Cancer information overload and death anxiety predict health anxiety

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Abstract. – **OBJECTIVE:** We aimed to investigate the relationship between health anxiety, cancer information overload and death anxiety in caregivers of inpatient cancer patients.

PATIENTS AND METHODS: A total of 92 inpatient cancer patients' caregivers were included the study. A sociodemographic information form, Arabic Scale of Death Anxiety (ASDA), Health Anxiety Scale (HAS), Cancer Information Overload Scale (CIO) were given to participants to respond.

RESULTS: Participants with high HAS scores were compared with those with low HAS scores; the rate of employed persons was less (n=16, 34.8% *vs.* n=30, 65.2%, *p*=0.006), income status was more likely to be very low/low (n=23, 50.0% *vs.* n=6, 13.0%, *p*<0.001) and research on cancer was more common (n=39, 84.8%, *p*<0.001). Median (IQR) CIO [24.0 (21.75-28.0) *vs.* 13.5 (11.0-18.25), *p*<0.001] and ASDA total [69.0 (62.0-77.0) *vs.* 41.0 (33.75-58.0), *p*<0.001] scores were higher in the group with high HAS score than in the group with low HAS score. Multivariate logistic regression analysis revealed that a moderate/high-income status [odds ratio (OR) 0.114, 0.013-0.986 95% confidence interval (CI), *p*=0.049], CIO score (OR 1.354, 1.106-1.658 95% CI, *p*=0.003) and ASDA total score (OR 1.079, 1.021-1.141 95% CI, *p*=0.007) were independent predictive factors for a high HAS score.

CONCLUSIONS: Death anxiety and CIO are crucial determinants of health anxiety. More research in multi-dimensional design is needed to obtain additional information about the relationship between death anxiety, CIO and health anxiety.

Key Words:
   Cancer patients' caregivers, Health anxiety, Cancer information overload, Death anxiety.

Introduction

The usual fears and uncertainties associated with a cancer diagnosis are often quite severe and include fear of death, pain, disability, and disruption of relationships[1]. It is essential to distinguish between reasonable fears for the patient and their relatives and more severe fears that may indicate the presence of an anxiety disorder and recommend appropriate interventions to relieve distress[1].

Health anxiety is the negative over-interpretation of ordinary bodily sensations without physical illness[2]. Patients previously diagnosed with hypochondriasis in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) can now meet the criteria for somatic symptom disorder (SSD) or illness anxiety disorder (IAD) in the DSM-V[3]. Health anxiety is recognized under the diagnoses of IAD and SSD in DSM-V[3]. The core feature of illness anxiety disorder is anxiety due to misinterpretation of bodily symptoms or believing that one is suffering from a severe illness[2]. Health anxiety is also involved in forming anxiety disorders and shapes its clinical appearance as one of its components[2,4].

Death anxiety can be defined as the conscious or unconscious fear of death with the thought that death can happen at any time[4]. A systematic review analysis[5] postulated that death anxiety plays an essential role in the development and severity of depression, eating disorders, obsessive-compulsive, and various anxiety disorders. Although extensive literature data is investigating the effect of death anxiety on life, there are limited studies[6] examining death anxiety's presence and effect on cancer patients and patients' caregivers.

Death anxiety has been suggested as a fundamental fear underlying the development and course of health anxiety[7]. It was thought that the sense of bodily threat was related to the pathological fear of death[7]. There are several theories on the association between death and health anxiety, but few studies[4] have empirically investigated this association.

Deadly diseases such as cancer diagnosis and concerns about death and health bring along the search for information in the fight against cancer in patients and caregivers[8]. On the other hand, the fact that the sources of information are many and provide a large amount of information has caused information overload[9]. Cancer Information Overload (CIO) has been defined as feeling overwhelmed by excessive information about cancer in the information environment[9]. Being subjected to information intensively leads to more uncertainty and anxiety related to the subject for some people[10].

As far as we know, there is no study in the literature investigating the effects of cancer knowledge and death anxiety on health anxiety. This study was planned to investigate the relationship between health anxiety, CIO and death anxiety in caregivers of inpatient cancer patients.

Patients and Methods

Study Design

This study was a cross-sectional observational descriptive study conducted in the inpatient treatment unit of medical oncology department of Dr Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital, a tertiary referral center. The study data was collected between April 2021 and September 2021 after the local Ethics Committee's approval.

Study Population

The companions of patients diagnosed with cancer and receiving inpatient treatment in the medical oncology clinic were included in the study. All participants were over 18 years of age, literate, and had no physical or mental disability. Participants with a known cancer diagnosis (current or past) and/or a history of psychiatric treatment (i.e., current or past treatments for depression, anxiety or psychotic disorder) were excluded from the study. Participants with severe and uncontrolled comorbidities (i.e., heart failure, chronic obstructive pulmonary disease, neurological disease, liver failure or kidney failure) were excluded. A sociodemographic information form, Arabic Scale of Death Anxiety (ASDA), Health Anxiety Scale (HAS), and Cancer Information Overload Scale (CIO), were given to participants to respond. A total of one hundred fifty participants were asked to complete the study scales given to them in printed form. The data of ninety-two participants who filled out the study scales completely and consistently were evaluated.

Instruments

Sociodemographic Information Form

A constructed demographic information form included questions about age, marital status (single or married), number of children, comorbidities (i.e., diseases such as hypertension, diabetes mellitus, osteoarthritis, migraine), educational time (total years of education at school), educational degree (primary / secondary / high school or university), income level (what patients report as very low, low, moderate or high, in their own opinion), employment status, and whether there is research on cancer (i.e., on the internet, magazines, social media, or video streaming sites).

Health Anxiety Scale (HAS)

The Health Anxiety Scale is a self-report scale consisting of 18 items. The 14 items of the scale consist of statements containing quartet answers questioning the mental state of individuals. In the remaining four questions, questions are asked about the presumed serious illness of the individuals. The scale scoring is between 0-3 for each item and the total score of the scale consists of the arithmetic sum of each item. Scores above the median indicate a high level of anxiety, and scores below the median indicate a low level of anxiety[2].

Arabic Scale of Death Anxiety (ASDA)

Arabic Scale of Death Anxiety (ASDA) is a 5-point Likert-type self-report scale (1=not at all and 5=a lot) containing 20 items. The score obtained from the scale varies between 20 and 100 points. A high score indicates increased death anxiety. There are five sub-dimensions: Fear of Death-Related Visual Stimuli (ASDA-1), Fear of Physical and Spiritual Pain Associated with Death (ASDA-2), Fear of Other Conditions Reminding Death (ASDA-3), Fear of the Afterlife (ASDA-4), Fear of Dying Itself (ASDA-5)[11].

Cancer Information Overload Scale (CIO)

The Cancer Information Overload Scale (CIO) consists of 8 items and has a 4-point Likert-type rating ranging from strongly agree to strongly disagree. A minimum of 8 and a maximum of 32 points can be obtained from the scale. The orig-

inal scale is one-dimensional and evaluates the information load of the person regarding cancer. A high score on the scale indicates information overload[9].

Ethical Considerations

Approval was obtained from the local Ethics Committee (UHS Dr Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital Clinical Research Ethics Committee, Approval Date: 21/04/2021, Document No.: 2021-04/1127). All participants signed an informed consent form before enrolment in the study.

Statistical Analysis

Statistical analysis was performed using SPSS software version 24.0 (IBM Corp., Armonk, NY, USA). Nonparametric data were presented as median (interquartile range-IQR), and categorical data were presented as frequency (percentage). Two groups were created as patients with a HAS score greater than or less than the median. Groups created according to HAS score were compared using Pearson's Chi-square test and Mann-Whitney U test for categorical and nonparametric numerical data. Multivariate logistic regression analysis was performed using variables with a *p*-value below 0.05 due to univariate analysis to determine independent factors predicting a high HAS score. All statistical tests were two-sided, and *p*-values <0.05 were considered statistically significant.

Results

Ninety-two caregivers accompanying the patient diagnosed with cancer and receiving inpatient treatment were included in the study. Median age of the participants was 44.5 (IQR 36.0-52.0) years. The majority of the participants (n=50, 54.3%) were female. Median educational time was 11.0 (IQR, 8.0-15.0) years, and the ratios of educational degree of primary/secondary school and high school/university were 30.4% (n=28) and 69.6% (n=64). The majority of the participants (n=65, 70.7%) were married. Income status determined by the individuals according to their own statements was very low/low and moderate/high for 29 (31.5%) and 63 (68.5%) participants. Of the participants, 22 (23.9%), 47 (51.1%), 14 (15.2%) and 9 (9.8%) were spouses, parents, siblings and children

of the patients, respectively. Research behavior on cancer was common (n=55, 59.8%). Median (IQR) scores of CIO, HAS, and ASDA-Total were 21.0 (13.0-25.0), 28.0 (14.25-31.0), and 60.5 (40.25-73.0), respectively. The main characteristics and median study scale scores of the participants are shown in Table I.

When participants with high HAS scores were compared with those with low HAS scores, the rate of employed persons was less (n=16, 34.8% *vs.* n=30, 65.2%, *p*=0.006), income status was more likely to be very low/low (n=23, 50.0% *vs.* n=6, 13.0%, *p*<0.001) and research on cancer behavior was more common (n=39, 84.8%, *p*<0.001). In terms of other sociodemographic parameters, the group with a high HAS score showed similar characteristics to the group with a low HAS score. Median (IQR) CIO [24.0 (21.75-28.0) *vs.* 13.5 (11.0-18.25), *p*<0.001] and ASDA Total [69.0 (62.0-77.0) *vs.* 41.0 (33.75-58.0), *p*<0.001] scores were higher in the group with high HAS score than in the group with low HAS score. Comparative statistical analysis results in terms of sociodemographic parameters and median study scale scores of low HAS and high HAS groups are shown in Table II.

Multivariate logistic regression analysis, including factors that may predict a high HAS score, revealed that a moderate/high-income status [odds ratio (OR) 0.114, 0.013-0.986 95% confidence interval (CI), *p*=0.049], CIO score (OR 1.354, 1.106-1.658 95% CI, *p*=0.003) and ASDA total score (OR 1.079, 1.021-1.141 95% CI, *p*=0.007) were independent predictive factors for a high HAS score. The multivariate logistic regression analysis results, including factors that may predict a high HAS score, are shown in Table III.

Discussion

In this study, we aimed to reveal the predictor factors of health anxiety in caregivers of inpatient cancer patients. We found that income status, death anxiety and CIO were independent predictive factors for a high health anxiety scale score.

To our best knowledge, there is no literature data concerning the relationship between health anxiety, death anxiety and CIO in cancer patients' caregivers. Our study is the first study on this issue and contributes to literature knowledge. The relationship between death anxiety and health anxiety has been subjected to research in

Table I. Main characteristics and median study scale scores of the participants.

Parameter		N	%
Age[§]		44.5 (36.0-52.0)	
Gender	Male	42	45.7
	Female	50	54.3
Employment Status	Employed	46	50.0
	Unemployed	46	50.0
Educational time[§]		11.0 (8.0-15.0)	
Educational degree	Primary/Secondary school	28	30.4
	High school/University	64	69.6
Marital status	Single	27	29.3
	Married	65	70.7
Income status	Very low/low	29	31.5
	Moderate/High	63	68.5
Child number[§]		1.5 (0.0-2.0)	
Kinship type	Spouse	22	23.9
	Others	70	76.1
Comorbidity	Yes	16	17.4
	No	76	82.6
Research on cancer	Yes	55	59.8
	No	37	40.2
CIO score[§]		21.0 (13.0-25.0)	
HAS score[§]		28.0 (14.25-31.0)	
ASDA Total score[§]		60.5 (40.25-73.0)	
ASDA-1[§]		13.5 (9.0-17.0)	
ASDA-2[§]		17.0 (13.0-20.0)	
ASDA-3[§]		9.5 (6.0-13.75)	
ASDA-4[§]		10.0 (6.0-11.0)	
ASDA-5[§]		9.0 (6.25-11.0)	

[§]Were given as median (IQR); CIO, cancer information overload scale; HA, health anxiety scale; ASDA, Arabic Scale of Death Anxiety.

non-cancer diseases for many years, but not on cancer patients or caregivers. In a study[12] evaluating 162 general medical outpatients, patients who met the diagnostic criteria for hypochondriasis (n=49) scored significantly higher on the fear of death scale than patients without hypochondriasis (n=113). It was interpreted that the fear of death is an integral part of hypochondriasis with these results[12]. A review[4] that included six studies evaluating the relationship between fear of death and hypochondriasis announced a positive association between death anxiety and hypochondriasis. In the study of Noyes et al[12], age was negatively associated with hypochondriasis and fear of death. The effects of sociodemographic variables such as age and gender on hypochondriasis and death anxiety were not analyzed in most previous studies[4]. In our study, only income status was an independent predictor of health anxiety among sociodemographic variables. Poor economic conditions may create health anxiety by preventing patients and caregivers from accessing all treatment opportunities.

Death anxiety may be an underlying factor for the etiopathogenesis of health anxiety and vice versa. Implicit death anxiety can negatively affect caregiving, manifesting as intolerance of uncertainty, emotional distress, and health anxiety in the caregiver. Another anxiety disorder that can lead to health and death anxiety, depressive mood, and a previous or current health threat may also be variables that affect the relationship. We also excluded the participants with severe mental or physical illness or psychiatric treatment history.

Few studies[12] show that witnessing someone else's non-cancer illness precipitates health anxiety. One study[13] found that participants with a seriously ill parent had significantly higher self-reported health anxiety than healthy parents. However, whether their anxiety is attributed to genetic risk factors for these diseases or whether the participants' indirect disease experiences preceded their health concerns is unclear[13]. Although it has been suggested that the diagnosis of a life-threatening illness such as cancer, witnessing

Table II. Comparative analysis results in terms of sociodemographic parameters and study scale scores, grouped according to the participants' Health Anxiety score (< median *vs.* > median).

Parameter		Low HAS (n = 46)		High HAS (n = 46)		*p*
		N	%	N	%	
Age[§]		42.0 (35.75-51.0)		46.5 (36.25-53.0)		0.560[§]
Gender	Male	21	45.7	29	63.0	0.142
	Female	25	54.3	17	37.0	
Employment Status	Employed	30	65.2	16	34.8	0.006
	Unemployed	16	34.8	30	65.2	
Educational time[§]		11.0 (11.0-15.0)		11.0 (8.0-15.0)		0.250
Educational status	Primary/secondary school	10	21.7	18	39.1	0.112
	High school/University	36	78.3	28	60.9	
Marital status	Single	17	37.0	10	21.7	0.169
	Married	29	63.0	36	78.3	
Income status	Very low/low	6	13.0	23	50.0	< 0.001
	Moderate/High	40	87.0	23	50.0	
Child number[§]		1.0 (0.0-2.0)		2.0 (1.0-2.25)		0.072
Kinship status	Spouse	9	16.9	13	28.3	0.464
	Others	37	80.4	33	71.7	
Comorbidity	Yes	6	13.0	10	21.7	0.410
	No	40	87.0	36	78.3	
Research on cancer	Yes	16	34.8	39	84.8	< 0.001
	No	30	65.2	7	15.2	
CIO score[§]		13.5 (11.0-18.25)		24.0 (21.75-28.0)		< 0.001
ASDA Total score[§]		41.0 (33.75-58.0)		69.0 (62.0-77.0)		< 0.001

[§]Were given as median (IQR); CIO, cancer information overload scale; HA, health anxiety scale; ASDA, Arabic Scale of Death Anxiety.

someone else's illness, or exposure to threatening health information can trigger health anxiety[14], only one study[15] has so far been conducted to assess whether having a cancer patient raises significant concerns about one's health. In this study, which included 207 participants, health anxiety severity did not differ between participants with and without indirect cancer experience, which is not in line with the results of previous studies[15] in non-cancer areas. This result was interpreted as that the participants might have been more in-volved in the care of their loved ones. Thus, they might have acquired more medical knowledge that relieved their health concerns[15].

The diagnosis of an incurable disease can trigger death anxiety as a profound existential crisis, as the present and future life of both patients and their families is threatened[6]. Worries about death can alienate and negatively affect communication between family members of patients with life-threatening diseases such as cancer[6]. There are very few studies[6] on death anxiety in can-

Table III. Results of multivariate logistic regression analysis including factors that may predict a high Health Anxiety Scale score.

Parameter	OR	SE	95% CI		*p*
			Lower	Upper	
Employment Status (Employed *vs.* Unemployed)	0.310	0.876	0.056	1.728	0.182
Research on cancer (Yes *vs.* No)	1.798	0.997	0.255	12.703	0.556
Income status (Moderate/High *vs.* Very low/low)	0.114	1.101	0.013	0.986	0.049
CIO score	1.354	0.103	1.106	1.658	0.003
ASDA Total score	1.079	0.028	1.021	1.141	0.007

OR, Odds Ratio; SE, standard error; CI, Confidence Interval; CIO, cancer information overload scale; ASDA, Arabic Scale of Death Anxiety. Note. R2adj = 0.782 (N = 92; *p* < 0.001).

cer patients and their caregivers. In a study[6] of 300 family caregivers caring for cancer patients, moderate death anxiety and decreased quality of life was reported in caregivers, and quality of life was inversely related to death anxiety (r=0.30, $p<0.001$). While some individuals can cope with their fear of death positively and adaptively, others may not cope effectively, leading to paralyzing fear and the development of maladaptive coping mechanisms[16]. A strong correlation was found between death anxiety and psychopathology in 200 treatment-seeking participants with various mental disorders[17]. Our study found that death anxiety positively predicted health anxiety, in line with the literature. It has been suggested that treatments focused on reducing death anxiety will also improve overall symptoms[18].

As in other anxiety disorders, there are safety behaviors in health anxiety disorder, such as avoidance, checking, searching for information in textbooks or the internet, and requests for reassurance. Such safety behaviors can result in severe economic costs, such as repeated medical consultations and testing[19]. Another finding in our study is that CIO is an independent positive predictive factor for health anxiety. The vast majority of cancer patients use the internet as their primary source of information[8]. However, it is challenging to provide cancer patients with appropriate information about their disease and treatment[9]. Content analysis show that cancer news is heavily therapeutic, some cancers are portrayed disproportionately with their realities, and 36-40% of science news exaggerates findings, omitting critical conditional statements, such as whether they represent the target audience[20]. Although it is essential to learn about cancer to prevent it, some people may experience more uncertainty and anxiety when exposed to information intensively[10]. Information overload can lead to poor information management, stress, and uncertainty, preventing people from making rational decisions[10]. Information overload has been shown[21] to hinder primary caregivers' decision making, cause confusion and create anxiety. Information obtained from non-medical sources causes an increase in the use of advanced examinations and may cause additional health risks and economic burdens[22]. Sources such as other people, the media, internet surfing, and advertising are just a few sources of potentially frightening information. A study[23] of online health information behaviors found that information overload impairs active

interaction and communication between patients and healthcare providers. The information load can significantly determine when health concern goes from compliant to maladaptive[13]. A certain level of health concern can be adaptive as it motivates individuals to take appropriate action (e.g., take prescription drugs) or seek necessary medical attention[24]. Adequate information about cancer can be adaptive, such as cancer screening behavior. Excessive health information overload was positively associated with low education level, low health literacy, poor information seeking skills, and low socioeconomic status[25]. Increasing well-planned information systems, increasing health literacy, and digital and media literacy can play an active role in preventing information overload. As a result of being a developing country and a society with low health literacy, we thought that the CIO in caregivers might have triggered health anxiety in our study. The caregivers of cancer patients receiving inpatient treatment in our study population experience the complex treatment process in the hospital environment, witnessing the difficulties experienced by their patients and other patients. The search for information about the disease and treatment is seen in caregivers as well as patients. In our study, 84.8% of the participants stated that they were doing research about cancer from the internet and other news sources. Also, research on cancer was common in participants with high health anxiety but was not an independent predictive factor for a high health anxiety score. Conversely, excessive anxiety about their health may also lead to information-seeking behavior, resulting in information overload and increased death anxiety. Our findings point to further studies on the role of death anxiety and information load about cancer in the development of health anxiety.

The cross-sectional nature of this descriptive study limits its ability to understand change over time. Factors such as the patients' symptoms, the severity of the condition requiring hospitalization, the stage of the disease, and the patients' performance status may affect the fear of death and anxiety of illness. In addition, the type of treatment that patients are receiving may also have a modifying effect on the results. One study[6] showed that the type of treatment was a significant predictor of death anxiety, and caregivers of both untreated and radiation-treated patients had higher death anxiety than caregivers of patients who had surgery and chemotherapy. In our study,

factors related to the patient and the disease were not considered. Although the limitations of the current study, our findings contribute significantly to the knowledge of the literature as it is the first study to investigate the knowledge burden of health anxiety about death anxiety and cancer. This study can also be a starting point for new prospective, longitudinally, and multi-dimensional designed studies on the same aspect of caregivers' health anxiety, considering comprehensive factors (i.e., factors related to caregivers, patients, and diseases).

Conclusions

This is the first study to examine the relationship between health anxiety, which is assumed to be exacerbated by the intense adverse emotional effects in the hospital environment, with death anxiety and CIO in caregivers of cancer patients receiving inpatient treatment. Our study showed that death anxiety and CIO are crucial determinants of health anxiety. More research with a multi-dimensional design is needed to obtain additional information about the relationship between health anxiety, death anxiety, and CIO, such as the underlying mechanisms, the role of age and gender, and causation. Such studies will assist in the early identification and intervention of at-risk groups. As we know more about the effects of death anxiety and the information load about cancer on health anxiety, further research can develop specific treatments to target health anxiety. Our study is even more critical when it is considered the first step towards improving caregivers' psychological well-being and quality of life by reducing health and death anxiety and providing adequate and practical information about cancer.

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