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Study on the Influencing Factors of Chemotherapeutic-Related Taste Changes in Cancer Patients

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Abstract

Objective: To investigate the current situation of chemotherapy-related taste changes of cancer patients in Jingzhou area, and analyze the influencing factors of chemotherapy-related taste changes of cancer patients. **Methods:** In this study, 233 patients with malignant tumors who were confirmed by pathological examination and expected survival time of more than 6 months after admission to a tertiary general hospital in Jingzhou from January 2018 to October 2018 were selected by convenience sampling method. The Chinese version of The chemotherapy-induced Taste Alternation Scale (CiTAS) was used to investigate the baseline data and occurrence status, and multiple regression analysis was used to explore the influencing factors. **Results:** In this study, 171 tumor patients experienced chemotherapy related taste changes, accounting for 73.4% (171/233); The vast majority of chemotherapy patients have different types and severity of taste changes; Multiple regression analysis showed that the duration of chemotherapy, the number of consecutive days of chemotherapy, and dry mouth were the main influencing factors for chemotherapy related taste changes in cancer patients ($p < 0.05$). **Conclusion:** Nursing personnel should pay attention to the occurrence of chemotherapy-related taste changes in tumor patients, and provide predictive nursing interventions to improve their taste experience for tumor patients who have a long course of chemotherapy, many consecutive days of chemotherapy, or have dry mouth conditions.

Keywords

Cancer Patients, Chemotherapy, Taste Change, Influencing Factors

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1. Introduction

According to statistics, about 3.12 million new cancer patients are added every year in China [1]. Chemotherapy is one of the important means of anti-tumor treatment for tumor patients, but chemotherapy drugs can kill tumor cells and damage normal taste bud cells and other structures, thus causing chemotherapy-related taste changes [2], the incidence of which is as high as 38% - 84% [3]. Once chemotherapy-related taste changes occur in tumor patients, it will not only stimulate negative emotions such as anxiety and psychological pain, but also induce symptoms such as malnutrition, and the severe cases will be affected by treatment interruption [4]. The purpose of this study is to investigate the current situation of chemotherapy-related taste changes in cancer patients and analyze the influencing factors, so as to provide a practical basis for clinical nurses to implement predictive nursing intervention, so as to improve the taste experience of cancer patients undergoing chemotherapy.

2. Research Object

With a convenient sampling method, 233 cancer patients who were to be treated with chemotherapy drugs for more than one course in a tertiary general hospital in Jingzhou City from January 2018 to October 2018 were selected as the study objects. The inclusion criteria of the patients were: 1) pathological diagnosis of malignant tumor; 2) age ≥ 18 years old; 3) chemotherapy; 4) expected survival time > 6 months; 5) clear consciousness of the patients, no language communication and cognitive dysfunction, able to independently complete the questionnaire questions and answers; 6) the patients agreed to accept the survey. Exclusion criteria: 1) patients with concurrent radiotherapy and chemotherapy; 2) patients with oral infection; 3) history of esophageal reflux; 4) those who can't eat by mouth; 5) those who have their own taste disorders.

3. Method

3.1. Research Tools

Including: 1) General information questionnaire: age, gender, nationality, residence, marital status, education level, working status after illness, medical treatment, chemotherapy plan, times of chemotherapy, days of chemotherapy, disease diagnosis, time of diagnosis, tumor stage, pathological type, metastasis, smoking, drinking, dry mouth, olfactory changes and complications. 2) Chinese version of the chemotherapy-induced taste alteration scale (CiTAS) [5]: prepared by Kano *et al.* in 2013 to evaluate the degree of taste alteration of chemotherapy patients. In 2017, Qian Lijing *et al.* authorized by the original author, Sinologized it. The scale includes taste change (6 items), unpleasant taste change (6 items), unpleasant symptoms and problems (6 items), and 18 items in total. The scale uses a Likert5-grade scoring method, from "no" to "very serious" respectively 1 - 5 points, all items are positive scoring. The higher the score is, the more serious the taste change is. The internal consistency coefficient was 0.766

and the retest reliability was 0.705.

3.2. Research Methods

The questionnaire was uniformly trained and explained by the researcher himself to the investigator, and was distributed and recycled on the spot. Before all questionnaires were distributed, the purpose of the study was explained to the patient and the caregiver to obtain the understanding and cooperation of the patient and the family members. When the respondents' physical, visual or educational level affects their answers, they should get the consent of the respondents, and read and explain the questions by the investigator. After the respondents understand and make a choice, they are authorized to fill in the questions on behalf of the investigator. In fact, 240 questionnaires were sent out and 233 effective questionnaires were recovered, the effective rate was 97.08%.

3.3. Statistical Methods

SPSS 19.0 statistical software was used to analyze the data. Frequency and percentage were used to describe the counting data, mean and standard deviation were used to describe the measurement data, and multiple linear regression was used to analyze the main influencing factors of chemotherapy-related taste changes, $p < 0.05$.

4. Results

4.1. General Information

In this study, 233 tumor patients participated in the investigation; 130 patients with dry mouth, 103 patients without dry mouth; 63 cases had olfactory changes and 170 cases had no olfactory changes. See Table 1 for other general information.

4.2. Current Status of Chemotherapy-Related Taste Changes

Among 233 cases, only 62 tumor patients did not have chemotherapy-related taste changes. Most of the chemotherapy patients had taste changes of different types and severity, as shown in Table 2.

4.3. Analysis of Influencing Factors

The results of logistic regression analysis showed that the duration of chemotherapy, the days of continuous medication, and dry mouth were the influencing factors for chemotherapy-related taste changes, as shown in Table 3.

5. Discussion

Of 233 patients, only 62 patients did not have chemotherapy-related taste changes, accounting for 26.6%. It can be seen that the incidence of chemotherapy-related taste changes in cancer patients is quite high. Paying attention to the taste changes of patients with cancer chemotherapy is the basis of tumor symp-

tom management, and also the key link to ensure the effect of chemotherapy [6]. The influencing factors of chemotherapy related taste changes in cancer patients were analyzed as follows.

Table 1. General information of 233 tumor patients.

Project		Number of cases (n)	Percentage (%)
Gender	female	95	40.77
	male	138	59.23
Age	<60 years old	127	54.51
	Over 60 years old	106	45.49
Nation	Han nationality	229	98.28
	Ethnic minority	4	1.72
Place of residence	City	56	24.03
	countryside	177	75.97
Marital status	unmarried	6	2.58
	married	213	91.42
	Divorce	6	2.58
	Widowed spouse	8	3.42
Degree of education	illiteracy	8	3.42
	primary school	95	40.78
	junior high school	87	37.34
	High school/technical secondary school	38	16.31
	College/University	5	2.15
Mode of seeking medical treatment	Medical insurance for residents	77	33.05
	Rural cooperative medical care	145	62.23
	Commercial insurance	1	0.43
	At their own expense	10	4.29

Table 2. 233 cases of tumor patients with chemotherapy-related taste changes.

Taste change type	Number of cases (n)	Percentage (%)	CiTAS score ($\overline{x} \pm s$)
No change	62	26.6	19.97 ± 0.275
Bad taste	53	22.7	22.91 ± 0.292
Absence of taste	41	17.6	23.66 ± 0.304
Phantom taste	36	15.5	23.14 ± 0.363
Hypofunction	31	13.3	23.39 ± 0.406
Gustatory error	10	4.3	22.60 ± 0.806

Table 3. Multiple regression analysis results of influencing factors of chemotherapy-related taste changes in tumor patients.

Item	β	S.E	Wald value	OR value	p value	95% CI
Constant term	−3.932	1.245	9.979	0.020	0.002*	
Age	−0.362	0.368	0.965	0.697	0.326	0.339 - 1.433
Course of disease	0.291	0.275	1.113	1.337	0.291	0.779 - 2.295
Course of treatment	1.379	0.389	12.557	3.969	0.000*	1.852 - 8.509
Days of medication	0.664	0.200	11.007	1.942	0.001*	1.312 - 2.874
Chemotherapy regimen	0.369	0.391	0.891	1.446	0.345	0.672 - 3.112
Smoking or drinking	−20.285	27604.277	0.000	0.000	0.999	0.000 - 0.000
Dry mouth or not	0.951	0.342	7.758	2.590	0.005*	1.326 - 5.058
Transfer or not	0.085	0.358	0.058	1.089	0.813	0.539 - 2.197

Note: "*" is $p < 0.05$, the difference is statistically significant.

5.1. Chemotherapy Time

The results of this study show that most cancer patients will have different degrees of taste changes at the beginning of chemotherapy, and its severity will gradually increase with the passage of time, until the most serious 3 - 5 days after chemotherapy. Previous studies have reported that chemotherapy-related taste changes may occur in cancer patients during chemotherapy or during the interval of chemotherapy, lasting for several hours or days or months [7], the most serious 5 - 7 days after general chemotherapy [8]. It can be seen that the results of this study show that the most serious change in chemotherapy-related taste is a little earlier than 1 - 2 days. The analysis of the causes may be related to the strengthening of health education for cancer chemotherapy patients by the specialized nurses of the oncology department, so that they gradually improve their awareness of the change in chemotherapy-related taste. Domestic research shows that chemotherapy related taste changes are usually temporary, and patients can gradually return to normal after chemotherapy, with a recovery time of about 6 months [9].

5.2. Whether There Are Complications

Based on the analysis of the results of this study, whether there is dry mouth in tumor patients is the influencing factor of chemotherapy-related taste changes, which is consistent with the conclusion of Qian Lijing and other researchers. The results showed that the type and degree of taste changes were related to dry mouth, olfactory changes and hypertension before chemotherapy. However, it is not clear that the mechanism of xerostomia is related to the decrease of saliva and the limitation of chemical receptors. Rich saliva can provide an ionic environment for taste cells to sense signals and conduct them. Chemotherapy drugs arrive at taste cells in the mouth with blood, producing bad taste, such as salty,

bitter or metallic taste [10]. Salivary gland is a very sensitive gland to chemotherapy drugs [11]. Once stimulated by chemotherapy drugs, the gland at the initial stage shows an increase in secretions and oral secretions, which can take away some bad taste. However, the serious damage of chemotherapy drugs to normal salivary gland cells has been irreversible, resulting in the decline of salivary secretion function, and finally, there is a small amount of saliva and viscosity, xerostomia, deterioration of chemotherapy-related taste changes in cancer patients [12]. In addition, relevant domestic research shows that the sensitivity of tumor patients with hypertension and diabetes to sweet and salty tastes is significantly lower than that of healthy people, which may cause tumor patients to take more sugar, salt or condiment, which may aggravate the degree of chemotherapy-related taste change of tumor patients [13].

5.3. Other Factors

The results of this study show that whether or not chemotherapy-related taste changes occur in cancer patients and the severity is not related to gender and age, which is consistent with the results of investigation and analysis by Qian Lijing and other domestic researchers [5], but through histological research, foreign researchers found that women have more fungiform taste buds and taste pores than men, and confirmed that women's sensitivity to taste is indeed higher than men's [14]. McGreevy J and other research report that the change of taste in female patients is often more serious than that in male patients, and with the increase of age, the degree of taste change will decrease [15]. The analysis of the reasons may be related to the gender and age distribution proportion of the study subjects. Early studies have pointed out that the incidence and duration of chemotherapy-related taste changes are different in patients with different tumor types [16]; when patients with head and neck tumors receive chemotherapy combined with radiotherapy, the incidence of taste changes increases, the occurrence time is earlier, and the duration is longer [17]. This study involves a large number of tumor types, and the sample size of some tumor types may be insufficient. Moreover, the inclusion criteria limit the inclusion of tumor patients undergoing concurrent radiotherapy and chemotherapy, leading to a certain deviation in the results of this study.

6. Summary

The nurses should pay more attention to the changes in taste in patients with cancer, effectively intervene and control the occurrence of xerostomia, chemotherapy or other complications, and improve the taste experience of patients with cancer chemotherapy. At the same time, we should pay attention to the compliance and tolerance of patients' chemotherapy plans, chemotherapy course and days of continuous chemotherapy, establish multi-disciplinary medical cooperation, give systematic and personalized predictive nursing intervention strategies in time, and reduce the occurrence of chemotherapy-related taste

changes of tumor patients. However, most of the cases in this survey are treated with several drugs combined with chemotherapy, and no single chemotherapy drug is involved. Whether there is a difference in chemotherapy-related taste changes of tumor patients caused by different chemotherapy drugs remains to be further studied.

States

The human data in this study were conducted according to the Helsinki Declaration with the informed consent of the patient. There are no interests or disputes in this article.

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