Submitted: 10 May, 2024 Accepted: 26 July, 2024 Published: 15 October, 2024 DOI:10.22514/ejgo.2024.104

ORIGINAL RESEARCH

European Journal of Gynaecological Oncology

Analysis of current status and influencing factors of cancer-related anorexia in patients undergoing chemotherapy for gynecological malignancies

Mingna Lin[1], Aimin Gong[1], Bingqing Zhao[1], Danyang Pan[1,*]

[1]Department of Gynecology, The People's Hospital of Yuhuan, 317600 Taizhou, Zhejiang, China

***Correspondence**
pandanyang712@163.com
(Danyang Pan)

Abstract

This study aims to assess the prevalence of cancer-related anorexia in patients undergoing chemotherapy for gynecological malignancies, including cervical cancer, endometrial cancer and ovarian cancer, as well as identify the corresponding influencing factors and potential countermeasures. Using a convenience sampling method, a total of 210 patients with gynecological malignancies who underwent chemotherapy between 2022 and 2023 at our hospital were identified. These patients were surveyed using a general data questionnaire, the Anorexia/Cachexia Subscale-12 (A/CS-12), and the Social Support Rating Scale (SSRS). Among them, 108 (51.4%) were found to have cancer-related anorexia. Univariate analysis revealed that age, marital status, economic level, chemotherapy stage, and social support level were statistically significant factors associated with the prevalence of cancer-related anorexia ($p < 0.05$). Further analysis using binary logistic regression identified economic level, chemotherapy stage, and social support level as independent risk factors for cancer-related anorexia in this patient population ($p < 0.05$). In conclusion, our findings indicate that cancer-related anorexia is prevalent among patients with gynecological malignancies undergoing chemotherapy and is influenced by multiple factors. Thus, it is essential that clinical staff develop individualized treatment plans based on patient's specific conditions to reduce the risk of cancer-related anorexia and improve overall quality of life.

Keywords

Gynecologic malignancy; Cancer-related anorexia; Influencing factors; Chemotherapy

1. Introduction

Gynecological malignancies, including cervical cancer, endometrial cancer and ovarian cancer, represent significant threats to women's health. In recent years, there has been an increase in their prevalence, especially among younger females [1, 2]. Cancer-related anorexia is characterized by a significant reduction in appetite or food intake attributable to the presence of the cancer [3, 4]. Epidemiological studies indicate that 33% to 75% of cancer patients experience anorexia, with prevalence rising to up to 80% in those with advanced cancer [5]. Since this condition can lead to weight loss, malnutrition and impaired immune function, potentially impacting both survival and quality of life, therefore, early diagnosis and intervention are pivotal [5, 6].

Currently, combined chemotherapy and hysterectomy are considered standard treatments for gynecological malignancies [7]. However, the hormonal alterations resulting from cancer surgery, coupled with chemotherapy-induced side effects, often precipitate varying degrees of anorexia during and after treatment, which can adversely affect both the physical and mental health of the patients [8]. Moreover, anorexia may trigger a cascade of nutritional pathologies, contributing to a general decline in the patient's health status [9]. Therefore, patients may experience not only appetite and weight loss but also abnormal catabolism, muscle mass depletion, functional decline and psychosocial issues. These symptoms can evolve into precachexia, cachexia and sarcopenia, leading to poor prognosis characterized by reduced median survival, lower chemotherapy response rates and diminished performance status [10].

Herein, we conducted this study to investigate the factors influencing cancer-related anorexia in patients with gynecological malignancies. Overall, this study aims to provide a foundation for comprehensive evaluation and intervention strategies for mitigating cancer-related anorexia in patients undergoing chemotherapy and to enhance their quality of life.

2. Study participants and methods

2.1 General data

Yuhuan People's Hospital is a major healthcare facility with a capacity of 1200 approved and operational beds. Annually,

the hospital manages approximately 1.33 million emergency visits and admits 31,000 inpatients. The average length of stay for patients is 6.56 days. The hospital has a substantial volume of patients undergoing chemotherapy for gynecological malignancies, with around 5000 such patients each year, providing a rich sample for research purposes.

In this study, we selected 210 patients with gynecological malignancies who were hospitalized and received chemotherapy from February 2022 to December 2023. The inclusion criteria for the study were: (1) Diagnosis of endometrial cancer, ovarian cancer, cervical cancer or other gynecological malignancies, and underwent chemotherapy; (2) Aged between 18 and 80 years; (3) Had normal cognitive function and mental clarity; (4) Absence of migration in the past six months and a survival time of more than six months; and (5) Both the patients and their families provided informed consent. The following cases were excluded: (1) the presence of other malignant tumors and (2) severe comorbidities with a life expectancy of less than six months.

2.2 Method

A cross-sectional survey was conducted to investigate cancer-related anorexia among patients with gynecological malignancies. Informed consent was obtained from each department involved in the study. Investigators received uniform training, and patient cancer types and stages were verified through medical record consultations. The survey instruments included: (1) General Data Questionnaire: This questionnaire was designed based on a review of relevant literature. It collected data on age, marital status, number of children, education level, occupation, economic level, tumor stage, metastasis, chemotherapy stage, social support and cancer type. (2) Cancer-Related Anorexia Screening Form (C/AS-12): The C/AS-12 scale [11], which evaluates 12 questions related to appetite in cancer patients, was used for this study. The C/AS-12 was selected for its reliability and accuracy, with the number of questions reduced to maintain or enhance these attributes. A cutoff score of 37 points is recommended to indicate the presence of anorexia. (3) Social Support Rating Scale (SSRS): The SSRS, developed by Xiao Shui-yuan [12], was employed to measure social support. The scale comprises 10 items across three dimensions: subjective support, objective support, and utilization of social support. Items 1–4 and 8–10 use a Likert scale with four levels (1 to 4 points) for scoring. Item 5 calculates the total score from four options (A, B, C and D) ranging from "none" to "full support" (1 to 4 points). Items 6 and 7 score 0 points if "no source" is selected, with other options scored based on the number of selected responses. The total score for the SSRS is 66 points, with higher scores indicating greater levels of social support. The Cronbach's α coefficient for the SSRS in this study was 0.807.

2.3 Data collection method and quality control

Informed consent was obtained from all participating departments. Investigators were trained uniformly to ensure consistency in data collection. Each investigator explained the purpose and significance of the study to the patients, obtained their informed consent, and had them sign the consent forms. Patients independently completed the questionnaires. For those with difficulties in completing the questionnaire or with lower educational levels, investigators provided assistance, ensuring that responses were recorded objectively without leading the patients towards specific answers. Completed questionnaires were collected on the spot. Using Kendall's sample size estimation method, a minimum sample size of 180 was determined to be necessary. A total of 240 questionnaires were distributed, and 210 were returned, yielding an effective response rate of 87.5%.

2.4 Statistical methods

The data were analyzed using SPSS version 25.0 (IBM, Armonk, NY, USA). Enumeration data are presented as frequencies and percentages. The chi-square (χ^2) test was used for comparisons between groups. Measurement data conforming to a normal distribution are reported as means $\pm$ standard deviations. Binary logistic regression analysis was employed to assess the relationship between cancer-related anorexia and various influencing factors. All statistical tests were two-sided, with significance set at $p < 0.05$.

3. Results

3.1 Cancer-related anorexia in patients with gynecological malignancies and risk factors

Among the 210 patients included in the study, 102 did not exhibit anorexia, while 108 patients (51.4%) were diagnosed with cancer-related anorexia. Table 1 illustrates the prevalence of cancer-related anorexia among patients with gynecological malignancies, stratified by various characteristics. Significant differences in the prevalence of cancer-related anorexia were observed based on patient age, marital status, economic level, chemotherapy stage, and social support level ($p < 0.05$).

3.2 Binary logistic regression analysis

Binary logistic regression analysis was conducted to assess the relationship between cancer-related anorexia and significant variables identified in univariate analysis. The independent variables included age, marital status, economic level, chemotherapy phase, and social support level, while the dependent variable was the presence of cancer-related anorexia. The assignment of variable values is detailed in Table 2.

3.3 Logistic regression analysis

Logistic regression analysis was performed to evaluate the impact of economic level, chemotherapy phase, and social support on cancer-related anorexia in patients with gynecological malignancies undergoing chemotherapy. These variables were identified as independent influencing factors, with statistical significance set at $p < 0.05$. The results are summarized in Table 3.

4. Discussion

TABLE 1. General data of the investigated patients and identification of potential risk factors by univariate analysis.

Variables	Case	Patients with cancer-related anorexia (108)	Patients without cancer-related anorexia (102)	χ^2/F value	p value
Age (yr)					
18–44	53 (25.2%)	10 (9.3)	43 (42.2)		
45–60	99 (47.1%)	75 (69.4)	24 (23.5)	49.171	0.0001
60–80	58 (27.6%)	23 (21.3)	35 (34.3)		
Marital status					
Married	189 (90.0%)	93 (86.1)	96 (94.1)		
single	13 (6.2%)	11 (10.2)	2 (2.0)	6.112	0.047
Widow/widower	8 (3.8%)	4 (3.7)	4 (3.9)		
Children					
Yes	205 (97.6%)	105 (97.2)	100 (98.0)	0.151	0.698
No	5 (2.4%)	3 (2.8)	2 (2.0)		
Education Level					
Primary school	54 (24.5%)	28 (23.9)	26 (25.2)		
Junior high school	84 (38.2%)	46 (39.3)	38 (36.9)	0.404	0.939
High School/Secondary School	51 (27.7%)	33 (28.2)	28 (27.2)		
Undergraduate/college	21 (9.5%)	10 (8.5)	11 (10.7)		
Occupation					
Retired person	83 (39.5%)	39 (36.1)	44 (43.1)		
Enterprise staff	29 (13.8%)	19 (17.6)	10 (9.8)		
Farmer	58 (27.6%)	31 (28.7)	27 (26.5)	5.988	0.200
Individual	6 (2.9%)	1 (0.9)	5 (4.9)		
Unemployed	34 (16.2%)	18 (16.7)	16 (15.7)		
Economic level (per capita)					
<1000	50 (23.8%)	32 (29.6)	18 (17.6)		
1000–3000	119 (56.7%)	62 (57.4)	57 (55.9)	8.966	0.030
3001–5000	25 (11.9%)	10 (9.3)	15 (14.7)		
>5000	16 (7.6%)	4 (3.7)	12 (11.8)		
Tumor stage					
Stage II	25 (11.9%)	19 (17.6)	6 (5.9)		
Stage III	124 (59.0%)	66 (61.1)	58 (56.9)	10.802	0.055
Stage IV	61 (29.0%)	23 (21.3)	38 (37.3)		
Tumor metastasis					
Yes	153 (72.9%)	75 (69.4)	78 (76.5)	1.310	0.252
No	57 (27.1%)	33 (30.6)	24 (23.5)		
Chemotherapy phase					
Early phase	77 (36.7%)	59 (54.6)	18 (17.6)		
Metaphase	73 (34.8%)	21 (19.4)	52 (51.0)	35.119	<0.001
Anaphase	60 (28.6%)	28 (25.9)	32 (31.4)		
Social support					
Poor (<23)	44 (21.0%)	34 (31.5)	10 (9.8)		
Moderate (23–44)	79 (37.6%)	39 (36.1)	40 (39.2)	16.267	0.001
Good (≥45)	87 (41.4%)	35 (32.4)	52 (51.0)		
Cancer type					
Cervix carcinoma	91 (43.3%)	40 (37.0)	51 (50.0)		
Endometrial cancer	60 (28.6%)	37 (34.3)	23 (22.5)	5.905	0.116
Ovarian cancer	46 (21.9%)	26 (24.1)	20 (19.6)		
Other	13 (6.2%)	5 (4.6)	8 (7.8)		

TABLE 2. Independent variable assignment.

Variables	Associated factors	Grading and value assignment
X1	Age	18–44 = 1, 45–60 = 2, 60–80 = 3
X2	Marital status	Married = 1, Divorced = 2, Widow/widower = 3
X3	Economic Level	<1000 = 1, 1000–3000 = 2, 3000–5000 = 3, >5000 = 4
X4	Chemotherapy phase	Early phase = 1, Metaphase = 2, Anaphase = 3
X5	Social support	Poor (<23) = 1, Moderate (23–44) = 2, Good (≥45) = 3
Y	Total score of cancer-related anorexia	Actual measured value

TABLE 3. Logistic regression analysis of influencing factors of cancer-related anorexia in patients undergoing chemotherapy for gynecological malignancies.

Variables	Regression coefficient	Standard error	Wald χ^2	p value	OR value	95% confidence interval
Constant	−2.954	1.139	6.724	0.010	0.052	
Age	0.511	0.472	1.169	0.280	1.666	0.660–4.205
Marital status	0.857	0.942	0.827	0.363	2.356	0.372–14.936
Economic Level	2.073	0.816	6.460	0.011	7.951	1.607–39.338
Chemotherapy phase	0.829	0.420	3.887	0.049	2.291	1.005–5.221
Social support	1.540	0.401	14.724	0.001	4.666	2.124–10.247

OR: odds ratio.

4.1 Current status of cancer-related anorexia

Cancer remains the second leading cause of death globally. Among the most prevalent symptoms in patients with advanced cancer are fatigue, pain and anorexia [9]. Anorexia, characterized by a diminished desire to eat leading to reduced food intake, is a prominent feature of cachexia, including its early stage, pre-cachexia. It is independently associated with decreased quality of life [13]. Research by Abdallah *et al.* [14] reported that patients with gynecological malignancies experience varying degrees of cancer-related anorexia. More severe anorexia symptoms correlate with increased nutritional risk and diminished quality of life [15], thereby significantly impacting patients' daily lives.

Our study found that the prevalence of cancer-related anorexia among patients with gynecological malignancies was 51.4%. This high prevalence can be attributed to the insidious onset, high malignancy, and rapid progression of gynecological cancers, which often necessitate intensive treatments such as surgery and chemotherapy. The combined psychological and mental stress associated with these treatments contributes to patients' aversion to food [16]. The prolonged treatment duration and associated severe discomfort further exacerbate the impact on patients' quality of life.

Given these findings, it is essential that healthcare providers closely monitor the presence and severity of cancer-related anorexia in patients because timely and effective interventions could alleviate anorexia symptoms and improve patients' appetite. Moreover, enhanced supportive care can help mitigate the adverse effects of anorexia and contribute to better overall patient outcomes.

4.2 Factors affecting cancer-related anorexia

4.2.1 Economic level

The findings of this present study indicate a significant correlation between cancer-related anorexia and the economic level of patients. Specifically, a higher economic level is associated with a lower prevalence of cancer-related anorexia. Patients with better economic conditions are more likely to have access to quality nutrition and are better able to manage the psychological burden of high treatment costs. These patients are more concerned with nutritional balance and improving appetite [17]. In clinical practice, it is essential to provide psychological support and nutritional interventions to patients with lower economic levels. Thus, addressing these needs can help alleviate psychological stress and improve nutritional status, complementing active treatment of the primary disease [18].

4.2.2 Chemotherapy phase

Our study identified the chemotherapy phase as a significant factor influencing cancer-related anorexia. Considering that there is evidence suggesting that patients undergoing early chemotherapy stages exhibit the poorest nutritional status [19], healthcare providers should monitor changes in nutritional status closely during the early stages of chemotherapy. Interventions should focus on addressing reduced food intake and resistance to eating caused by chemotherapy or surgery to improve nutritional outcomes and support the continuation of effective treatment [20]. Another important aspect that could be considered is that nurses could be trained to be more attentive to manifestations of cancer-related anorexia and provide empathy, comfort and support to enhance the quality of life for patients undergoing chemotherapy [21].

4.2.3 Social support

The results of this study indicate a negative correlation between social support and the prevalence of cancer-related anorexia. Social support encompasses both material and emotional assistance provided by a network of relationships, which can significantly aid in disease recovery [22]. Our findings demonstrate that higher levels of social support are associated with lower levels of cancer-related anorexia in patients. Specifically, material support helps alleviate the economic strain on patients, while emotional support fosters determination, reduces negative psychological emotions, and enhances self-confidence and self-management skills [23]. Based on these findings, it could be important for medical staff to provide comprehensive informational support and actively utilize available social support resources, as such approaches could help mitigate symptoms of cancer-related anorexia and improve the overall quality of life for patients.

4.3 Nutritional management strategies for cancer-related anorexia

Cancer-related anorexia can lead to significant discomfort and suffering, often exacerbated by olfactory and gustatory disturbances during or after chemotherapy. These disturbances contribute to food aversion and resistance to eating, resulting in insufficient energy and protein intake and, consequently, impaired nutritional status [24, 25]. Hence, addressing and alleviating anorexia symptoms is therefore a crucial objective in managing these patients.

In clinical practice, it is essential to conduct a thorough nutritional assessment and provide personalized dietary guidance and nutritional support. Special attention should be given to changes in nutritional status, particularly during the early stages of chemotherapy. Early detection of appetite issues and prompt intervention are vital for improving nutritional status, which in turn supports the effectiveness of chemotherapy and enhances the patient's quality of life [26, 27].

Healthcare workers should tailor nutritional therapy and dietary strategies to the specific anorexia symptoms experienced by each patient. First, nutritional risk screening should be conducted to identify patients at risk and develop customized nutritional programs; enteral nutritional preparations may be used if necessary to supplement the patient's intake [28]. Second, promoting nutritional awareness is essential by educating patients on the importance of proper nutrition and encouraging them to eat small, frequent meals to maintain energy levels. Third, meal plans should be optimized by including favored foods that are rich in nutrients, emphasizing high-protein and nutrient-dense options while avoiding excessive portion sizes. Fourth, modifying eating habits involves encouraging patients to eat in a relaxed setting and avoiding medications that may induce nausea before meals. Moreover, creating a comfortable dining environment ensures a pleasant and supportive setting for eating. By implementing these strategies, healthcare providers may effectively manage cancer-related anorexia, improve nutritional intake, and enhance the overall quality of life for patients.

4.4 Study limitations

This study had several limitations that should be clarified. Firstly, the single hospital design of this study limits the generalizability of the findings, as the sample may not fully represent the diversity and breadth of the gynecological malignancy patient population. Secondly, the study's data are confined to the period from 2022 to 2023, which does not capture long-term trends in cancer-related anorexia among gynecological malignancy patients, affecting the timeliness of the findings. Additionally, convenience sampling introduces selection bias, potentially impacting the representativeness of the sample. The reliance on questionnaires and general data surveys may also restrict the depth of analysis, as these tools did not encompass a broader range of clinical data and outcome measures, which are essential for a comprehensive understanding of the factors influencing cancer-related anorexia. Furthermore, important variables, such as patients' psychological status and specific disease treatments, were not fully considered. Addressing these limitations in future research will be crucial for enhancing the study's credibility and applicability.

5. Conclusions

In summary, this study provides insight into the prevalence and influencing factors of cancer-related anorexia in patients undergoing chemotherapy for gynecological malignancies, with a prevalence rate of 51.4%. The analysis revealed that factors such as age, marital status, economic level, chemotherapy stage, and social support are associated with the prevalence of cancer-related anorexia. Notably, economic level, chemotherapy stage, and social support were identified as independent risk factors. Cancer-related anorexia is prevalent in this patient population and is influenced by multiple factors. Future clinical practice should focus on the management of cancer-related anorexia through personalized interventions tailored to each patient's specific conditions. Addressing these symptoms effectively is essential for improving patients' quality of life and has significant clinical implications. However, the study had some limitations. The logistic regression analysis, while useful, did not clearly outline how confounding factors were controlled or adjusted, which may impact the accuracy and interpretability of the results. Thus, future research could provide a more precise accounting of confounders to enhance the reliability and validity of the findings.

AVAILABILITY OF DATA AND MATERIALS

The authors declare that all data supporting the findings of this study are available within the paper and any raw data can be obtained from the corresponding author upon request.

AUTHOR CONTRIBUTIONS

MNL—designed the study and carried them out; MNL, AMG, BQZ—supervised the data collection; MNL, AMG, BQZ—analyzed the data, interpreted the data; MNL, DYP—prepared the manuscript for publication and reviewed the draft of the manuscript. All authors have read and approved the

manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Ethics Committee of the People's Hospital of Yuhuan (Approval no. 2021022). Written informed consent was obtained from a legally authorized representative for anonymized patient information to be published in this article.

ACKNOWLEDGMENT

Not applicable.

FUNDING

This research received no external funding.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Piechocki M, Koziołek W, Sroka D, Matrejek A, Miziołek P, Saiuk N, *et al.* Trends in incidence and mortality of gynecological and breast cancers in Poland (1980–2018). Clinical Epidemiology. 2022; 14: 95–114.

[2] Wang Z, Guo E, Yang B, Xiao R, Lu F, You L, *et al.* Trends and age-period-cohort effects on mortality of the three major gynecologic cancers in China from 1990 to 2019: cervical, ovarian and uterine cancer. Gynecologic Oncology. 2021; 163: 358–363.

[3] Yeom E, Yu K. Understanding the molecular basis of anorexia and tissue wasting in cancer cachexia. Experimental & Molecular Medicine. 2022; 54: 426–432.

[4] Yeom E. Recent studies on anorexia and tissue wasting induced by cancer cachexia. Journal of Life Science. 2022; 32: 263–269. (In Korean)

[5] Peixoto da Silva S, Santos JMO, Costa ESMP, Gil da Costa RM, Medeiros R. Cancer cachexia and its pathophysiology: links with sarcopenia, anorexia and asthenia. Journal of Cachexia, Sarcopenia and Muscle. 2020; 11: 619–635.

[6] Fonseca G, von Haehling S. An overview of anamorelin as a treatment option for cancer-associated anorexia and cachexia. Expert Opinion on Pharmacotherapy. 2021; 22: 889–895.

[7] D'Augè TG, Giannini A, Bogani G, Dio CD, Lagana AS, Donato VD, *et al*. Prevention, screening, treatment and follow-up of gynecological cancers: state of art and future perspectives. Clinical and Experimental Obstetrics & Gynecology. 2023; 50: 160.

[8] Harris BS, Bishop KC, Kuller JA, Ford AC, Muasher LC, Cantrell SE, *et al*. Hormonal management of menopausal symptoms in women with a history of gynecologic malignancy. Menopause. 2020; 27: 243–248.

[9] Morton M, Patterson J, Sciuva J, Perni J, Backes F, Nagel C, *et al*. Malnutrition, sarcopenia, and cancer cachexia in gynecologic cancer. Gynecologic Oncology. 2023; 175: 142–155.

[10] Zhao J, Kong Y, Xiang Y, Yang J. The research landscape of the quality of life or psychological impact on gynecological cancer patients: a bibliometric analysis. Frontiers in Oncology. 2023; 13: 1115852.

[11] Zhang L, Zhou C, Wu Y, Du D, He L, He L, *et al*. Assessment and nonpharmacological management for patients with cancer anorexia-cachexia syndrome: a best practice implementation project. JBI Evidence Implementation. 2022; 20: 334–343.

[12] Sun J, Sun R, Jiang Y, Chen X, Li Z, Ma Z, *et al*. The relationship between psychological health and social support: evidence from physicians in China. PLOS ONE. 2020; 15: e0228152.

[13] Puckett L, Grayeb D, Khatri V, Cass K, Mehler P. A comprehensive review of complications and new findings associated with anorexia nervosa. Journal of Clinical Medicine. 2021; 10: 2555.

[14] Abdallah Hasaneen M, Ali IK, Gamal AM, Khalil AK. Assessment of health problems caused by gynecological malignancies treatments. Menoufia Nursing Journal. 2021; 6: 51–64.

[15] Spagnoletti BRM, Bennett LR, Keenan C, Shetty SS, Manderson L, McPake B, *et al*. What factors shape quality of life for women affected by gynaecological cancer in South, South East and East Asian countries? A critical review. Reprod Health. 2022; 19: 70.

[16] Zuo Y, Luo BR, Peng WT, Liu XR, He YL, Zhang JJ. Informal caregiver burden and influencing factors in gynaecological oncology patients hospitalized for chemotherapy: a cross-sectional study. Journal of International Medical Research. 2020; 48: 300060520974927.

[17] Ma SG, Deng X, Xing L, Huang Y. Postoperative health-related quality of life of patients with gynecological malignancy: a meta-analysis. Support Care Cancer. 2021; 29: 4209–4221.

[18] Opheim L, Engeskaug I, Bjerre Trent PK, Thorsen L, Staff AC, Nordskar NJ, *et al*. Associations between modifiable lifestyle factors and health-related quality of life among endometrial carcinoma survivors—a cross-sectional study. Gynecologic Oncology. 2023; 179: 52–62.

[19] Andreyev HJN, Lalji A, Mohammed K, Muls ACG, Watkins D, Rao S, *et al*. The FOCCUS study: a prospective evaluation of the frequency, severity and treatable causes of gastrointestinal symptoms during and after chemotherapy. Supportive Care in Cancer. 2021; 29: 1443–1453.

[20] Jafarimanesh H, Akbari M, Hoseinian R, Zarei M, Harorani M. The effect of peppermint (*Mentha piperita*) extract on the severity of nausea, vomiting and anorexia in patients with breast cancer undergoing chemotherapy: a randomized controlled trial. Integrative Cancer Therapies. 2020; 19: 1534735420967084.

[21] Oakvik J, Ready D. Updates in cancer-related symptom management of anorexia and cachexia syndrome. Seminars in Oncology Nursing. 2022; 38: 151254.

[22] Oh GH, Yeom CW, Shim EJ, Jung D, Lee KM, Son KL, *et al*. The effect of perceived social support on chemotherapy-related symptoms in patients with breast cancer: a prospective observational study. Journal of Psychosomatic Research. 2020; 130: 109911.

[23] Baba MR, Buch SA. Revisiting cancer cachexia: pathogenesis, diagnosis, and current treatment approaches. Asia-Pacific Journal of Oncology Nursing. 2021; 8: 508–518.

[24] Gaafer OU, Zimmers TA. Nutrition challenges of cancer cachexia. Journal of Parenteral and Enteral Nutrition. 2021; 45: 16–25.

[25] Ukovic B, Porter J. Nutrition interventions to improve the appetite of adults undergoing cancer treatment: a systematic review. Supportive Care in Cancer. 2020; 28: 4575–4583.

[26] Darakhshandeh A MM. Cachexia and anorexia in cancer; a systematic review. Immunopathologia Persa. 2020; 7: e20.

[27] Aprile G, Basile D, Giaretta R, Schiavo G, La Verde N, Corradi E, *et al*. The clinical value of nutritional care before and during active cancer treatment. Nutrients. 2021; 13: 1196.

[28] Arends J, Strasser F, Gonella S, Solheim TS, Madeddu C, Ravasco P, *et al*. Cancer cachexia in adult patients: ESMO clinical practice guidelines. ESMO Open. 2021; 6: 100092.

How to cite this article: Mingna Lin, Aimin Gong, Bingqing Zhao, Danyang Pan. Analysis of current status and influencing factors of cancer-related anorexia in patients undergoing chemotherapy for gynecological malignancies. European Journal of Gynaecological Oncology. 2024; 45(5): 162-167. doi: 10.22514/ejgo.2024.104.