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Effect of mouth-care using magic solution in management of oral mucositis among patients undergoing chemotherapy

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ABSTRACT

Background: Patients how that received a chemotherapy will experience some degree of oral mucositis. It starts off as erythema and a burning sensation and can progress to extremely painful ulcerative sores, which makes it difficult for people to eat and speak and lowers their quality of life. This study was done to find out how using magic solution to manage the mouth affects how much oral mucositis a chemotherapy patient has.

Method: A quasi-experimental design was used in this study conducted in the Babylon Oncology Center at Babylon governorate for the period from January, 25, 2023 to May, 17, 2023, on a sample of (40) patients undergoing chemotherapy with oral mucositis. The questionnaires where validated by experts and then it reliability was verified through a pilot study. The total number of items included in the questionnaire was 13 items for oral mucositis assessment tool, 5 items for oral toxicity, and 10 items for Challacombe scale. Data were collected by assess the oral cavity before and after applying the intervention and analyzed by applying descriptive and inferential statistical analysis.

Results: The results indicate that the mean age for patients in study group is 52.2 and the mean age in control group is 51.9, the age 50 years-59 years old were recorded the highest percentage in study group (50%) and 40-49 and ≥ 60 years old in control group (30%) for each them; gender, (60%) of studied sample were female in both study and control groups; education level, half of participants were elementary school in study group (50%), and middle school of participants in control group (30%); occupation related findings, the unemployment in study and control groups were predominated (80% and 60%) respectively; smoking status, most of studied sample were not smokers (70% and 60%) respectively in study and control groups; type of chemotherapy associated findings, most of participants in study group received Taxans (50%) and in control group received Taxans and FOLFOX (40%) for each them; concerning duration of CT, patients in study and control groups expressed a 5 month and more as a duration of CT (60% and 80%) respectively; and finally with chronic comorbidities, more than half of participants were not associated (60%) in study groups and half of participants (50%) in control group. In study group, the results show that there is a significant difference in oral mucositis between two periods of measurements as a pre-test (M=2.68) (before the intervention) and a post-test (M=1.71) (after the intervention of magic solution) (t=10.837; p=0.000). In control group, the results show that there is no significant difference in oral mucositis between two periods of measurements as a pre-test (M=2.08) and a post-test (M=2.18) (after the seven days has been passed) (t=1.724; p=0.119). According to the oral toxicity, in study group findings indicate that the (50%) of patients were grade III oral toxicity before applying magic solution intervention 3.30 (± 0.82). While, at the post test after intervention of magic solution for seven days, findings indicate that the (40%) of patients were 0 and I 1.80 (± 0.78). In control group at pre and post-test. Findings indicate that the (50%) of patients were grade I oral toxicity at the pre-test 3.20 (± 0.91). While, at the post test (a seven days has been passed), findings indicate that the (80%) of patients were grade II 3.80 (± 0.42). The results of oral dryness show that there is a significant difference in oral dryness for study group between two periods of measurements as a pre-test (M=5.90) (before the intervention) and a post-test (M=2.20) (after the intervention) (t=6.398; p=0.0). In control group, the results show that there is no significant difference in oral dryness between two periods of measurements as a pre-test (M=5.80) and a post-test (M=5.20) (after the seven days has been passed) (t=.562; p=.588).

Conclusions: The results of the current study demonstrated that the application of magic solution that enhanced the chemotherapy-induced oral mucositis. There is a significant statistical difference between study and control groups in treat oral mucositis. It is necessary to conduct more studies on larger sample size for identify the effect of magic solution regarding oral mucositis.

Key words: magic solution, oral mucositis, chemotherapy.

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INTRODUCTION

Cancer is one of the oldest diseases in the world, with a high incidence and fatality rate. Characterized by the quick growth of abnormal cells that invade organs, cause damage, and take over their usual functions, weakening the patient and degrading his quality of life [1]. Cancer is a condition marked by an unchecked growth of aberrant cells that ignores the regular process of cell division. Whether a healthy cell will multiply, develop, or perish depends on the stimuli it is constantly exposed too [2]. A crucial component of the treatment of many malignancies is systemic chemotherapy. The long-term prognosis for cancer patients has significantly improved as a result of recent advancements in chemotherapy regimens. Nevertheless, the administration of chemotherapeutic drugs alters cellular structure and function in multiple ways, leading to toxic side effects that are gradual, on-going, and frequently permanent. One of the frequent side effects of a number of first-line chemotherapy drugs is Oral Mucositis (OM) [3]. OM is the term used to describe erythematous and uncomfortable ulcerative lesions of the oral mucosa seen in patients who are undergoing chemotherapy and/or radiation therapy [4]. Most studies indicate that between 20% and 40% of patients getting conventional chemotherapy and between 80% and 100% of those receiving high-dose chemotherapy or radiotherapy for head and neck cancer experience this problem [5, 6]. Depending on the cancer treatment plan, oral mucositis incidence and severity will vary. The chemotherapy agent used, the dose, and the length of time are essential aspects in chemotherapy [7]. A crippling ailment known as OM can affect patients undergoing oncologic treatment. Erythema and slight discomfort in the oral mucosa are the first signs of OM. However,

it has the potential to worsen, leading to oral mucosal ulcerations and excruciating pain that interferes with oral intake, raising the risk of morbidity, impairing quality of life, and raising healthcare costs. Prior oropharyngeal irradiation, renal insufficiency, poor performance status, prior use of etoposide to mobilize peripheral blood progenitor cells, and malnutrition are also risk factors for OM [8]. In addition to weight loss, dysphagia, changes in taste, and subsequent infections, OM is a painful consequence. These issues can make therapy very difficult, prolong hospital stays, and worsen the patient's Quality of Life (QOL) [9, 10]. QOL in oncology is a multifaceted paradigm that has attracted a lot of study in recent years. The four dimensions of QOL are typically assessed: physical well-being, which refers to apparent bodily function; functional well-being, which refers to the ability to carry out typical daily tasks; emotional well-being, which includes both positive and negative aspects; and social well-being, which refers to the capacity to maintain social relationships and social life [11]. According to previous studies, With the exception of chewing gum, which proved ineffective for prophylaxis, there is little or inconsistent information available regarding therapies for the management of OM in cancer patients. Therefore, it may currently be necessary to extrapolate findings from adult research for the care of patients [12]. OM is one of the most painful, harmful, and treatment-interrupting side effects of ablative therapy CRT. It's still a huge unmet clinical need. It is a frequent toxic side effect of cytotoxic cancer treatments. The number of approved definitive preventive or therapeutic alternatives is still limited despite its prevalence and impact [13]. The oral adverse effects of cancer treatment can be treated with a variety of over-the-counter and prescription medications, including chewing gum, lozenges, rinses, and Mucoadhesive discs, which increase saliva but are uncomfortable for patients. To make the product more pleasant, several rinses and gels incorporate sugar, artificial sweeteners, and/ or citric acid. However, these components cause the mouth's pH to decrease and raise the chance of tooth decay. It is essential to pay close attention to the pH of all oral care products because a number of them are naturally acidic and, when used frequently, might result in decay [14]. Furthermore, the study discovered that this issue still needs further investigation and attention since, if left unaddressed, the risks of OM would escalate, including extreme discomfort that makes it difficult for the patient to ingest, feed, or perhaps even speech, which can result in malnutrition and dehydration. This issue was also considered from the perspective of the workplace because it complicated the treatment process and presented difficulties for both the patient and the health care workers. As a result, there will be an increase in hospital stays, treatments, and other financial and administrative costs on both patients and healthcare providers or health situation. This experiment will give new evidence to support the use of magic solution in the prevention and management of OM. The present study's goal is to determine the performance of magic solution in the prevention and management of OM among cancerous patients how receiving CT. Also to minimize the effect on the patients and health situations.

MATERIALS AND METHODS

Study design

A quasi-experimental design was used in this study. It was used to identify the effect of using magic solution in the management of OM in cancerous patients who undergoing CT. The quasi-experimental approach, which is concerned with studying an existing phenomenon, event, or issue, can obtain information that answers the research questions with the intervention of the researcher. The study conducted during the period from 20/9/2022 to 19/3/2023.

Study sitting and sample

The study population consisted of 40 adult patients undergoing chemotherapy in the Babylon Oncology Center at Babylon City. However, of all the patients divided to two groups; group one consist of 20 patients for a study group, and the second consist of 20 patients for control group.

Study instrument

The oral mucositis assessment questionnaire consists of two part include the followings.

Part I: Sociodemographic characteristics that including age, gender, level of education, occupation, smoking status, type of CT, duration of CT, and comorbid chronic diseases.

Part II: The Cancer Institute NSW. Last reviewed December (2013) is a 13-item questionnaire that includes items for voice as well as four domains: swallowing, mucus membrane, saliva, tongue, lips, gums, teeth/ dentures, ability to maintain nutrition, analgesic requirement, evidence of infection, taste, and self-care assessment. The oral toxicity scale consisted from grade 0 to grade IV. The challacombe scale consisted from 10 items that identify the oral dryness. The Cronbach-alpha value in current was 0.817.

Data collection

The researcher interviewee the participants, explained the instructions about the study to allow for the participants agreement or refuse, assess the oral cavity, urged them to participate and thanked them for the cooperation. The interview techniques was used on individual bases, and each interview (20-25) minutes to assess for oral mucositis after taking the important steps that must be included in the study design.

Statistical analysis

The IBM SPSS 24 program was used for all the analyses that follow. Numbers and percentages (No. and %) were used to categorize the variables, while the mean and standard deviation were used to characterize the continuous variables (mean and SD). Paired T-test to different between study variables. Statistical significance was defined as a two-tailed p .05.

RESULTS

Table 1 show participants characteristics, the mean age for patients in study group is 52.2 and the mean age in control group is 51.9, the age 50 years to 59 years old were recorded the highest percentage in study group (50%) and 40-49 and ≥ 60 years old in control group (30%) for each them with no significant differences. In regards with gender, (60%) of studied sample were female in the study group and (70%) in the control group with no difference between groups based on gender. Respect to the education level,

half of participants were elementary school in study group (50%), and middle school of participants in control group (30%) with no differences based education level. Occupation related findings, the unemployment in study and control groups were predominated (80% and 60%) respectively with no significant differences. In terms of smoking status, most of studied sample were not smokers (70% and 60%) respectively in study and control groups with no differences. Type of chemotherapy (CT) associated findings, most of participants in study group received Taxans (50%) and in control group received Taxans and FOLFOX (40%) for each them with no differences. Concerning duration of CT, patients in study and control groups expressed a 5 month and more as a duration of CT (60% and 80%) respectively with no differences. Finally with chronic comorbidities, more than half of participants were not associated (60%) in study groups and half of participants (50%) in control group.

The distribution of patients undergoing CT according to the management of oral mucositis in study group at pre and post intervention by using magic solution. Findings indicate that the (60%) of patients were sever oral mucositis before applying magic solution as described by higher total mean scores, which equal to 26.8 (± 3.19). While, at the post-test after intervention of magic solution for seventh days, findings indicate that the (80%) of patients were mild oral mucositis as described by lower total mean scores, which equal to17.1 (± 3.34). The distribution of patients undergoing CT according to the management of oral mucositis in control group at pre and post-test without using magic solution. Findings indicate that the (70%) of patients were sever oral mucositis at the pre-test as described by higher total mean scores, which equal to 27.1 (± 3.10). While, at the post test (a seven days has been passed), findings indicate that the (80%) of patients were severe oral mucositis as described by higher total mean scores, which equal to 28.3 (± 2.94) (Table 2).

In study group, the results show that there is a significant difference in oral mucositis between two periods of measurements as a pre-test (M=2.68) (before the intervention) and a post-test (M=1.71) (after the intervention of magic solution) (t=10.837; p=0.000). In control group, the results show that there is no significant difference in oral mucositis between two periods of measurements as a pre-test (M=2.08) and a post-test (M=2.18) (after the seven days has been passed) (t=1.724; p=0.119) (Table 3).

The distribution of patients undergoing CT according to the oral toxicity in study group at pre and post intervention by using magic solution. Findings indicate that the (50%) of patients were grade III oral toxicity before applying magic solution intervention 3.30 (± 0.82). While, at the post-test after intervention of magic solution for seven days, findings indicate that the (40%) of patients were 0 and I 1.80 (± 0.78). The distribution of patients undergoing CT according to the oral toxicity in control group at pre and post-test without using magic solution. Findings indicate that the (50%) of patients were grade III oral toxicity at the pre-test 3.20 (± 0.91). While, at the post test (a seven days has been passed), findings indicate that the (80%) of patients were grade III 3.80 (± 0.42) (Table 4).

In study group, the results show that there is a significant difference in oral toxicity between two periods of measurements as a pre-test (M=3.30) (before the intervention) and a post-test (M=1.80)

Tab. 1: Socio-demographic characteristics in study and control groups.

SDVs	Classification	Study		Control		Chi.
		No.	%	No.	%	Sig.
Age/yer	<40 years old	2	10	4	20	14.67
	40-49 years old	4	20	6	30	0.101
	50-59 years old	10	50	4	20	
	60 and older	4	20	6	30	
	M ± SD	52.2 ± 8.66		51.9 ± 12.93		
Gender	Male	8	40	9	30	3.801
	Female	12	60	11	70	0.062
Education Level	Illiterate	2	10	4	20	21.17
	Read and write	4	20	2	10	0.956
	Elementary school	10	50	2	10	
	Middle school	2	10	6	30	
	High school	2	10	2	10	
	College	0	0	4	20	
Occupation	Unemployment	16	80	12	60	1.667
	Free-business	2	10	2	10	0.948
	Employee	2	10	2	10	
	Retired	0	0	4	20	
Smoking	Smoker	4	20	4	20	2.857
	Previous smoker	2	10	4	20	0.582
	Non smoker	14	70	12	60	
Type of CT	Taxans	10	50	8	40	.3.917
	Ifosphmide	4	20	4	20	0.417
	FOLFOX	6	30	8	40	
Duration of CT	1-2 month	2	10	2	10	1.667
	3-4 month	6	30	2	10	0.797
	≥ 5 month	12	60	16	80	
Chronic comorbidities	Non	12	60	10	50	8
	HTN	2	10	6	30	0.534
	DM	2	10	2	10	
	DM & HTN	4	20	2	10	

(after the intervention) (t =6.708; p=0.000). In control group, the results show that there is significant difference in oral toxicity between two periods of measurements as a pre-test (M=3.20) and a post-test (M=3.80) (after the seven days has been passed) (t=2.250; p=0.051) (Table 5).

The distribution of patients undergoing CT according to the oral dryness in study group at pre and post intervention by using magic solution. Findings indicate that the (40%) of patients were moderate to severe oral dryness before applying magic solution intervention 5.90 ± 2.64. While, at the post-test after intervention of magic solution for seven days, findings indicate that the (80%) of patients were mild 2.20 (± 1.39). The distribution of patients undergoing CT according to the oral dryness in control group at pre and post-test without using magic solution. Findings indicate that the (40%) of patients were moderate to severe oral dryness at the pre-test 5.80 (± 2.48). While, at the post test (a seven days has been passed), findings indicate that the (50%) of patients were moderate oral dryness 5.20 (± 1.57) (Table 6).

In study group, the results show that there is a significant difference in oral dryness between two periods of measurements as a pre-test (M=5.90) (before the intervention) and a post-test (M=2.20) (after the intervention) (t = 9.296; p=.000). In control group, the results show that there is no significant difference in oral dryness between two periods of measurements as a pre-test (M=5.80) and a post-test (M=5.20) (after the seven days has been passed) (t=.817; p=.424) (Table 7).

Tab. 2. Management of oral mucositis among patient undergo CT in study and control groups

Groups	Class	Pre-test			Post-test		
		No.	%	M ± SD	No.	%	M ± SD
Study Group	Mild (13-20)	0	0	26.8 ± 3.19	16	80	17.1 ± 3.34
	Moderate (21-26)	8	40		4	20	
	Sever (27-39)	12	60		0	0	
Control Group	Mild (13-20)	0	0	27.1 ± 3.34	0	0	28.3±2.94
	Moderate (21-26)	6	30		4	20	
	Sever (27-39)	14	70		16	80	

M: Mean of total Scores, SD: Standard Deviation for total scores

Tab 3. Difference in management of OM between pre-post-test in management of OM in study group

Oral Mucositis	Periods	M	SD	t-value	d.f	Sig.
Study Group	Pre-test	2.68	0.245	10.837	19	0
	Post-test	1.71	0.257			
Control Group	Pre-test	2.08	0.239	1.724	19	0.119
	Post-test	2.18	0.226			

Tab 4. Oral toxicity among patient undergo CT in study and control groups

Groups	Grade	Pre-test			Post-test		
		No.	%	M ± SD	No.	%	M ± SD
Study Group	0	0	0	3.30 ± 0.82	8	40	1.80 ± 0.78
	I	4	20		8	40	
	II	6	30		4	20	
	III	10	50		0	0	
	IV	0	0		0	0	
Control Group	0	0	0	3.20 ± 0.91	0	0	3.80 ± 0.42
	I	6	30		0	0	
	II	4	20		4	20	
	III	10	50		16	80	
	IV	0	0		0	0	

Tab 5. Difference in management of oral toxicity between pre and post-test study and control groups

Oral Toxicity	Periods	M	SD	t-value	d.f	Sig.
Study Group	Pre-test	3.3	0.823	6.708	19	0
	Post-test	1.8	0.788			
Control Group	Pre-test	3.2	0.918	2.25	19	0.051
	Post-test	3.8	0.421			

M: Mean, SD: Standard deviation, t: t-test, d.f: Degree of freedom, Sig: Significance level.

Tab 6. Management of oral dryness among patient undergo CT in study and control groups

Groups	Class	Pre-test			Post-test		
		No.	%	M ± SD	No.	%	M ± SD
Study Group	Mild (1-3)	4	20	5.90 ± 2.64	16	80	2.20 ± 1.39
	Moderate (4-6)	8	40		4	20	
	Sever (7-10)	8	40		0	0	
Control Group	Mild (1-3)	4	20	5.80 ± 2.48	4	20	5.20 ± 1.57
	Moderate (4-6)	8	40		10	50	
	Sever (7-10)	8	40		6	30	

M: Mean of total Scores, SD: Standard Deviation for total scores.

Tab 7. Difference in management of oral dryness between pre and post-test study and control groups

Oral Dryness	Periods	M	SD	t-value	d.f	Sig.
Study Group	Pre-test	5.9	2.64	9.296	19	0
	Post-test	2.2	1.39			
Control Group	Pre-test	5.8	2.48	0.817	19	0.424
	Post-test	5.2	1.75			

M: Mean, SD: Standard deviation, t: t-test, d.f: Degree of freedom, Sig: Significance level.

DISCUSSION

Severity of symptoms

The presented results show pre-test and post-test scores for a study group and a control group, where the study group received intervention by applying magic solution gargle and the control group did not. The groups were divided based on the severity of their condition, which was measured using a scale that ranges from mild (score 13-20) to moderate (score 21-26) to severe (score 27-39).

In the study group, there were no participants with mild symptoms at pre-test, but the participants with moderate (40.0%) and severe (60.0%) symptoms. After seven days of intervention, there was a statistically significant improvement in the symptoms for those with mild symptoms ($p<0.05$), with an average score of 26.8 ± 3.19 at pre-test to 17.1 ± 3.34 at post-test. None of the participants with severe symptoms completed the study, so the intervention was effective for this group. In the control group, there were participants with severe symptoms (70.0%) at pre-test, (80.0 %) for post-test. With respect to the statistical mean, there were no improvement in symptoms for any of the severity groups in the control group [15].

Some evidence existed to support adjunctive short-term use of chlorohexidel to manage dental plaque, and reduce clinical symptoms of gingivitis, dry socket, as well as reduce aerosolisation of bacteria. However, use must be weighed alongside the less desirable effects of chlorohexidel, including extrinsic staining of teeth, antimicrobial resistance to antiseptic agents and the rare, but fatal, allergic reactions to chlorohexidel. Conversely, evidence for the effectiveness of chlorhexidine to manage or prevent periodontitis, dental caries, necrotising periodontal diseases, peri-implantitis, and infections associated with extraction and aerosolised viruses remains less certain [16].

In addition, a randomized controlled trials indicate that the chewing menthol-flavoured substances with a $p<0.001$ which was considered highly significant. Alteration in the nuclear-cytoplasmic ratio was also seen $p=0.001$, which showed significant at 1% significance level [17].

Moreover, study conducted in Hiwa Oncology Hospital and Zhyanawa Radiation Center, Sulaimani, confirmed that the Nigella sativa oil mouthwash by two groups randomized has a potential anti-inflammatory activity that may be beneficial in minimizing or preventing radiation-or chemo-radiation-induced oral mucositis in patients with head and neck cancer [18].

As well as, randomized controlled trial found that the incidence and severity of oral mucositis were significantly lower in the honey group compared to the placebo group. Patients in the honey group also reported less pain and discomfort associated with oral mucositis. Besides, the honey can be an effective and low-cost option for the management of oral mucositis in patients undergoing chemotherapy [19].

The above studies are in agreement with our results, as they confirmed that the use of different substances such as Chlorohexidel, chewing menthol-flavored substances, Nigella sativa oil mouthwash and honey were effective in the treatment of oral mucositis. In addition to those materials above, the results of our study confirmed that the magic solution is also effective in managing oral mucositis. The magic solution must be applied to large groups in order to ensure its effectiveness is highly recommended.

Oral toxicity

In addition, at post-test, the study group after applying the intervention with magic solution showed a significant reduction in the frequency and severity of oral toxicity, with only 20% of patients having grade II toxicity and 40% for both grade 0 and I at mean of score 1.80. This improvement was likely due to the use of the magic solution. In contrast, the control group show that is no reduction in the frequency and severity of oral toxicity, with 80% of patients that having grade III toxicity and a mean score of 3.80.

These findings suggest that the magic solution was effective in managing oral toxicity among patients undergoing chemotherapy. The study group had significantly better outcomes than the control group, indicating that the magic solution may be a more effective management strategy than standard care. However, it is important to note that the specific ingredients and composition of the magic solution are unknown, and further research is needed to evaluate its safety and effectiveness. The results of this study support the use of the magic solution as a potential management strategy for oral toxicity among patients undergoing chemotherapy. However, further research is needed to confirm these findings and identify the optimal composition and dosage of the magic solution.

This findings in agreement with previous studies include Oklahoma City by using magic mouthwash containing diphenhydramine, lidocaine, and aluminium-magnesium hydroxide [20]. Tehran, Iran by using benzydamine oral rinse [21]. This confirmed that the magic mouthwash was significantly more effective than the placebo mouthwash in reducing the incidence and severity of oral mucositis.

Oral dryness

Among the results indicate that the study group experienced a significant improvement in their oral dryness symptoms after applying the magic solution, with a significant decrease in mean scores from 5.90 ± 2.64 to 2.20 ± 1.39, as compared to the control group, which had a decrease in mean scores from 5.80 ± 2.48 to 5.20 ± 1.57. The study group showed a more substantial reduction in the severity of their symptoms, with all severe cases (7-10) in the study group having no oral dryness after the intervention.

This findings is similar to the findings of previous studies include

Isfahan, Iran by using Veramin moisturizing gel and a placebo gel [22]. In India, by using chlorhexidine/thymol varnish twice a week [23]. This showed that the Veramin moisturizing gel is effective in significantly relieving mouth dryness, preventing dental plaque formation, and improving oral health and chlorhexidine/thymol varnish is an effective and safe intervention for managing oral dryness in patients undergoing chemotherapy for head and neck cancer respectively.

CONCLUSION

The results of the current study demonstrated that the patients with chemotherapy-induced oral mucositis where a recovery after used magic solution. The study indicate that there is a statistically differences between study and control groups, the study concluded that the magic solution is an effected for treat oral mucositis.

REFERENCES

1. Cavalcanti IDL, Soares JCS. Advances in Cancer Treatment: From Systemic Chemotherapy to Targeted Therapy. Springer Nat.
2. Yadav AR, Mohite SK. Cancer-A silent killer: An overview. Asian J Pharm Res. 2020; 10:213-216.
3. Ibrahim EY, Ehrlich BE. Prevention of chemotherapy-induced peripheral neuropathy: a review of recent findings. Crit Rev Oncol Hematol. 2020; 145:102831.
4. Elad S, Cheng KKF, Lalla RV, Yarom N, Hong C, et al. MASCC/ISOO clinical practice guidelines for the management of mucositis secondary to cancer therapy. Cancer. 2020; 126:4423-4431.
5. Lalla RV, Bowen J, Barasch A, Elting L, Epstein J, et al. MASCC/ISOO clinical practice guidelines for the management of mucositis secondary to cancer therapy. Cancer. 2014; 120:1453-1461.
6. Courtois E, Bouleftour W, Guy JB, Louati S, Bensadoun RJ, Rodriguez-Lafrasse C et al. Mechanisms of PhotoBioModulation (PBM) focused on oral mucositis prevention and treatment: a scoping review. BMC Oral Health. 2021; 21:1-11.
7. Lalla RV, Brennan MT, Gordon SM, Sonis ST, Rosenthal DI, et al. Oral mucositis due to high-dose chemotherapy and/or head and neck radiation therapy. JNCI Monographs. 2019; 2019:lgz011.
8. Roldan CJ, Huh B, Song J, Nieto Y, Osei J, et al. Methylene blue for intractable pain from oral mucositis related to cancer treatment: a randomized phase 2 clinical trial. BMC Med. 2022; 20:1-9.
9. Daugėlaitė G, Užkuraitytė K, Jagelavičienė E, Filipauskas A. Prevention and treatment of chemotherapy and radiotherapy induced oral mucositis. Medicina. 2019; 55:25.
10. Uberoi AS, Brown TJ, Gupta A. Magic mouthwash for oral mucositis: a teachable moment. JAMA Intern Med. 2019; 179:104-105.
11. Al-Rudayni AHM, Gopinath D, Maharajan MK, Menon RK. Impact of oral mucositis on quality of life in patients undergoing oncological treatment: a systematic review. Transl Cancer Res. 2020; 9:3126.
12. Miranda-Silva W, Gomes-Silva W, Zadik Y, Yarom N, Al-Azri AR, et al. MASCC/ISOO clinical practice guidelines for the management of mucositis: sub-analysis of current interventions for the management of oral mucositis in pediatric cancer patients. Support Care Cancer. 2021; 29:3539-3562.
13. Villa A, Sonis ST et al. An update on pharmacotherapies in active development for the management of cancer regimen-associated oral mucositis. Expert Opin Pharmacother. 2020; 21:541-548.
14. Potts K. Simple Strategies for Relieving Oral Pain Caused by Cancer Treatment.
15. Kravitz ND, Crutchfield WE, Miller S, Gill J. Magic mouthwash demystified. J Clin Orthod. 2020; 54:462-465.
16. Brookes ZL, Bescos R, Belfield LA, Ali K, Roberts A et al. Current uses of chlorhexidine for management of oral disease: a narrative review. J Dent. 2020; 103:103497.
17. Prasad N, Vijay S, Reddy AY, Nonitha S. Effects of menthol-flavored substances at the cellular level on oral mucosal sites. Dent Res J (Isfahan). 2019; 16:7.
18. Ameen HA, Mohammed MO, Ahmed KM, Ali RH, Saeed KA, Hussain SA et al. Anti-inflammatory effect of Nigella sativa oil on chemoradiation-induced oral mucositis in patients with head and neck cancers. Int J Curr Pharm Res. 2019; 11:58-64.
19. Jayalekshmi JL, Lakshmi R, Mukerji A. Honey on oral mucositis: A Randomized controlled trial. Gulf J Oncol. 2016; 1:30-37.
20. Miller MM, Donald DV, Hagemann TM. Prevention and treatment of oral mucositis in children with cancer. J Pediatr Pharmacol Ther. 2012; 17:340-350.
21. Sheibani KM, Mafi AR, Moghaddam S, Taslimi F, Amiran A, Ameri A et al. Efficacy of benzydamine oral rinse in prevention and management of radiation-induced oral mucositis: a double-blind placebo-controlled randomized clinical trial. Asia Pac J Clin Oncol. 2015; 11:22-27.
22. Atashi V, Yazdannik A, Mahjobipoor H, Ghafari S, Bekhradi R, Yousefi H. The effects of Aloe vera-Peppermint (Veramin) moisturizing gel on mouth dryness and oral health among patients hospitalized in intensive care units: A triple-blind randomized placebo-controlled trial. J Res Pharm Pract. 2018; 7:104.
23. Zero DT, Brennan MT, Daniels TE, Papas A, Stewart C, et al. Clinical practice guidelines for oral management of Sjögren disease: dental caries prevention. J Am Dent Assoc. 2016; 147:295-305.