Symptom Clusters and Associated Factors in Gynecologic Cancer Patients Undergoing Chemotherapy: A Survey Study Postprint

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Date: 2023-05-12T00:00:00+00:00

Abstract

Objective To investigate the related symptoms in patients with gynecologic malignancies undergoing chemotherapy and to explore the types of symptom clusters and their influencing factors. Methods A general information questionnaire and the Chinese version of the M.D. Anderson Symptom Inventory (MDASI) were used to survey 430 hospitalized patients with gynecologic malignancies undergoing chemotherapy. Results Patients with gynecologic malignancies undergoing chemotherapy experienced multiple symptoms; the top three symptoms by incidence rate were vomiting (91.86%), drowsiness (90.70%), and fatigue (90.00%). The top three areas of symptom interference by incidence rate were walking (76.74%), interpersonal relations (76.30%), and emotion (72.79%). Exploratory factor analysis extracted four symptom clusters: emotional symptom cluster, disease symptom cluster, fatigue symptom cluster, and gastrointestinal symptom cluster. Multiple stepwise regression analysis showed that tumor metastasis, monthly household income per capita, recurrence status, expected length of hospital stay for this admission, number of chemotherapy cycles, chemotherapy regimen, tumor stage, and employment status were influencing factors of symptom cluster severity. Conclusion Patients with gynecologic malignancies undergoing chemotherapy experience multiple symptom clusters; clinical nursing staff should provide effective symptom management measures from the perspective of symptom clusters to improve their quality of life.

Full Text

Abstract

Objective: To investigate the related symptoms, symptom clusters, and influencing factors among patients with gynecological cancer during chemotherapy.

Methods: A total of [number] hospitalized gynecological cancer patients undergoing chemotherapy were surveyed using a General Information Questionnaire and the Chinese version of the M.D. Anderson Symptom Inventory (MDASI). **Results:** Gynecological cancer patients during chemotherapy experienced multiple symptoms. The top three symptoms by incidence rate were vomiting (%), drowsiness (%), and fatigue (%). The top three areas of symptomatic distress by incidence rate were walking (%), interpersonal relations (%), and emotion (%). Exploratory factor analysis extracted four symptom clusters: emotional symptom cluster, disease symptom cluster, fatigue symptom cluster, and digestive tract symptom cluster. Multiple stepwise regression analysis showed that tumor metastasis, family monthly income per capita, recurrence, expected length of hospital stay, number of chemotherapy cycles, chemotherapy regimen, tumor stage, and work status were influencing factors of symptom cluster severity. **Conclusion:** Gynecological cancer patients during chemotherapy experience multiple symptom clusters. Clinical nursing personnel should approach symptom management from the perspective of symptom clusters to provide effective interventions and improve patients' quality of life.

Keywords: gynecology; cancer; chemotherapy; symptom cluster; influencing factors

Gynecological malignant tumors include cervical cancer, ovarian cancer, endometrial cancer, fallopian tube cancer, and vaginal cancer, among which cervical cancer, ovarian cancer, and endometrial cancer are the most common. In recent years, the incidence of gynecological malignant tumors has gradually increased, seriously threatening women's health. Chemotherapy, as a common treatment modality for gynecological malignant tumors, plays an important role in gynecological cancer treatment. However, various chemotherapeutic agents, while prolonging patient survival, also produce a series of symptom experiences. Symptoms of cancer and chemotherapy often appear in the form of "symptom clusters." The concept of "symptom cluster" was first proposed by Dodd et al., referring to two or more interrelated symptoms occurring simultaneously, with symptoms within the cluster not requiring the same etiological mechanism. Research has shown that, compared with individual symptoms, symptoms within a cluster have a synergistic effect that increases patients' symptom burden and significantly reduces their quality of life. This study investigated [number] gynecological cancer patients undergoing chemotherapy to explore the types and influencing factors of symptom clusters, providing a basis for nursing staff to implement symptom cluster management measures and improve patient quality of life.

1. Materials and Methods

1.1 Study Design and Participants

A convenience sampling method was used to survey gynecological cancer inpatients at a tertiary maternal and child hospital in Chengdu from [month] to

[month] [year]. Inclusion criteria were: (1) histopathologically diagnosed with gynecological malignant tumor; (2) having completed at least one chemotherapy cycle; (3) clear consciousness without cognitive or communication impairment; and (4) voluntary participation in the study. Exclusion criteria were: (1) combined with diseases of vital organs (such as heart, lung, brain, etc.) or other serious diseases; (2) family members requesting confidentiality of patient condition; and (3) participation in other clinical studies that might affect the results of this survey.

1.2 Research Tools

The research instruments included: (1) General Information Questionnaire: Developed by the researchers after reviewing relevant literature, including demographic data such as age, education level, marital status, family monthly income per capita, and disease-related information including pathological diagnosis, cancer stage, chemotherapy regimen, and number of chemotherapy cycles. (2) Chinese Version of the M.D. Anderson Symptom Inventory (MDASI): Developed by the University of Texas MD Anderson Cancer Center and validated by Wang et al., demonstrating good reliability and validity (Cronbach's α coefficient = , CVI =). The Chinese version consists of two parts with a total of [number] items. The first part assesses the severity of [number] symptoms in cancer patients, including fatigue, loss of appetite, pain, etc., with each item scored on a 0-10 scale, where 0 indicates absence of the symptom and 10 indicates the most severe symptom; higher scores indicate greater severity. The second part assesses the degree to which these symptoms interfere with [number] daily life domains including general activity, emotion, work, and interpersonal relationships, also using a 0-10 scale where 0 indicates no interference and 10 indicates the most severe interference.

1.3 Data Collection

This study used a questionnaire survey method. A research assistant from the department distributed questionnaires to patients who met the inclusion and exclusion criteria. Before the survey, the purpose and significance of the study were explained to patients, and informed consent was obtained after they understood and agreed to participate. Questionnaires were distributed on-site and checked individually by the research assistant upon collection; any missing items were promptly completed. A total of [number] questionnaires were distributed, [number] valid questionnaires were collected, with a valid response rate of [percentage]%.

1.4 Statistical Analysis

SPSS software was used for data entry, analysis, and processing of valid questionnaires. Demographic and disease-related data were described using frequency and percentages. Symptom scores and interference scores were described using mean $\pm$ standard deviation ($x \pm s$) if normally distributed, and median

(interquartile range) [M(P25-P75)] if not normally distributed. Exploratory factor analysis was used to extract symptom clusters. Multiple stepwise regression analysis was used to examine the influence of general data on symptom clusters. $P < 0.05$ was considered statistically significant.

2. Results

2.1 General Patient Characteristics

A total of [number] patients were included, aged [range] years, with a mean age of [mean] (SD) years. The majority had junior high school or high school education ([percentage]%). [Percentage]% were married. Other general characteristics are detailed in Table 1 .

2.2 Symptom Incidence and Severity

Symptom incidence and severity in gynecological cancer chemotherapy patients: The results showed that the incidence of symptoms was [percentage]%, with nausea having the highest incidence rate at [percentage]%, followed by vomiting (%), drowsiness (%), and fatigue (%). The median severity score was [score]. Details are shown in Table 2 .

2.3 Symptom Distress Incidence and Severity

Symptom distress incidence and severity: A symptom distress severity score ≥ 1 indicated interference in that domain. The results showed that the incidence of symptom distress was [percentage]%, with the highest incidence rates in descending order being walking (%), interpersonal relations (%), emotion (%), enjoyment of life (%), and general activity (%). The median symptom distress severity score was [score]. Details are shown in Table 3 .

2.4 Symptom Cluster Factor Analysis

Exploratory factor analysis was performed on [number] symptoms in gynecological cancer chemotherapy patients. Using principal component analysis and varimax orthogonal rotation, the results showed KMO = [value] and Bartlett's test ($P < 0.001$), indicating correlations among variables and suitability for factor analysis. The number of common factors was determined by eigenvalues > 1. This study extracted [number] factors with eigenvalues > 1, with a cumulative variance contribution rate of [percentage]%. Factor 1 was named emotional symptom cluster (distress, forgetfulness, sadness); Factor 2 was named disease symptom cluster (shortness of breath, numbness, pain, dry mouth); Factor 3 was named fatigue symptom cluster (fatigue, disturbed sleep, drowsiness); and Factor 4 was named digestive tract symptom cluster (nausea, loss of appetite, vomiting). The Cronbach's α coefficients for each factor were [values]. Symptom cluster scores are detailed in Table 5 .

2.5 Influencing Factors Analysis

Using scores of different symptom clusters as dependent variables and patient characteristics (age, education level, family monthly income per capita, chemotherapy regimen, etc.) as independent variables, multiple stepwise regression analysis was performed. The results showed that influencing factors for the emotional symptom cluster included tumor metastasis, family monthly income per capita, recurrence, and expected length of hospital stay; for the disease symptom cluster: number of chemotherapy cycles and chemotherapy regimen; for the fatigue symptom cluster: tumor stage and work status; and for the digestive tract symptom cluster: tumor metastasis and chemotherapy regimen. The explained variance for each symptom cluster is detailed in Table 6 .

3. Discussion

3.1 Common Symptoms in Gynecological Cancer Chemotherapy Patients

This study shows that gynecological cancer patients experience multiple symptoms during chemotherapy, with incidence rates above [percentage]% and a median severity score of [score]. The most common symptoms were nausea (%), vomiting (%), drowsiness (%), and fatigue (%). Nausea and vomiting had the highest incidence rates, with a severity score of [score]. This may be related to the fact that most patients in this study received platinum-based chemotherapy. Jordan et al. [ ] found that highly emetogenic chemotherapeutic agents such as cisplatin cause chemotherapy-induced nausea and vomiting (CINV) in up to [percentage]% of patients. Meng et al. [ ] suggested that for patients receiving cisplatin-containing chemotherapy, conventional antiemetic regimens plus oral aprepitant effectively prevent CINV. This may provide a possible approach to reducing the incidence of nausea and vomiting in gynecological cancer chemotherapy patients. The drowsiness incidence rate in this study was as high as [percentage]%, which is higher than related studies [ ]. This may be related to patients' physical symptoms, psychological status, treatment response, and immune factors [ ]. The incidence of fatigue was consistent with the findings of Hu et al. [ ] in lung cancer chemotherapy patients and Wei et al. [ ] in gastric cancer chemotherapy patients. Fatigue can be explained as cancer-related fatigue (CRF), referring to an unusual, persistent, and excessive fatigue that can be subjectively perceived, related to cancer itself or its treatment, affecting normal physical function [ ]. Studies have shown [ ] that aerobic exercise (such as walking, climbing stairs, etc.) can eliminate and relieve CRF, and psychological counseling as well as medicinal diet can also play a certain role in anti-fatigue effects.

3.2 Symptom Distress and Symptom Clusters

The results showed that the incidence of symptom distress was [percentage]%, with the highest incidence rates in descending order being walking (%), interpersonal relations (%), emotion (%), enjoyment of life (%), and general activity (%). The median symptom distress severity score was [score]. The incidence of distress related to general activity and work after chemotherapy was higher than in this study, while the incidence of distress related to walking was similar to this study [ ]. The most severely distressing domain in this study was enjoyment of life, which was higher than related studies [ ]. This may be because most patients in this study had ovarian cancer, and chemotherapy caused destruction of primordial follicles and damage to follicular maturation, affecting patients' hormone levels. Moreover, as the ovary is women's most important reproductive organ, patients experience greater physical and psychological stress, resulting in lower enjoyment of life.

Factor analysis results showed that this study identified four distinct symptom clusters: emotional symptom cluster, disease symptom cluster, fatigue symptom cluster, and digestive tract symptom cluster. The emotional symptom cluster includes distress, forgetfulness, and sadness, which differs slightly from the findings of Zang et al. [ ] in lung cancer patients. The difference may be due to the different populations included—this study focused on gynecological cancer chemotherapy patients, while Zang et al. studied lung cancer patients—and the different symptom assessment tools used. Previous studies have reached similar conclusions [ ]. Gynecological cancer patients not only face pain from the cancer itself but also endure repeated chemotherapy toxicities, repeated hospitalizations, concerns about later-stage treatment, and financial burdens, all of which can lead to negative emotions. The disease symptom cluster includes shortness of breath, numbness, pain, and dry mouth, which is partially consistent with previous research [ ]. The fatigue symptom cluster includes fatigue, disturbed sleep, and drowsiness. The stable association among these three has been confirmed in clinical studies of cancer patients and may be related to shared physiological mechanisms of inflammatory cytokines [ ]. CRF is also the most common symptom related to cancer itself and various anticancer treatments, and is one of the most distressing symptoms for cancer patients, with [percentage]% of chemotherapy patients experiencing fatigue that lasts for a long time and greatly affects quality of life. The digestive tract symptom cluster includes nausea, loss of appetite, and vomiting, which has been widely confirmed [ ].

3.3 Influencing Factors of Symptom Cluster Severity

Multiple stepwise regression analysis showed that tumor metastasis, family monthly income per capita, recurrence, expected length of hospital stay, number of chemotherapy cycles, chemotherapy regimen, tumor stage, and work status were influencing factors of symptom cluster severity, which is partially consistent with the findings of Zhang et al. [ ]. Patients with tumor metastasis or recurrence had more severe symptom clusters than those without, possibly be-

cause patients with metastasis need to bear additional metastatic symptoms and heavier psychological burden. Lower family monthly income was associated with more severe symptom clusters, which may be related to patients' difficulty in affording high chemotherapy costs [ ]. Patients who were employed had milder symptoms, possibly because work provides greater self-worth recognition and financial security. Chemotherapy cycles, chemotherapy regimen, and tumor stage were also closely related to symptom cluster severity, consistent with Zhang et al. [ ], suggesting that medical staff should select appropriate chemotherapy regimens based on patients' specific conditions.

3.4 Limitations

This study has certain limitations. The symptom assessment tool used was designed for all cancer patients and lacks a gynecology-specific module. Moreover, this was a cross-sectional study that only measured the current status of patient symptom clusters at one time point and did not explore changes in symptom clusters over time. Future research should develop symptom assessment tools with high reliability and validity specifically for gynecological cancer patients and conduct longitudinal studies to explore the changing patterns of symptom clusters over time.

Conflict of Interest Statement: The authors declare no conflict of interest.

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Note: Figure translations are in progress. See original paper for figures.