



Effect of oral hygiene education to mothers on stomatitis induced by chemical therapy in cancer children: A quasi-experimental study

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Abstract

Background: Stomatitis is considered as one of the most important acute complications of chemical therapy. Due to the problems and complications of stomatitis, it is very important to prevent it during chemotherapy. This study explored the effect of oral hygiene education to mothers on stomatitis induced by chemical therapy in cancer children.

Methods: The present quasi-experimental research was conducted on 69 mothers with cancer children undergoing chemotherapy hospitalized in a pediatric oncology ward. The mothers were randomly assigned into case and control groups. Oral hygiene pedagogy was delivered face to face. The severity of stomatitis was assessed using the World Health Organization (WHO) checklist once on day 1 of chemotherapy and then on days 7 and 14 after chemotherapy in both groups. The gleaned Data were statistically analyzed using *t* test, Mann-Whitney test, and χ^2 test.

Results: The mean degree of stomatitis on the seventh and fourteenth days after chemotherapy was 0.71 ± 0.52 and 0.32 ± 0.63 in the experimental group and 1.46 ± 0.61 and 2.74 ± 0.92 in the control group, respectively. A significant difference existed between the intensity of stomatitis after education to mothers in the two groups ($P=0.001$).

Conclusion: Oral hygiene education to mothers exerted an effect on the severity of stomatitis induced by chemical therapy in cancer children and reduced it on days 7 and 14 after chemotherapy. It is necessary for nurses to control oral hygiene status of these children and the severity of stomatitis every day.

Keywords: Oral hygiene, Stomatitis, Chemotherapy, Children, Education

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Introduction

Cancer is one of the most prevalent etiologies of mortality in children in developed and developing countries.¹ Childhood cancers are sporadic and are responsible for only 1% of new cancer cases; nonetheless, they serve as the second major cause of mortality in children 5 to 14 years of age.^{2,3} Chemotherapy is a systemic treatment and has short-term and long-term complications on most body systems.⁴ Stomatitis is one of the most important acute complications of chemotherapy and its prevalence is between 30 and 75%. Children are three times more likely than adults to develop this complication due to their cell formation.⁵ Stomatitis causes pain and reduction or cessation of oral nutrition leading to weight loss and malnutrition. It promotes the risk of systemic sepsis and length of hospitalization. Speaking and the expression of nonverbal emotions such as laughing also become

difficult. These conditions continuously reduce the patient's quality of life and may even endanger their life by making them delay or discontinue chemotherapy.⁶⁻⁹ There are different protocols of oral care for prevention of complications of chemotherapy, but some of them have been useful.⁶ Between 31% and 51% of patients undergoing standard chemotherapy protocol experience stomatitis.¹⁰ In severe cases, it may cause the doctor to stop treatment or the patient to avoid continuing treatment with chemotherapy.¹¹ Due to the complications of stomatitis, prevention of it in children undergoing chemotherapy is very important.¹² Oral hygiene reduces the growth of bacteria.¹³ The maternal role in the caregiving of sick children is very effective.¹ They need the ability, knowledge and skills to take care of their children.¹³ Maintaining oral care requires motivation to carry out these methods correctly.¹⁴ Therefore,



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teaching oral hygiene to mothers increases their ability to take care of the mouth and teeth of their children.¹⁵ Considering the active role of mothers in child care and the importance of oral hygiene and health of children undergoing chemotherapy, this study was carried out to explore the impact of oral hygiene instruction to mothers on chemotherapy-induced stomatitis in cancer children.

Methods

This quasi-experimental research was carried out on 69 mothers with cancer children undergoing chemotherapy hospitalized in the pediatric oncology ward of Shahid Sadoughi Hospital in Yazd (Iran) selected using purposive sampling. The mothers were randomly assigned into case and control groups using Random Allocation Software.

The inclusion criteria included willingness to participate in this research, having mental and physical health, having the ability to communicate verbally (fluency in Persian), having a minimum level of primary education, not having attended special training courses related to oral health in the past, non-employment of the mothers as a health care worker, having a child aged 5-15 years with a definitive diagnosis of cancer undergoing chemotherapy, the absence of other underlying diseases, such as diabetes, heart disease, kidney, liver, immune system defects, previous history of cancers other than leukemia and related tumors in the child, not having congenital problems and previous oral diseases and not undergoing radiotherapy. Exclusion criteria included unwillingness of the mothers to continue their participation in the study, lack of access to the subjects in the second stage of the study, death of the child, and the use of other treatments in addition to chemotherapy.

The demographic questionnaire and consent form were given to the mothers. All items were fully explained to them. The intervention included holding three training sessions 1–1.5 hours long during one week before chemotherapy. The educational content in these sessions included general oral care, principles of dental disease prevention, importance of oral hygiene during treatment, physiological changes of the mouth during chemotherapy, using a soft toothbrush, avoiding use of dental floss and toothpicks and use of mouthwash solutions. Face-to-face training (lectures and questions and answers) was given to the mothers by a dentist. Then, their acquired information on how to observe the oral hygiene of their children was evaluated by asking them questions. In order to examine the mouth of the children for stomatitis, the dentist examined the status of stomatitis with the standard tool of the World Health Organization (WHO). This is a standard tool and its validity and reliability have been measured several times in Iran and other countries.¹³ The grading included grade zero: no stomatitis, grade one: pain and redness of the mouth without ulcers, grade two: presence of sores and redness in the mouth and ability

to eat solid foods, grade three: sores and red patches in the mouth and lack of ability to ingest solid foods, grade four: the most severe form of stomatitis with extensive bleeding and inflammation and inability to eat and drink fluids or take medications.

The mothers were educated in three sessions in one week before chemotherapy. The severity of stomatitis was assessed once on the first day of chemotherapy and then on days 7 and 14 after chemotherapy in the intervention group. The control group was treated and cared for according to routine procedures. According to the dentist's recommendation, all patients in both groups used routine mouthwash solution and Benzylamine HCL three to four times a day and after meals. They were taught that not to consume water or food for at least an hour after rinsing.

Data were analyzed with SPSS version 21 using paired *t* test, χ^2 , and Mann-Whitney test ($P < 0.05$).

Results

No statistically significant disparity was observed between the two groups regarding individual characteristics such as occupation, education level, age and being local. The mean maternal age was 34.21 ± 6.07 years in case group and 33.54 ± 6.23 years in control group ($P = 0.65$). Also, the mean pediatric age was 7.35 ± 2.37 years in the case group and 6.49 ± 2.26 years in the control group ($P = 0.12$).

Table 1 shows that no statistically significant difference existed between the two groups regarding intensity of chemotherapy-induced stomatitis in the studied children (on first day of chemical therapy) using the Fisher test ($P = 0.23$).

Moreover, χ^2 indicated a significant difference between the two groups regarding severity of stomatitis caused by chemotherapy in the children under study on the seventh day after the intervention ($P = 0.001$; Table 2).

Table 3 suggests that according to the Fisher test, a significant difference was seen between the two groups regarding severity of chemotherapy-induced stomatitis in the studied children on the 14th day after chemical therapy ($P = 0.001$).

Table 4 demonstrates that on days 7 and 14 after chemotherapy, a significant difference was indicated between the two groups. In the control group and the fourteenth day, the severity of stomatitis was significantly higher ($P = 0.001$).

Table 1. Comparison of the severity of chemotherapy-induced stomatitis in the two groups of children on the first day of chemotherapy

Variable	Control group		Intervention group		<i>P</i>
	Percent	Frequency	Percent	Frequency	
Stomatitis Severity					
Zero	91.4	32	100	34	0.23
One	8.6	3	0	0	

Table 2. Comparison of the severity of chemotherapy-induced stomatitis in the two groups of children on seven days after chemotherapy

Variable	Intervention group		Control group		P
	Frequency	Percent	Frequency	Percent	
Stomatitis severity					
Zero	11	32.4	1	2.9	0.001
One	22	64.7	18	54.1	
Two	1	2.9	15	42.9	
Three	0	0	1	2.9	

Discussion

In this research, oral hygiene education has been shown to reduce the severity of stomatitis in children undergoing chemotherapy. The comparison of the degree of chemotherapy-induced stomatitis in the studied children on the first day of the chemotherapy did not suggest any statistically significant disparity between the two groups, but on day 7 after the chemotherapy, this difference was significant. Stomatitis is a serious complication of chemotherapy.¹⁶ The occurrence of stomatitis in children is higher than adults, which can be attributed to the high rate of regeneration of mucosal cells and changes in immunological response and resistance.¹⁷ Yavuz and Yilmaz referred to a significant disparity between the occurrence of mucositis before and after training¹⁸; this is consistent with our findings. The examination of the severity of stomatitis in three stages revealed a significant difference on days 7 and 14 ($P=0.001$) and education to mothers was effective in diminishing the intensity of stomatitis in their children. Studies emphasized that educating the patient is important in diminishing the occurrence of oral mucositis and stomatitis induced by cytotoxic agents.¹⁹⁻²¹ Most patients do not receive proper training for oral mucosal management. Therefore, nursing officials and planners should prepare nursing staff for the special care and support of cancer children.²² Oral care is important as a complementary method to prevent and manage oral mucositis, so health care professionals should educate parents and their children about oral health benefits, but this is often overlooked.²³ Arshadi Bostanabad et al reported that many of patients in pediatric oncology wards did not get enough training about oral mucosal care.²² Nurses are effective in preventing of oral mucositis. Patient pedagogy is also a noticeable constituent of care provided in cooperation with the health care team to meet patient requirements.²⁴ Training on oral mucositis reduces the degree of mucositis and increases quality of life of patients.²⁵ In this research, the children in case group had lower intensity of stomatitis on the seventh and fourteenth days after chemotherapy than the control group. Oral mucous membranes are often damaged between days 7 and 14 after cytotoxic treatment, causing pain and burning sensation.²⁶ Patients with cancer usually manifest symptoms 4 or 5

Table 3. Comparison of the severity of chemotherapy-induced stomatitis in the two groups of children on 14 days after chemotherapy

Variable	Control group		Intervention group		z	P
	Percent	Frequency	Percent	Frequency		
Stomatitis severity						
Zero	0	0	73.5	25	0	0.001
One	11.4	4	23.5	8		
Two	22.9	8	0	0		
Three	45.7	16	2.9	1		
Four	20	7	0	0		

Table 4. Comparison of the mean degree of stomatitis on the first, seventh, and fourteenth days after chemotherapy in the studied children

Degree of Stomatitis	Intervention group Mean \pm SD	Control group Mean \pm SD	P
First day	0.00	0.09 \pm 0.28	0.08
Seventh day	0.71 \pm 0.52	1.46 \pm 0.61	0.001
14 th day	0.32 \pm 0.63	2.74 \pm 0.92	0.001

days after starting chemical therapy, which peaks on the tenth day and then slowly resolves over several weeks.²⁷ Stomatitis can be prevented in the next period if it can be reduced in the first week after treatment. In one study, children who were trained on the fifth and seventh days of chemotherapy had a lower degree of oral mucosal damage.¹⁸ In this study, it was found that education of mothers can reduce the severity of stomatitis in sick children, which is consistent with the study of Yavuz and Yilmaz.¹⁸ Dentists, physicians, and nurses should be informed of the complications of stomatitis in children and inform mothers about oral hygiene techniques and care for prevention of this problem.

This research was performed in a hospital. Therefore, caution should be taken in generalizing the results to all patients. Also, it included all types of pediatric cancer and different treatment protocols, which may affect the patient's various symptoms. Despite these limitations, the results of this study provided important information about the impact of oral care instruction on mothers to reduce the intensity of stomatitis in children undergoing chemotherapy. It is suggested that a specific type of cancer or a specific treatment protocol be considered in future research.

Conclusion

Oral hygiene education to mothers affected the severity of stomatitis caused by chemical therapy in cancer children and reduced it on days 7 and 14 after chemotherapy. It is recommended that mothers and sick children be educated from the first day of hospitalization in the oncology ward. It is also necessary for nurses to check oral hygiene status of cancer children and the severity of stomatitis every day.

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Authors' Contribution

Conceptualization: All authors

Data Curation: All authors

Investigation: All authors

Formal Analysis: All authors

Methodology: All authors

Writing- Original Draft: All authors

Writing- Review & Editing: All authors

Competing Interests

The authors have declared that no conflict of interest exists.

Data Availability Statement

Data will be available by request to the corresponding author.

Ethical Approval

The study proposal was confirmed by The Committee of Ethics in Human Research at Shahid Sadoughi University of Medical Sciences, Yazd, central Iran (IR.SSU.MEDICINE.REC.1398.238).

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