Effect of using Chamomilla Recutita on Management of Radiation Induced Stomatitis in Cancer Patients

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Abstract

Background: Oral Stomatitis is a common inflammatory complication amongst cancer patients enduring radiation therapy. Stomatitis may consequence in discomfort pain and, difficulty in ingestion which may lead to nutritional deficiency. It is a serious side effect, which can consequence in a secondary infection (fungal, viral, or bacterial); it can lead to an interruption in treatment schedule and sometimes even patient drawing from treatment. So, it is important to use chamomilla recutita as preventative measures, and appropriate management measures when stomatitis does occur. **This study aimed** to determine the effect of using Chamomilla Recutita on the management of radiation-induced stomatitis in cancer patients. **Design**: A randomized controlled trial research design was utilized. **Subjects**: 60 adult patients were randomly selected and distributed into two groups equally **(Study groups)** who received routine care and mouthwash with a liquid extracted from Chamomilla Recutita at 1% and **(Control group)** who received routine hospital care only. A daily evaluation was done using the measurement scales of oral toxicities defined by the World Health Organization (WHO). **Results:** A significant difference was found in oral assessments' scores between the two groups. analysis and comparison of data mean a statistically significant difference between both studied groups as regards the decrease of pain level in the Chamomilla Recutita group faster and better than the other group. There was a statistically significant difference in the change in weight between both studied groups, and that meant that body weight improved much more in the Chamomilla Recutita group than it was in the other one. **Recommendation**: It is important to enhance the awareness level among the public, patients, and also the health care providers regarding the importance of performing oral hygiene using Chamomilla Recutita especially during receiving radiotherapy. Regular educational programs to continuously update the nurses knowledge with the advanced and effective practice of oral hygiene, early detection of stomatitis, and proper treatment to avoid or decrease oral infection as well as enforcing adequate nutrition rich in proteins, that promote healing and minimize infection.

Key Words: Oral Stomatitis, Radiation, Chamomilla Recutita

Introduction

Globally, cancer is a community health problem and it's ranked as the second leading cause of death. Radiotherapy is the optimal prescribed cancer treatment modalities. 5-fluorouracil (5-FU) is a type of radiotherapy drug. 5-fluorouracil has several side effects similar to any other chemotherapeutic agents as its effects not only affect the cancer cells but also, the healthy cells. The most common side effects include nausea, vomiting,

diarrhea, mucositis, poor appetite, metallic taste, and photosensitivity. Oral mucositis represent major non-hematologic complications of radiotherapy. It may happen to any mucosal cell, but frequently occur in the oral cavity and the small intestine cells **(Vagliano, Feraut, Gobetto, 2017).**

Radiation therapy (radiotherapies) is one of the essential management modalities of head-neck cancers **(Ohbayashi, Imataki, Ohnishi, 2018**) by irradiating the tumors inside the neck. Stomatitis is the most common side-effect resulting from radiotherapies for many head, and neck tumors and can have a very severe stomatitis impact on nutritional statuses and qualities of life. In 2017, about 42% of patients treated for head and neck cancers develop stomatitis grade 3 or 4 **(Vera-Llonch, Oster, Ford, 2017)** Damage to the epithelia of the oropharyngeal cavities and gastrointestinal tracts from radiotherapies or chemotherapies are the common characteristics of stomatitis **(Raber-Durlacher, Elad, Barasch, 2015).**

One of the causes that the epithelial cells are more vulnerable to cytotoxic effects of radiations and chemotherapies is that they relatively have high rates of turnover of cells in comparison to other organs. Radiotherapies or chemotherapies further depletes stem cells of the basal epithelia causing epithelial cells reductions, releases cytokines that develops local vascularity, and inflammations **(Chen, 2018).** Stomatitis can result in secondary infections, ulcerations, and pain causing malnutrition status. Severe stomatitis can result in hospitalization and delay in the treatment plans, and giving therapeutic efficacies. In some instances, patients used to terminate effective radio-therapeutic treatments **(Cheng, Leung, Liang, 2016; Sonis et al., 2018).**

In radiation-induced oral stomatitis, original mucosal whitening may happen before eurythmic and mucosal ulcerations. Mucosal lesions that stretch outside the sector of radiation almost characterize infections because of herpes simplex virus (HSV) or candidiasis reactivation. Myelosuppression can increase the risk of fungal and bacterial invasions and also the systemic infections. In general, 3-5 weeks are necessary for oral tissues to heal following completion of Head & Neck Radiation **(Multinational Association of Supportive Care in Cancer, 2018**). Topical modalities of the preventions and managements of oral complications offer possible gains of high local concentrations without systemic diffusion and also with reduced risks of drug's interactions and toxicities. A number of the conditions of concern in cancer patients occur on the mucosal surface e.g. candidiasis and in the epithelium and immediately adjacent connective tissue e.g. stomatitis, and therefore are amenable to topical therapies **(Worthington, Clarkson, Bryan, 2016).**

Nurses working in the oncology center play an essential role in the treatment and prevention of stomatitis before any antineoplastic therapy. In the treatment of stomatitis nutritional safety measure is to be enforced such as avoid acidic, spicy, salty, and dry foods. The key to successful treatment of stomatitis is early detection. Whatever, the cancer types or prognoses, many patients are susceptible to many complications. A significant role of the nurse on the oncology team is to provide complete and effective care for the patients **(Logan, Gibson, Sonis, 2017; Sonis, 2017).** The liquid Chamomilla Recutita was clean, transparent, and yellow, with a relative density of 1.030 g/mL, pH range of 5.42 to 5.70 according to the World Health

Organization **(World Health Organization (WHO), 2015).**

According to Foundations of supportive care in patients receiving cancer treatment, management of mucositis includes three key components: Basic oral care, oral care protocols, and patient education, and palliative care including pain management. Chamomilla Recutita are competent to manage oropharyngeal bacterial colonization and formation of dental plaque. Chamomilla Recutita usually uses in mouthwash. Oral care is an integral part of basic nursing practice, so oral care should be a particular priority for nurses caring for patients with cancer. Perfectly, when offering care to cancer patients with oral mucositis, nurses ought to recognize its severity and classify risks, give the priority to the recommended preventive precautions for it, regardless of the severity of the condition **(Raber-Durlacher, Elad, Barasch, 2015).**

Recently, Chamomilla Recutita has been designated to have anti-inflammatory effects on around 60 classes of bacteria comprising aerobes, anaerobes, both gram negative and positive microorganisms **(Morales-Rojas, Viera, Moro´n-Medina, 2017).** Antifungal actions have also been noticed for some yeasts and classes of aspergillus and penicillium **(Al-Dasooqi, Sonis, Bowen, 2016).** Recent studies appearing the effectiveness of Chamomilla Recutita in the management of all mouth health problems. The antibacterial action is one of the highly significant structures that may be mainly helpful in the promotion of mouth wellness **(Frank, Schilcher, 2018; Srivastava, Shankar, Gupta, 2018).** Besides the severe stomatitis prevention, a positive improvement was observed in body weight. Global availability of the Chamomilla Recutita as a natural agent may be useful and cost-effective in stomatitis treatment with radiations **(Blumenthal, Busse, Goldberg, 2015).**

Chamomilla Recutita is a product of the flower of Chamomilla Recutita that is concentrated through dehydration processes inside this flower. However, Chamomilla Recutita is an age-old therapy from the time of the old Egyptian civilizations, nearly; it has found a place in modern medicine **(Smolinski& Pestka, 2016).** As its high viscosity, hydrogen peroxide, acidic PH, high osmolality, and can inhibit the growth of bacteria and promote healing **(Srivastava, Pandey, Gupta, 2009).** Also, Chamomilla Recutita has been used to manage all oral infections **(Lalla, Pilbeam, Walsh, 2017; WHO, 2017)**, used Chamomilla Recutita to manage radiation stomatitis successfully for the first time. It was observed also that patients on radiotherapy who applied Chamomilla Recutita on mouth sores proved tht Chamomilla Recutita soothed the pain. Based on this frequently observed behavior it was believed worthwhile to test objectively in a nursing hunch. If the present study proves improvement in the oral assessment score for patients using Chamomilla Recutita, it would have the advantage of being available, easily, culturally believed in, free from side effects, and less costly.

Aim of the study

To determine the effect of using Chamomilla Recutita on the management of radiation-induced stomatitis in cancer patients.

Research Hypothesis:

1. The mean scores will be improved for patients who use Chamomilla Recutita than patients who use pharmacological agents

2.   The oral pain will be less for patients with stomatitis who used chamomilla than the other patients who do not)

3.   The nutritional intake and ability to eat will be improved for patients with stomatitis who used chamomilla than the other patients who do not)

Materials and Method Research Design:

A randomized controlled trial (RCT) design was utilized to meet the aim of the study.

Setting

The study was carried out at Nuclear Medicine Unit and its Inpatients and Outpatients Clinics, where the patients treated by radiotherapy and also follow up for all cancer patients for all days of the week except Friday from 8 a.m. to 1 p.m., also, this unit is serving patients from surrounding areas and other governorates. There are two out-patient rooms where patients receive their radiotherapy sessions. In addition there are about 33 beds in the inpatients' section; the patients' stay 5- 6 days in the hospital every week until they finish their radiotherapy course which takes about five cycle

Subjects:

Sixty adult patients were selected randomly of both sexes and distributed equally into two groups each for 30 patients

• **Study group I**: received chamomilla Recutita plus routine hospital care

• **Control group II:** received

routine hospital care only.

Criteria for selection of the subjects:

Inclusion criteria: Adult male and female. Have head and neck cancer. Receive radiotherapy for the first time.

Exclusion criteria: Patients use of an oral or systemic anticoagulant, topical anti-inflammatory agent, or other intervention for stomatitis. Diabetic patients, Patients on steroid therapy or oxygen therapy, mouth breather, and their WBCs count less than 2000/mm3.

Tools: One tool was used for data collection:

Oral Status Among Cancer Patients Nursing Assessment:

This tool was adopted from **Mohamed (2018)** to assess mouth condition, it comprised two main parts:

● **Part I: Patient's Sociodemographic Data and Clinical Data:**

This part included patient's sociodemographic data such as; age, gender, marital status, educational level, income, and employed condition, as well as clinical data such as duration of cancer, patient's diagnosis, the onset of treatment, number of cycles, height & weight,

Part II: The World Health Organization (WHO) Oral Toxicity Scale (WHO, 2017):

This scale was used for the purpose of assessing the degree of stomatitis and oral cavity pre and posttest for two study groups .It included the following: lips and angle of the mouth; tongue; saliva; mucus membrane; gingiva,

teeth or denature, pain and nutritional intake (ability to swallow). It contains eight categories; each category is measured on three Likert scales from 1 to 3, where (1) = normal, 2=altered but not loss of function or barrier breakdown, and 3= loss of function or barrier breakdown. The complete assessment scores were ranging from 7-24. The tools classified the patients **into the following category:**

• Subjects scoring from 7 to less than 9 of the possible score were categorized as normal mouth.

• Subjects scoring (9-16) were categorized as altered mouth but not loss of function or barrier breakdown (moderate degree of dysfunction).

• Subjects scoring (17-24) were categorized as loss of function or barrier breakdown (severe degree of dysfunction).

Tools validity:

The tool was tested for content validity by 5 experts (one medical oncologist in the faculty of medicine, two professors, and two assistant professors in the medical-surgical nursing department at Mansoura University). They tested the tools for its clarity, content, relevance, simplicity, comprehensiveness, and its appropriateness. Minor modifications were done accordingly, and then the final form of the tools was developed and its validity was 100%.

Reliability

The Cronbach's alpha test was done to test the reliability of the data collecting tools and it was 0.93.

Pilot study:

A pilot study was conducted on 6 patients who received radiotherapy and was satisfying the prescribed criteria to test the applicability and the clarity of the developed tools, additionally on estimate the time needed for every tool. Some modifications were done on the sociodemographic data sheet to meet all the needed data, but no modifications were done on the tool part II. Patients of the pilot study were excluded from the study's subjects.

Ethical considerations:

Ethical approval will be obtained from the Research Ethical Committee, Faculty of Nursing, Mansoura University, and approval from administrative authority from the director of the Nuclear Medicine Unit. Verbal clarification of the aim and nature of the study will be done for medical and nursing staff. Verbal consent will be taken from each participating patient earlier to his /her inclusion into the study after clarification of the nature and aim of the study. Participation will be completely voluntary. Anonymity, privacy, security, and confidentiality will be guaranteed throughout the research as well as the right to withdraw from the study at any time.

Field work:

It was included in four phases: **Assessment, planning, implementation, and evaluation phase. Assessment phase (pretest):**

● All patients were met individually at the nuclear Medicine Unit to gather data on their sociodemographic and clinical data using the tool (part one). For literate patients, the researcher provides them with the tool but for the illiterate patients they interviewed separately and data collection was

obtained by asking the questions and recording the responses by the investigator.

● Oral assessment before the first radiotherapy session used tool (part two). It took about 30-45 minutes.

Planning phase:

• Depending on the findings of the assessment phase, objectives, priorities, and also the expected outcome were formulated.

• A teaching program was developed for each patient and the investigator developed the colored booklet about Chamomilla Recutita time of mouth washing when waking up in the morning, after each meal, and at bedtime and teaching about the method of mouth wash, duration of the rinsing, importance of continuous oral care, and monitoring of the implementation of the intervention distributed to each patient.

• Radiotherapy sessions were given in three sessions in the nuclear medicine unit the first one (from 8 am to 1 pm), the second one (from 2 pm to 6 pm), and the third one (from 6 pm to 12 am).

Expected outcomes criteria:

• Improvement in oral assessment mean score for the study group used Chamomilla Recutita than the control group used routine care with less oral pain.

• Increase their nutritional intake with improved ability to eat which leading to Increase their body weight

• Reestablished of the oral mucosa or the granulocyte count exceeded 500

mm3 for 3 consecutive days in patients who did not develop stomatitis

Implementation Phase:

• Data was gathered over 8 months starting from the first of December 2019 to the end of July 2020. During this period the researcher stayed about 4 hours/day; 3- 4 days/week.

• **The study group** educational program was explained over 3 sessions with 45 minutes for each. The session started at 10 am in a special room of the outpatient clinic (No 7). All patients were distributed into 6 small groups; each group consists of five patients

• **The educational program: Were presented in the form of three sessions for all patients included in the study. Two practical sessions and one for a theoretical session as the following:**

• **Theoretical sessions**: were carried out in one session. It covered also the following: chamomilla Recutita action, how it works, side effect, the importance of repeated mouth care, and complications.

• **Practical training session**: at the beginning of this session, the researcher introduced herself and explained the expected outcomes of the program This session included patients training on his/her role about how to brush his/her teeth with chamomilla recutita, and in the second session, each patient re demonstration in front the researcher how to used chamomilla recutita.

For the study group Patients: They were trained to rinse the oral cavity using 10 mL of the chamomilla Recutita solution three times per day following

meals or one hour before meals. Each one was done for only 1 minute, and then to spit out the mouthwash. Use of the mouthwash began on the first day of conditioning and ended when the oral mucosa was reestablished or the granulocyte count exceeded 500 mm3 for 3 consecutive days through complete blood count in patients who did not develop stomatitis. In the oncology unit, standard care of the oral cavity consists of training patients about brushing their teeth and tongue using a brush with extra-soft bristles and a non-abrasive toothpaste and removing dentures or orthodontic devices

For control group patients: was instructed to follow the hospital routine treatment for the prophylaxis management of stomatitis which is to take (Diflucan) with the beginning of radiotherapy sessions, and when stomatitis appears to apply miconazole - oral gel 1/2 teaspoonful four times daily for at least one week after the symptoms have disappeared and 10 drops of Mycostatin locally on the oral mucous membrane and swishes it in the mouth for 5 minutes then swallow it 3 times/ day for at least 10 days.

Teaching methods: lecture, discussions, and small group discussions were done for giving the theoretical part of the program, while demonstrations and re-demonstrations were done for its practical part. In each session, the researcher used concise, simple, and clear words. Lastly, at end, a quick summary was provided by the researchers. Furthermore, the instruction-colored booklet was given to each patient in the control group after the program finished.

Evaluation phase (posttest)

• The final step of data collection is evaluating the patient's response to the chamomilla Recutita and the extent to which the outcomes have been achieved. The study patients were evaluated using the study tools at the 5th day of radiotherapy sessions weekly for 5 weeks until the end of radiotherapy treatment by using the tool (part II) developed by the WHO were filled to identify the changes in oral condition and compare the findings of the two studied groups.

• Data was collected and analyzed and comparisons between the data for both the control and study group's findings were performed to evaluate the effect of using Chamomilla Recutita on the management of radiation-induced stomatitis in patients with head and neck cancer by using the proper statistical analysis.

Statistical Analysis:

A compatible personal computer (PC) was used to store and analyze data and to produce a graphic presentation for some important results. The Statistical Package for Social Studies (SPSS) version 16 was used for statistical analysis of data as it contains the tests of significance given in standard statistical books such as:

● P is significant if less than or equal to 0.05.

● Count and percentage used for describing and summarizing qualitative data.

Chi-square (χ^2) was used to test the association between two qualitative variables or to detect the difference between two proportions.

● T-Test of significance used to compare two sample means. Another means for analysis such as the Microsoft Excel package was used in entering data

for some diagram's illustration.

Results

Table (1): Shows frequency distribution of patients of both groups according to sociodemographic characteristics

This table showed that there were no statistically significant differences between patients in the study and control group regarding their sociodemographic (P > 0.05). Regarding patient's age, the results revealed that the highest percentage of patients in both control and study group (46 % and 44 % respectively) were between 50 to 60 years of age, while the lower percent (16 % and 18 % respectively) of both groups were between 20 to 30 years of age.

In relation to patient's gender, slightly more than two third of patients (72 % and 74 % respectively) in the control and study group were females. While only (28 % and 26 % respectively) were males. As regards the marital status, the highest percentage of patients in both control and study group (92 % and 86 % respectively), were married. In relation to the educational level, the highest percentage of patients in both control and study group (68 % and 74 respectively) were illiterate. The lowest percentage in both the control and study group (4 % and 2 % respectively) had secondary education.

Regarding occupation, the highest percentage of patients in both control and study group (72 % and 74 % respectively) were housewives. As for monthly income, the majority of patients in the control and study group (66 % and 78 % respectively) did not have enough monthly income from the patient's point of view. In relation to the area of residence, more than half of patients in the control and

study group (52 % and 54 % respectively) were from rural areas.

Table II : Percentage Distribution of patients of both study and control group according to clinical data

Regarding diagnosis, about one quarter (26.7%) of patients in the study and control groups suffered from Nasopharyngeal Non Hodgkin lymphoma. As for cancer thyroid 23.3% of patients in the study group suffered from this diagnosis, but just 13.3% of patients in the control group had the same diagnosis. In relation to Nasopharyngeal carcinoma, almost one quarter (23.3%) of patients in the control group suffered from this cancer and only 6.7% of patients in the study group had the same diagnosis. However, the difference was not statistically significant ($\chi 2=7.296$, p>0.505). The table also revealed that, almost one third (33.3%) of the study group and more than half (53.3%) of the control group had their radiation sessions on whole neck. 26.7% and 13.3% of study and control groups respectively had the sessions on thyroid bed and its drainage LN. but, the difference was not statistically significant ($\chi 2=3.029$, p>0.553). Regarding number of treatment sessions, the study and control groups were equally matched

Table III : The mean score and standard deviation of patients in the studied groups according to the prior oral assessment. There was no statistically significant difference in the basic assessment data between both study and control groups.

Table IV: Shows mean score and standard deviation of patients in the studied groups according to oral assessment post first week of radiotherapy treatment. There was no

statistically significant difference in the oral assessment post the first week between both study and control groups

Table V: Shows mean score and standard deviation of patients in both studied groups according to oral assessment post second week of radiotherapy treatment. There was statistically significant difference in the oral assessment post the second week by oral assessment between the study and control groups regarding all aspects of the oral assessment ($p< 0.05$), except for the condition of teeth or denture; there was no statistically significant difference ($p>0.086$).

Table VI: This table reveals that, the mean score and standard deviation of patients in the study group regarding total score of oral assessment was (11.57 ± 0.858) while the mean score and standard deviation of patients in the control group regarding total score of oral assessment was (14.47 ± 2.700).From this table it was observed that there was statistically significant difference between the study and control groups regarding the total score of oral assessment post the third week of using chamomilla recutita in the study group vs. the medication in the control group.

Table VII: Shows mean score and standard deviation of patients in both studied groups according to oral assessment post fourth week of radiotherapy treatment. There was statistically significant difference post fourth week of using chamomilla recutita in the study group vs. the medication in the control group. Regarding the mean and standard deviation of total score of oral assessment was respectively as (13.53 ± 2.488), (17.83 ± 2.451) and ($p< 0.001$). However, there was no statistically significant difference within the condition of denture or teeth between

the study and control groups ($p>0.086$).

* Table VIII: Shows mean score and standard deviation of patients in both studied groups according to oral assessment post fifth week of radiotherapy treatment. A highly statistically significant difference ($p< 0.001$) was observed between the study and control groups regarding the mean and standard deviation of total score of oral assessment respectively as (15.93 ± 3.778), (21.57 ± 2.373). There was no statistically significant difference among the study and control groups regarding the condition of teeth or denture as its mean and standard deviation respectively (1.53 ± 0.629), (1.80 ± 0.551).

Table IX: Shows the effect size of using chamomilla recutita in the study group over the five weeks of radiotherapy treatment. A high effect size of using chamomilla recutita for treatment in the study group over the period of five weeks of radiotherapy sessions on all aspects of the oral assessment as observed, but this effect was low on the condition of teeth or denture and was medium on nutritional intake on the 2nd , 3rd , and 4th week. That indicates the positive effect which chamomilla recutita makes.

Figure (1): When the gap between the two groups of treatment increased, it indicates the better effect of chamomilla recutita as compared to medications in the management of radiotherapy induced stomatitis. The oral change in the study group was smaller over the period of 5 weeks, but on the other hand the oral dysfunction in the control group was larger over the same period of time. That indicates the positive effect which chamomilla recutita makes.

Table XI: Illustrates the effect size of using chamomilla recutita in the study group post the radiotherapy

treatment according to the Oral assessment scale by WHO . A high effect size of using chamomilla recutita for treatment in the study group over the period of the fifth week of treatment was observed

Table X: Shows mean score and standard deviation of patients in the studied groups according to the oral assessment scale by WHO. There was statistically significant difference (p< 0.001) in oral toxicity assessment between the study and control groups over the five weeks of treatment.

Figure (II): When the gap between the two groups of treatment increased, it indicates the better effect of chamomilla recutita as compared to medications in the management of radiotherapy induced stomatitis. The use of chamomilla recutita on the study group

delayed the occurrence of radiotherapy induced stomatitis to the 2nd week. That indicates the positive effect which chamomilla recutita makes.

Table X II : Illustrate the changes of Weight in both studied groups. The Weight was increased in 20% of the study group and only in 3.3% of the control group, this weight gain was statistically significant (2= 7.820, p<0.05). The decreased Weight in the majority of control group (76.7%) was statistically significant compared to the decreased Weight in almost half of the study group (43.3%). There was no change in about one third (36.7%) of the study group and in less than one quarter (20%) of the control group, that was statistically significant (2= 7.820, p<0.05).

Table (1): Shows frequency distribution of patients of both groups according to sociodemographic characteristics

Sociodemographic characteristics	Control group (No=30)		Study group (No=30)		χ^2	P
	No	%	No	%		
Age (in years)						
20 -	4	16.0	5	18.0		
30 > 40	7	20.0	5	18.0	0.186	0.980
40 > 50	6	18.0	8	20.0		
50 ≥ 60	13	46.0	12	44.0		
Gender						
-Male	7	28.0	3	26.0	0.051	0.822
- Female	23	72.0	27	74.0		
Marital Status						
- Single	0	0.0	4	2.0	1.501	0.472
- Married	26	92.0	20	86		
- Widow	4	8.0	6	12.0		
Level of Education						
- Illiterate	22	68.0	17	74.0		
- Read and write	2	8.0	2	4.0	2.003	
- Basic education	2	8.0	6	12.0		0.735
- Secondary education	2	8.0	2	4.0		
- University education	2	8.0	3	6.0		
Occupation						
- Manual work	10	20.0	9	18.0	0.0663	
- Housewives	16	72.0	17	74.0		0.967
- Not working	4	8.0	4	8.0		
Monthly Income form a Patient's Point of View						
- Not enough	23	66.0	19	78.0	1.786	
- Enough	7	34.0	11	22.0		0.181
Area of Residence						
- Urban	14	48.0	13	46.0	0.040	0.841
- Rural	16	62.0	17	54.0		

X^2: Chi- square test   FET: Fisher exact test   * P statistically significant at ≤ 0.05

Table (2) : Percentage Distribution of patients of both study and control group according to clinical data :

Items		Study group (n=30)		Control group (n=30)		χ^2	p. value
		No.	%	No.	%		
	Cancer. Tongue	3	10.0	2	6.7		
	Nasopharyngeal (NHL) Non Hodgkin lymphoma	8	26.7	8	26.7		
	Cancer. Thyroid	7	23.3	4	13.3		
	Nasopharyngeal carcinoma	2	6.7	7	23.3		
	Cancer. salivary gland	2	6.7	2	6.7		
Diagnosis	Laryngeal carcinoma	5	16.7	3	10.0	7.296	0.505
	Vocal cord Scc.	2	6.7	2	6.7		
	Re. papillary thyroid cancer	1	3.3	0	0		
	Cancer. tongue Scc.	0	0	2	6.7		
	Oral cavity	3	10.0	2	6.7		
	Nasopharynx	4	13.3	4	13.3		
Radiation Site	Thyroid bed+ drainage lymph nodes	8	26.7	4	13.3	3.029	0.553
	Whole neck	10	33.3	16	53.3		
	Laryngeal box	5	16.7	4	13.3		
o. of treatment Sessions	10-20	0	0	0	0		
	21-25	30	100.0	30	100.0	-	-

Table (3): Mean score and standard deviation of patients in both studied groups according to the WHO oral assessment prior to radiotherapy treatment.

Items	Study group (n=30)		Control group (n=30)		t	p. value
	Mean	SD	Mean	SD		
Lips condition & angle of mouth	1.00	0.000	1.00	0.000	-	-
Appearance of teeth or denture	1.53	0.629	1.80	0.551	1.747	0.086
Appearance of tongue	1.00	0.000	1.00	0.000	-	-
Appearance of Mucous membrane/ gingiva	1.00	0.000	1.00	0.000	-	-
Saliva	1.00	0.000	1.00	0.000	-	-
Pain	0.00	0.000	0.00	0.000	-	-
Nutritional intake(ability to swallow)	0.00	0.000	0.00	0.000	-	-
Total	5.53	0.629	5.77	0.568	1.508	0.137

Table(4) : Mean score and standard deviation of patients in both studied groups according to the WHO oral assessment one week post radiotherapy treatment.

Items	Study group (n=30)		Control group (n=30)		T	p. value
	Mean	SD	Mean	SD		
Lips condition & angle of mouth	1.00	0.000	1.40	0.498	4.397	0.091
Appearance of teeth or denture	1.53	0.629	1.80	0.551	1.747	0.153
Appearance of tongue	1.00	0.000	1.43	0.504	4.709	0.092
Appearance of Mucous membrane/ gingiva	1.00	0.000	1.43	0.504	4.709	0.092
Saliva	1.00	0.000	1.10	0.305	1.795	0.056
Pain	0.00	0.000	0.43	0.504	4.709	0.092
Nutritional intake(ability to swallow)	0.13	0.346	0.57	0.504	3.883	0.112
Total	5.67	0.711	8.17	2.768	4.792	0.522

Table (5): The mean score and standard deviation of patients in both studied groups according to the WHO oral assessment two weeks post radiotherapy treatment.

Items	Study group (n=30)		Control group (n=30)		T	p. value
	Mean	SD	Mean	SD		
Lips condition & angle of mouth	1.50	0.509	1.97	0.183	4.731	*0.001
Appearance of teeth or denture	1.53	0.629	1.80	0.551	1.747	0.086
Appearance of tongue	1.67	0.479	2.07	0.371	3.594	*0.001
Appearance of Mucous membrane/ gingiva	1.57	0.504	2.10	0.403	4.529	*0.001
Saliva	1.40	0.498	1.97	0.414	4.792	*0.001
Pain	0.73	0.450	1.13	0.434	3.505	*0.001
Nutritional intake(ability to swallow)	0.70	0.466	0.93	0.254	2.408	*0.019
Total	9.10	2.869	11.97	1.903	4.561	*0.001

* $p < 0.05$ (significant)

Table (6) : Mean score and standard deviation of patients in the studied groups according to the WHO oral assessment three weeks post radiotherapy treatment.

Items	Study group (n=30)		Control group (n=30)		T	p. value
	Mean	SD	Mean	SD		
Lips condition & angle of mouth	2.00	0.000	2.40	0.498	4.397	*0.001
Appearance of teeth or denture	1.53	0.629	1.80	0.551	1.747	0.086
Appearance of tongue	2.00	0.000	2.47	0.571	4.474	*0.001
Appearance of Mucous membrane/ gingiva	2.00	0.000	2.57	0.568	5.461	*0.001
Saliva	2.00	0.000	2.37	0.490	4.097	*0.001
Pain	1.13	0.346	1.77	0.568	5.215	*0.001
Nutritional intake(ability to swallow)	0.90	0.305	1.03	0.183	2.054	*0.045
Total	11.57	0.858	14.47	2.700	5.606	*0.001

* $p < 0.05$ (significant)

Table (7): Mean score and

standard deviation of patients in both studied groups according to the WHO oral assessment four weeks post radiotherapy treatment.

Items	Study group (n=30)		Control group (n=30)			
	Mean	SD	Mean	SD	t	p. value
Lips condition & angle of mouth	2.47	0.730	3.37	0.669	4.978	*0.001
Appearance of teeth or denture	1.53	0.629	1.80	0.551	1.747	0.086
Appearance of tongue	2.40	0.498	3.00	0.371	5.288	*0.001
Appearance of Mucous membrane/ gingiva	2.13	0.346	3.10	0.607	7.575	*0.001
Saliva	2.17	0.379	2.87	0.434	6.652	*0.001
Pain	1.83	0.648	2.50	0.572	4.224	*0.001
Nutritional intake(ability to swallow)	1.00	0.000	1.20	0.407	2.693	*0.009
Total	13.53	2.488	17.83	2.451	6.745	*0.001

* p<0.05 (significant)

Table (8) : Mean score and standard deviation of patients in both studied groups according to the WHO oral assessment five weeks post radiotherapy treatment.

Items	Study group (n=30)		Control group (n=30)			
	Mean	SD	Mean	SD	T	p. value
Lips condition & angle of mouth	2.63	0.928	3.80	0.484	6.105	*0.001
Appearance of teeth or denture	1.53	0.629	1.80	0.551	1.747	0.086
Appearance of tongue	2.73	0.740	3.53	0.507	4.885	*0.001
Appearance of Mucous membrane/ gingiva	2.70	0.750	3.87	0.346	7.740	*0.001
Saliva	2.77	0.728	3.47	0.507	4.321	*0.001
Pain	2.40	0.621	3.30	0.535	6.012	*0.001
Nutritional intake(ability to swallow)	1.13	0.346	1.90	0.607	6.008	*0.001
Total	15.93	3.778	21.57	2.373	6.916	*0.001

* p<0.05 (significant)

Table (9) : The effect size values of using chamomilla recutita in the study group over the five weeks of treatment.

Items	1st week		2nd week		3rd week		4th week		5th week	
	x2	Effect size	x2	Effect size	x2	Effect size	x2	Effect size	x2	Effect size
Lips condition & angle of mouth	0.25	High	0.28	High	0.25	High	0.30	High	0.39	High
Appearance of teeth or denture	0.05	Low	0.05	Low	0.05	Low	0.05	Low	0.05	Low
Appearance of tongue	0.28	High	0.18	High	0.26	High	0.33	High	0.29	High
Appearance of Mucous membrane/ gingiva	0.28	High	0.26	High	0.34	High	0.50	High	0.51	High
Saliva	0.05	Low	0.28	High	0.22	High	0.43	High	0.24	High
Pain	0.28	High	0.17	High	0.32	High	0.24	High	0.38	High
Nutritional intake (ability to swallow)	0.21	High	0.09	Medium	0.07	Medium	0.11	Medium	0.38	High
Total	0.28	High	0.26	High	0.35	High	0.44	High	0.45	High

1-IF $X2 > (15\%)$ then Effect size is High.
2-IF $(6\%) < X2 < (15\%)$ then Effect size is Medium.
3-IF $X2 < (6\%)$ then Effect size is Low.
4-IF $X2 = (0\%)$ then No Effect size

Figure (1): The changes in the mean score of total oral assessment of patients over time in the studied groups.
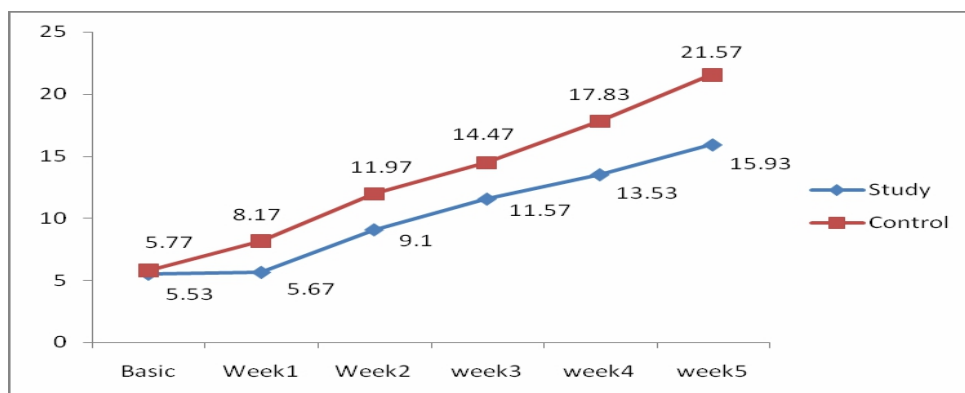
Table (10): Mean score and standard deviation of patients in the studied groups according to the oral assessment scale   by WHO

Items	Study group (n= 30)		Control group (n= 30)		T	p. value
	Mean	SD	Mean	SD		
Oral assessment scale (prior)	0.00	0.000	0.00	0.000	-	-
Oral assessment scale (after 1st week)	0.00	0.000	0.43	0.504	4.709	*0.001
Oral assessment scale (after 2nd week)	0.57	0.504	1.10	0.403	4.529	*0.001
Oral assessment scale (after 3rd week)	1.00	0.000	1.47	0.571	4.474	*0.001
Oral assessment scale (after 4th week)	1.13	0.346	2.00	0.643	6.500	*0.001
Oral assessment scale (after 5th week)	1.47	0.730	2.90	0.607	8.265	*0.001

* $p < 0.05$ (significant)

Table (11) : The effect size values of using chamomilla recutita in the study group post radiotherapy treatment according to the Oral assessment scale by WHO .

Items	x2	Effect size
Oral assessment scale (after 1st week)	0.28	High
Oral assessment scale (after 2nd week)	0.26	High
Oral assessment scale (after 3rd week)	0.26	High
Oral assessment scale (after 4th week)	0.42	High
Oral assessment scale (after 5th week)	0.54	High

1- IF X2 > (15%) then Effect size is High.   2-IF (6%) < X2 < (15%) then Effect size is Medium.

3-IF X2 < (6%) then Effect size is Low. 4- IF X2 = (0%) then No Effect size.

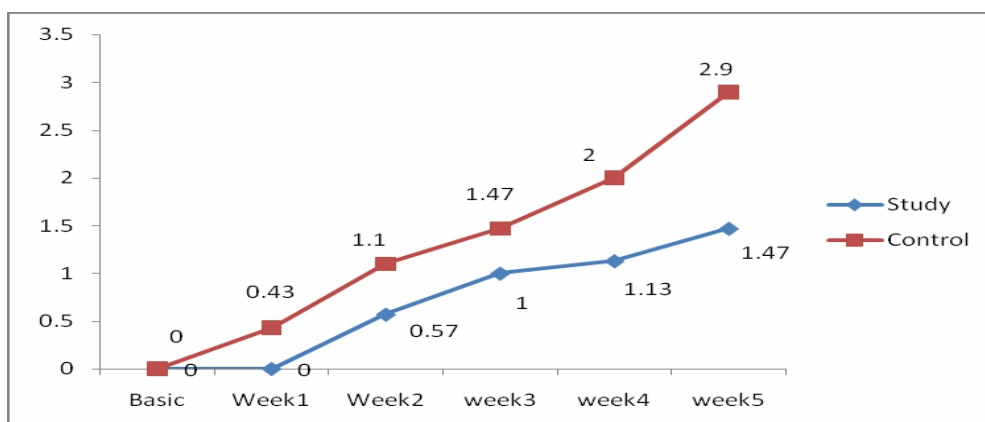Figure (2): The changes in Oral assessment scale of patients of both group over time.

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Table (12) : The changes of Weight in both studied groups

Items		Study group (n= 30)		Control group (n= 30)		X^2	p. value
		No.	%	No.	%		
Body Weight	No change	11	36.7	6	20.0	7.820	*0.05
	Increased	6	20.0	1	3.3		
	Decreased	13	43.3	23	76.7		

* p<0.05 (significant)

Discussion

Radiotherapy is one of the essential treatment modalities, but it may cause several adverse effects to those diagnosed with cancer because. It also may cause rapid-division of normal cells. The utmost difficult side effects of radiotherapy include mucosal ulceration nausea and vomiting **Vokurka et al (2016) and Motallebnejad et al., (2018).**

Recent studies have examined that more patients suffer from stomatitis post-radiotherapy when they are compared with healthy groups. From this perspective, our study showed the importance of using Chamomilla Recutita inappropriate preventative measures and appropriate management measures when stomatitis does occur. This study was conducted to evaluate the effect of using Chamomilla Recutita on the management of radiation-induced stomatitis in patients with head, and neck cancer.

Sociodemographic and Medical Characteristics

The findings of the present study revealed that the highest percentage of the participants in both the study and control groups were between 50 < 60 years old. This result may be due to the poor healing rate in old patients. This finding is congruent with **(McCarthy et al., 2016)** who studied the factors related to mucositis in those who received 5-fluorouracil, and in a randomized clinical trial by **(Rocke et al., 2017)** that was studied along two different periods of oral cryotherapy for the prevention of 5-fluorouracil related stomatitis, stated that patients who developed oral mucositis were between 50 < 65 years of age. This finding contradicts with **(Sonis, 2015)** who found an increased prevalence of mucositis in children.

As similar, there is a conflicting evidence for the gender effects on the risk for mucositis. The current study showed that most of the two studied groups were females, married, and illiterate. These findings may be due to that the awareness of the importance of education was not enough especially for females and in general people were satisfied with primary education only and did not care to complete their education, this may be related to the fact that marriage increases the responsibilities which make females ignore their health most of the time. Those are in the same line with (**Zalcberg et al., 2017**) and **(Vokurka et al., 2019)**, as they reported that a higher incidence of radiotherapy-induced oral mucositis is in females.

The present study showed that the common patients of both groups were from rural areas**.** This may be attributed to the acceptance of the study group to use Chamomilla Recutita as a treatment for radiotherapy-induced stomatitis instead of the conservative pharmacological therapy. This was mentioned to the benefit of being easily available, less costly, culturally believed in, highly nutritive, and free from side effects. This was in accordance with

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Geoff et al., (2016) who demonstrated that combined medicine is a holistic method to cancer care, and constant too with **Scardina et al., (2018)** who stated that alternative and complementary therapies can be safe and effective in treating upper GIT toxicities of chemo/radiotherapy.

Additionally, this study portrayed that the percentage of participants in the study group who accept that chamomilla Recutita can be used for oral dysfunction was a majority and the patients who conventionally used it before successfully were more than half which emphasis that it's culturally believed in. They used to use Chamomilla Recutita to treat oral problems, particularly within their families. These results were in agreement with **Frank (2016) and Ludgate (2018)** who stated that alternative and complementary therapies are widely used by patients with cancer. The familiarity with the use of chamomilla Recutita by the majority of the study group makes it easier for them to follow the instructions program **(Scardina, Pisano, Messina, 2018).**

The present study pointed out the improvement of the lips& angle of mouth in the study group (p< 0.001) it was started from the second-week post chamomilla use, this improvement was related to the moisturizing & healing enhancement effect of chamomilla Recutita. **Bardy et al., (2018)** have agreed with the present study findings and due to the osmolarity effect of the chamomilla Recutita which draws the fluid from underlying tissues and promotes the lips healing process.

The present study also revealed a rapid improvement in the condition of mucous membranes & gingiva of the study group more than the control group, these results were congruent with the result of another study by **Bogdanov (2017)**, who had to confirm the same results and advised that the healing properties of chamomilla Recutita might also be useful in the management of cancer patients. In this respect, **Bardy et al., (2018), and Rodrı´guez et al ., (2017)** had agreed also about the fact that chamomilla Recutita possesses anti-inflammatory, antimicrobial, healing, and moisturizing properties that decreased the severity and duration of radiotherapy-induced stomatitis minority of the study group vs. more than half of the control group of his chamomilla.

Additionally, regarding the better tongue condition which the study group had faster than the control group where (p< 0.001). **Bardy et al., (2018)**, agreed with these results stating that 25% of the studied group and 75% of the other group had grad 3/4 stomatitis in a similar study. He mentioned also that chamomilla Recutita is known to diminish the number of the microbes presented in the oral cavity. This may have benefits for patients with head and neck cancers and are prone to oral or oropharyngeal infection and undergoing radiotherapy like chamomilla Recutita may diminish the incidence of oral infections and teeth decay. This knowledge make it effective with the protection and treatment of the oral inflammatory condition.

Charalambous et al., (2017), illustrates that some studies refer to chamomilla Recutita as one of the complementary medicines that have positive properties to health including its ability to facilitate the healing process and delay or prevent the growth of ulceration in the minority of patients who had stomatitis. This justifies the better condition of the oral cavity within the study group than the control group

Kanal et al., (2017), has concluded in a similar study that in the chamomilla Recutita group, only 5% of patients developed intolerable stomatitis, but in the lignocaine group 75% of patients developed intolerable stomatitis. This was matched with the findings of the current study concerning the effect of chamomilla Recutita vs. the pharmacological agents. Chamomilla Recutita applied to the oral cavity reduced the severity of gingivitis and enhanced the condition of tongue and mucous membrane of the study group in which the T-test showed statistically significant differences (p< 0.001).

Contrarily, a study was done by **Parsons et al., (2016),** concluded that in contrast to previous chamomilla Recutita trials in Malaysia, Iran, and India, diluted manual chamomilla Recutita did not decrease the extent and onset of radiation-induced oral stomatitis, this may be due to the type of chamomilla Recutita which he uses or the very small sample size (28 patients) that his results come from.

Pain assessment in Relation to the Use of Chamomilla Recutita

The current study revealed a statistically significant decrease in oral pain in the study group more rapid than the control group (p< 0.001), which was related to the analgesic effect which chamomilla Recutita possesses. **Kanal et al., (2017)** demonstrated that chamomilla Recutita was applied to oral cavity controlled infection early and relieved pain in the majority of patients in a similar group. This is in line with the current study findings with statistically significant difference (p< 0.001)

Findings from the present study showed that the majority of patients in the study group had less pain than the patients in the control group, in the same line **Mohamed (2018)**, mentioned that a chamomilla was conducted in Egypt describing a small clinical trial of using Chamomilla Recutita in skin lesions and concluded that there was less pain, less incidence of complications and less swelling in chamomilla Recutita treated group than in the untreated control group Another important chamomilla done by **Rashad (2016)** conducted in Assiut University- Egypt also supports the current study findings reporting that prophylaxis chamomilla Recutita rinse has significantly reduced stomatitis severity in cancer patients receiving either chemotherapy or radiotherapy. In his study, the treatment group had not developed grade four stomatitis and only three out of 20 patients (15 percent) developed grade three stomatitis. In contrast with the control group, 13 out of 20 patients (65 percent) developed grade three or four stomatitis (p < 0.05).

Weight assessment in Relation to the Use of Chamomilla Recutita.

The current study revealed that, there were significant differences between the weights in the two groups .There was a significant weight gain in the study group but on the other hand there was a significant weight loss in the control group, post five weeks of using chamomilla recutita. Based on this results it could be assumed that the study group can eat better than the control group. These results was in agrees with **Charalambous et al., (2017)**, and **Parsons et al., (2016)**[39], who supported the current findings reporting that chamomilla recutita contains numerous compounds which can help patients undergoing radiotherapy in relation to improved malnutrition and weight loss. In another trial done in Malaysia by **Biswal et al., (2018)**, a significant reduction in stomatitis was observed

among prophylactic chamomilla recutita-treated patients compared to controls. In addition, 55% of patients treated with topical chamomilla recutita showed no change or a positive gain in body weight compared to 25% in the control group, the majority of whom lost weight.

In the present study, the nutritional status of the study group was enhanced post treatment which was evidenced by the weight gain in some patients or the no change of weight. According to **(McCarthy et. al. 2016)** his results were congruent with the results of the present study; the mean weight loss of the study group was 1±0.35 (0 to 7 kg). Ten patients showed no weight loss in this group (25%). In the control group the weight loss was (2 to 11 kg); researcher also reported that natural chamomilla recutita is a product with rich nutritional qualities that could be a pleasant, simple, and economic modality for the management of radiation stomatitis.

Conclusion

Based on the findings of the current study it can be concluded that use of chamomilla recutita proved too had a positive effect in relation to management of stomatitis in cancer patients treated by radiotherapy

Recommendations

In the light of the findings of the present study, the following recommendations are suggested:

A- Recommendations for patients:

- Health education program for patients receiving radiotherapy about the possible side effects and how to deal with each one of them immediately.

- Patients who complain from stomatitis should be encouraged to regular mouth care and to apply chamomilla recutita for better management.

- Oral care protocol should be taught to staff concerning with patients receiving radiotherapy in order to improve and prevent stomatitis.

- Regular training programs to keep the all nurses working in Nuclear Medicine Unit updated with the most advanced and early detection of stomatitis and proper treatment to avoid or decrease oral infection as well as enforcing adequate nutrition rich in proteins, that promote healing and minimize infection.

- Nurses should prevent and decease oral complication of radiotherapy for cancer patients receiving radiotherapy through assessing oral cavity by using standardized grading system as an oral assessment guide (OAG) tool prior to the initiation of radiotherapy and at least daily following the administration of it.

Conflict of interest

There were no conflicts of interest.

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