Relationship of Cachexia with Self-Care Agency and Quality of Life in Cancer Patients: The Case of Turkey

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ABSTRACT

Objective: This study aims to determine the effects of cachexia, causing major problems in the world and Turkey, on self-care agency and quality of life in cancer patients. Methods: The population of this cross-sectional and relationship-seeking study consisted of cancer patients in Turkey from April 1 to April 20, 2021. Using the snowball sampling method, 174 patients were sampled. “Patient Information Form,” “The European Organization for Research and Treatment of Cancer C30 Cancer Quality of Life Scale,” and “Exercise of Self-Care Agency Scale” were used as data collection tools. Results: In the study, 52 patients (29.9%) were found to have cachexia. Function, general well-being, symptom (except insomnia), and self-care agency, which are subdimensions of the quality-of-life scale, were found to be significantly lower in patients with cachexia than patients without cachexia (P < 0.001). It was determined that there was a significant negative correlation between the cachexia status of the patients and the five basic functions in the functional scale (physical, role, emotional, cognitive, and social function), general well-being, and self-care agency, and there was a significant positive correlation between the cachexia status of the patients and the symptom scale (P < 0.001). According to the results of multiple linear regression analysis, it was found that the factor that significantly affected the cachexia status of the patients was their self-care agency (P < 0.001). Conclusions: It was determined that cachexia caused significantly lower self-care agency and quality of life in cancer patients. Furthermore, quality of life was related to self-care agency.

Key words: Cachexia, cancer, quality of life, self-care

Introduction

Cancer is an important health problem that affects the whole world with its increasing and widespread results.[¹] As in many other countries of the world, it ranks second after cardiovascular diseases in Turkey.[²] According to the data of the Global Cancer Observatory (GLOBACON) 2020, it has been reported that 19.3 million new cancer cases were diagnosed in the world, and 10 million people died due to cancer.[³]

Cachexia is a multifactorial syndrome prevalent in patients with advanced cancer, leading to increased...
morbidly and mortality and progressive functional
impairment.\textsuperscript{4,5} It is stated that approximately 50% of
cancer patients have cachexia, and more than 20% die due
to cachexia.\textsuperscript{6} In the literature, cachexia is defined as a
metabolic syndrome associated with an underlying disease,
characterized by muscle loss with or without loss of fat
tissue, and does not fully recover through conventional
nutritional therapy.\textsuperscript{7,8}

Cachexia in a patient with cancer leads to a deterioration
in the quality of life as it affects the treatment response
negatively and leads to decreased survival.\textsuperscript{9} The World
Health Organization defines the quality of life as the
perception of individuals’ living conditions by their culture,
norms, goals, expectations, standards, and interests.\textsuperscript{10}

Self-care is activities initiated and performed by
individuals to maintain life, health, and well-being. Self-care
agency is the combination of action and agency elements
that determine an individual’s self-care performance in
maintaining and improving health.\textsuperscript{11-13}

Cachexia causes physiological, biological, psychological,
and socioeconomic changes by affecting self-care and
quality of life in patients with cancer.\textsuperscript{14} Increasing the
quality of life and self-care agency of patients is very
important to facilitate their adaptation to the process and
meeting their needs.\textsuperscript{15} Considering the literature, it is
thought that the study will add a new perspective to the
literature due to the limited number of studies examining
the effect of cachexia on self-care agency and quality of life
in patients with cancer. Based on this information, this study
aimed to determine the effects of cachexia, causing major
problems in the world and Turkey, on self-care agency and
quality of life in cancer patients on self-care agency and
quality of life in patients with cancer.

Methods

Study design

This is a cross-sectional and relationship-seeking study.
The data in the study were collected from the cancer
patients in Turkey from April 1 to April 20, 2021. Due to the
coronavirus disease 2019 (COVID-19) pandemic, the data
were collected online through Google Form. ASTROBE
checklist was used in writing the study.\textsuperscript{16}

Study population and sample

The population of this cross-sectional and relationship-seeking study consisted of cancer patients in
Turkey. In the COVID-19 pandemic situation, reaching
cancer patients was hard and involved the risk of infection.
Therefore, using the snowball sampling method, the
data were gathered from cancer patients living in Turkey
between 1\textsuperscript{st} and 20\textsuperscript{th} April and accepting participation in
the study. Seven people who were diagnosed with cancer
and attended the cancer awareness training held by the
“Kelkit Community Health Center” on “February 4,
2018, World Cancer Day” formed the first ring of the
snowball chain. These seven people were asked to send the
questionnaire to their acquaintance cancer patients who
met the study criteria and agreed to fill out it. All types
of cancer were included in the study without making any
distinction in cancer patients. Data collection continues
until data saturation.\textsuperscript{17} The study included the data of
174 patients (response rate: 88%) [Figure 1].

Inclusion criteria

- Being 18 years or older
- Agreeing to participate in the study voluntarily
- Owning a smartphone
- Being literate
- Being diagnosed with cancer
- Living in Turkey
- Having no impairment in mental and cognitive
functions.

Data collection tools and data collection

The data were collected through “Patient Information
Form,” “European Organization for Research and
Treatment of Cancer (EORTC) C30 Cancer Quality of
Life Scale,” and “Exercise of Self-Care Agency Scale.”
After obtaining the necessary permissions for the study, an
online questionnaire was created and filled in the electronic
environment. The questionnaire form was prepared with the
Google Forms web application and sent to patients through
the WhatsApp messaging program.

Patient introduction form

This form consisted of two parts: “introductory information
of the participants” and “information on the status of cachexia.”

Introductory information of the participants

In this section, there were eight questions to determine
the sociodemographic characteristics of the patients

![Flow diagram of patient recruitment and tracking process and analysis set](image-url)

Figure 1: Flow diagram of patient recruitment and tracking process and analysis set.
including age, gender, marital status, educational status, income level, and cancer type.

**Information on cachexia status**

In this section, there were six questions to determine cachexia status including height, weight, body mass index (BMI), weight loss status in the last 6 months, and percent body weight lost.

**The European Organization for Research and Treatment of Cancer C30 Cancer Quality of Life Scale**

The scale developed by Aaronson *et al.* consists of thirty questions. The validity and reliability of the EORTC C30 Cancer Quality of Life Scale for the Turkish population have been determined. The scale consists of three subdimensions: a general health score (general well-being), a functional scale, and a symptom scale, and it includes thirty questions for the past week. The functional scale involves physical, role, cognitive, emotional, and social functions. Symptom scale consists of such subtitles as weakness, pain, nausea-vomiting, dyspnea, insomnia, loss of appetite, constipation, diarrhea, and financial difficulty. The first 28 questions in the scale are four-point Likert-type scale, and the items are scored as None: 1, A little: 2, Quite: 3, and Many: 4 points. The 29th and 30th questions in the scale are questions regarding the field of general well-being. That the functional scale score and general health status scale score of the patients are high, and their symptom scale score is low indicates that the quality of life is high.[18]

**Exercise of self-care agency scale**

ESCA is developed by Kearney and Fleischer in 1979, the scale focused on individuals’ self-assessment of their interest in self-care activities. The scale consists of 43 items. It was adapted as 35 items to Turkish society. The scale is a 5-point Likert-type. Each statement is scored from 1 to 4, and it is a 5-point Likert type scale. On the scale, eight expressions are evaluated as negative, and the scoring is reversed, and the minimum score is 35, and the maximum score is 140. The highest point refers to the highest self-care agency. As the score value increases, the self-care agency of the patients increases in direct proportion.[19]

**Diagnosing cachexia**

According to international consensus, cachexia in cancer patients is examined in three groups: non-cachexia, cachexia, and refractory cachexia.[5] In this study, the patients were divided into two groups as “cachexia and noncachexia” in terms of weight change, BMI, and sarcopenia in the past 6 months to reveal more clearly the relationship between cachexia and self-care and quality of life because the necessary conditions for detecting refractory cachexia and sarcopenia could not be met. Those with a weight loss of >5% in the last 6 months and a weight loss of >2%–5% and a BMI of <20kg/m² were considered “cachexia.” Furthermore, those with a weight loss of 22% in the past 6 months and a weight loss of >2%–5% and a BMI of ≥20kg/m² were considered “noncachexia” [Figure 2].

**Ethical approval**

Necessary permission was obtained from the ethics committee of Gümüşhane University for the study (Approval No. E.95674917-108,99-21807; 2021/4). An online questionnaire was created and filled in electronically. Electronic informed consent was obtained from each participant before beginning the study. The participant could leave the survey at any time without any justification. The study was carried out in accordance with the Helsinki Declaration.

**Statistical analysis**

Microsoft Excel table of the data was created through Google Forms and transferred to the Statistical Package for the Social Sciences 22.0 for statistical analysis, software licensed by Karadeniz Technical University. For the data evaluation, such descriptive statistical methods as frequency, percentage, mean, and standard deviation, as well as the Kolmogorov–Smirnov distribution test were used to examine the normal distribution. We adopted the Chi-squared or Fisher’s exact to compare differences in categorical variables. The Mann–Whitney U-test analysis was performed to determine the relationship between the scale scores of the patients and sociodemographic variables. The relationship between BMI, self-care power, and quality of life was evaluated with a Spearman correlation. Binary logistic regression analysis was used to determine factors associated with cachexia. Statistical significance level was set at *P* < 0.05.

**Results**

The average age of the patients participating in the study was 53.61 ± 10.63 (range: 20-78), and 59.0% were women, 70.2% were married, and 68.0% were primary school graduates. It was determined that 38.2% of the participants had digestive system cancer, 33.0% had Stage 4, 56.7% had cancer surgery, 64.6% received chemotherapy, 61.2% did
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not receive radiotherapy, and 69.7% received supportive treatment. It was observed that 68.5% of the patients lost more than 5 kg in the past 6 months, and 31.4% had a BMI <20kg/m². There was no difference between the groups in terms of age, marital status, education levels, cancer types, having chemotherapy, and radiotherapy. In the group without cachexia, on the other hand, there existed more patients who were males, had Stage 2, did not have surgery, and did not get supportive treatment [Table 1].

Five basic functions and general well-being in the functional scale of the patients with cachexia were significantly lower than the other. Furthermore, the patients in the cachexia group had significantly higher scores on the symptom scale except for insomnia. It was observed that the self-care agency of the patients in the cachexia group was considerably lower [Table 2].

It was observed that there was a significant negative correlation between the cachexia status of the patients and the five basic functions (physical, role, emotional, cognitive, and social function), general well-being, and self-care agency (P < 0.001). There was a significant positive correlation between the absence of cachexia and the symptom scale (P < 0.001). It was found that the incidence of cachexia increased as the stage of the tumor increased, and the incidence rate of cachexia decreased in those who did not have surgery and get supportive treatment (P < 0.001) [Table 3].

According to the results of logistic regression analysis, it was found that the factor that significantly affected the cachexia status of the patients was their self-care agency. These variables account for 45% of the total variance [Table 4].

### Table 1: Sociodemographic and clinical characteristics of the patients according to the groups (n=174)

| Variable                  | Cachexia (n=52) | Noncachexia (n=122) | P    |
|---------------------------|-----------------|---------------------|------|
| Age (years), mean±SD      | 51.60±9.30      | 54.35±11.22         | 0.121|
| Gender                    |                 |                     |      |
| Female                    | 29 (55.8)       | 44 (36.1)           | 0.016|
| Male                      | 23 (44.2)       | 78 (63.9)           |      |
| Marital status            |                 |                     |      |
| Married                   | 38 (73.1)       | 85 (69.7)           | 0.652|
| Single                    | 14 (26.9)       | 37 (30.3)           |      |
| Educational level         |                 |                     |      |
| Primary school            | 34 (65.4)       | 85 (69.7)           | 0.578|
| High school and above     | 18 (34.6)       | 37 (30.3)           |      |
| Types of cancer           |                 |                     |      |
| Lung                      | 2 (3.8)         | 31 (25.4)           | 0.852|
| Digestive system          | 32 (61.5)       | 34 (27.9)           |      |
| Head-neck                 | 0               | 13 (10.7)           |      |
| Lymphoma                  | 8 (15.4)        | 16 (13.1)           |      |
| Breast                    | 4 (7.7)         | 8 (6.6)             |      |
| Gynecological             | 3 (5.8)         | 8 (6.6)             |      |
| Soft tissue tumor         | 2 (3.8)         | 8 (6.6)             |      |
| Other                     | 1 (1.9)         | 4 (3.3)             |      |
| Stages of tumor           |                 |                     |      |
| 1                         | 0               | 15 (12.3)           | <0.001|
| 2                         | 0               | 48 (39.3)           |      |
| 3                         | 23 (44.2)       | 33 (27.0)           |      |
| 4                         | 29 (55.8)       | 26 (21.3)           |      |
| Having surgery            |                 |                     |      |
| Yes                       | 39 (75.0)       | 36 (29.5)           | <0.001|
| No                        | 13 (25.0)       | 86 (65.9)           |      |
| Receiving chemotherapy    |                 |                     |      |
| Yes                       | 29 (55.8)       | 83 (68.0)           | 0.122|
| No                        | 23 (44.2)       | 39 (32.0)           |      |
| Receiving radiotherapy    |                 |                     |      |
| Yes                       | 26 (50.0)       | 42 (34.4)           | 0.054|
| No                        | 26 (50.0)       | 80 (65.6)           |      |
| Receiving supportive treatment |          |                     |      |
| Yes                       | 25 (48.1)       | 25 (20.5)           | <0.001|
| No                        | 27 (51.9)       | 97 (79.5)           |      |

SD: Standard deviation

### Discussion

Cachexia in cancer patients can cause morbidity and mortality, especially in advanced stages of cancer.[20] In a study on cancer patients conducted by Liao et al.,[21] the incidence of cachexia was found to be 57.95%. Sun et al.[22] reported the rate of cachexia as 53.98% in their study. In our study, the rate of cachexia in the patients diagnosed with cancer was lower (29.9%) compared to the literature. It is estimated that this difference may be due to the lower average age of the patients with cachexia in this study.

Although there was no significant relationship between the types of cancer and having cachexia in our study, the fact that cachexia was seen mostly in digestive system cancers (61.5%) is similar to other studies examined.[22‑24] The reason why cachexia is more common in digestive system cancers is thought to be due to loss of appetite, food intake, and weight loss caused by digestive system disorders in such cancers.

In the literature, some studies show that the treatment applied to cancer patients directly affects their appetite and weight loss, while others indicate that there is no relationship between them.[22,23] In our study, a significant correlation was found between having surgery and receiving supportive treatment and having cachexia.

In the literature, it has been reported that cachexia-related malnutrition, weight loss, and decreased muscle mass negatively affect the quality of life.[26-28] In our study, similar to the studies by Sun et al.,[22] we found that the function, general well-being, symptom (except insomnia), and general quality of life were significantly lower in the patients with cachexia than the patients without cachexia.[29‑35]

Our study results, as in the studies examined, show that there was a negative direction between cachexia and the five
In our study, 0.710 (P < 0.001) and 0.998 (P = 0.812, 50.86±13.60 vs. 23.55±12.78, n = 11, 2 vs. 1). The relationship between some sociodemographic characteristics of the patients, self-care agency, quality of life and cachexia and symptom scale. We found that the incidence of cachexia decreased in cancer patients who did not have surgery and did not receive supportive treatment should be planned in patients who have undergone surgery or have cachexia. In our study, we found that the incidence of cachexia decreased in cancer patients who did not have surgery and did not receive supportive treatment, in contrast to a study examined. Weight loss and weakness are among symptoms of tumor spread. Besides, inflammatory cytokines such as TNF-α, IL-6, and IL-8, play a role in the pathogenesis of cachexia. Therefore, it is important to identify and treat these factors early to prevent the progression of cachexia in cancer patients.
as C-reactive protein, interleukin-6, and tumor necrosis factor-alpha are also crucial factors in the development of cachexia.\textsuperscript{39,40} In our study, we found that, as the stage of the tumor increased, the incidence of cachexia also increased.

The concept of self-care agency is one of the main concepts of the “General Nursing Theory or Self-Care Failure Theory in Nursing” and it is the combination of action and agency elements that determine an individual’s self-care performance in maintaining and improving health.\textsuperscript{41} Some studies reported that cancer patients had high self-care agency,\textsuperscript{42,43} while others stated that they had moderate self-care agency.\textsuperscript{44-46} In our study, the self-care agency of cancer patients with cachexia was significantly lower than cancer patients without cachexia. In the literature, the self-care agency of patients without cachexia was found to be moderate. It is similar to our study result. In our study the self-care level of cachexia patients was considerably lower than the studies reviewed. In our study, we estimated that the difference in self-care level is caused by the cachexia status of the sample group, having surgery, receiving supportive treatment, and the stage of the tumor.

Keeping the quality of life of cancer patients at the highest level and their taking responsibility for their treatment and care to lead their lives are of great importance. Therefore, it is highly essential to determine the quality of life and self-care agency of the patients.\textsuperscript{47} A study drawing a comparison between self-care agency and quality of life reported a positive relationship between self-care agency and physical function, role function, and social function.\textsuperscript{47} The study conducted by Bae et al. stated that self-care agency positively affected the quality of life in individuals with cancer.\textsuperscript{42} In the literature, in studies conducted with patients with and without cancer, it is stated that self-care agency positively affects the quality of life.\textsuperscript{48-50} Whether the self-care agency increases quality of life, or the increased quality of life affects the self-care agency positively should be taken into consideration. Regardless of the result, it is a remarkable finding that self-care agency and quality of life affect each other in parallel. As in the other studies, by comparing self-care agency and quality of life, we determined that there was a positive relationship between self-care agency and physical function, role function, emotional function, cognitive function, social function and general well-being, and a negative relationship between self-care agency and symptom scale. This result shows that, as self-care increases, the quality of life also increases.

In the snowball sampling method, the sampling process starts by reaching one of the participants in the study. After being interviewed, this initial participant is asked to suggest other potential participants, and following the interview, they recommend additional participants. Thus, the process continues with an increasing number of participants.\textsuperscript{51} In our study, while choosing the first ring of the snowball sample among those who attended cancer awareness training, all seven people who were diagnosed with cancer were selected among 86 people who participated in the training session to reduce the selection bias.

**Limitations**

The limitations of this study are that it is a cross-sectional study, and cachexia was evaluated only once, and the sample size was small.

**Conclusions**

Approximately one-third of cancer patients had cachexia. We determined that cachexia caused significantly lower self-care agency and quality of life in cancer patients. The quality of life of patients with cachexia was associated with self-care agency. Besides, we found the factor significantly affecting the cachexia status of the patients was their self-care agency.

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**Conflicts of interest**

There are no conflicts of interest.

**References**

1. Riahi S, Mokhtari AM, Vali M, Abdzadeh E, Mohseni S, Salehiniya H, et al. The incidence and mortality rate of cervix cancer in Iran from 1990 to 2016: A systematic review and meta-analysis. Iran J Public Health 2016;54:28-41.

2. Sarıtaş SC, Büyükbayram Z. The anxiety level of chemotherapy receiving patients and their caregivers and affecting factors. TAF Prev Med Bull 2016;15:141-50.

3. Global Cancer Observatory. Available from: https://www. iarc.fr/en/news/item/globalcan2020.-new-global-cancer-data. [Last accessed on 2021 Apr 09].

4. Zimmers TA, Fishel ML, Bonetti A. STAT3 in the systemic inflammation of cancer cachexia. Semin Cell Dev Biol 2016;54:28-41.

5. Fearon K, Strasser F, Anker SD, Baoész I, Brüera E,
Fiinsinger RL, et al. Definition and classification of cancer cachexia: An international consensus. Lancet Oncol 2011;12:489-95.

6. Tisdale MJ. Mechanisms of cancer cachexia. Physiol Rev 2009;89:381-410.

7. Evans WJ, Morley JE, Argilés J, Bales C, Baracos V, Guttridge D, et al. Cachexia: A new definition. Clin Nutr 2008;27:793-9.

8. Aapro M, Arens M, Bozzetti F, Fearon K, Grunberg SM, Herrstedt J, et al. Early recognition of malnutrition and cachexia in cancer patient: A position paper of European School of oncology task Force. Ann Oncol 2014;25:1452-9.

9. O'Gorman P, McMillan DC, McArdle GS. Prognostic factors in advanced gastrointestinal cancer patients with weight loss. Nutr Cancer 2000;37:36-40.

10. Bonomi AE, Patrick DL, Bushnell DM, Martin M. Validation of the United States' version of the World Health Organization Quality of Life (WHOQOL) instrument. J Clin Epidemiol 2000;53:1-12.

11. Akdemir N. Psikososyal destek. In: Platin N, editor. Hemşirelerİçin Kanser El Kitabı, 1. Baskı., Ankara: Akşam Sanal Okulu Matbaası; 1996. p. 186-93.

12. Orem D. Nursing: Concept of Practice Self-Care Agency and Dependent-Care Agency. 4th ed. St. Louis: Mosby Year Book; 1991. p. 145-75.

13. Jenny J. Self-care deficit theory and nursing diagnosis: A test of conceptual fit. J Nurs Educ 1991;30:227-32.

14. Al-Amer R, Ramjan L, Glew P, Randall S, Salamonson Y. Self-efficacy, depression, and self-careactivities in adult Jordanians with type 2 diabetes: The role of illness perception. Issues Ment Health Nurs 2016;37:744-55.

15. Carlson LE, Bultz DB. Benefits of psychosocial oncology care: Improved quality of life and medical cost offset. Health Qual Life Outcomes 2003;1:8.

16. Von Elm E, Patrick DL, Bushnell DM, Martin M. Validation of the United States' version of the World Health Organization Quality of Life (WHOQOL) instrument. J Clin Epidemiol 2000;53:1-12.

17. Kerlinger FN, Lee HB. Foundations of behavioral research. New York: Harcourt College Publishers; 1999.

18. Aapro M, Arens M, Bozzetti F, Fearon K, Grunberg SM, Herrstedt J, et al. Early recognition of malnutrition and cachexia in cancer patient: A position paper of European School of oncology task Force. Ann Oncol 2014;25:1452-9.

19. Sadeghi M, Keshavarz-Fathi M, Baracos V, Arends J, Mahmoudi M, Rezaei N. Cancer cachexia: Diagnosis, assessment, and treatment. Crit Rev Oncol Hematol 2016;127:91-104.

20. Liao WC, Chen PR, Huang CC, Chang YT, Huang HS, Chang CC, et al. Relationship between pancreatic cancer-associated diabetes and cachexia. J Cachexia Sarcopenia Muscle 2020;11:899-908.

21. Sun H, Sudip T, Fu X, Wen S, Liu H, Yu S. Cachexia is associated with depression, anxiety and quality of life in cancer patients. BMJ Support Palliat Care 2020; Sep 11:bmjspcare-2019-002176. doi: 10.1136/bmjspcare-2019-002176.

22. Zhou T, Yang K, Thapa S, Liu H, Wang B, Shiyong Y. Differences in symptom burden among cancer patients with different stages of cachexia. J Pain Symptom Manage 2017;53:919-26.

23. Tisdale MJ, Molecular pathways leading to cancer cachexia. Physiology (Bethesda) 2005;20:340-8.

24. Gupta D, Lis CG, Granick J, Grutsch JF, Vashi PG, Lammersfeld CA. Malnutrition was associated with poor quality of life in colorectal cancer: A retrospective analysis. J Clin Epidemiol 2006;59:704-9.

25. Bye A, Sjøblom B, Wentzel-Larsen T, Grønberg BH, BaracosVE, Hjermstad MJ, et al. Muscle mass and association to quality of life in non-small cell lung cancer patients. J Cachexia Sarcopenia Muscle 2017;8:759-67.

26. Evans WJ, Lambert CP. Physiological basis of fatigue. Am J Phys Med Rehabil Assoc Phys Acad Phys 2007;86:S29-46.

27. Jatoi A, Ritter HL, Dueck A, Nguyen PL, Nikcevich DA, Luyun RF, et al. A placebo-controlled, double-blind trial of infliximab for cancer-associated weight loss in elderly and/or poor performance non-small cell lung cancer patients (N01Ca). Lung Cancer 2010;68:234-9.

28. Davidson W, Ash S, Capra S, Bauer J; Cancer Cachexia Study Group. Weight stabilisation is associated with improved survival duration and quality of life in unresectable pancreatic cancer. Clin Nutr 2004;23:239-47.

29. Burns CP, Halabi S, Clamon G, Kaplan E, Hohl RJ, Atkins JN, et al. Phase II study of high-dose fish oil capsules for patients with cancer-related cachexia – A cancer and leukemia group B study. Cancer 2004;101:370-8.

30. van den Berg MG, Rasmussen-Conrad EL, van Nispen L, van Binsbergen JJ, Merkx MAW. A prospective study on malnutrition and quality of life in patients with head and neck cancer. Oral Oncol 2008;44:830-7.

31. Richey LM, George JR, Couch ME, Kanapkey BK, Yin X, Cannon T, et al. Defining cancer cachexia in head and neck squamous cell carcinoma. Clin Cancer Res 2007;13:6561-7.

32. Nourissat A, Vasson MP, Merrouche Y, Bouteiloup C, Goulette M, Mille D, et al. Relationship between nutritional status and quality of life in patients with cancer. Eur J Cancer 2008;44:1238-42.

33. Copland L, Rothenberg E, Ellegård L, Hyltander A, Bosaeus I. Muscle mass and exercise capacity in cancer patients after major upper gastrointestinal surgery. e-SPEN, the European e-Journal of Clinical Nutrition and Metabolism 2010;5:e265-71.

34. Mullen JT, Davenport DL, Hutter MM, Hosokawa PW, Henderson WG, Khuri SF, et al. Impact of body mass index on perioperative outcomes in patients undergoing major infra-abdominal cancer surgery. Ann Surg Oncol 2008;15:2164-72.

35. Collins LG, Haines C, Perkel R, Enck RE. Lung cancer: Diagnosis and management. Am Fam Physician 2007;75:56-63.

36. Pettersen K, Andersen S, Degen S, Tadini V, Grosjean J, Hatakeyama S, et al. Cancer cachexia associates with a systemic autophagy-inducing activity mimicked by cancer cell-derived IL-6 trans-signaling. Sci Rep 2017;7:1-16.

37. Patel HJ, Patel BM. TNF-α and cancer cachexia: Molecular insights and clinical implications. Life Sci 2017;170:56-63.
41. Nahcivan NÖ. Validity and reliability study: Adaptation of self-care ability scale to Turkish. Hemsirelikbülteni 1994;33:109-19.
42. Bae KR, Im YS, Noh GO, Son Y, Seo HG. Relationships among hope, self-care agency and quality of life of female oncology patients with lymphedema. Asian Oncol Nurs 2017;17:213-9.
43. Goudarzian AH, Boyle C, Beik S, Jafari A, Nesami MG, Thebi M, et al. Self-Care in Iranian cancer patients: The role of religious coping. J Relig Health 2019;58:259-70.
44. Castro EK, Feuker AC, Lawrenz P, Figueiras MJ. Illness perception, knowledge and self-care about cervical cancer. Psicol Reflex Crít 2015;28:483-9.
45. Koç Z, Şener A. Distress symptoms, anxiety, depression level, and self-care ability of oncology inpatients in a region of turkey. Eur J Oncol 2017;22:76-87.
46. Küçükkaya B, Erçel Ö. The effect of disease perception on self-care agency in gynecologic cancer patients. EGE HFD 2019;35:137-45.
47. Altparmak S, Fadiloglu Ç, Gürsoy ŞT, Altparmak O. Kemo terapitedavisianakciğerkanserlihastalardaözbakımcınlığı ve yaşamkalitesi. Ege J Med 2011;50:95-102.
48. West P, Isenberg M. Instrument development: The mental health-related self-care agency scale. Arch Psychiatr Nurs 1997;11:126-32.
49. Jaarsma T, Halfens R, Tan F, Abu-Saad HH, Dracup K, Diederiks J. Self-care and quality of life in patients with advanced heart failure: The effect of a supportive educational intervention. Heart Lung 2000;29:319-30.
50. Akyol D, Karadakovan A. The investigation of influence factors on self-care agency and quality of life on hemodialysis patients. Ege Tıp Derg 2002;41:97-102.
51. Şahin B. Scientific research methods (4. Baskı). In: Tanrıöğen A, editor. (Yay. Haz). Methodology. Ankara: Anı Publishing; 2014. p. 111-30.