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Effect of Education About Oral Mucositis Given to the Cancer Patients Having Chemotherapy on Life Quality

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Abstract The study was aimed to determine the effect of education cancer patients receiving chemotherapy for prevention of oral mucositis on the quality of life. A total of 60 patients including 30 patients each in education and control groups were included in this randomized controlled study. On the first day of study, Oral Assessment Guide and EORTC QLQ-C30 Version 3.0 were applied to both groups and also it was trained only the education group for the prevention of oral mucositis and explained Patient Education Booklet. The oral mucosae of both groups were evaluated with Oral Assessment Guide on the 5th, 10th, 15th, and 21st day of chemotherapy. EORTC QLQ-C30 Version 3.0 was again applied to them on the 15th day and on the 21st day of treatment. The frequency of oral mucositis in the education group was less than the control group ($p < 0.05$). The patients' quality of life in the education group in the fields of functional and general health status was higher than the control group and the mean of their symptom score was also lower than control group ($p < 0.05$). The education to be provided training for the patient can have an important role in preventing oral mucositis developed due to chemotherapy.

Keywords Mucositis · Education · Nursing

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Introduction

In recent years, remarkable progresses in the treatment of malignant diseases have been made and the cancer patients' prognosis has significantly been improved. However, its clinical importance continues to have become a major problem for health professionals since the adverse effects caused by cancer therapy influence negatively quality of life. Oral mucositis among these adverse effects affects about 15 to 40% of the patients treated with standard-dose chemotherapy [1, 2]. Its symptoms are usually manifested within 3 to 5 days after the initiation of chemotherapy. Treatment-related oral mucositis has reached its peak intensity within 7 to 14 days. Unless an infection is advanced, it is slowly declining and complete recovery may last approximately 2 to 3 weeks [3].

The development of oral mucositis may depend on coexistence of risk factors related to the patient oneself and treatment regimen. In the occurrence of oral mucositis, it can consider the reasons such as gender, age, oral health, nutritional status, tumor type, smoking and alcohol use, and neutrophil counts during the treatment and before treatment among the major risk factors concerning patients. Besides, treatment-related risk factors are known as the chemotherapy protocol used, dose of therapy and its route of admistration, neutrophil count, and also the use of different drugs with chemotherapy. There are 5-fluorouracil (5-FU), cisplatin, etoposide, doxorubicin, vinblastine, taxanes, and methotrexate among the most common chemotherapeutic agents that cause the develepment of oral mucositis. Peak phase of oral mucositis is a time when the patients are most symptomatic. The individuals' quality of life (QoL) can reduce owing to bio-psycho-social problems such as nutrition problems, speech impediment, having difficultly in communication, a reduction in fluid intake, change in comfort due to pain, impaired body image and decreased self-esteem, which occur at peak phase of oral mucositis. It is often

emphasized that it affects adversely their QoL by challenging oral mucositis to patients' physical, social and psychological functions [4, 5]. Aydın et al. are found that the most common symptom in patients receiving chemotherapy is dryness of the mouth capable of leading oral mucositis (73.5%) and QoL for 89.4% of patients is impaired in a moderate to severe manner because of these symptoms [6]. As stated in Cheng's study (2007), difficulty in chewing, swallowing, eating and drinking caused by severe oral mucositis may negatively affect the patients' daily life and reduce their QoL [1].

Furthermore, oral mucositis is a preventable symptom although it creates negative effects in the individuals. It has been indicated that patients' awareness of risk factors prior to treatment, and the use of oral care protocols during chemotherapy, reduce significantly the incidence of chemotherapy, improve the condition of the oral mucosa and decrease the incidence of oral complications [7].

The appearance of oral symptoms caused by most of cancer treatment gives priority to the patients' oral health care, as well as to medical treatment to be administered. In a study conducted by Honnor and Law (2002), it is established that oral problems have identified earlier and their treatment has lasted for a shorter time, when new applications (use of oral assessment scale, development of guidelines related to oral care and preparation of patient information booklet) bring to prevent oral problems of cancer patients and to improve the quality of oral care [8].

In prevention of the developed oral mucositis related to chemotherapy, continuity of patient education and maintaining an approach to be allowed a continuous communication with the patient can be important in determining and preventing the development of oral mucositis at an early stage. So, it will also be able to enhance the patients' QoL. The current study was conducted to determine the effect of education cancer patients receiving chemotherapy for prevention of oral mucositis on the QoL.

Methods

This randomized controlled study was carried out at chemotherapy outpatient units of two university hospitals and a public hospital. Education and control groups were created in the study. Thirty patients were included in each of the education and control groups.

Participants

To include in the study, the patients must have certain criteria such as being over the age of 18, receiving chemotherapy for the first time, not receiving any education related to oral mucositis previously, having physical and cognitive health level, which is suitable to answer forms to be planned the implementation in the study. It is paid attention that the patients including in the education and control groups are similar with regard to smoking status, presence of dental problems and chemotherapy protocol.

Instruments

Data were collected by "Personal Information Form", "EORTC QLQ-C30 Version 3.0 Scale for Assessing Quality of Life in Cancer Patients" and "Oral Assessment Guide." Personel Information Form was created as a result of the literature research on the subject with the aim of determining some socio-demographic, disease and treatment-related characteristics. EORTC QLQ-C30 Version 3.0 Scale for Assessing Quality of Life in Cancer Patients was developed by European Organization for Research and Treatment of Cancer (EORTC). The translation of the scale into Turkish version in our country, and its reliability and validity studies were conducted by Güzelant et al., and all the subscales met the minimal standards of reliability (Cronbach's alpha ≥ 0.70) [21]. The scale is comprised of three subheadings and 30 questions, including general well-being, functional difficulties, and symptom control. Oral Assessment Guide, which was developed by Eirlers et al. (1988) and tested its validity and reliability for Turkish Society by Güzelant et al., is comprised of eight categories (voice, ability to swallow, lips, tongue, saliva, mucous membrane, gingiva, teeth, or dentures) [21, 22].

Interventions and Data Collection

Firstly, Patient Education Booklet was prepared by researchers [7, 9–11]. This Patient Education Booklet includes nutritional recommendations necessary for adopting during chemotherapy in order to prevent the development of oral mucositis, the recommendations to be referred to when occurred dryness of the mouth, the recommendations on problems such as taste and smell changes, the recommendations for tooth brushing and use of dental floss technique, preparation of sodium bicarbonate/saline solution to be used in oral care and information about the daily oral mucosa assessment guidelines. Oral Assessment Guide and EORTC QLQ-C30 Version 3.0 were applied to both groups on the first day of study. On the first day of treatment, it was trained the education group for the prevention of oral mucositis, and explained Patient Education Booklet to the patient and his/her relatives. Routine nursing interventions were applied to the patients in the control group. The oral mucosae of both groups were evaluated by means of Oral Assessment Guide on the 5th, 10th, 15th, and 21st day of chemotherapy. In the meantime, information about which the patients in the education group need oral mucositis was provided via phone or face to face interview. EORTC QLQ-C30 Version 3.0 was again applied to them on the 15th day when chemotherapy symptoms

intensified and on the 21st day when the patients came to receive second course of treatment. During this study, it was not intervened in the care and treatment of individuals in education and control groups.

Data Analysis

Statistical evaluation was assessed with chi-square analysis, Mann-Whitney *U* Test, number and percentage, mean, standard deviation and median [min-max] values. $p < 0.05$ was taken as the level of statistical significance.

Results

The average age of individuals in the education group was 55.4 ± 15.2; 66.7% of them were women; 70% of them were married; 53.3% of them were literate or primary school graduate; 96.7% of them were living together their family. The average age of individuals in the control group was 58.1 ± 14.1; 50% of them was women; 76.7% of them was married; 60% of them was literate or primary school graduate and all of them was living together their family ($p > 0.05$).

Patients in the education and control groups had similar risk factors (used chemotherapeutic agents, comorbidit, oxygenotherapy, cortisol treatment, dental prosthesis, tooth brushing habit, smoking, use of alcohol, number of dairy meal, commonly consumed food, the amount of water consumed per day) of the development of oral mucositis.

It was determined that there is a statistically significant difference between the education and control groups of degree of oral mucositis on the 5th day ($p = 0.003$), 10th day ($p = 0.003$), 15th day ($p < 0.001$), and 21st day ($p < 0.001$) of treatment (Table 1).

It was found to be a statistically significant difference between education and control groups in terms of experiencing the following symptoms; "reduced saliva" on the 5th day of treatment ($p = 0.005$), "difficulty swallowing" on the 5th day of treatment ($p = 0.018$) and "deterioration in taste" on the 5th day of treatment ($p = 0.004$) (Table 2).

In Functional Subscale of EORTC QLQ-C36 Scale for Assessing Quality of Life in Cancer Patients, it was found that changes in time difference between the two groups are a statistically significant ($p = 0.017$). It was determined that the average of functional scores of patients in education group is 79.41 ± 15.78, and this average in control group is 81.09 ± 17.76 on the first day of treatment. It was also determined that the average of functional score in control group is less than those in education group on the 15th day and 21st day of treatment ($p < 0.05$) (Table 3).

In Symptom Subscale, it was found that changes in time difference between the two groups are a statistically significant ($p = 0.044$). It was found that the average of symptom scores of patients in education group is 14.49 ± 12.80, and this average in control group is 17.09 ± 13.08 on the first day of treatment. It was also found that the average of symptom score in control group is greater than those in education group on the 15th day and 21st day of treatment ($p < 0.05$) (Table 3).

In General Health Status Subscale, it was found that changes in time difference between the two groups are a statistically significant ($p < 0.001$). It was found that the average of general health scores of patients in education group is 67.50 ± 16.28, and this average in control group is 70.83 ± 17.47 on the first day of treatment. It was also detected that the average of general health score in control group is less than those in education group on the 15th day and 21st day of treatment ($p < 0.001$) (Table 3).

Discussion

We determined that oral mucositis, to varying degrees, develops depending on chemotherapy in oral mucosa assessment of patients included in the scope of this study on the 5th, 10th, 15th and 21st days of treatment. It has been seen that symptoms related to oral mucositis in both groups began to appear on the 5th day of treatment and its incidence and degree increased on the 10th and 15th days as compared to other days. As the treatment days progress, it has been determined that the incidence and degree of oral mucositis in patients of control group were more than that in those of education group.

Elting et al. (2003) have expressed that patients in 37% of 1236 chemotherapy cures experienced oral mucositis to varying degrees [4]. Cheng et al. (2012) have suggested that grade 1 and grade 2 oral mucositis, and grade 3 and grade 4 oral mucositis developed, respectively, in 23 and 18% of 140 patients receiving chemotherapy, in oral mucosa assessment on the 7th and 14th days of treatment [12]. It has been thought that a provision of regular education associated with oral health care for the education group with the purpose of the prevention of oral mucositis was the reason why oral mucositis in the education group less frequently experienced and mucosal healing in the education group was faster than that in the control group.

Taking into account, risk factors associated with the development of oral mucositis patients in the education and control groups had similar risk factors. It has been reported in the studies carried out so far that some personal characteristics such as teeth brushing habits, daily water consumption, any dental problems before chemotherapy, dietary habits, use of alcohol and smoking, as well as the chemotherapeutic agents, also contributed to the development of oral mucositis [13–15]. It has been thought that the lack of difference in terms of patient- and treatment-related risk factors and treatment between the groups in our study was important to show the effect of oral health care protocol to be applied, regardless of the

Table 1 Distribution of degrees of oral mucositis in education and control group

Degree of oral mucositis	Assessment days															
	5th day				10th day				15th day				21st day			
	Education group (*n*:30)		Control group (*n*:30)		Education group (*n*:30)		Control group (*n*:30)		Education group (*n*:30)		Control group (*n*:30)		Education group (*n*:30)		Control group (*n*:30)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
No mucositis	24	68.6	11	31.4	18	75.0	6	25.0	20	76.9	6	23.1	25	80.6	6	19.4
1st degree	3	20.0	12	80.0	7	63.6	4	36.4	6	66.7	3	33.3	3	30.0	7	70.0
2nd degree	3	30.0	7	70.0	5	26.3	14	73.7	4	25.0	12	75.0	2	16.7	10	83.3
3th degree	0	0.0	0	0.0	0	0.0	6	100.0	0	0.0	9	100.0	0	0.0	7	100.0
4th degree	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
p	$p = 0.003$				$p = 0.003$				$p < 0.001$				$p < 0.001$			

effect which potent risk factors for the development of oral mucositis would cause.

It has been determined that oral complications associated with oral mucositis in the findings of our education and control groups were found to be the reduced saliva, deterioration in taste and difficulty in swallowing, and that these symptoms more often experienced in patients of control groups than in the others. In paralel with our findings, Cheng et al. (2012) have been reported that 60 to 80% of patients participating in their study complained about the pain caused by oral mucositis, difficulty in swallowing and difficulty speaking (aphasia) [12]. Some other studies have also reported that the most severe oral complications accompanied by oral mucositis were associated with the pain, reduced saliva and difficulty in swallowing [12, 16, 17]. It has been thought that a provision of regular education associated with oral health care was the reason why the incidence of symptoms such as the pain occurring in the oral mucosa related to oral mucositis, reduced saliva and difficulty in swallowing experienced more in control group.

It has been determined that the mean QoL scores for patients in both groups on the 15th and 21st days of treatment was low when compared to those on the first day of treatment, and that the QoL scores for patients in control group was lower than those in education group. It has been established that depending on observing more often the symptoms experienced in the control group on the 15th day of treatment, the mean of symptom scores for patients in this group was more than those in the education group and their general health status was worse than those in the education group. It was determined that the mean of symptom scores for patients in education group on the 21st of treatment fell more than those on the first and 15th days, and hence the mean of their functional score

Table 2 Patients experience the symptoms according to assessment days

Symptom	Assessment days									
	Before treatment		5th day		10th day		15th day		21st day	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Reduced saliva										
Education group (*n*:30)	4	57.1	23	52.3	21	45.6	9	27.3	2	9.5
Control group (*n*:30)	3	42.9	21	47.7	25	54.4	24	72.7	19	90.5
p	0.005									
Difficulty in swallowing										
Education group (*n*:30)	4	80.0	3	33.3	2	12.5	3	17.6	2	13.3
Control group (*n*:30)	1	20.0	6	66.7	14	87.5	14	82.4	13	86.7
p	0.018									
Deterioration in taste										
Education group (*n*:30)	2	66.7	13	39.4	26	48.1	17	37.8	3	10.0
Control group (*n*:30)	1	33.3	20	60.6	28	51.9	28	62.2	27	90.0
p	0.004									

Table 3 Distribution of means of EORTC QLQ-C30 Version 3.0 Scale for Assessing Quality of Life in Cancer Patients subscale score of individuals in training and control groups before treatment and on the 15th and 21st days of treatment

Days assessed	Means of EORTC QLQ-C30 Version 3.0 Scale for Assessing Quality of Life in Cancer Patients Subscale Score					
	Mean of functional score ± SD		Mean of symptom score ± SD		Mean of general health score ± SD	
	Education group (*n*:30)	Control group (*n*:30)	Education group (*n*:30)	Control group (*n*:30)	Education group (*n*:30)	Control group (*n*:30)
1st day	79.41 ± 15.78	81.09 ± 17.76	14.49 ± 12.80	17.09 ± 13.08	67.50 ± 16.28	70.83 ± 17.47
15th day	67.30 ± 13.18	60.10 ± 18.14	28.84 ± 15.13	37.11 ± 18.58	58.04 ± 13.40	43.92 ± 15.89
21st day	79.68 ± 12.68	68.46 ± 18.01	16.07 ± 14.37	28.50 ± 18.30	75.73 ± 15.18	51.26 ± 18.08
p	0.017		0.044		<0.001	

and general health status also increased. In addition, it has been found that both the mean of their functional scores and of their general health status was low, depending on experienced more often the symptoms for patients in the control group. In agreement with our study findings, Bektaş (2005) reports that cancer led to the limitations in the relevant areas associated with, in particular, physical functions, psychological functions, general well-being and social functions of the patients, and the patients included in the study had poor functional status [18].

Depending on the cancer therapy, the patients have problems related to oral mucositis, dysphagia, pain, nausea, vomiting, diarrhea, constipation, and feeding. In relation to all these, their immune response and tolerance to treatment decrease, their anxiety and depression are increasing, their social relationships decrease, their self-care ability and personel performance worsen, and because of all these reasons, the QoL for patients have reduced [19]. The reason for declining the functional subscale and general health status scores of patients in both groups as the treatment days progress was that the patients' self-care ability and performance decrease as a result of being intensified oral complications such as fatigue, pain, poor appetite, nausea, vomiting, diarrhea, constipation, and oral mucositis due to chemotherapy, and therefore, that it can be attributed that they lead the patients to have physical, social and economical problems. As a result of providing the regular education associated with oral mucositis for patients in the education group, a decrease seen in the incidence of symptoms such as oral mucositis, pain in the oral mucosa, reduced saliva, difficulty in swallowing, nausea, womiting and poor appetite can be explained why the QoL in the control group is lower than those in the education group.

Our study reports that the patients who have not been adequately informed about chemotherapy and its adverse effects more often had the problems than those training for oral mucositis and symptom control associated with oral mucositis, they experienced more severe adverse effects of treatment in oral mucosa they received, and their QOL affects adversely because of these symptoms. In accordance with our findings, Mollaoğlu et al. (2014) state that intensity of mouth and throat problems associated with chemotherapy significantly decreased in the patients providing a planned education [20].

Conclusion

By taking into consideration adverse effects of oral mucositis and its concomitant symptoms on the patient's QoL, the incidence of oral mucositis can be reduced, if nurses are informed patients and their families about oral health care principles, given consultation to them and provided education for them during chemotherapy.

Compliance with Ethical Standards The study was approved by the Mersin University Clinic Researches Ethics Committee and the institutions where the study was conducted. Verbal and written informed consent was obtained from patients.

Conflict of Interest The authors declare that they have no conflict of interest.

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