Dentistry 3000

Vol 14, No 1 (2026)
ISSN 2167-8677 (online)
DOI 10.5195/d3000/2026.1413

Artificial Saliva to Mitigate the Severity of Oral Mucositis in Cancer Patients Undergoing Chemotherapy

A Randomized Controlled Trial

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Abstract

To examine the effectiveness of artificial saliva in mitigating chemotherapy-induced OM severity in cancer patients. A randomized controlled trial included 62 patients undergoing chemotherapy at oncology centers. Patients were selected using simple random sampling. The intervention group used artificial saliva for 14 days after receiving instructions, while the control group received conventional care only. Data were collected using a sociodemographic and clinical data questionnaire, the WHO Oral Toxicity Scale, and the Challacombe Scale. Data were analyzed using SPSS version 26.0. Descriptive statistics (frequencies, percentages, means, standard deviations) and inferential statistics (independent t-test) were used to examine differences between groups. A total of 62 patients (26 intervention, 36 control) completed the study. At baseline, all patients had grade 0 OM. After 14 days, 76.9% of the intervention group remained at grade 0 compared to only 11.1% of the control group. The intervention group had a significantly lower mean oral toxicity score (0.30 ± 0.6) than the control group (1.63 ± 0.93; $p < 0.001$). The control group showed a significant increase in oral dryness scores ($p < 0.001$), while the intervention group showed a significant reduction ($p < 0.001$). The between-group difference was statistically significant ($p < 0.001$). Artificial saliva significantly reduces OM severity and alleviates oral dryness in chemotherapy patients. Oncology nurses should consider it as an effective adjunctive intervention.

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Citation: Abdulkareem B et al. (2026) Artificial Saliva to. Itigate the Severity of Oral Mucositis in Cancer Patients Undergoing Chemotherapy. Dentistry 3000. 1:a001 doi:10.5195/d3000.2026.1413
Received: May 30, 2026
Accepted: May 31, 2026
Published: June 16, 2026

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Introduction

In the 21st century, cancer remains a leading cause of death worldwide. By 2030, the annual global burden is expected to increase more than 21.4 million and 13.2 million new cases and deaths, respectively [1]. Cancer is a disease in which some of the body's cells grow uncontrollably and spread to other parts of the body [2] as a progressive illness, it imposes significant physical, social, and psychological burdens on patients [3].

Numerous types of therapies, including surgery, immunotherapy, hormone-therapy, radiotherapy, chemotherapy (CT), and advanced techniques like ribonucleic acid (RNA) injections, have been applied for cancer treatment. Among them, chemotherapy often the treatment of choice for metastatic disease, where it demonstrates considerable effectiveness [4].

Chemotherapy (CT) involves the use of potent drugs that target and destroy cancer cells, helping to shrink tumors, prevent metastasis, and increase survival rates [5,6]. However, because it targets all rapidly dividing cells, it also affects healthy ones. This includes cells in the digestive tract, bone marrow, and hair follicles [7].

The administration of CT is frequently associated with severe adverse effects including nausea, vomiting, diarrhea, anorexia, and dysphagia that collectively compromise nutritional intake and digestion. Among these toxicities, oral mucositis (OM) stands out as a particularly common and debilitating condition and is currently regarded as the most critical non-hematological toxicity resulting

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from cancer treatment. Its onset typically occurs 3-7 days after the initiation of treatment, with symptom severity peaking around day 10 [8,9].

Oral mucositis (OM) characterized by erythematous and ulcerative lesions, is a debilitating condition that impairs oral hygiene, complicates eating and swallowing, compromises nutrition, and reduces the patient's quality of life .The risk of developing this condition is treatment dependent , with incidence rates rising from 20-40% in standard CT to 60-85% in Hematopoietic Stem Cell Transplantation (HSCT) and reaching a peak of 90% in head and neck cancer patients treated with chemoradiation [10,11].

The OM a side effect of cancer treatment, is widely recognized for its profoundly negative impact on the multidimensional quality of life in oncology patients. This quality of life paradigm, which captures the patient's comprehensive experience of cancer and its treatment through physical, functional, emotional, and social well-being, is directly compromised by the condition [12,13]. Severe OM can lead to a decrease or discontinuation of cancer treatment, resulting in a poor prognosis. Consequently, effective strategies for the prevention of OM are necessary [14].

Patients receiving chemotherapy frequently experience transient or permanent xerostomia (the subjective sensation of dry mouth) and hyposalivation (an objectively measurable reduction in salivary flow). Hyposalivation can elevate tissue inflammation and thus increase the risk of local infection and make mastication difficult.as a result increased risk of developing severe OM [15].

Artificial saliva products are designed to mimic the natural salivary peroxidase system and supplement other salivary components, to enhance the mouth's innate antimicrobial defenses while providing essential lubrication and moisture to the oral cavity. It is commonly used because they are readily available over-the-counter, have minimal side effects, and the fact that they are non-invasive, requiring no surgical intervention [16]. Artificial saliva works by forming a continuous, proactive, and hydrating film that helps prevent OM. Most clinical studies of artificial saliva only focused on signs and symptoms of dry mouth [17–19] . However, the effect of artificial saliva on OM has not directly established yet.

The conceptual framework guiding this study is presented in Figure 1.

As illustrated in Figure 1, cancer patients undergoing chemotherapy are randomly assigned to either the intervention group (artificial saliva spray) or the control group (conventional care). According to the Barrier Protection Theory, artificial saliva restores the protective salivary barrier through continuous hydration, forming a protective layer, reducing friction, and preventing direct contact with chemotherapeutic agents. This concept is supported by recent evidence shows that early intervention with oral mucosal barrier protective agents significantly reduces oral mucositis severity and lowers complication rates [20] .The present randomized controlled trial aimed to evaluate the effectiveness of artificial saliva in mitigating the severity of oral mucositis. The study hypothesized that patients in the intervention group would have significantly lower OM severity scores compared to the control group.

Studying the effect of artificial saliva in Mitigating the Severity of OM in Patients Undergoing CT are significance. it provides an important test of a novel biological rationale. Artificial saliva addresses the propagation of injury by mitigating the secondary damage from a compromised oral environment. This study will therefore not only determine the potential effect of intervention but also advance our understanding of OM management that could lead to improved patient quality of life, reduced healthcare costs, and reduce CT disruptions, thereby making an essential contribution to supportive oncology care.

Materials and Methodos

Study design and setting

This parallel-group randomized controlled trial was conducted to examine the effectiveness of artificial saliva in mitigating the severity of oral mucositis (OM) in patients with cancer undergoing chemotherapy (CT). The study was conducted at the Al-Imam Al-Hussein Canter for Oncology and Hematology and the Oncology wards at Al-Imam Al-Hassan Al-Mujtaba Teaching Hospital. from October 19, 2025, to May 13, 2026.

Study participants and sampling

The sample size (n = 62) was calculated using a free online sample size calculator for proportions, based on a 90% confidence level, a 5% margin of error, and a 50% expected percentage, with an estimated total population of approximately 80 patients across two oncology centers in Kerbala. No interim analyses were performed. No stopping guidelines were established. The patients were enrolled based on the study aims, population characteristics, and eligibility criteria. The inclusion criteria were: (a) patients diagnosed with cancer and scheduled to receive a CT regimen containing 5-fluorouracil (5-FU) or gemcitabine; (b) patients aged 18 years or older; (c) both sexes (male and female); (d) patients who were conscious and cooperative; and (e) patients who agreed to participate in the study. A simple random sampling method was implemented for group allocation using an opaque box containing an equal number of cards for all the groups. Each participant randomly selected one card to determine their group assignment. To ensure the probability of allocation remained constant for all participants, the selected card was returned to the box immediately after each draw. Neither the researcher nor any staff member knew which paper the patient would draw, ensuring that the allocation sequence was concealed until after assignment. The sample was divided into 26 patients in the artificial saliva group and 36 patients in the control group. This imbalance is a known characteristic of simple randomization

Data collection tools and technique

Interview and observing techniques were used, the researcher assessed and recorded oral toxicity, oral dryness severity, in two sessions per patient. In period from January 3rd, 2026, to March 3rd, 2026. The researcher took 15-20 minutes to collect data and to fill out the questionnaire completely from each patient.

The study instruments consisted of four parts. The first part covered socio-demographic characteristics including age, sex, educational level, and smoking status. The second part included clinical data such as type of diagnosed cancer, duration of CT, chronic comorbidities, and body mass index (BMI). The third part was World Health Organization oral toxicity scale, which was developed by the World Health Organization in 1979 [21] which categorizes oral mucositis into five grades based on symptom severity and impact on oral intake .The fourth part was the Challacombe Scale of Clinical Oral Dryness the instrument score consists of a 10-point scale, each point representing a feature of dryness in the mouth closely related to both the unstimulated salivary flow and the thickness of the mucin layer over the epithelium (mucosal wetness) suggesting a physiological basis to the feeling of xerostomia. with one point allocated for each observed feature, and the patient's additive total score categorizes the condition as mild (1-3), moderate (4-6), or severe (7-10) [22].

Interventions

Patients in the experimental group received artificial saliva spray for 14 days, administered four times daily: before breakfast, lunch, dinner, and bedtime. Instructions for using the artificial saliva spray included: shaking the bottle before each application, spraying the product to thoroughly coat the oral mucosa, and spreading it evenly with the tongue. The artificial saliva spray used was a commercially available, enzyme-based formulation supplied in 44.3 mL containers. The control group received conventional care during chemotherapy sessions without

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any additional interventions. A post-test was conducted for all patients using the same instruments to evaluate the effectiveness of the interventions.

Ethical considerations

Ethical approval for this study was granted by the Scientific Research Committee at a university in Iraq on October 19, 2025 (code: uok.con.25.92). All participants provided both verbal and written informed consent after receiving a full explanation of the study's purpose. They were informed of their right to withdraw at any time, and the researcher ensured the confidentiality of all collected data.

Clinical trial registration

This randomized controlled trial was registered as secondary outcome of the study with ClinicalTrials.gov (National Library of Medicine, United States) on December 19, 2025, under the identifier number NCT07297472.

Statistical analysis procedures

The data were analyzed through use of the application of Statistical Package for Social Sciences (SPSS), version 26.0. A descriptive statistical analysis measures such as frequency (f), percentage (%), means of scores (MS) and standard deviations (SD), were used. Normality was checked via Shapiro-Wilk test (p>0.05 for all). An inferential statistical analysis measures such as Mann-Whitney U test, Chi-Square test, paired samples t-test and the independent samples t-test.

Results

Participant flow

A total of 63 patients were randomly assigned to either the intervention group (n=27) or the control group (n=36). One patient (1.6%) from the intervention group withdrew due to health-related issues and was excluded from the final analysis. No dropouts occurred in the control group. Thus, 62 patients (26 in the intervention group and 36 in the control group) were included in the final analysis.

A standardized daily telephone follow-up protocol was implemented for participants in intervention group to ensure consistent monitoring and support. Follow-up was conducted via phone, primarily through individual communication on social media sites (WhatsApp). For patients without social media access, follow-up was performed via standard telephone calls (using SIM cards). During these daily contacts for the artificial saliva group, the researcher monitored the adherence component focused on reminding patients to use the spray according to the prescribed schedule and clarifying any issues with the home-use instructions, while also monitoring the progression of the OM level, assessed the effect of the artificial saliva protocol, and evaluated the extent of each patient's response.

The comparator (conventional care) was delivered as part of routine clinical practice at the participating oncology centers. No additional interventions were provided to the control group. Fidelity was not formally assessed for the comparator, as it consisted of standard oral hygiene instructions routinely provided to all chemotherapy patients. No adverse events were reported in either group.

Demographic characteristics

Table 1 shows that the mean age of patients in the control group was 59.2±10.04 years compared to 56±12.8 years for the patients in the artificial saliva group The largest proportion of participants were aged 60 years and older across both groups, accounting for 47.2% of the control group and 46.2% artificial saliva group. In terms of gender, the control group were predominantly female, with females comprising 58.3. In contrast, the artificial saliva group was predominantly male, at 65.4%. Regarding education levels, 34.6% of the artificial saliva completed primary school, whereas 36.1% of the control group were only able to read and write. The smoking status indicates that 52.8% of the control group are non-smokers, as are 61.5% in the artificial saliva group.

Clinical data

Table 2 presents the clinical variables distribution of the artificial saliva and control groups. Regarding Type of chemotherapy (CT) the artificial saliva group, 23.1% received 5-fluorouracil and 76.9% received Gemcitabine. In the control group ,22.2% received 5-fluorouracil and 77.8% received Gemcitabine. In terms of the duration of CT, 52.8% of the control group and 34.6% of the artificial saliva group underwent treatment for 5 months or longer. Lastly, analysis of preexisting chronic diseases showed that 25.0% of the control group had hypertension, 23.1% of the artificial saliva group had hypertension and diabetes mellitus.

Primary outcome

Table 3 presents the distribution of patients undergoing CT in terms of oral toxicity prevention among artificial saliva and control group. At pre-test, both groups were identical, with 100% of patients classified as grade 0 oral toxicity. Following the 14-day intervention, the post-test results showed that the artificial saliva group had the highest proportion of patients maintaining grade 0 (76.9%), while only 11.1% of the control group remained at grade 0. Among the remaining patients, the artificial saliva group had 15.4% at grade 1, 7.7% at grade 2, and 0% at grade 3 and 4. The control group had 33.3% at grade 1, 36.1% at grade 2, 19.4% at grade 3, and 0% at grade 4.

As shown in the Table 4, both groups began with a mean oral toxicity score of 0.00±0.00 at pre-test. From pre-test to post-test, the control group demonstrated a statistically significant increase in oral toxicity scores (mean = 1.63±0.93; t = -10.56, df = 35, p = 0.000). In contrast, the artificial saliva group did not show a statistically significant increase (mean = 0.3±0.61; t = -2.54, df = 25, p = 0.18). These findings indicate that the artificial saliva intervention was effective in preventing oral toxicity.

Table 5 shows that the control group had a significantly higher mean score (1.63 ± 0.93) than the artificial saliva group (0.3 ± 0.61). Statistical analysis revealed a significant difference between the two groups (t = 6.34, df = 60, p = 0.000). These results demonstrate that the artificial saliva intervention led to a marked reduction in oral toxicity compared to the control group.

Table 6 compares the severity of oral dryness before and after the intervention within each group. the control group experienced a statistically significant increase in oral dryness severity from pre-test (1.2±0.7) to post-test (2.0±0.7) (t=-6.2, df=35, p=0.000). Conversely, the artificial saliva group demonstrated a statistically significant reduction from 1.5±0.7 to 0.6±0.6 (t=5.55, df=25, p=0.000). These findings indicate that artificial saliva had a beneficial effect in reducing oral dryness, while control group showed worsening.

The results of Table 7 indicate that the artificial saliva significantly reduced severity of oral dryness compared to the control group with (t = -8.546, df = 60, p = 0.000).

Discussion

Oral mucositis (OM) is a common and debilitating complication arising from cancer therapy, affecting approximately 40% of chemotherapy (CT) patients. Hyposalivation can elevate tissue inflammation because of an increased risk of developing severe OM. Artificial saliva is commonly used to relieve dry mouth in various patient groups, including those undergoing CT. Most clinical studies of artificial saliva have focused only on the signs and symptoms of oral dryness. To our knowledge, this study is the first to provide experimental evidence examining the effectiveness of artificial saliva in mitigating the severity of OM. The artificial saliva spray used in this study was an enzyme-based formulation containing the salivary antimicrobial enzymes lactoperoxidase, lysozyme, lactoferrin, mutanase, and dextranase, together with moisturizers such as xylitol, propylene glycol, sunflower oil, and coconut oil.

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The results of the study demonstrate that artificial saliva significantly reduced the severity of oral toxicity compared to no intervention. At baseline, both groups were identical, with 100% of patients classified as grade 0. After fourteen days of using artificial saliva, 76.9% of patients in this group remained free of OM (grade 0) compared to only 11.1% in the control group. These differences were confirmed, as the artificial saliva group had a significantly lower mean oral toxicity score (0.3 ± 0.6) compared to the control group (1.63 ± 0.93; t = 6.34, df = 60, p = 0.000). These findings support the conclusion that artificial saliva mitigates oral toxicity by maintaining oral moisture and promoting mucosal integrity.

These findings are consistent with a pilot study in Japan conducted by Kumagai et al . [23] who observed that chemotherapy persists in saliva for up to 48 hours after chemotherapy completion, even after becoming undetectable in serum. This study also suggested that the level of hydration after the completion of CT may be involved in differences in CT excretion. As a result, it reconfirmed that sufficient hydration during and after CT is essential for the prevention of OM. This study suggested that adequate post-chemotherapy hydration may facilitate more rapid salivary clearance of cytotoxic drugs, thereby reducing prolonged exposure of the oral mucosa.

The present results also indicate that oral dryness worsened significantly in the control group, with the mean score increasing from 1.2 ± 0.7 at pretest to 2.0±0.7 at post-test, Conversely, the artificial saliva group demonstrated a statistically significant reduction from 1.5±0.7 to 0.6±0.6 (t=5.55, df=25, p=0.000). These findings indicate that artificial saliva had a beneficial effect in reducing oral dryness and was associated with less severe oral toxicity than no intervention. The clinical importance of this result is that oral dryness is not only an uncomfortable symptom but also a factor that may worsen oral integrity during cancer treatment. Reduced lubrication can increase friction, impair oral comfort, and contribute to mucosal irritation. Therefore, maintaining moisture in the oral cavity may help reduce the progression of treatment-related oral toxicity. These findings are broadly consistent with earlier evidence. In a randomized controlled trial by Marimuthu et al. [17] involving 94 nasopharyngeal cancer survivors with xerostomia, artificial saliva containing natural enzymes (lactoperoxidase, lysozyme, lactoferrin) was significantly more effective than placebo, with all 47 patients in the intervention group showing improvement in both subjective and objective dryness measures. Similarly, Savo et al. [24] in double-blind randomized controlled trial of head and neck cancer survivors with radiotherapy-induced xerostomia, reported that an artificial saliva formulation containing humectants, electrolytes, and weak acids significantly alleviated dry mouth symptoms and improved oral health-related quality of life, achieving a 54% reduction in Oral Health Impact Profile (OHIP-14) scores ($p < 0.01$).

Current clinical practice guidelines from Multinational Association of Supportive Care in Cancer/International Society of Oral Oncology (MASCC/ISOO) also support the use of artificial saliva and topical mucosal lubricants for the management of salivary gland hypofunction and xerostomia after cancer therapy, further strengthening the rationale for their use in patients at risk of oral dryness [25].

Overall, the present results support the use of artificial saliva as a practical adjunctive intervention for reducing the severity of oral dryness during cancer treatment. The findings suggest that maintaining oral moisture can help limit oral toxicity and potentially reduce mucosal complications, although larger randomized studies are still needed to confirm its preventive value for oral mucositis specifically.

This study has several strengths, Including its randomized controlled design and the use of a validated outcome measure. However, several limitations should be acknowledged. First, blinding of outcome assessors could not be performed due to the nature of the intervention and limited staff resources, which may have introduced detection bias. Nevertheless, we attempted to minimize this bias by using a validated, objective scoring tool with standardized criteria. Second, the relatively small sample size limits the generalizability of our findings, primarily because of the established timeframe for recruitment and data collection. Third, the intervention period was only 14 days, leaving uncertainty regarding the long-term effectiveness and sustainability of the protective effects of artificial saliva.

Conclusion

The study demonstrated that artificial saliva is an effective intervention for mitigating the severity of oral mucositis in cancer patients undergoing chemotherapy. Based on these findings, oncology healthcare professionals especially nurses should consider using artificial saliva as an additional supportive measure to relieve oral dryness and decrease the severity of oral mucositis.

Acknowledgements

We extend our sincere thanks and appreciation to the Faculty of Nursing, University of Kerbala, and the administration of Al-Imam Al-Hussein Center for Oncology and Hematology and Imam Al-Hassan Al-Mujtaba Hospital in holy Karbala city for their invaluable support in conducting this study. I am also deeply grateful to all participants who contributed to this research.

Conflict of Interest

The authors have no conflicts of interest to declare.

Financial Disclosure

This study was not supported by any sponsor or funder.

Data Availability Statement

All data generated or analyzed during this study, including tables, figures, and trial registration details, are included within the published article.

Author Contributions

Both authors conceived and designed the study, collected data, and drafted the manuscript, performed statistical analysis, critically revised the manuscript and approved the final version.

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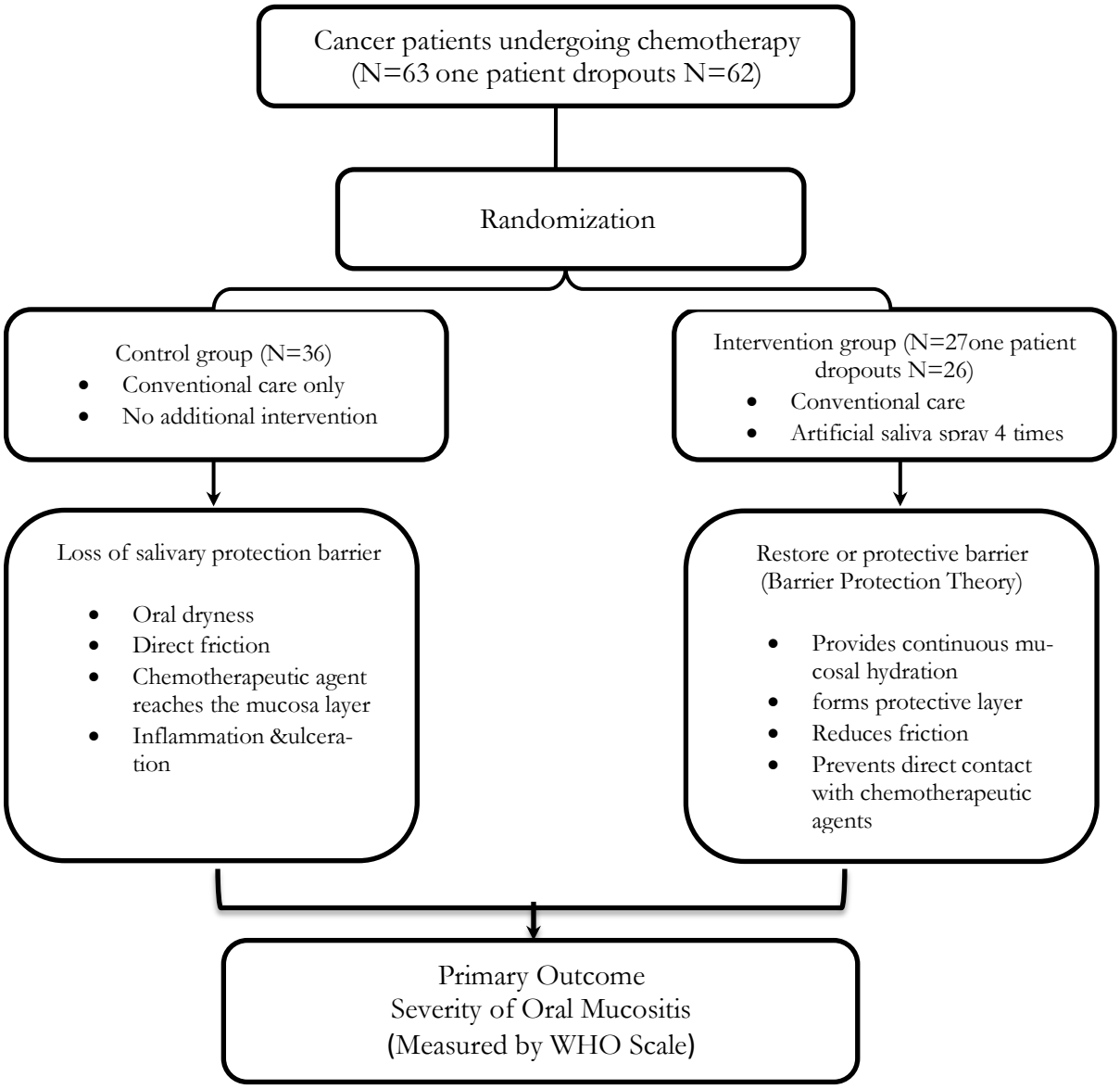

Figure 1. Conceptual framework of the study based on the Barrier Protection Theory.

Table 1. Distribution of patients in two groups based on their socio-demographic characteristics.

Characteristics	Categories	p-value				
		Artificial saliva		Control		
		f	%	f	%	
Age/year	<40 years	3	11.5	2	5.6	0.399*
	40-49 years	4	15.4	3	8.3	
	50-59 years	7	26.9	14	38.9	
	≥60 years	12	46.2	17	47.2	
	Total	26	100	36	100	
	M± SD	56 ± 12.8		59.2 ± 10.04		
Sex	Male	17	65.4	15	41.7	0.065**
	Female	9	34.6	21	58.3	
	Total	26	100	36	100	
Education Level	Not read and not write	3	11.5	7	19.4	0.077*
	Read and write	3	11.5	13	36.1	
	Primary school	9	34.6	5	13.9	
	Middle school	3	11.5	2	5.6	
	Secondary school	4	15.4	6	16.7	
	Bachelor's and above	4	15.4	3	8.3	
	Total	26	100	36	100	
Smoking Status	Currently Smoker	2	7.7	6	16.7	0.63*
	Previous smoker	8	30.8	11	30.6	
	Nonsmoker	16	61.5	19	52.8	
	Total	26	100	36	100	

f= frequencies; %=Percentages; * Mann-Whitney U; ** Chi-Square test.

Table 2. Distribution of patients in two groups according to their clinical data.

Characteristics	Categories	p-value				
		Artificial saliva		Control		
		f	%	f	%	
Cancer Types	Gastrointestinal Cancer	13	50	18	50	0.193**
	Genitourinary Cancer	5	19.2	6	16.7	
	Gynecologic Cancer	1	3.8	4	11.1	
	Breast Cancer	2	7.7	1	2.8	
	Head, and neck cancer	3	11.5	0	0	
	Lungs cancer	2	7.7	7	19.4	
	Total	26	100	36	100	
Type of chemotherapy	5-fluorouracil (CAF)	6	23.1	8	22.2	0.937**
	Gemcitabine (Gemzar)	20	76.9	28	77.8	
	Total	26	100	36	100	
Duration of chemotherapy	< 1 month	3	11.5	4	11.1	0.34*
	1-2 month	8	30.8	8	22.2	
	3-4 month	6	23.1	5	13.9	
	≥5 months	9	34.6	19	52.8	
	Total	26	100	36	100	
Preexisting Chronic diseases	Non	13	50	19	52.8	0.88**
	Diabetes mellitus (DM)	2	7.7	2	5.6	
	Hypertension (HTN)	5	19.2	9	25	
	HTN & DM	6	23.1	6	16.7	
	Total	26	100	36	100	

f= frequencies; %=Percentages; * Mann-Whitney U; ** Chi-Square test.

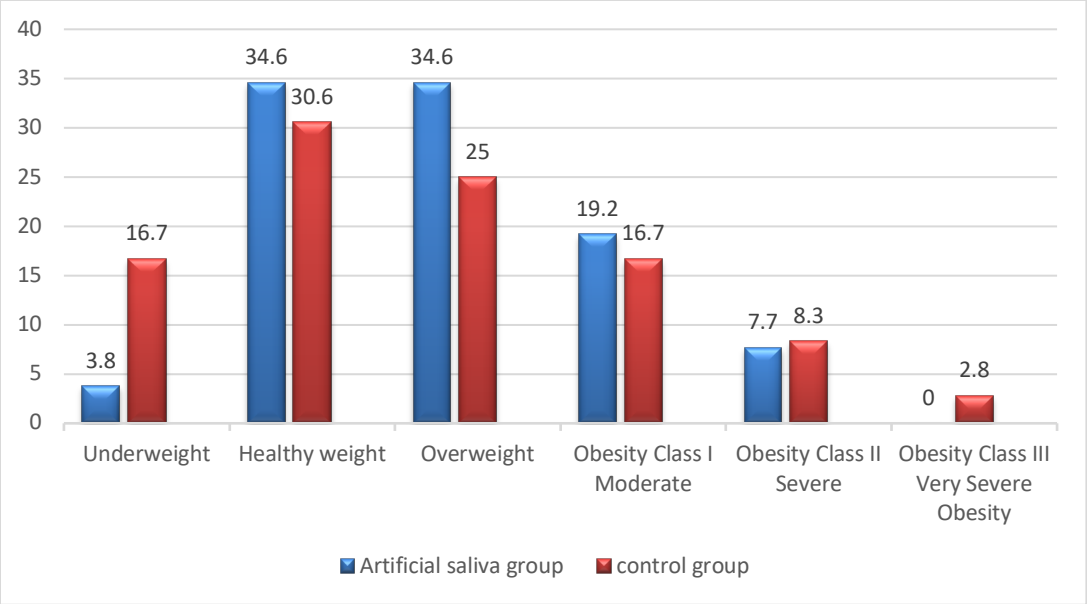

Figure 2. Distribution of patients by their body mass index (BMI) in the control and artificial saliva groups.

Table 3. Comparison the statistical results of oral toxicity grade between artificial saliva and control groups.

Oral toxicity grade	Artificial saliva				Control			
	Pre-test		Post-test		Pre-test		Post-test	
	f	%	f	%	f	%	f	%
Grade 0	26	100	20	76.9	36	100	4	11.1
Grade I	0	0	4	15.4	0	0	12	33.3
Grade II	0	0	2	7.7	0	0	13	36.1
Grade III	0	0	0	0	0	0	7	19.4
Grade IV	0	0	0	0	0	0	0	0

f=Frequency; %=percentage.

Table 4. Comparison significant the oral toxicity grade in both groups between pre-test and post-test period.

Groups	Period	MS	SD	t-value	df	p- value*
Control group	Pre-test	0	0	-10.56	35	0.000
	Post-test	1.63	0.93			
Artificial saliva group	Pre-test	0	0	-2.54	25	0.18
	Post-test	0.3	0.61			

MS=Mean of score; SD=Standard deviation; df=Degree of Freedom; * Paired samples t-test; P-value= Probability value.

Vol 14, No 1 (2026) DOI 10.5195/d3000/2026.1413

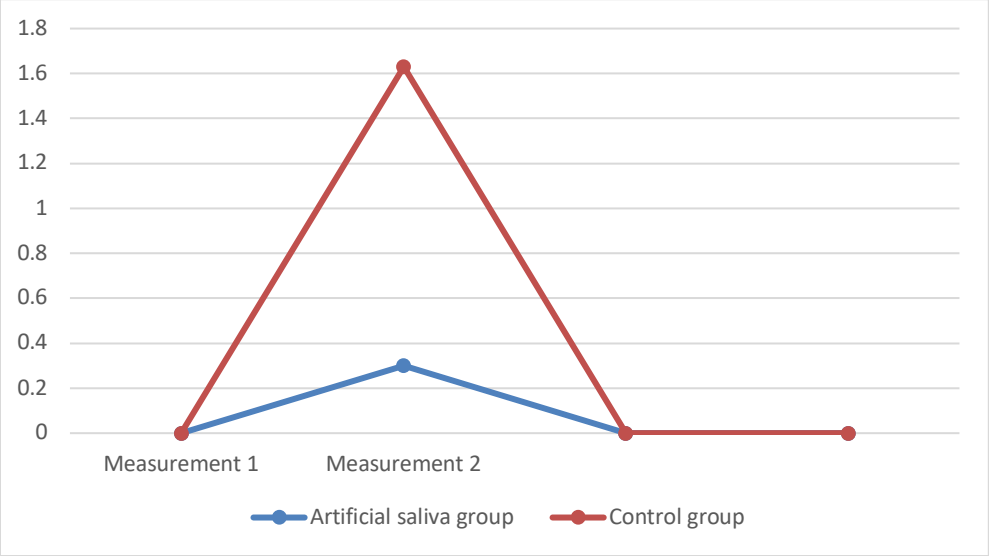

Figure 3. Shows mean oral toxicity scores in the control and artificial saliva groups at pre-test and post-test.

Table 5. Comparison significant the oral toxicity grade between artificial saliva and control groups at post-test period.

Groups	MS	S.D.	t-value	df	p-value*
Control group	1.63	0.93	6.34	60	0.000
Artificial saliva group	0.3	0.61			

MS=Mean of score; SD=Standard deviation; df=Degree of Freedom;* Independent samples t-test; P-value= Probability value.

Table 6. Comparison the severity of oral dryness between control and artificial saliva groups.

Groups	Level of Oral Dryness	Pretest			Posttest			t	df	p-value*
		f	%	MS±SD	f	%	MS±SD			
Control group	None (0)	6	16.7	1.2±0.7	1	2.8	2.±0.7	-6.2	35	0.000
	Mild (1-3)	16	44.4		6	16.7				
	Moderate (4-6)	13	36.1		21	58.3				
	Severe (7-10)	1	2.8		8	22.2				
Artificial saliva group	None (0)	3	11.5	1.5±0.7	12	46.2	0.61±0.6	5.55	25	0.00
	Mild (1-3)	8	30.8		12	46.2				
	Moderate (4-6)	14	53.8		2	7.7				
	Severe (7-10)	1	3.8		0	0				

MS=Mean of score; SD=Standard deviation; df=Degree of Freedom; * Paired samples t-test; P-value= Probability value.

Table 7. Comparison significant the oral dryness between the artificial saliva and control groups at post-test period.

Groups	MS	S.D.	t-value	df	p-value*
Control group	2.0	0.7	-8.546	60	0.000
Artificial saliva group	0.6	0.6			

MS=Mean of score; SD=Standard deviation; df=Degree of Freedom; * Independent samples t-test; P-value= Probability value.