



Death anxiety among advanced cancer patients: a cross-sectional survey

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Abstract

Purpose This study aimed to investigate death anxiety in advanced cancer patients and identify associated factors in the context of Chinese culture.

Methods Participants ($N=270$) with advanced cancer in a tertiary cancer hospital completed anonymous questionnaire surveys. Measures included the Chinese version of a Likert-type Templer-Death Anxiety Scale, Rosenberg's Self-esteem Scale, Medical Coping Modes Questionnaire, the Social Support Rating Scale, and Connor-Davidson Resilience Scale. Data were analyzed in SPSS using descriptive statistics, Student's t test, Pearson correlation test, and linear regression.

Results Respondents returned 252 (93.33%) of the 270 questionnaires. The total CL-TDAS score was 39.56 ± 10.20 . The top three items were "I fear dying a painful death" (3.59 ± 1.41), "I often think about how shortly life really is" (3.11 ± 1.33), and "I am not particularly afraid of getting cancer" (3.09 ± 1.35). Associated factors of death anxiety ($R^2 = .333$, $F = 15.756$, $p < .001$) were the medical coping mode (resignation, confrontation), self-esteem, the participants' adult children, the patient-primary caregivers' relationship, resilience, and the level of activity of daily living.

Conclusions Our results demonstrate high levels of death anxiety in advanced cancer patients. Generally, patients with adult children, high self-esteem and resilience had low death anxiety. Conversely, patients with low levels of activity of daily living and high coping mode (resignation, confrontation) reported high death anxiety. We determined that associated factors contributed to reduce death anxiety. Social interventions are recommended to improve the end-of-life transition for patients and caregivers.

Keywords Death anxiety · Thanatophobia · Attitude to death · Self-esteem · Coping mode · Resilience

Background

In 2020, almost 10.0 million people worldwide were estimated to die of cancer, and 3.003 million of them occurred in China [1, 2]. Awareness of the inevitable reality of death and its conflict with the strong desire for survival can arouse severe fear in a person [3]. Specifically, cancer patients are at high risk of death anxiety facing all kinds of challenges [4]. People with advanced cancer are close to death and 32% of them reported death anxiety [5].

Death anxiety is an individual's extreme fear of death and the anxiety and feelings they experience when thinking about dying or posthumous events [6]. It is a common phenomenon and natural, normal experience [7]. Moderate death anxiety is necessary to encourage engagement in positive activities and arouse individual's meaning of life. However, an abnormally high level of death anxiety may lead to maladaptation, anxiety, and other psychological disorders

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[8], engender avoidance [9], and stifle communication on end-of-life care [10], and medical decision making [11].

Terror management theory (TMT) is the leading and most influential theoretical approach to death anxiety. Cultural worldviews and self-esteem serve as an important anxiety buffer to manage (or “tranquillise”) fear of death [12]. When one’s worldview and self-awareness is threatened, people are likely to experience anxiety and defend against threats in an attempt to maintain their psychological structure, self-esteem, and faith [13]. There are cultural worldviews differences in the formation of death anxiety. Death is a taboo among Chinese people. Avoidance of discussing death among Chinese people is evident in the Confucian concept of “highlighting birth and avoiding death” [14]. It has added the mystery of death and increased people’s death anxiety [3]. In support of TMT several studies have shown that when self-esteem is increased or is dispositionally high, and defensiveness in response to the threat of receiving painful electric shocks or viewing graphic images of death [5, 15], while some others did not approve the result [16]. Some scholars who supplemented TMT proposed a new defense mechanism: the pursuit and investment of close interpersonal relationships can buffer death anxiety [17, 18]. Social support is a good interpersonal relationship. It might interact with stressful events or conditions to reduce the effect of stress by contributing to people’s sense of belonging to the social environment, improving their sense of confidence and self-image as well as their belief in their ability to cope with difficulties [19, 20]. Accordingly, social support may reduce or prevent the emergence of psychological distress and some studies have found its alleviating effect on death anxiety [21, 22]. To clarify the effect of self-esteem and social support on cancer patients’ death anxiety can also help medical staff deal with this issue better.

In addition, coping mode is considered an active effort involving a series of cognitive and behavioral strategies to manage, reduce, or demands generated by stress. In contrast to defensive systems, coping methods usually entail a deliberate and direct approach to difficulties [23]. Resilience is the ability to maintain or rapidly regain mental health during or after stressful life experiences [24]. A study of Spanish student nurses showed that resilience was one of the key emotional competences for managing anxiety around death and dying [25]. Some previous studies among cancer patients have found that resilience plays a mediating role to regulate mental states and social support [26, 27]. Therefore, studies on the association among coping mode, resilience, and death anxiety are actually needed.

With the development of hospice and palliative care during the past few decades in China, death anxiety is getting more and more attention. But studies on death anxiety in China are few. This quantitative study was to describe the status of death anxiety among Chinese patients with

advanced cancer and explore factors associated with death anxiety, so as to alleviate further distress among Chinese patients with advanced cancer.

Methods

Participants and procedures

This is a cross-sectional study of a convenience sample of patients with advanced cancer in a tertiary cancer hospital in Beijing, China conducted from June to August 2020. The inclusion criteria were as follows: (1) age ≥ 18 years, (2) a stage III/IV cancer diagnosis through pathological examination, (3) ability to communicate normally and understand the investigation content, and (4) voluntary participation. Patients who were taking antipsychotic drugs and/or had other serious life-threatening diseases were excluded.

A priori power test was performed using GPower3.1 [28]. A linear multiple regression test was used, with $\alpha = 0.05$, two tails; an effect size of $d = 0.15$; and a power ($1 - \beta$) of 0.99 to compute the required sample size, which was $n = 125$. Seventeen (17) of the 270 questionnaires were excluded because they had over 30% missing data. The remaining 252 responses were analyzed (effective response rate 93.3%).

Measurements

Sociodemographic and disease-specific characteristics included: (1) individual factors—gender, age, education status, marital status, working status, religious belief, family monthly income, medical insurance, and experience of losing a loved relative/friend; (2) interpersonal factors—primary caregiver of patients, the number of children, and adult children; and (3) disease-specific factors—cancer diagnosis, stage of cancer, understanding the disease, treatment methods, activity of daily living (ADL), and cancer pain. Understanding the disease was defined as “awareness of knowledge of cancer and status of their own condition,” ranging from “not at all” to “fully understand.” ADL was measured by the Barthel index [29], which included 10 items (i.e., self-feeding, self-bathing, grooming, getting dressed) Accordingly, a higher score means a better level of ADL.

Death anxiety

Templer’s Death Anxiety Scale was used to measure the level of death anxiety, including a total of 15 items [30]. The scale has been translated into multiple languages with high reliability and validity. Factor analysis in different studies found three to five factors for DAS and identified it as a multidimensional scale [31]. In 2010, we developed a Chinese cross-cultural adaptation of the T-DAS into the

CT-DAS with good reliability and validity. The CT-DAS was originally a 15-item scale with a true/false format. In 2012, we evaluated and validated the performance of the 5-point Likert-type CT-DAS (CL-TDAS) on cancer patients [32]. The minimum score on the DAS indicates that the individual was not afraid of death. Our results showed reliable performance and confirmed it as a promising instrument to evaluate death anxiety among cancer patients. The internal consistency of the instrument was $\alpha = 0.824$.

Self-esteem

The Rosenberg's Self-esteem Scale (RSES) [33] was used to measure patients' global self-esteem, overall feelings of self-worth and acceptance [34]. The questionnaire consisted of 10 items: 6 items assessed positive self-esteem, e.g., "In general, I am satisfied with myself"; 4 items assessed self-deprecation, e.g., "I am inclined to take myself as a failure." The items were rated on a 4-point Likert scale from 1 (not at all true) to 4 (very true). The total score was the sum of item responses and ranged from 10 to 40; higher scores represented higher self-esteem. The overall scale had good internal reliability (Cronbach's $\alpha = 0.833$).

Coping mode

The Medical Coping Modes Questionnaire (MCMQ) [35] is a valuable tool widely used in China to measure coping mode. It contains three subscales and 20 questions. MCMQ scales were ranked from 1 to 4 assessment levels. Eight questions scored reversely. The three coping mode subscales of "confrontation," "avoidance," and "resignation" were used to evaluate three corresponding strategies in patients. The individual subscales had good internal reliability (Cronbach's $\alpha = 0.69, 0.60, \text{ and } 0.76$).

Social support

SY Xiao's [36] Social Support Rating Scale (SSRS) was used to measure the level of social support. The scale contains 10 questions divided into three dimensions: subjective support (questions 1, 3–5), objective support (questions 2, 6–7), and utilization of support (questions 8–10). The total score of the three dimensions ranged from 12 to 66; higher scores indicated higher levels of social support. The total scale was reliable (Cronbach's $\alpha = 0.680$).

Resilience

KM Connor and JR Davidson developed the original Connor-Davidson Resilience Scale (CD-RISC) in 2003. It is a 25-item scale that assesses resilience within 1 month, and higher scores indicate higher resilience capacity. Each item

is rated on a 5-point range of responses from 0 (not true at all) to 4 (true nearly all the time). The total score ranges from 0 to 100. A preliminary study of its psychometric properties in the general population and patient samples showed adequate internal consistency, test-retest reliability, and convergent and divergent validity [37]. Yu Xiaonan developed the Chinese version of the CD-RISC [38]. The internal consistency of this version was 0.91, and it showed a three-factor structure of tenacity, self-improvement, and optimism in the Chinese population [38].

Statistical analysis

SPSS software v.20.0 was used for data input and statistical analyses. Patient characteristics were summarized using descriptive statistics. The total scores of CL-TDAS were tested by normality plots with tests; the scores belonged to normal distribution data. Pearson correlation, the chi-squared, independent-sample *t* test, one-way ANOVA test, and Tukey HSD test were used to explore factors associated with death anxiety. Multiple regression analyses were then performed. The dependent variable was death anxiety, and the stepwise variable selection method was adopted. Significance was accepted as $p < 0.05$.

Ethical considerations

The Institutional Biomedical Ethics Committee reviewed and approved the study protocol (Nr.2020KT19). Investigators provided detailed explanations about the aims and procedures of the study and then obtained informed consent from all participants prior to study participation.

Results

Participants' characteristics

Participants' sociodemographic and disease-specific characteristics are presented in Table 1.

Death anxiety level

The CL-TDAS score was 39.56 ± 10.20 . All 15 items were arranged in descending order by score. The top three items were "I fear dying a painful death" (3.59 ± 1.41), "I often think about how short life is" (3.11 ± 1.33), and "I am not particularly afraid of getting cancer" (3.09 ± 1.35) (Table 2).

Factors related to death anxiety

We analyzed the relationships between death anxiety and each variable (Table 3). Death anxiety was negatively

correlated with self-esteem ($r = -0.396$, $p < 0.01$) and resilience ($r = -0.380$, $p < 0.01$) and positively correlated with resignation ($r = 0.426$, $p < 0.01$).

Factors associated with death anxiety were age, primary caregivers, adult children, treatment methods (targeted therapy, supportive therapy), and ADL from

Table 1 Study Participants Characteristics ($N = 252$)

		<i>n</i> (%)	Mean	<i>SD</i>	<i>p</i>
Patient individual factors					
Age		27–83(range)	52.47	13.51	0.012*
Gender	Female	94(37.3)	40.65	10.42	0.194
	Male	158(62.7)	38.92	10.04	
Education status($n = 250$)	Primary school	16(6.3)	37.00	10.39	0.750
	Secondary school	51(20.2)	38.91	10.69	
	High school	116(46.0)	39.98	9.81	
	University	67(26.6)	39.64	10.35	
Marital status	Unmarried	18(7.1)	41.67	8.60	0.110
	Married	221(87.7)	39.71	10.14	
	Widowed/ divorced	13(5.2)	34.20	12.20	
Working status	Employed	85(33.7)	41.21	10.05	0.100
	Retired	104(41.3)	38.03	9.86	
	Unemployed	63(25.0)	39.87	10.73	
Religious belief	No	238(94.4)	39.55	10.06	0.966
	Yes	14(5.6)	39.71	12.76	
Monthly income (\$)($n = 250$)	< 464.00*	58(23.0)	39.12	10.04	0.585
	464.01–928.00	80(31.7)	38.63	10.04	
	928.01–1546.67	52(20.6)	40.84	10.49	
	> 1546.67	60(23.8)	40.33	10.23	
Medical insurances	Yes	236(93.7)		0.253	0.800
	No	16(6.3)			
Experience of losing loved relative/ friend($n = 249$)	No	149(59.1)	38.88	10.87	0.176
	Yes	100(39.7)	40.68	9.18	
Interpersonal factors					
Patient-primary caregivers relationship	Relatives	240(95.2)	39.89	10.11	0.025*
	Unrelated person	12(4.8)	33.13	10.37	
Number of children	Zero	26(10.3)	41.24	7.91	0.054
	1–2	215(85.3)	39.72	10.49	
	≥ 3	11(4.4)	32.64	6.22	
Adult children ($n = 229$)	Yes	172(68.3)	38.26	10.34	0.008**
	No	57(22.6)	42.48	9.90	
Disease-related factors					
Cancer diagnosis	Respiratory system	86(34.1)	37.63	9.59	0.441
	Digestive system	68(27.0)	40.56	9.86	
	Lymphoma	30(11.9)	41.39	9.65	
	Breast	25(9.9)	40.94	11.55	
	Bone and soft tissue	12(4.8)	40.71	9.44	
	Genital system	12(4.8)	37.70	12.98	
	Others	19(7.5)	40.53	11.68	
Stage of cancer	III	69(27.4)	39.74	10.73	0.457
	IV	183(72.6)	39.50	10.02	
Understanding the disease ($n = 251$)	Not at all	9(3.6)	44.99	6.00	0.089
	Partly understand	81(32.1)	40.64	10.67	
	Fully understand	161(63.9)	38.62	10.00	

Table 1 (continued)

		n(%)	Mean	SD	p
Treatment methods (multiple-choice)	Radiotherapy	60(23.8)	38.34	9.73	0.289
	Chemotherapy	210(83.3)	39.07	10.31	0.085
	Surgical treatment	56(22.2)	40.48	11.15	0.448
	Targeted therapy	56(22.2)	37.15	10.18	0.045*
	Immunotherapy	69(27.4)	40.01	8.96	0.670
Activity of daily living	Supportive therapy	4(1.6)	50.12	10.16	0.037*
	Independence	171(67.8)	38.37	9.90	0.015*
	Mild dependence	60(23.8)	41.07	9.86	
	Moderate dependence	14(5.6)	46.46	7.69	
	Severe dependence	4(1.6)	46.50	16.94	
Cancer pain	Dependence	3(1.2)	36.00	20.42	
	No	167(66.3)	39.10	10.28	0.312
If Yes	Yes	85(33.7)	40.48	10.04	
	Use analgesic	42(16.7)	39.85	11.01	0.759
	No use analgesic	43(17.1)	40.53	0.01	

* $p < .05$, ** $p < .01$ *** $\$1 = ¥ 6.4678$ (Jul 1, 2021)

bivariate analyses, which showed statistical significance (see Table 1). Variables of self-esteem, medical coping mode, and reliance were related to death anxiety ($p < 0.05$) (Table 3). The results from the stepwise multiple regression analysis showed that the medical coping mode (resignation, conformance), self-esteem, adult children, primary caregiver, resilience, and ADL were associated with death anxiety ($R^2 = 0.333$, $F = 15.756$, $p < 0.001$; Table 4).

Discussion

Death anxiety among Chinese patients with advanced cancer

This study showed that all Chinese patients with advanced cancer experienced some degree of death

Table 2 Scores for CL-TDAS (N=252)

Items	Min	Max	Mean	SD
I fear dying a painful death	1.0	5.0	3.59	1.41
I often think about how short life is	1.0	5.0	3.11	1.33
I am not particularly afraid of getting cancer	1.0	5.0	3.09	1.35
I am not at all afraid of death	1.0	5.0	2.96	1.38
The thought of death never bothers me	1.0	5.0	2.70	1.33
*I dread to think about having to receive treatment for cancer	1.0	5.0	2.69	1.26
The subject of life after death troubles me greatly	1.0	5.0	2.61	1.17
I am very much afraid to die	1.0	5.0	2.54	1.27
I am often distressed by the way time flies so very rapidly	1.0	5.0	2.52	1.24
I feel that the further holds nothing for me to fear	1.0	5.0	2.50	1.29
The thought of death seldom enters my minds	1.0	5.0	2.47	1.26
I am really scared of having a heart attack	1.0	5.0	2.41	1.25
The sight of a dead body is horrifying to me	1.0	5.0	2.38	1.27
It doesn't make me nervous when people talk about death	1.0	5.0	2.35	1.24
I shudder when I hear people talking about a World War III	1.0	5.0	1.67	0.84
Total	15.0	64.0	39.56	10.20

*Item 4 “I dread to think about having to have an operation” changed to “I dread to think about having to receive treatment for cancer” after review by the Institutional Biomedical Ethics Committee

Table 3 Descriptive Statistics and Inter-correlations of all Variables

	Mean	SD	r	p
Self-esteem	31.68	3.98	-0.396**	0.000
Medical Coping Mode				
Confronce	18.83	3.60	0.103	0.104
Avoidance	15.60	2.93	0.025	0.690
Resignation	8.90	2.65	0.426**	0.000
Social Support	42.02	8.34	-0.023	0.721
Subjective support	25.03	5.41	0.009	0.889
Objective support	10.14	3.53	-0.067	0.291
Utilization of support	6.85	1.91	0.000	0.997
Resilience	12.65	5.15	-0.380**	0.000
Tenacity	36.37	7.72	-0.277**	0.000
Self-improvement	24.38	4.68	-0.439**	0.000
Optimism	10.44	2.89	-0.329**	0.000

** $p < 0.01$

anxiety. This result is similar to those reported by Vehling S [39] and Nazari F [40] among cancer patients. Patients with advanced cancer need to be optimistic to avert thanatophobia [41]. In China, patients often enter the advanced stage as soon as they are diagnosed with cancer. As a result, patients and their families are forced to face death almost immediately. The first three items in descending order were “I fear dying a painful death,” “I often think about how shortly life really is,” and “I am not particularly afraid of getting cancer,” which reflected patients’ genuine feelings. Patients suffer a tremendous amount of discomfort from cancer, its treatments and the side effects of treatment. Kyota and Kanda suggested that healthcare professionals, including nurses, had a responsibility to understand this suffering and its effect on their patients’ lives [42] to reduce the distress of facing death.

Table 4 Multiple Regression Analysis

Variable	Partial Regression Coefficient	Standard error	Standardized regression coefficient	t	p
Constant	50.084	8.048	–	6.223	0.000***
Medical coping mode(resignation)	1.068	0.238	0.273	4.485	0.000***
Self- esteem	-0.574	0.171	-0.220	-3.349	0.001***
Medical coping mode(confronce)	0.465	0.158	0.164	2.936	0.004**
Adult children	-3.402	1.328	-0.142	-2.561	0.011*
Primary caregivers	6.577	2.680	0.136	2.454	0.015*
Resilience	-0.108	0.051	-0.142	-2.119	0.035*
Level of self-dependence	-1.484	0.723	-0.114	-2.053	0.041*

* $p < .05$, ** $p < .01$, *** $p < .001$

Factors related to death anxiety among Chinese advanced cancer patients

Coping mode

Our findings indicated that both resignation and confronce were related to death anxiety. Coping is a complex, multidimensional attitudinal, and behavioral process with diverse strategies. When patients face debilitating challenges related to cancer, they adopt different ways to deal with, discuss and understand the disease, and acquire information about it, and participate in the treatment process. Although persons’ performances differ, resignation or confronce are often strategic coping modes for death anxiety. Resignation coping mode is a passive process to hinder patients from becoming open to and acknowledge physical and emotional aspects of their current situation. A previous study pointed out that fear of death leads to some maladaptive coping behaviors [43]. The causal relationship between death anxiety and coping mode needs to be further studied.

Self-esteem

Our study showed a moderately significant negative correlation between self-esteem and death anxiety. Self-esteem is an anxiety-buffering function [44]. Researchers confirm that self-esteem is negatively correlated with death anxiety in healthy individuals and can alleviate death anxiety [45, 46]. Neel found that self-esteem was a protective factor against death anxiety among 60 cancer patients [5]. Therefore, it is helpful for patients with advanced cancer to find meaning in life by reminding them of things they did well in the past to recall their life journey and the joy it brought to relatives and friends. Encouraging patients to discuss their cancer-fighting experience and feelings with each other can be beneficial. These are all excellent ways to build confidence and self-esteem.

Resilience

The findings indicated that resilience was correlated with death anxiety; that is, patients with higher resilience reported lower death anxiety. Resilience is important for self-protection. Hoeltherhoff and Chung found that coping mechanisms allowed participants to develop resilience against the effects of death anxiety and minimize its negative impact on mental health [47]. Interventions to promote resilience should be available for cancer patients [24] to help them deal with their impending death.

Demographic and medical conditions

We found that death anxiety among patients with adult children was significantly lower than those with minor children, and the patients cared for by nonrelated caregivers had lower death anxiety (Table 1). They had a lower sense of burden on the family. During the current COVID-19 pandemic, self-care became more important. Patients had lower death anxiety for the same reason that they reduced the burden on their families by good self-care.

We also explored the influence of individual factors on patients' death anxiety. Age was negatively correlated with death anxiety; however, it was not a variable included in the multiple regression analysis. Religious belief has been frequently discussed in many death anxiety-related studies. It was reported that approximately 73.56% of China's population (i.e., more than a billion people) was irreligious [48]. Here, patients with irreligious beliefs accounted for 94.4%.

Support obtained from family members, siblings, friends, and health care professionals is an essential source of comfort for cancer patients, particularly support received from family or spouse helps in adaptation to bodily illness [49]. We did not find a relationship between death anxiety and social support, although this relationship has been previously reported among different cancer patients [50, 51].

Study limitations

The present study had several limitations. First, some patients declined to participate when they learned that the topic was about death anxiety. As these patients did not meet the inclusion criteria, we did not count how many people refused to. This sensitivity to death suggests an underestimation of death anxiety. Second, the CL-TDAS was a composite measure of death anxiety, but considering complete factor analysis for this version had not been done among Chinese cancer patients, only the total scores of the whole scale and items were analyzed in this study. Additionally, we used a quantitative technique, although a qualitative approach can better describe participants' inner experiences

of death anxiety more systematically and subjectively. Qualitative research would have also supplemented data support for any follow-up interventions. Finally, our sample size did not permit to analysis the difference in among patients with different cancer. Therefore, our results cannot provide targeted guidance to patients with specific cancer types. This is an area for further research.

Clinical implications

Our study revealed possible factors related to death anxiety among Chinese patients with advanced cancer. Our findings suggest that medical staff should pay attention to death anxiety. The analysis of influencing factors showed the need to improve the management of pain symptoms among patients to reduce their distress in the face of painful death. In addition, further correlational and regression studies aimed to examine in depth the predictive role of death anxiety on positive constructs such as meaning of life [52], coping mode, and quality of life [53] are recommended. Additionally, interventional studies on this topic should take into account specific cognitive and behavioral stimulation exercises (such as the Relaxation Response Resiliency Program, mindfulness-based intervention) [54–56] and spirituality support [57, 58] as the main strategies to help patients find their meaning in life and improve their self-esteem and resilience to better deal with impending death.

Conclusions

The current death anxiety of advanced cancer patients is melancholic and includes fear of dying a painful death, cancer diagnosis, and short life. Generally, patients with adult children, high self-esteem, and resilience had low death anxiety, while patients with low levels of ADL and high coping mode (e.g., resignation, conformance) reported high death anxiety. These new findings may be taken into consideration when formulating a plan for the management of death anxiety in patients with advanced cancer and thereby provide effective interventions for key populations.

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data analysis and data interpretation. Hong Yang wrote the manuscript. Yuhuan Lu approved the last version of the manuscript. All the authors read and approved the final manuscript.

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Data are available upon request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Declarations

Ethics approval This study was approved by the Ethics Committee of Peking University Cancer Hospital.

Informed consent Written informed consent was obtained.

Consent to participate Research assistants explained the study purpose, procedures, and participants' role in the study to all prospective participants before they started. Patients and family caregivers were informed that the autonomy to participate or withdraw in this study at any time was respected.

Conflict of interest The authors declare no competing interests.

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