Meaning in life.

Additionally, mindfulness can help patients engage in death reflection with a more objective and tranquil mindset. While in a mindful state, patients can delve

deeply into the relationship between death and life, uncovering the significant values inherent in existence. For example, during mindfulness practice, patients may recall cherished moments spent with family, leading them to recognize their importance within their families, such an awareness of life's value further enhances their sense of meaning in life. Simultaneously, the process of death reflection may encourage patients to cherish their relationships with family and friends more deeply, which is also a crucial component of Meaning in life.

While previous psycho-oncology literature has independently examined the effects of mindfulness or death reflection on meaning in life, this study advances the field in three distinct ways. First, it addresses a notable cultural gap: most existing models are derived from Western individualistic contexts, whereas this research empirically validates the Self-Determination Theory (SDT) pathway within a Chinese collectivist cultural setting—where collective family obligations and societal roles often shape the pursuit of meaning differently. Second, it provides empirical integration of a theoretically proposed “cognitive triggering—psychological processing—meaning generation” pathway. By simultaneously testing the mediating roles of mindfulness and death reflection, the study demonstrates that awareness of death does not directly enhance meaning in life; rather, its impact is contingent on the joint operation of adaptive psychological mechanisms. This integrated model resolves ambiguities in prior fragmented findings and clarifies how death awareness can be transformed into a constructive force for meaning reconstruction. Third, it shifts the dominant clinical paradigm from risk mitigation to growth facilitation, offering a theoretically grounded framework for optimizing psychosocial interventions in oncology.

Therefore, based on the above analysis, the following hypotheses are proposed in this study:

H1: Awareness of death has a positive impact on meaning of life in breast cancer patients.

H2: Mindfulness mediates the relationship between awareness of death and meaning in life in breast cancer patients.

H3: Death reflection mediates the relationship between awareness of death and meaning in life in breast cancer patients.

H4: Mindfulness and death reflection have a chain mediating effect between awareness of death and meaning in life of breast cancer patients.

2. Methods

2.1. Sample

This cross-sectional study was conducted to examine the mediating roles of mindfulness and death reflection in the association between awareness of death and meaning in life among patients with breast cancer. Our study has obtained the formal approval of the North Sichuan Medical College Ethics Committee (approval number: 2025019). Data were collected from May to August 2025 in several Grade A tertiary hospitals in Nanchong, Sichuan Province, China. A convenience sampling strategy was used.

Potential participants were identified from oncology-related departments and outpatient or inpatient clinical settings by trained research assistants in collaboration with attending oncologists and nurses. Before recruitment, oncologists helped screen patients according to the medical inclusion and exclusion criteria. Patients who met the eligibility criteria were then approached by the research team and were provided

with a standardized explanation of the study purpose, procedures, confidentiality arrangements, potential risks and benefits, and their right to withdraw at any time without any influence on their medical care.

The inclusion criteria set for this study were: (1) Confirmed cases of breast cancer through pathological examination and categorized into stages I-IV according to the 8th Edition American Joint Committee on Cancer (AJCC) Staging System. (2) Participants aged more than 18 years, free from severe cognitive impairments, and capable of providing informed consent. (3) Participants with an expected survival period of at least three months as assessed by oncologists.

Participants may be excluded based on the following criteria: (1) Severe cognitive impairments such as dementia, delirium, or active mental health disorders. (2) Recent psychological intervention, including systematic psychological therapy or adjustment of psychotropic drugs within the past four weeks. (3) Patients requiring long-term hospitalization or complete loss of self-care ability. (4) Participation in other clinical trials involving psychological assessments within the past three months.

After written informed consent was obtained, participants completed the questionnaires either in paper-and-pencil format or electronically, depending on their preference and physical condition. For participants with reading difficulties or physical fatigue, assistants provided assistance by reading the items aloud without explaining or guiding the responses. The average completion time was approximately six minutes. To protect privacy, all questionnaires were completed anonymously, and no identifiable personal information was collected. A total of 454 questionnaires were distributed and 440 were returned. After excluding questionnaires with excessively short completion times, substantial missing data, or highly invariant response patterns, 404 valid questionnaires were retained for final analysis, yielding an effective response rate of 88.98%.

2.2 Measurement tools

2.2.1 Awareness of death scale

The Awareness of Death Scale was adapted from the COVID-19 a Awareness of Death Scale developed by Shao, He [58], which consists of 4 measurement items. This scale has been widely used among Chinese populations [59-61], demonstrating its good cultural adaptability and validity. In this study, we used this scale to assess breast cancer patients' awareness of death (Cronbach's $\alpha = 0.725$). A 7-point Likert scale was used for scoring (1 = Strongly Disagree, 7 = Strongly Agree). Higher scores indicate a stronger awareness of death among breast cancer patients.

2.2.2 Mindfulness scale

The Mindfulness Scale was adapted from the Toronto Mindfulness Scale developed by Lau, Bishop [62], which includes 13 measurement items. This scale was translated into Chinese by Deng, Liu [63] and has been widely used among Chinese populations [64, 65]. In this study, we used this scale to assess breast cancer patients' mindfulness, employing a 7-point Likert scale for scoring (1 = Strongly Disagree, 7 = Strongly Agree; Cronbach's $\alpha = 0.945$). Higher scores indicate stronger mindfulness among breast cancer patients.

2.2.3 Death reflection scale

The Death Reflection Scale was adopted from Yuan, Baranik [66] research, which comprises 15 measurement items grouped into five dimensions: Motivation to Help, Motivation to Live, Putting Life in Perspective, Legacy, and Connection to

Others. This scale has been widely used among Chinese populations [67], indicating its good cultural adaptability and validity. In this study, we used this scale to assess death reflection in breast cancer patients, utilizing a 7-point Likert scale for scoring (1 = Strongly Disagree, 7 = Strongly Agree; Cronbach's $\alpha = 0.744$). Higher scores reflect a higher level of death reflection among breast cancer patients.

2.2.4 Meaning in life scale

The Meaning in Life Scale was adapted from Steger, Frazier [68], which includes 10 measurement items. This scale was translated into Chinese by Chan [69] and has been widely used to measure the meaning in life among Chinese populations [70, 71]. In this study, we used this scale to assess breast cancer patients' sense of meaning in life, employing a 7-point Likert scale for scoring (1 = Strongly Disagree, 7 = Strongly Agree; Cronbach's $\alpha = 0.899$). Higher scores indicate a stronger sense of meaning in life among breast cancer patients.

To rigorously assess the psychometric properties of the instruments, reliability and validity analyses were conducted prior to hypothesis testing. The internal consistency of all scales was satisfactory, with Cronbach's α coefficients ranging from 0.725 to 0.945, exceeding the recommended threshold of 0.70. Furthermore, composite reliability (CR) values for all constructs were above 0.80, and the average variance extracted (AVE) surpassed the 0.50 benchmark, confirming adequate convergent validity. These indices demonstrate that the measurement model possesses robust reliability and validity for structural equation modeling.

3. Results

3.1 Demographic characteristics of the sample

The data collection period extended from May to August 2025, during which 454 questionnaires were distributed and 440 responses received. After a thorough data cleaning process, where we eliminated questionnaires with very short response times or overly consistent answers, 404 valid questionnaires were retained, achieving a response rate of 88.98%. Among the respondents, 38 were male and 366 were female; detailed demographic information is presented in **Table 1**.

Table 1. Demographic information of the participants.

Variables	Items	Numbers (N)	Frequency (%)
Gender	Male	38	9.4%
	Female	366	90.6%
Age	18-25 years old	19	4.7%
	26-40 years old	61	15.1%
	41-60 years old	141	34.9%
	61-75 years old	149	36.9%
	76 years old and above	34	8.4%
Educational background	Primary school	76	18.8%
	Junior high school	83	20.6%
	High school, technical secondary school	48	11.9%

Continuation Table:

Variables	Items	Numbers (N)	Frequency (%)
Residence	Junior college	23	5.7%
	Undergraduate college	106	26.2%
	Master's student	61	15.1%
	Doctoral student	7	1.7%
	Urban	267	66.1%
Marital status	Suburban	137	33.9%
	Married	270	66.8%
	Unmarried	46	11.4%
	Widowed	24	5.9%
Economic income	Get divorced	64	15.8%
	Under 3000 ¥	77	19.1%
	3001-6000 ¥	140	34.6%
	6001-9000 ¥	116	28.7%
	9001 and above ¥	71	17.6%
Staging of cancer	I	130	32.2%
	II	169	41.8%
	III	74	18.3%
	IV	31	7.7%

Note. N = Number of participants; Frequency (%) = Percentage of participants in each category. Cancer staging was classified according to the 8th Edition of the American Joint Committee on Cancer (AJCC) Staging System.

3.2 Common method bias analysis

Following the approach used by Rosenman, Tennekoon [72], we employed an anonymous data collection method to gather participants' self-reported data, thereby minimizing potential biases in their responses. Additionally, we utilized Harman's single-factor test to assess common method bias. The results indicated that, without rotation, 10 factors with eigenvalues greater than 1 were extracted, with the first factor accounting for 37.627% of the variance, which did not exceed the critical threshold of 40%. This suggests that the study does not suffer from common method bias.

3.3 Correlation analysis and descriptive statistics

We conducted descriptive statistics and correlation analysis on awareness of death, mindfulness, death reflection and meaning in life in breast cancer patients. The results showed that there was a significant positive correlation between the awareness of death and the meaning in life in breast cancer patients ($r = 0.7$, $P < 0.01$). There was a significant positive correlation between awareness of death and mindfulness ($r = 0.713$, $P < 0.01$). There was a significant positive correlation between awareness of death and death reflection ($r = 0.646$, $P < 0.01$). Mindfulness was positively correlated with death reflection ($r = 0.815$, $P < 0.01$). There was a significant positive correlation

between mindfulness and meaning in life ($r = 0.89$, $P < 0.01$). There was a significant positive correlation between death reflection and meaning in life ($r = 0.808$, $P < 0.01$). Specific details are provided in **Table 2**. In addition, multicollinearity diagnostics showed that the variance inflation factor values were below the recommended threshold (≤ 5), indicating that multicollinearity was unlikely to substantially bias the regression estimates.

Table 2. Correlation analysis and descriptive statistics of key variables.

Variables	M	SD	1	2	3	4
1. Awareness of death	5.517	0.815	1			
2. Mindfulness	6.305	1.022	0.713**	1		
3. Death reflection	5.269	0.563	0.646**	0.815**	1	
4. Meaning in life	5.917	0.856	0.700**	0.890**	0.808**	1

Note. M = Mean; SD = Standard Deviation; r = Pearson correlation coefficient; ** $p < 0.01$ (two-tailed). All variables were measured using 7-point Likert scales (1 = Strongly Disagree, 7 = Strongly Agree).

3.4 Chain mediation analysis

This study treated awareness of death as the independent variable, mindfulness and death reflection as mediator variables, and meaning in life as the dependent variable. We used Process Model 6 to conduct a chain mediation analysis to examine the mediating effects of mindfulness and death reflection. The results revealed the following. Awareness of death had a significant impact on mindfulness ($\beta = 0.894$, 95% CI = [0.808, 0.980], $P < 0.001$). Awareness of death had a significant impact on death reflection ($\beta = 0.397$, 95% CI = [0.353, 0.441], $P < 0.001$). Awareness of death had a significant impact on Meaning in life ($\beta = 0.108$, 95% CI = [0.044, 0.171], $P < 0.001$). Mindfulness had a significant impact on death reflection ($\beta = 0.091$, 95% CI = [0.036, 0.147], $P < 0.01$). Mindfulness had a significant impact on meaning in life ($\beta = 0.529$, 95% CI = [0.462, 0.596], $P < 0.001$). Death reflection had a significant impact on meaning in life ($\beta = 0.344$, 95% CI = [0.232, 0.456], $P < 0.001$). Specific details are presented in **Table 3**.

Table 3. Regression table of awareness of death, mindfulness, death reflection, and meaning in life.

Regression Equation		Overall Fit Index			Regression Coefficient		
Predictive Variables	Outcome Variables	R	R^2	F	β	t	95%CI
Awareness of death	Mindfulness	0.713	0.508	415.940***	0.894	20.395***	[0.808,0.980]
Awareness of death	Death reflection	0.821	0.673	413.479***	0.397	17.714***	[0.353,0.441]
Mindfulness					0.091	3.244**	[0.036,0.147]
Awareness of death	Meaning in life	0.904	0.817	597.212***	0.108	3.321***	[0.044,0.171]
Mindfulness					0.529	15.544***	[0.462,0.596]
Death reflection					0.344	6.057***	[0.232,0.456]

Note. R = Multiple correlation coefficient; R^2 = Coefficient of determination; F = F-statistic; β = Standardized regression coefficient; t = t -test statistic; 95% CI = 95% Confidence Interval; * $p < 0.001$, * $p < 0.01$, * $p < 0.05$.

Subsequently, we performed a mediation analysis for mindfulness and death

reflection. The results indicated that mindfulness exhibited a significant mediating effect between awareness of death and meaning in life ($\beta = 0.451$, $SE = 0.042$, 95% $CI = [0.371, 0.534]$). Similarly, death reflection demonstrated a significant mediating effect between awareness of death and meaning in life ($\beta = 0.030$, $SE = 0.014$, 95% $CI = [0.006, 0.061]$). Furthermore, mindfulness and death reflection jointly exhibited a significant chain mediating effect between awareness of death and meaning in life ($\beta = 0.116$, $SE = 0.024$, 95% $CI = [0.070, 0.165]$). For a detailed illustration, please refer to **Figure 1**.

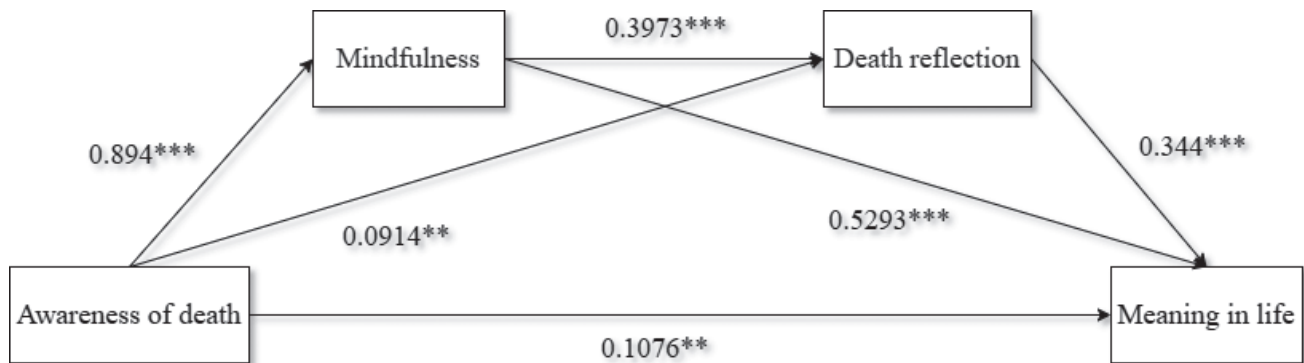


Figure 1. Path coefficient diagram of chained mediators.

4. Discussion

4.1 Theoretical implications

4.1.1 The positive impact of awareness of death on the meaning in life in breast cancer patient

This study reveals that awareness of death among breast cancer patients is not merely associated with negative emotional responses. Instead, under certain conditions, it can promote a re-examination and reconstruction of meaning in life. From the perspective of existential psychology, the awareness of death can stir individuals to engage in a deeper exploration of meaning in life [73, 74]. Specifically, when breast cancer patients confront the possibility of death, they often undergo a re-evaluation of priorities, which helps them identify the truly important values and goals in life, thereby enhancing their gratitude for life and their sense of meaning [75]. Furthermore, research indicates that when breast cancer patients translate awareness of death into profound reflections on life, they are more likely to experience a sense of life purpose, which can significantly improve their quality of life and psychological health [76]. Consistent with the Awakening Theory of Mortality Salience [77], our findings suggest that the confrontation with mortality disrupts patients' complacency, prompting a cognitive shift toward prioritizing intrinsic values over extrinsic achievements. This suggests that awareness of death is not merely a source of repression but can become a crucial factor in constructing meaning in life, especially when patients receive appropriate psychological support and interventions.

4.1.2 The mediating role of mindfulness in awareness of death and meaning in life of breast cancer patients

The study finds that mindfulness not only regulates the impact of awareness of death on meaning in life but also enhances the sense of meaning in life among breast cancer patients by promoting death reflection. The core of mindfulness lies in its ability to awaken individuals to a complete awareness of the present moment

without judgment [78]. This mindset can help breast cancer patients reduce fear and avoidance when facing awareness of death, enabling them to engage in more open and profound life reflections [79]. As Kabat-Zinn [80] has suggested, mindfulness helps individuals reconnect with life. For breast cancer patients, this may manifest as a deeper understanding of life's limitations and a more active pursuit of life's meaning.

Specifically, mindfulness practices can reduce death anxiety and depressive emotions among breast cancer patients [81], which are negative emotions that often hinder deep reflections on awareness of death and the active construction of Meaning in life. Additionally, mindfulness can enhance patients' awareness and acceptance of life, allowing them to recognize the preciousness and limitations of life when confronting mortality [82]. This awareness can then inspire a pursuit of life's meaning. Therefore, mindfulness can transform awareness of death into a profound understanding of life's significance. This discovery offers a new approach to psychological interventions for breast cancer patients, suggesting that mindfulness practices can enhance the positive effects of death reflection, thereby improving patients' quality of life and psychological well-being.

4.1.3 The mediating role of death reflection in awareness of death and meaning in life of breast cancer patients

The study reveals that death reflection plays a mediating role in the relationship between awareness of death and meaning in life among breast cancer patients. According to Meaning-Construction Theory, when individuals reflect on death, they often redefine life's meaning [83]. For breast cancer patients, death reflection is not only an acknowledgment of life's finitude but also a reevaluation of life's values and goals. Through death reflection, patients can gain a clearer understanding of what truly matters in life, enabling them to mentally reorganize their life priorities. This aligns with SDT's concept of relatedness; by reflecting on death, patients strengthen their bonds with others, realizing that their impact extends beyond their physical lifespan. This reorganization can reduce meaningless daily distractions and enhance focus and investment in life, thereby increasing the sense of meaning in life and satisfaction.

Moreover, death reflection can help breast cancer patients transform awareness of death into existential awakening, which is characterized by a profound understanding of life's limited nature and a deeper appreciation of life. Death reflection can activate patients' ability to redefine their goals, allowing them to recognize their core values and life objectives more clearly. This enables them to pursue more meaningful activities within their limited lifespans. This indicates that through death reflection, breast cancer patients can not only better cope with the challenges posed by awareness of death but also achieve higher levels of life satisfaction and happiness on a psychological level.

4.2. Practical implications

The present findings may provide several implications for psychological support and supportive care for patients with breast cancer. First, the positive association between awareness of death and meaning in life suggests that death-related concerns should not be addressed solely as symptoms to be eliminated. In clinical practice, patients' awareness of mortality is often accompanied by fear, avoidance, and emotional distress. However, when handled in a supportive and structured context, such awareness may also become an entry point for meaning reconstruction. Therefore, oncology professionals and psycho-oncology practitioners could consider

assessing death-related concerns as part of routine psychosocial screening, while carefully distinguishing maladaptive death anxiety from reflective and meaning-oriented awareness of death.

Second, the mediating role of mindfulness indicates that mindfulness-based approaches may be useful for helping patients relate to death-related thoughts and emotions in a less avoidant and more accepting manner. For example, brief mindfulness exercises, breathing awareness, body scanning, and acceptance-based practices could be integrated into psycho-oncology care to help patients observe fear, uncertainty, and bodily discomfort without excessive judgment or suppression. Such practices may create a psychological space in which patients can tolerate mortality-related thoughts and engage more flexibly with questions about life purpose, relationships, and personal values. Importantly, because this study used a cross-sectional design, these implications should be regarded as clinically promising directions rather than evidence of intervention efficacy.

Third, death reflection may be incorporated into meaning-centered or existentially oriented interventions for breast cancer patients. Healthcare providers could guide patients to reflect on questions such as what remains valuable in their lives, what relationships they wish to strengthen, what unfinished goals they hope to pursue, and what legacy or contribution they would like to leave. These reflective exercises should be conducted sensitively and gradually, particularly for patients with high levels of distress or advanced disease. Structured writing tasks, life-review conversations, dignity therapy, and meaning-centered counseling may provide feasible formats for facilitating constructive death reflection while minimizing the risk of overwhelming patients.

Fourth, the sequential mediating pathway suggests that mindfulness and death reflection may be more effective when combined rather than applied in isolation. Mindfulness may first help patients stabilize attention, regulate distress, and adopt a non-judgmental stance toward death-related thoughts. On this basis, guided death reflection may further support patients in clarifying priorities, strengthening relatedness, and reconstructing meaning in life. Thus, a staged intervention model could be considered: initial sessions may focus on emotional stabilization and mindful awareness, whereas later sessions may introduce existential reflection, value clarification, family communication, and life-goal reconstruction.

Finally, these findings also have implications for healthcare team training. Nurses, oncologists, and psychosocial care providers often encounter patients' concerns about recurrence, suffering, and death, but may feel insufficiently prepared to discuss existential issues. Training programs could help healthcare professionals develop communication skills for responding to death-related concerns with empathy, openness, and cultural sensitivity. Such training may reduce avoidance of end-of-life or existential conversations and improve the quality of psychosocial care for breast cancer patients and their families.

These findings provide actionable insights for clinical practice, demonstrating that breast cancer patients' awareness of death can be transformed into a positive force for meaning when paired with adaptive psychological mechanisms. For patients experiencing distress, brief mindfulness interventions—such as guided breathing exercises—can help regulate emotional responses to mortality threats, preventing maladaptive anxiety and creating a foundation for constructive reflection. Once emotional stability is achieved, clinicians can guide patients in exploring life priorities and personal legacy through structured approaches like dignity therapy, aligning

with Self-Determination Theory's emphasis on relatedness and competence. These reflections enable patients to redefine life's value in the context of their diagnosis, fostering a renewed sense of purpose.

Interventions should be tailored to individual needs: patients with higher literacy and lower distress may benefit from life-review journaling to articulate post-diagnosis priorities, while those with advanced disease might find family-assisted discussions more supportive. Such formats not only facilitate meaningful engagement with existential questions but also involve caregivers in understanding patient values.

To ensure the effective implementation of these approaches, oncology professionals need training in existential communication. This includes recognizing the difference between pathological anxiety and healthy awareness of mortality, and using open-ended prompts such as "What matters most to you now?" to encourage patients to explore the meaning of their experiences. By integrating these strategies, clinicians can move beyond generic support to address the psychological complexity of mortality awareness, ultimately enhancing patients' quality of life.

4.3 Limitations

Despite revealing the chain mediating role of mindfulness and death reflection in the relationship between awareness of death and meaning in life among breast cancer patients, this study has several limitations. The research employed a cross-sectional design, which prevents a dynamic examination of the changes in awareness of death, mindfulness, and death reflection across the life trajectory of breast cancer patients. The psychological state of breast cancer patients may undergo significant changes as the disease progresses, during treatment, or due to personal life events. Consequently, the lack of longitudinal follow-up data limits the validation of the temporality and stability of the research findings. Additionally, the study's sample was primarily drawn from specific clinical populations, potentially introducing selection bias and failing to fully represent breast cancer patients of different ages, cultural backgrounds, and disease stages. This homogeneity may have compromised the generalizability and applicability of the results.

Although the study utilized validated standardized scales to assess awareness of death, mindfulness, death reflection, and meaning in life, these scales primarily relied on self-reported data, which could be influenced by participants' subjective experiences, social expectations, and cultural backgrounds, potentially leading to measurement errors. Furthermore, the study did not directly observe the actual processes of death reflection and mindfulness practices among patients but instead inferred these constructs through questionnaire measurements. This approach may not fully capture the dynamic characteristics of these complex psychological processes. Therefore, future research could incorporate more objective physiological or neuroimaging data, such as heart rate, skin conductance, or functional Magnetic Resonance Imaging (fMRI) data, to validate the mediating roles of mindfulness and death reflection, thereby strengthening the physiological basis and reliability of the conclusions.

In terms of the theoretical framework, while this study treated mindfulness and death reflection as mediating variables, the model remains relatively simple and may have overlooked other potential mediating or moderating variables, such as psychological resilience, social support, or religious beliefs. These factors may play significant roles in shaping the life meaning of breast cancer patients. Thus, future research could expand the theoretical model by incorporating additional psychological and social factors, constructing a more comprehensive and complex

theoretical framework.

Author contributions: Conceptualization, W.L.; methodology, W.L.; software, T.S.; validation, R.L.; formal analysis, T.S.; investigation, W.L.; resources, T.S.; data curation, L.H.; writing—original draft preparation, W.L.; writing—review and editing, L.H.; visualization, T.S.; supervision, R.L.. All authors have read and agreed to the published version of the manuscript.

Funding: Project of Sichuan Grassroots Health Development Research Center (2022) (Grant No. SWFZ22-Q-54)

Ethical approval: This study was reviewed and approved by North Sichuan Medical College (approval number: 2025019).

Informed consent statement: Informed consent was obtained from all subjects involved in the study.

Data availability statement: All study data can be provided by contacting the corresponding author.

Conflict of interest: The authors declare no conflict of interest.

References

1. Guo L, Zhu C, Cai L, Zhang X, Fang Y, Chen H, et al. Global burden of lung cancer in 2022 and projected burden in 2050. 2024;137(21):2577-82. doi: 10.1097/CM9.00000000000003268.
2. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2024;74(3):229-63. Epub 20240404. doi: 10.3322/caac.21834. PubMed PMID: 38572751.
3. Yuan Y, Liu C, Guo M, Xin Z, Chen G, Yang Y, et al. Exploring Cancer Incidence Trends by Age and Sex Among 14.14 Million Individuals in China From 2007 to 2021: Population-Based Study. *JMIR public health and surveillance.* 2024;10:e55657. Epub 2024/08/07. doi: 10.2196/55657. PubMed PMID: 39110964; PubMed Central PMCID: PMCPMC11339572.
4. Xiao Z, Li L. Breast cancer mortality in Chinese women and men from 1990 to 2019: Analysis of trends in risk factors. *The journal of obstetrics and gynaecology research.* 2024;50(6):970-81. Epub 2024/04/02. doi: 10.1111/jog.15931. PubMed PMID: 38561241.
5. Akbari ME, Akbari A, Khayamzadeh M, Salmanian R, Akbari M. Ten-Year Survival of Breast Cancer in Iran: A National Study (Retrospective Cohort Study). *Breast care (Basel, Switzerland).* 2023;18(1):12-21. Epub 2023/03/07. doi: 10.1159/000526746. PubMed PMID: 36876173; PubMed Central PMCID: PMCPMC9982336.
6. Hemminki K, Försti A, Liska V, Kanerva A, Hemminki O, Hemminki A. Long-term survival trends in solid cancers in the Nordic countries marking timing of improvements. *International journal of cancer.* 2023;152(9):1837-46. Epub 2022/12/27. doi: 10.1002/ijc.34416. PubMed PMID: 36571455.
7. King LA, Hicks JAJArop. The science of meaning in life. 2021;72(1):561-84. doi: 10.1146/annurev-psych-072420-122921.
8. Menzies RE, Menzies RG. Death anxiety and mental health: Requiem for a dreamer. *J Behav Ther Exp Psychiatry.* 2023;78:101807. Epub 20221123. doi: 10.1016/j.jbtep.2022.101807. PubMed PMID: 36435549.
9. Nielsen RE, Banner J, Jensen SE. Cardiovascular disease in patients with severe mental illness. *Nat Rev Cardiol.* 2021;18(2):136-45. Epub 20201030. doi: 10.1038/s41569-020-00463-7. PubMed PMID: 33128044.
10. Gao Y, Lu K, Ni Y, Shen Y. Death and beauty: mortality salience and creatureliness increase self-objectification not only in females but also in males. *Frontiers in psychology.* 2025;16:1512704. Epub 2025/03/07. doi: 10.3389/fpsyg.2025.1512704. PubMed PMID: 40051403; PubMed Central PMCID: PMCPMC11882579.
11. Xiao H, Liu H, Chen T, Wang K, Huang S, Liu H, et al. How does mortality salience influences personal identity-based consumption? The role of meaning in life. *Current Psychology.* 2024;43(17):15564-75.
12. Obeagu EI, Obeagu GU. Breast cancer: A review of risk factors and diagnosis. *Medicine (Baltimore).* 2024;103(3):e36905.

- doi: 10.1097/md.00000000000036905. PubMed PMID: 38241592; PubMed Central PMCID: PMCPMC10798762.
13. Duzova US, Duzova M, Altinel BJSCiC. The effect of sleep quality on attitudes toward death in breast cancer survivors. 2024;32(10):666.
14. Ji P, Zhang L, Gao Z, Ji Q, Xu J, Chen Y, et al. Relationship between self-esteem and quality of life in middle-aged and older patients with chronic diseases: mediating effects of death anxiety. BMC psychiatry. 2024;24(1):7. Epub 2024/01/04. doi: 10.1186/s12888-023-05459-4. PubMed PMID: 38166844; PubMed Central PMCID: PMCPMC10763298.
15. Lim CYS, Laidsaar-Powell RC, Young JM, Solomon M, Steffens D, Blinman P, et al. Fear of Cancer Progression and Death Anxiety in Survivors of Advanced Colorectal Cancer: A Qualitative Study Exploring Coping Strategies and Quality of Life. Omega (Westport). 2025;90(3):1325-62. Epub 20220920. doi: 10.1177/00302228221121493. PubMed PMID: 36127158.
16. Letzner RD. Death anxiety in connection to anxiety and depressive disorders: A meta-analysis on emotional distress in clinical and community samples. Death studies. 2024;48(4):393-406. Epub 2023/07/07. doi: 10.1080/07481187.2023.2230556. PubMed PMID: 37416947.
17. Menzies RE, McMullen K, Riotto GD, Iliescu S, Petrovic B, Remfrey M. From dread to disorder: A meta-analysis of the impact of death anxiety on mental illness symptoms. Clinical psychology review. 2024;113:102490. Epub 2024/08/31. doi: 10.1016/j.cpr.2024.102490. PubMed PMID: 39208495.
18. Yan Y, Chen Y, Ou M, Gong Y, Yang R, Liu X, et al. The mediating role of meaning in life between experiential avoidance and death anxiety among cancer patients: a cross-sectional study. BMC cancer. 2024;24(1):663. Epub 2024/06/01. doi: 10.1186/s12885-024-12433-0. PubMed PMID: 38822257; PubMed Central PMCID: PMCPMC11141075.
19. Benites AC, Arantes de Oliveira-Cardoso É, Dos Santos MA. Spirituality in Brazilian family caregivers of patients with cancer from the end-of-life care to bereavement. Death studies. 2023;47(3):249-58. Epub 2022/03/19. doi: 10.1080/07481187.2022.2051095. PubMed PMID: 35300583.
20. Frankl VE. Logotherapy and existential analysis--a review. Am J Psychother. 1966;20(2):252-60. doi: 10.1176/appi.psychotherapy.1966.20.2.252. PubMed PMID: 5327827.
21. Chua JYX, Shorey S. Effectiveness of end-of-life educational interventions at improving nurses and nursing students' attitude toward death and care of dying patients: A systematic review and meta-analysis. Nurse education today. 2021;101:104892. Epub 2021/04/19. doi: 10.1016/j.nedt.2021.104892. PubMed PMID: 33866077.
22. Almeida M, Ramos C, Maciel L, Basto-Pereira M, Leal I. Meaning in life, meaning-making and posttraumatic growth in cancer patients: Systematic review and meta-analysis. Frontiers in psychology. 2022;13:995981. Epub 2022/12/27. doi: 10.3389/fpsyg.2022.995981. PubMed PMID: 36570997; PubMed Central PMCID: PMCPMC9784472.
23. Zhang JM, Zhang MR, Yang CH, Li Y. The meaning of life according to patients with advanced lung cancer: a qualitative study. International journal of qualitative studies on health and well-being. 2022;17(1):2028348. Epub 2022/02/02. doi: 10.1080/17482631.2022.2028348. PubMed PMID: 35103558; PubMed Central PMCID: PMCPMC8925916.
24. Levine GN, Cohen BE, Commodore-Mensah Y, Fleury J, Huffman JC, Khalid U, et al. Psychological Health, Well-Being, and the Mind-Heart-Body Connection: A Scientific Statement From the American Heart Association. Circulation. 2021;143(10):e763-e83. Epub 2021/01/26. doi: 10.1161/cir.0000000000000947. PubMed PMID: 33486973.
25. Krok D, Telka E. Meaning in life in cancer patients: relationships with illness perception and global meaning changes. Health Psychology Report. 2018;6(2):171-82.
26. Zhou JJ, Zhang Y, Ren QZ, Li T, Lin GD, Liao MY, et al. Mediating effects of meaning in life on the relationship between family care, depression, and quality of life in Chinese older adults. Frontiers in public health. 2023;11:1079593. Epub 2023/04/20. doi: 10.3389/fpubh.2023.1079593. PubMed PMID: 37077192; PubMed Central PMCID: PMCPMC10106746.
27. Guo Z, Yang T, He Y, Tian W, Wang C, Zhang Y, et al. The Relationships Between Suicidal Ideation, Meaning in Life, and Affect: a Network Analysis. International journal of mental health and addiction. 2023;1-20. Epub 2023/02/14. doi: 10.1007/s11469-023-01019-9. PubMed PMID: 36776916; PubMed Central PMCID: PMCPMC9904259.
28. Reed DE, Williamson RE, Wickham RE. Memento Mori: understanding existential anxiety through the existential pathway model. Journal of Theoretical Social Psychology. 2021;5(1):14-25.
29. Taylor S, Egeto-Szabo KJJoTP. Exploring awakening experiences: A study of awakening experiences in terms of their triggers, characteristics, duration and after-effects. 2017;49(1):45-65.
30. Gui G, Yang D, Liu Y, Yao Y, Xie X, Liu R, et al. How family support alleviates death anxiety in breast cancer patients: the mediating role of meaning in life. Frontiers in public health. 2025;13:1567485. Epub 2025/04/16. doi: 10.3389/

- fpubh.2025.1567485. PubMed PMID: 40236320; PubMed Central PMCID: PMCPMC11996639.
31. Zarzeczna N, Preston LJJPoR, Spirituality. Meaning in science as a response to existential threat. 2025. doi: 10.1037/rel0000552
32. Neimeyer RAJDs. Meaning reconstruction in bereavement: Development of a research program. 2019;43(2):79-91. doi: 10.1080/07481187.2018.1456620.
33. Aftab A, Lee EE, Klaus F, Daly R, Wu TC, Tu X, et al. Meaning in Life and Its Relationship With Physical, Mental, and Cognitive Functioning: A Study of 1,042 Community-Dwelling Adults Across the Lifespan. *The Journal of clinical psychiatry*. 2019;81(1). Epub 2019/12/18. doi: 10.4088/JCP.19m13064. PubMed PMID: 31846240; PubMed Central PMCID: PMCPMC7138140.
34. Chems-Maarif R, Cavanagh K, Baer R, Gu J, Strauss CJM. Defining Mindfulness: A Review of Existing Definitions and Suggested Refinements. 2025:1-20. doi: 10.1007/s12671-024-02507-2.
35. Dreyfus G. Is mindfulness present-centred and non-judgmental? A discussion of the cognitive dimensions of mindfulness. *Mindfulness*: Routledge; 2013. p. 41-54.
36. Rouleau CR, Garland SN, Carlson LE. The impact of mindfulness-based interventions on symptom burden, positive psychological outcomes, and biomarkers in cancer patients. *Cancer management and research*. 2015;7:121-31. Epub 2015/06/13. doi: 10.2147/cmar.S64165. PubMed PMID: 26064068; PubMed Central PMCID: PMCPMC4457221.
37. Cillessen L, Johannsen M, Speckens AEM, Zachariae R. Mindfulness-based interventions for psychological and physical health outcomes in cancer patients and survivors: A systematic review and meta-analysis of randomized controlled trials. *Psycho-oncology*. 2019;28(12):2257-69. Epub 2019/08/30. doi: 10.1002/pon.5214. PubMed PMID: 31464026; PubMed Central PMCID: PMCPMC6916350.
38. Rahrig H, Vago DR, Passarelli MA, Auten A, Lynn NA, Brown KW. Meta-analytic evidence that mindfulness training alters resting state default mode network connectivity. *Scientific reports*. 2022;12(1):12260. Epub 2022/07/20. doi: 10.1038/s41598-022-15195-6. PubMed PMID: 35851275; PubMed Central PMCID: PMCPMC9293892.
39. Wheeler MS, Arnkoff DB, Glass CR. The neuroscience of mindfulness: How mindfulness alters the brain and facilitates emotion regulation. *Mindfulness*. 2017;8:1471-87.
40. Marchand WR. Mindfulness-based stress reduction, mindfulness-based cognitive therapy, and Zen meditation for depression, anxiety, pain, and psychological distress. *Journal of psychiatric practice*. 2012;18(4):233-52. Epub 2012/07/19. doi: 10.1097/01.pra.0000416014.53215.86. PubMed PMID: 22805898.
41. Askarizadeh G, Poormirzaei M, Bagheri M. Mindfulness facets and death anxiety: The role of cognitive flexibility components. *Psychological Studies*. 2022;67(2):208-17.
42. Stella M. Befriending death: A mindfulness-based approach to cultivating self-awareness in counselling students. *Death studies*. 2016;40(1):32-9. Epub 2015/06/16. doi: 10.1080/07481187.2015.1056566. PubMed PMID: 26073406.
43. Anālayo B, Medvedev ON, Singh NN, Dhaussy MR. Effects of Mindful Practices on Terror of Mortality: A Randomized Controlled Trial. *Mindfulness*. 2022;13(12):3043-57. Epub 2022/09/13. doi: 10.1007/s12671-022-01967-8. PubMed PMID: 36089935; PubMed Central PMCID: PMCPMC9441318.
44. Trivate T, Dennis AA, Sholl S, Wilkinson T. Learning and coping through reflection: exploring patient death experiences of medical students. *BMC medical education*. 2019;19(1):451. Epub 2019/12/06. doi: 10.1186/s12909-019-1871-9. PubMed PMID: 31801494; PubMed Central PMCID: PMCPMC6894273.
45. Langs RJPP. Death Anxiety and the Emotion-Processing Mind. 2004;21(1):31. doi: 10.1037/0736-9735.21.1.31.
46. Karlsson M, Kasén A, Wärnå-Furu CJP, care s. Reflecting on one's own death: The existential questions that nurses face during end-of-life care. 2017;15(2):158-67. doi: 10.1017/S1478951516000468.
47. Steinhauer KE, Christakis NA, Clipp EC, McNeilly M, McIntyre L, Tulsy JAJJ. Factors considered important at the end of life by patients, family, physicians, and other care providers. 2000;284(19):2476-82. doi: 10.1001/jama.284.19.2476.
48. Guerrero-Torrelles M, Monforte-Royo C, Rodríguez-Prat A, Porta-Sales J, Balaguer A. Understanding meaning in life interventions in patients with advanced disease: A systematic review and realist synthesis. *Palliative medicine*. 2017;31(9):798-813. Epub 2017/05/13. doi: 10.1177/0269216316685235. PubMed PMID: 28498025.
49. Wright ST, Breier JM, Depner RM, Grant PC, Lodi-Smith JJCPQ. Wisdom at the end of life: Hospice patients' reflections on the meaning of life and death. 2018;31(2):162-85. doi: 10.1080/09515070.2016.1274253.
50. Landmark BT, Strandmark M, Wahl AK. Living with newly diagnosed breast cancer--the meaning of existential issues.

- A qualitative study of 10 women with newly diagnosed breast cancer, based on grounded theory. *Cancer nursing*. 2001;24(3):220-6. Epub 2001/06/21. PubMed PMID: 11409066.
51. Vaughn LA, Burkins PG, Chalachan RD, Judd JK, Garvey CA, Luginsland JW. Feeling Socially Connected and Focusing on Growth: Relationships With Wellbeing During a Major Holiday in the COVID-19 Pandemic. *Frontiers in psychology*. 2021;12:710491. Epub 2021/10/12. doi: 10.3389/fpsyg.2021.710491. PubMed PMID: 34630218; PubMed Central PMCID: PMC8496488.
52. Ryan RM, Deci EL. Overview of self-determination theory: An organismic dialectical perspective. *Handbook of self-determination research*. 2002;2(3-33):36.
53. Milyavskaya M, Koestner RJP, differences i. Psychological needs, motivation, and well-being: A test of self-determination theory across multiple domains. 2011;50(3):387-91. doi: 10.1016/j.paid.2010.10.029.
54. Patrick H, Knee CR, Canevello A, Lonsbary CJJop, psychology s. The role of need fulfillment in relationship functioning and well-being: a self-determination theory perspective. 2007;92(3):434. doi: 10.1016/j.paid.2010.10.029.
55. Wojtkowiak J, Geusendam E, van Dijk R, Smid GE. Perspectives on dying in severe and enduring eating disorders (SEEDs): A qualitative study among Dutch mental healthcare providers. *Death studies*. 2024;48(1):43-53. Epub 2023/03/18. doi: 10.1080/07481187.2023.2186534. PubMed PMID: 36930988.
56. Houska A, Loučka M. Patients' Autonomy at the End of Life: A Critical Review. *Journal of pain and symptom management*. 2019;57(4):835-45. Epub 2019/01/07. doi: 10.1016/j.jpainsymman.2018.12.339. PubMed PMID: 30611709.
57. Kostanski M, Hassed CJAP. Mindfulness as a concept and a process. 2008;43(1):15-21. doi: 10.1080/00050060701593942.
58. Shao R, He L, Chang CH, Wang M, Baker N, Pan J, et al. Employees' reactions toward COVID-19 information exposure: Insights from terror management theory and generativity theory. *The Journal of applied psychology*. 2021;106(11):1601-14. Epub 2021/12/07. doi: 10.1037/apl0000983. PubMed PMID: 34871021.
59. Zhang J, Xie C, Li W, Huang SSJTM. Does mortality salience produce positive effects on hotel employee behaviors? A temporal distance perspective. 2025;110:105193. doi: 10.1016/j.tourman.2025.105193.
60. Wang K, Sun Z, Hou Y, Yuan M. Coping with mortality salience: the role of connection thinking and afterlife beliefs in Chinese context. *Frontiers in psychology*. 2023;14:1190906. Epub 2023/12/11. doi: 10.3389/fpsyg.2023.1190906. PubMed PMID: 38078250; PubMed Central PMCID: PMC8496488.
61. Xie Q, Yan Y, Lai J, Wei M. Mortality salience and helping behavior amidst public crisis: cross-sectional evidence during COVID-19. *Frontiers in public health*. 2024;12:1455818. Epub 2024/10/24. doi: 10.3389/fpubh.2024.1455818. PubMed PMID: 39444972; PubMed Central PMCID: PMC8496488.
62. Lau MA, Bishop SR, Segal ZV, Buis T, Anderson ND, Carlson L, et al. The Toronto mindfulness scale: Development and validation. 2006;62(12):1445-67. doi: 10.1002/jclp.20326.
63. Deng Y-Q, Liu X-H, Rodriguez MA, Xia C-YJM. The five facet mindfulness questionnaire: psychometric properties of the Chinese version. 2011;2:123-8.
64. Wang H, Dai Z, Jing S, Wang H, Xiao W, Huang Y, et al. Psychometric properties of the Short-Form Five Facets of Mindfulness Questionnaire among nursing students in China: A confirmatory factor analysis. *Nursing open*. 2024;11(7):e2246. Epub 2024/07/23. doi: 10.1002/nop2.2246. PubMed PMID: 39039901; PubMed Central PMCID: PMC8496488.
65. You C, Liu Y. The effect of mindfulness on online self-presentation, pressure, and addiction on social media. *Frontiers in psychology*. 2022;13:1034495. Epub 2022/12/23. doi: 10.3389/fpsyg.2022.1034495. PubMed PMID: 36544442; PubMed Central PMCID: PMC8496488.
66. Yuan Z, Baranik LE, Sinclair RR, Sliter MT, Rand KL, Salyers MPJJoOB. Memento Mori: The development and validation of the Death Reflection Scale. 2019;40(4):417-33. doi: 10.1002/job.2339.
67. Chang B, Cheng J, Fang J, Lyu ZJFiP. Mortality salience and helping intentions: mediating role of search for meaning and moderating role of negotiable fate. 2025;16:1507212. doi: 10.3389/fpsyg.2025.1507212.
68. Steger MF, Frazier P, Oishi S, Kaler MJJocp. The meaning in life questionnaire: assessing the presence of and search for meaning in life. 2006;53(1):80.
69. Chan WC. Factor structure of the Chinese version of the Meaning in Life Questionnaire among Hong Kong Chinese caregivers. *Health & social work*. 2014;39(3):135-43. Epub 2014/08/07. doi: 10.1093/hsw/hlu025. PubMed PMID: 25095626.
70. Chao M, Chen X, Liu T, Yang H, Hall BJ. Psychological distress and state boredom during the COVID-19 outbreak in China:

- the role of meaning in life and media use. *European journal of psychotraumatology*. 2020;11(1):1769379. Epub 2020/10/09. doi: 10.1080/20008198.2020.1769379. PubMed PMID: 33029315; PubMed Central PMCID: PMC7473057.
71. Lin L, Chan HW. The Associations Between Happiness Motives and Well-Being in China: The Mediating Role of Psychological Need Satisfaction and Frustration. *Frontiers in psychology*. 2020;11:2198. Epub 2020/10/06. doi: 10.3389/fpsyg.2020.02198. PubMed PMID: 33013570; PubMed Central PMCID: PMC7495498.
 72. Rosenman R, Tennekoon V, Hill LGJJ, Research H. Measuring bias in self-reported data. 2011;2(4):320-32. doi: 10.1504/IJBHR.2011.043414.
 73. Grassi L, Sabato S, Caruso R, Tiberto E, De Padova S, Ruffilli F, et al. Reflecting on meaning in an existential-reorientation group psychotherapy approach for cancer patients: a qualitative thematic analysis. 2022;20(3):313-20. doi: 10.1017/S1478951521000936.
 74. Sköld ABJM. Being-towards-grief: rethinking death awareness. 2021;26(3):284-98. doi: 10.1080/13576275.2020.1779203.
 75. Hiltrop KS. The role of job changes in sustainable return to work for breast cancer survivors—patterns of interpretation and coping strategies: Universitäts-und Landesbibliothek Bonn; 2022.
 76. Ukpo SD, Imohiosen CE, Owot JA, Ajuluchukwu PJJ, Evaluation G. The impact of religious and spiritual counseling on mental health outcomes in geriatric care. 2024;5(6):1538-47. doi: 10.54660/IJMRGE.2024.5.5.1538-1547.
 77. Sehgal R, Kaur AJSS-AIMMJ. Role of mindfulness and stress management in enhancing life skills for sustainable living. 2024;2(01):44-53. doi: 10.59231/SARI7704.
 78. Purser R. The myth of the present moment. *Mindfulness*. 2015;6(3):680-6.
 79. Iannopollo L, Cristaldi G, Borgese C, Sommacal S, Silvestri G, Serpentine SJBS. Mindfulness meditation as psychosocial support in the breast cancer experience: a case report. 2022;12(7):216. doi: 10.3390/bs12070216.
 80. Kabat-Zinn J. *Coming to our senses: Healing ourselves and the world through mindfulness*: Hachette UK; 2005.
 81. Liu W, Liu J, Ma L, Chen J. Effect of mindfulness yoga on anxiety and depression in early breast cancer patients received adjuvant chemotherapy: a randomized clinical trial. *Journal of cancer research and clinical oncology*. 2022;148(9):2549-60.
 82. Phan HP, Ngu BH, Chen S-C, Hsu C-S. Using life and death education to guide the teaching and research of mindfulness. *Frontiers in Public Health*. 2025;13:1576500.
 83. Wong PT. *Meaning management theory and death acceptance. Existential and spiritual issues in death attitudes*: Psychology Press; 2007. p. 91-114.