

ORIGINAL RESEARCH ORJİNAL ARAŞTIRMA

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# Investigation of the Relationship Between Information Overload and Psychological Well-Being and Anxiety Levels of Individuals Who Were Diagnosed with Cancer: Descriptive and Relationship-Seeking Research

## Kanser Tanısı Alan Bireylerde Bilgi Yükü ile Psikolojik İyi Oluş ve Anksiyete Düzeyi Arasındaki İlişkinin İncelenmesi: Tanımlayıcı ve İlişki Arayıcı Araştırma

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This study was produced from Halime Ulu's master's thesis titled "Investigation of the Relationship Between Information Load and Psychological Well-Being and Anxiety Levels in Individuals Diagnosed with Cancer" (İstanbul: Üsküdar University; 2023).

**ABSTRACT Objective:** Receiving a diagnosis of cancer is a stressful life experience. Individuals need information to help them learn how to cope physically and emotionally with stressful situations. However, receiving excessive and incorrect information about the disease can lead to psychological symptoms such as inability to interpret information, confusion, and feeling overwhelmed. This situation is defined as an information overload. Addressing the information burden and related factors in individuals diagnosed with cancer is important for patients to develop appropriate health behaviors. Therefore, this study was conducted to examine the relationship between information overload, psychological well-being and anxiety levels in individuals diagnosed with cancer. **Material and Methods:** The study had a descriptive and correlational design and the sample consisted of 400 patients who were receiving treatment in the outpatient chemotherapy unit. The data of the study were collected by using the "descriptive information form", "Cancer Information Overload Scale", "Psychological Well-Being Scale", and "State-Trait Anxiety Inventory". **Results:** The mean "Cancer Information Overload Scale" score of the patients was found to be 17.83±4.65, the mean "Psychological Well-Being Scale" score was 47.71±5.81, the mean state anxiety score was 45.49±9.89, and the mean trait anxiety score was 56.58±8.56. A negative relationship was found between cancer information overload and psychological well-being and state anxiety, while a positive relationship was found between trait anxiety ( $p<0.05$ ). **Conclusion:** The increase in cancer information overload decreased the level of psychological well-being and state anxiety and caused the level of trait anxiety to increase.

**Keywords:** Anxiety; cancer; cancer information overload; nursing; psychology

**ÖZET Amaç:** Kanser tanısı almak stresli bir yaşam deneyimidir. Bireylerin, bu stresli durum ile fiziksel ve duygusal olarak nasıl başa çıkacaklarını öğrenmelerine yardımcı olacak bilgilere ihtiyacı vardır. Fakat hastalık hakkında fazla ve yanlış bilginin alınması, bireylerde bilgiyi yorumlayamama, kafa karışıklığı, boğulmuşluk hissi gibi psikolojik semptomların ortaya çıkmasına neden olabilmektedir. Bu durum, bilgi yükü olarak tanımlanmaktadır. Kanser tanısı alan bireylerde, bilgi yükünün ve ilişkili faktörlerin ele alınması hastaların uygun sağlık davranışları geliştirmesi açısından önemlidir. Bu nedenle bu çalışma, kanser tanısı alan bireylerde bilgi yükü ile psikolojik iyi oluş ve anksiyete düzeyi arasındaki ilişkiyi incelemek için gerçekleştirilmiştir. **Gereç ve Yöntemler:** Bu çalışma, tanımlayıcı ve ilişkisel tasarıma sahip olup, çalışma örneklemini ayaktan kemoterapi ünitesinde tedavi gören 400 hastadan oluşmuştur. Çalışmanın verileri "tanımlayıcı bilgi formu", "Kanser Bilgi Yükü Ölçeği", "Psikolojik İyi Oluş Ölçeği" ve "Durumluk-Sürekli Kaygı Envanteri" kullanılarak toplanmıştır. **Bulgular:** Hastaların "Kanser Bilgi Yükü Ölçeği" puanı ortalaması 17,83±4,65, "Psikolojik İyi Oluş Ölçeği" puanı ortalaması 47,71±5,81, durumluk kaygı puanı ortalaması 45,49±9,89 ve sürekli kaygı puanı ortalaması 56,58±8,56 olarak belirlenmiştir. Kanser bilgi yükü ile psikolojik iyi oluş ve durumluk kaygı arasında negatif ilişki, sürekli kaygı arasında ise pozitif ilişki bulunmuştur ( $p<0,05$ ). **Sonuç:** Kanser bilgi yükünün artmasıyla psikolojik iyi oluş ve durumluk kaygı düzeyinin azaldığı, sürekli kaygı düzeyinin ise arttığı saptanmıştır.

**Anahtar Kelimeler:** Anksiyete; kanser; kanser bilgi yükü; hemşirelik; psikoloji

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"Cancer" is a disease that often reminds individuals of death, creates a sense of loss of control, and causes individuals to expect pain and deformity in body integrity. Such associations and emotions cause fear, stress, sadness, and future anxiety in individuals.<sup>1,2</sup> The feeling of uncertainty stemming from not understanding the details of the disease throughout the process including diagnosis and prognosis also causes feelings of death anxiety, helplessness, anxiety, and depression.<sup>3</sup> Considering that being diagnosed with cancer is among the most stressful life events, causing many psychological problems, the concept of psychological well-being has acquired special importance for people who have to live with cancer.<sup>4</sup> The psychological well-being is associated with a person's high satisfaction and happiness with his/her life and his/her ability to tolerate negative emotions. There are studies in the literature reporting that cancer symptoms, cancer treatment, and the side effects of the treatment cause deterioration in a person's psychological well-being.<sup>5,6</sup>

Although multiple factors accompany the disease and treatment process for cancer patients, it was reported that "information" and "obtaining information" also play roles in the disease process and reactions to the disease.<sup>7</sup> Patients need information to help them make treatment decisions and learn how to cope physically and emotionally with this stressful condition.<sup>8</sup> Although health professionals are the most frequent source of information for cancer patients, many cancer patients also seek information from additional sources.<sup>9</sup>

Today, rapidly developing communication technologies facilitate access to information about diseases, treatments, and other patients' personal experiences. Easy and widespread access to cancer information enables the development of health protection measures, increased cancer screenings, and improved quality of life for patients.<sup>7,10,11</sup> Depending on the amount and characteristics of the information, an individual might feel overwhelmed, which is defined as "information overload".<sup>12</sup> Değer and Zoroğlu reported in their study that as the cancer information overload increased, health-protective and cancer-preventive behaviors decreased, participation in screening programs decreased, selection of appropriate

diagnosis and treatment became difficult, and compliance with treatment was disrupted.<sup>13</sup> In a study conducted by Öztoprak and Ege, it was reported that the cancer information overload of individuals who cannot obtain accurate information from the right source increases.<sup>7</sup> For this reason, cancer patients must be provided with a list of reliable information sources that match their information needs, the risks of inaccurate or contradictory information must be minimized, and planning must be made on how to evaluate health information from the Internet to make informed decisions and improve coping skills.<sup>9,14</sup>

Nursing has important roles since it serves as a link between the care of the physical, psychological, and social aspects of patients who are hospitalized or receive outpatient treatment and follow-up.<sup>15</sup> In the scope of their roles as educators, nurses evaluate the information of the patients and their families, their inaccurate or incomplete information, and how much and what type of information they need from the nurse and provide appropriate information.<sup>16</sup> Dealing with by nurses the information overload in individuals who are diagnosed with cancer is very important for patients to reduce anxiety, improve well-being, develop appropriate health behaviours. However, when the literature was reviewed, no study discussed the relationship between information overload, psychological well-being and anxiety levels in this field. Therefore, the present study will contribute to the clinical field and literature.

### *Study Questions*

1. What are the defining characteristics of cancer patients?
2. Is there a relationship between cancer information overload and the psychological well-being of patients who are diagnosed with cancer?
3. Is there a relationship between cancer information overload and anxiety levels in patients who are diagnosed with cancer?

## **MATERIAL AND METHODS**

### **TYPE OF THE STUDY**

The present study, which was conducted to examine the relationship between the information overload of

individuals diagnosed with cancer and their psychological well-being and anxiety levels, had a descriptive and correlational design.

## VARIABLES OF THE STUDY

Independent variables of the study: Descriptive characteristics of the patients.

Dependent variables of the study: Cancer information overload, psychological well-being, and anxiety levels of the patients.

### Population and Sample of the Study

The study population consisted of cancer patients who received treatment in the Outpatient Chemotherapy Unit of Acibadem Hospital between February and April 2023. The number of participants to be sampled was based on the total number of patients between January-December 2022 ( $n=6,912$ ). A convenience sampling method was used to determine the sample size of the study. The sample size was calculated using sample size calculation formula. The sample size was calculated to be 364.

Seventy patients were excluded because they were younger than 18 years of age, 60 patients did not speak Turkish, 205 patients were in the terminal period, and 302 patients had physical side effects of chemotherapy such as fatigue. 247 patients did not want to participate in the study. The study was completed with 400 patients.

### Inclusion Criteria

1. Being over the age of 18.
2. Knowing and expressing that s/he was diagnosed with cancer.
3. Ability to understand and speak Turkish.
4. Agreeing to participate in the study.

### Exclusion Criteria

1. Being in the terminal period.
2. Chemotherapy side effects affecting physical condition.

## DATA COLLECTION TOOLS

**Descriptive Information Form:** The form, which was created by the researchers by reviewing the relevant literature, consisted of 14 questions (3 on

the patient's demographic data, 4 on clinical data, and 1 question on obtaining information).<sup>11,17</sup>

**Cancer Information Overload Scale:** The scale evaluates the person's knowledge overload regarding cancer.<sup>10,12</sup> The scale consists of 8 items. It is a 4-point Likert-type. A minimum of 8 and a maximum of 32 points were obtained from the scale. A high score on the scale indicates information overload.<sup>12</sup> In the original study, Cronbach's alpha reliability was found to be 0.87. It was found to be 0.81 in this study.

**Psychological Well-Being Scale:** This scale evaluates the psychological well-being of participants.<sup>18,19</sup> It consists of 8 items. It is a 7-point Likert-type. The score range of the scale is 8-56 points, with a high score indicating that the person has enhanced, psychological resources. Cronbach alpha reliability was found to be 0.86 in the original study.<sup>19</sup> In this study, the value was 0.83.

**State-Trait Anxiety Inventory:** This scale measures anxiety. It uses a 4-point Likert style.<sup>20,21</sup> There are a total of 40 items (20 in the State Anxiety Scale and 20 in the Trait Anxiety Scale). The State Anxiety Scale was designed to measure the patient's current anxiety level, and the Trait Anxiety Scale was designed to measure the patient's general anxiety level.<sup>22</sup> Cronbach alpha reliability of the Turkish form was calculated as 0.94-0.96 for the State Anxiety Inventory and 0.83-0.87 for the Trait Anxiety Inventory.<sup>23</sup> The Cronbach alpha reliability was calculated as 0.91 for the State Anxiety Inventory and 0.84 for the Trait Anxiety Inventory in this study.

## DATA COLLECTION

Verbal and written consent was obtained from all patients. Patients completed the data collection forms in the interview room located in the chemotherapy unit on the first control day after receiving chemotherapy treatment. The data collection process took 30-45 minutes.

## ANALYSIS OF DATA

The SPSS 24.0 program (IBM, ABD) was used to analyze the data. Skewness and Kurtosis analyses were performed on the dataset. Parametric analyses (t-test and analysis of variance test) were used to determine

the significance levels between the variables. Pearson correlation analysis was used for variables that met the normality condition for the correlation analysis. The significance level was set at  $p < 0.05$  for statistical analysis.

## RESEARCH ETHICS

Written and verbal permission were obtained from patients participating in the study. Approval was received from the Üsküdar University Non-Interventional Research Ethics Committee for the study (date: January 31, 2023; no: 61351342/2023-61). Institutional permission was obtained for this study. All the requirements of the Declaration of Helsinki were fulfilled.

## RESULTS

The mean age of the cancer patients was found to be  $53.70 \pm 11.81$  years, 73% were women, 81% were married, 37.5% had breast cancer, 34% had Stage 3, 52.8% of them had a relative diagnosed with cancer, 69.3% were worried about their disease, 37.5% were worried about the treatment, and 25.5% were worried about the costs. It was also found that 98.5% of them received information from health professionals and 78.5% received information from the Internet (Table 1).

The mean cancer information overload of the patients who participated in the study was found to be  $17.83 \pm 4.65$ , the mean psychological well-being score was  $47.71 \pm 5.81$ , the mean state anxiety score was  $45.49 \pm 9.89$ , and the mean trait anxiety score was  $56.58 \pm 8.56$  (Table 2).

A statistically significant difference was determined between the medical diagnosis status of the patients who participated in the study and their CIO scores ( $p < 0.05$ ). According to the adjusted Bonferroni analysis performed to determine the group that made a difference, the mean CIO scores of patients with head and neck cancer were ( $11.82 \pm 5.35$ ), breast cancer ( $17.67 \pm 4.32$ ), lung cancer ( $17.86 \pm 6.06$ ), colon cancer ( $17.82 \pm 5.35$ ), breast cancer ( $17.67 \pm 4.32$ ), lung cancer ( $17.86 \pm 6.06$ ), colon cancer ( $17.86 \pm 6.06$ ), and colon cancer ( $17.82 \pm 5.35$ ),  $90 \pm 3.98$ , pancreatic cancer ( $20.33 \pm 4.82$ ), brain cancer ( $18.50 \pm 4.16$ ), ovarian

**TABLE 1:** Descriptive characteristics of cancer patients (n=400)

|   | Minimum                          | Maximum | $\bar{X} \pm SD$  |
|---|----------------------------------|---------|-------------------|
| Age (years)                             | 22                               | 80      | $53.70 \pm 11.81$ |
|   |                                  | n       | %                 |
| Gender                                  | Women                            | 292     | 73.0              |
|   | Men                              | 108     | 27.0              |
| Marital status                          | Married                          | 324     | 81.0              |
|   | Single                           | 76      | 19.0              |
| Medical diagnosis                       | Sarcoma                          | 16      | 4.0               |
|   | Breast cancer                    | 150     | 37.5              |
|   | Lung cancer                      | 49      | 12.3              |
|   | Colon cancer                     | 48      | 12.0              |
|   | Rectal cancer                    | 18      | 4.5               |
|   | Pancreatic cancer                | 15      | 3.8               |
|   | Head and neck cancer             | 11      | 2.8               |
|   | Brain cancer                     | 18      | 4.5               |
|   | Ovarian cancer                   | 38      | 9.5               |
|   | Kidney cancer                    | 9       | 2.3               |
|   | Gastric cancer                   | 16      | 4.0               |
|   | Prostate cancer                  | 12      | 3.0               |
| Stage of diagnosis                      | Stage 1                          | 3       | 0.8               |
|   | Stage 2                          | 74      | 18.5              |
|   | Stage 3                          | 136     | 34.0              |
|   | Stage 4                          | 106     | 26.5              |
|   | Relapse                          | 81      | 20.3              |
| Having a relative diagnosed with cancer | Yes                              | 211     | 52.8              |
|   | No                               | 189     | 47.2              |
| State of anxiety                        | Disease anxiety                  | 277     | 69.3              |
|   | Treatment anxiety                | 150     | 37.5              |
|   | Cost anxiety                     | 102     | 25.5              |
|   | Caregiver anxiety                | 79      | 19.8              |
|   | Anxiety about feeling inadequate | 146     | 36.5              |
|   | Transport anxiety                | 45      | 11.3              |
|   | Relapse anxiety                  | 71      | 17.8              |
| Sources of information                  | Health professionals             | 394     | 98.5              |
|   | Patient relative                 | 312     | 78.0              |
|   | Internet                         | 314     | 78.5              |
|   | Television                       | 264     | 66.0              |
|   | Newspaper, magazine              | 164     | 41.0              |
|   | Book                             | 155     | 38.8              |
|   | Scientific resources             | 188     | 47.0              |

SD: Standard deviation

**TABLE 2:** CIO, PWBS and anxiety scale score distributions of cancer patients (n=400)

|               | Minimum | Maximum | $\bar{X} \pm SD$ |
|---------------|---------|---------|------------------|
| CIO           | 8       | 32      | $17.83 \pm 4.65$ |
| PWBS          | 13      | 56      | $47.71 \pm 5.81$ |
| State anxiety | 30      | 79      | $45.49 \pm 9.89$ |
| Trait anxiety | 31      | 71      | $56.58 \pm 8.56$ |

CIO: Cancer Information Overload Scale; PWBS: Psychological Well-Being Scale; SD: Standard deviation

cancer ( $17.08 \pm 3.66$ ), kidney cancer ( $20.33 \pm 3.74$ ) and stomach cancer ( $21.75 \pm 5.31$ ) (Table 3).

A statistically significant difference was determined between the diagnostic stages of the patients

**TABLE 3:** Mean CIO scores according to patients' descriptive characteristics (n=400)

|   |                      | $\bar{X} \pm SD$ | Statistical analysis<br>p value | Bonferroni |
|---|----------------------|------------------|---------------------------------|------------|
| Gender                                  | Women                | 17.65 $\pm$ 4.46 | t=-1.259<br>p=0.209             |            |
|   | Men                  | 18.31 $\pm$ 5.11 |                                 |            |
| Marital status                          | Married              | 18.11 $\pm$ 4.63 | t=2.504<br>p=0.013              |            |
|   | Single               | 16.63 $\pm$ 4.70 |                                 |            |
| Medical diagnosis                       | Sarcoma              | 17.25 $\pm$ 3.36 | F=3.815<br>p=0.000 <sup>a</sup> | 2>7        |
|   | Breast cancer        | 17.67 $\pm$ 4.32 |                                 | 3>7        |
|   | Lung cancer          | 17.86 $\pm$ 6.06 |                                 | 4>7        |
|   | Colon cancer         | 17.90 $\pm$ 3.98 |                                 | 6>7        |
|   | Rectal cancer        | 17.17 $\pm$ 3.35 |                                 | 8>7        |
|   | Pancreatic cancer    | 20.33 $\pm$ 4.82 |                                 | 9>7        |
|   | Head and neck cancer | 11.82 $\pm$ 5.35 |                                 | 10>7       |
|   | Brain cancer         | 18.50 $\pm$ 4.16 |                                 | 11>7       |
|   | Ovarian cancer       | 17.08 $\pm$ 3.66 |                                 |            |
|   | Kidney cancer        | 20.33 $\pm$ 3.74 |                                 |            |
| Stage of diagnosis                      | Stage 1              | 17.33 $\pm$ 1.15 | F=3.705<br>p=0.006 <sup>a</sup> | 4>3        |
|   | Stage 2              | 17.65 $\pm$ 4.06 |                                 | 5>3        |
|   | Stage 3              | 16.73 $\pm$ 4.69 |                                 |            |
|   | Stage 4              | 18.63 $\pm$ 4.51 |                                 |            |
|   | Relapse              | 18.80 $\pm$ 4.99 |                                 |            |
| Having a relative diagnosed with cancer | Yes                  | 18.41 $\pm$ 4.84 | t=2.692<br>p=0.007 <sup>a</sup> |            |
|   | No                   | 17.17 $\pm$ 4.34 |                                 |            |

<sup>a</sup>p<0.05; CIO: Cancer Information Overload Scale; SD: Standard deviation t: t-test; F: Analysis of variance test

**TABLE 4:** Relationship between CIO, PWBS and anxiety scale (n=400)

|               |         | CIO | PWBS                | State anxiety       | Trait anxiety       |
|---------------|---------|-----|---------------------|---------------------|---------------------|
| CIO           | r value | 1   | -0.241 <sup>a</sup> | -0.268 <sup>a</sup> | 0.29 <sup>a</sup>   |
|               | t value |     | 0.000               | 0.000               | 0.000               |
| PWBS          | r value |     | 1                   | -0.449 <sup>a</sup> | -0.495 <sup>a</sup> |
|               | t value |     |                     | 0.000               | 0.000               |
| State anxiety | r value |     |                     | 1                   | 0.414 <sup>a</sup>  |
|               | t value |     |                     |                     | 0.000               |
| Trait anxiety | r value |     |                     |                     | 1                   |
|               | t value |     |                     |                     |                     |

<sup>a</sup>p<0.05; CIO: Cancer Information Overload Scale; PWBS: Psychological Well-Being Scale; r= correlation coefficient

and the CIO scores (p<0.05). According to the adjusted Bonferroni analysis performed to determine the group making a difference, it was found that the mean CIO scores of patients with diagnostic Stage 3 (16.73 $\pm$ 4.69) were significantly lower than those of patients with Stage 4 (18.63 $\pm$ 4.51) and recurrence stage (18.80 $\pm$ 4.99) (Table 3).

A statistically significant difference was found between patients with a relative diagnosis of cancer and the CIO scores (p<0.05). The mean CIO score of

those who had a relative diagnosis of cancer (18.41 $\pm$ 4.84) was higher than that of those who did not (17.17 $\pm$ 4.34).

No statistically significant difference was found between the CIO scores according to gender and marital status (p>0.05) (Table 3).

A statistically significant and negative relationship was detected between cancer information overload, psychological well-being, and state anxiety (p<0.05). Increasing cancer information overload reduces psychological well-being and state anxiety levels. A statistically significant and positive relationship was detected between cancer information overload and trait anxiety (p<0.05). Increasing cancer information overload caused trait anxiety to increase (Table 4).

## DISCUSSION

It was found that cancer patients who participated in the study were most concerned about their disease, treatment, and treatment costs. It can be considered that the reason for cancer concerns of cancer patients may be uncertain and difficult treatment options, financial difficulties, concerns about the future, the effects of the disease on family and social developments, and lack of accurate information.<sup>24,25</sup>

In the present study, 98.5% of the patients obtained information from health professionals and 78.5% obtained information from the Internet. When the literature was reviewed, it was found that cancer patients first use health professionals and the Internet and then others to obtain information, and this is similar to this study.<sup>7,9</sup> Communication between nurses and patients also affects the sources of information obtained and the correct use of information. In studies conducted with individuals diagnosed with breast cancer, it was determined that patients who could not receive information from nurses due to communication-related problems and obtained information from other sources had a lower quality of life.<sup>26</sup> One of the factors affecting patients' communication with nurses is health literacy. Many studies have shown that people with inadequate and limited health literacy levels cannot communicate effectively



with health professionals.<sup>27</sup> In the study conducted by Değer and Zoroğlu, it was stated that increasing the level of health literacy increases communication with health professionals and reduces the burden of cancer information.<sup>13</sup> Despite the positive effects of health literacy, it was observed that 64.6% of the society had inadequate and problematic health literacy levels in the Turkish health literacy study conducted by Durusu Tanrıöver et al.<sup>28</sup> It is very important to increase the health literacy level of society in order to increase communication between patients and nurses, for patients to reach nurses as a source of information, and to avoid cancer information burden with sufficient and accurate information.

The study determined that patients' cancer information overload was at a moderate level. In the study that was conducted by Çelik, it was reported that the cancer information overload of cancer patients was at a moderate level ( $20.10 \pm 4.64$ ).<sup>11</sup> The findings of this study are similar to the findings of studies that examined the CIO score in the literature.<sup>7,12,13</sup>

The study determined that patients' psychological well-being was at a high level. In the study conducted by Çobanoğlu and Oğuzhan with 151 cancer patients who were receiving outpatient chemotherapy treatment, the mean PWBS score was found to be  $48.44 \pm 6.76$ .<sup>29</sup>

The mean state anxiety score of the patients was found to be  $45.49 \pm 9.89$  and the trait anxiety mean score was  $56.58 \pm 8.56$ . Kaykunoğlu et al. reported that the mean score of state anxiety from anxiety scales was  $40.40 \pm 3.89$  and the mean score of trait anxiety was  $46.67 \pm 6.33$ .<sup>30</sup> Similarly, Demir Zencirci et al. reported that the mean score of the Trait Anxiety Scale was  $42.14 \pm 7.36$ , and the mean score of the State Anxiety Scale was  $33.43 \pm 6.09$ .<sup>31</sup> It was found that previous studies were parallel to this study and the average anxiety score of the patients who were diagnosed with cancer was high.

In the study conducted by Çelik, there was no statistically significant difference between the medical diagnosis status of cancer patients and their "CIO" scores.<sup>11</sup> In this study, a significant difference was found between the medical diagnosis status of the pa-

tients and their "CIO" scores. The reason for the low mean "CIO" score of patients with head and neck cancer is that head and neck cancers are rare in our country. This is thought to reduce cancer information overload.

In this study, we determined that cancer information overload differed according to cancer stage. Patients at the relapse stage had the highest level of cancer information overload. It is thought that this may be due to the fact that patients perceive cancer as an "insurmountable situation" in the recurrence stage and do not know what to do and seek more information with the effect of increasing helplessness.

There was a statistically significant difference between "CIO" scores according to the relative diagnosis of cancer in cancer patients. In a study conducted by Jensen et al., it was determined that having a relative diagnosis of cancer increased cancer information overload.<sup>10</sup>

The present study found that increasing cancer information overload reduced psychological well-being. Chae et al. reported that when the cancer information overload of individuals increases, it causes them to become mentally and emotionally fatigued, negatively affecting their daily life activities. This is considered to negatively affect patients' psychological well-being.<sup>32</sup>

A statistically significant relationship was found between cancer information overload and state-trait anxiety scores. An increase in cancer information overload leads to a decrease in state anxiety. In a study conducted by Jensen et al., it was stated that the negative thoughts of people who increased their knowledge in the field of health decreased.<sup>10</sup> In the study conducted by Çelik, it was stated that the advice, opinions and suggestions obtained from information sources reduced the anxiety level of patients.<sup>11</sup> In this study, cancer information overload caused a decrease in state anxiety but an increase in trait anxiety. It is thought that the information that individuals diagnosed with cancer receive at that moment about the disease decreases their state anxiety, while the more complex the information obtained as the treatment period continues to increase trait anxiety. We can understand how cancer information overload

leads to anxiety through the information processing theory and cognitive load theory. According to information processing theory, information comes from the environment. If there is no problem in interpreting the information, it is stored in short-term memory. For information to be transferred to long-term memory, it is necessary to process the information. For information to be learned, it is necessary to establish a relationship between new and previously learned information. Each individual has a certain ability to process information. Bagdikian states that an individual's ability to process information and information overload will collide violently. According to cognitive load theory, the brain can process a certain amount of information. If this limit is exceeded, the brain becomes tired and its efficiency decreases. Mental fatigue manifests itself as symptoms such as forgetfulness, distraction, anxiety and physical fatigue. These symptoms may be characterized as "fatigue", but they are also indicators of mental capacity exhaustion. As the brain becomes fatigued by exposure to information overload, information anxiety increases. Information anxiety is caused by the amount of irrelevant and irrelevant information in the mass of information rather than the quantity of information.<sup>33-35</sup>

## LIMITATIONS

The study was conducted in a single center with patients who were administered chemotherapy unit with a diagnosis of cancer. In addition, not all cancer types and stages were included in the study and only the diagnoses and stages of the patients who applied to the center where the study was conducted and agreed to participate were included. Therefore, the results of this study cannot be generalized to all patients with cancer.

## CONCLUSION

The results of the study indicated that increased information overload decreased the level of psycho-

logical well-being and state anxiety and caused the level of trait anxiety to increase. Nurses can provide individualized patient education appropriate for their patients' lifestyles (such as adequate and balanced nutrition, regular physical activity, and coping with stress) to reduce the cancer information burden in clinical practice. Support groups can be established to provide patients with access to information about the disease process and treatment, as well as to develop coping strategies and reduce anxiety levels. Nurses can create reliable and easily understandable websites and information sources about cancer, share visual, written, and verbal information with patients about how and where to access scientific and accurate information; and examine the contents of online information sources about cancer. It is recommended to conduct experimental studies in which interventions to reduce information burden in cancer patients are carried out, examine the factors that increase cancer information burden in more detail.

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## Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

## Authorship Contributions

**Idea/Concept:** Halime Ulu, Aydan Akkurt Yalçintürk; **Design:** Halime Ulu, Aydan Akkurt Yalçintürk; **Control/Supervision:** Aydan Akkurt Yalçintürk; **Data Collection and/or Processing:** Halime Ulu; **Analysis and/or Interpretation:** Halime Ulu, Aydan Akkurt Yalçintürk; **Literature Review:** Halime Ulu; **Writing the Article:** Halime Ulu; **Critical Review:** Aydan Akkurt Yalçintürk.

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