



# An Impact of Coconut Oil Pulling on Oral Mucositis among Malignancy Patients

C. Manjunathan<sup>1\*</sup> and Vijoykumar Singh<sup>2</sup>

<sup>1</sup>Operations and Nursing, Apollo CBCC Cancer Care, Apollo Hospitals International Ltd., Gandhinagar, Ahmedabad – 382428, Gujarat, India; manjunathan1801@gmail.com

<sup>2</sup>Department of Surgery, SBKSMIRC, Vadodara – 391760, Gujarat, India; drvijoyksingh@gmail.com

## Abstract

Acute or chronic oral complications may develop around 400,000 patients each year during chemotherapy. Oral mucositis happens in around 40% of patients who get malignancy chemotherapy<sup>1,2</sup>. Basically 75% of patients who get strong regimens develop oral mucositis. Treating oral mucositis with coconut oil has worked and battle all anti-viral, bacterial, and fungal properties<sup>3</sup>. The medium-chain unsaturated fats found in coconut oil which is immediately consumed into the body and thus the healing process is accelerated and it helps to enhance the body's own immune system and hence assist it with battling all germs<sup>4</sup>. Coconut oil is a conventional treatment and is completely edible and natural<sup>5,6</sup>. It aims to evaluate the impact of coconut oil pulling on oral mucositis. A Quasi-experimental approach, convenient examining strategy, test size was 60 and the information was gathered through organized self-talk with questionnaires with standardized WHO Oral Mucositis Rating Scale. The Coconut oil pulling technique was administered to the experimental group. This group of people were administered with the coconut oil pulling technique and collected outcomes were analyzed statistically. The majority of samples had grade 3 rating in trial batch and in control batch larger part of them had grade 2 rating on severity of oral mucositis. The coconut oil pulling technique intervention was effective among cancer patients with oral mucositis of post-test results, the secured 't' benefit was remarkable,  $p < 0.05$  extent. The association between oral mucositis with their demographic variables are found was significant ( $p < 0.05$ ). The technique tested was found to have significant outcomes for the experimental group. This group has less intensity of oral mucositis as contrasted to the control group.

**Keywords:** Cancer Patients, Coconut Oil Pulling, Evaluation, Impact, Oral Mucositis

## 1. Introduction

Chemotherapy and radiotherapy is the treatment of cancer and will impact the unfavorable side effects<sup>7</sup> particularly on the mucous membrane of the digestive track, resulting in excurating irritation and ulceration is referred to as mucositis. Mucositis can happen any place in the digestive (GI) system, however oral mucus inflammation alludes to the specific aggravation and sore that happens in the oral cavity. Oral mucus inflammation is a typical and regularly crippling intricacy of malignancy treatment<sup>8</sup>.

Every year, almost 12 million cases are diagnosed with cancer. In India, around 1150 cases for each 100,000 are diagnosed with cancer. Around 72,169 cases each year are analyzed in Gujarat, among them 85 % of cancer patients get chemotherapy and radiotherapy (RT)<sup>9,10</sup>.

Buccal cavity and digestive track mucositis can influence practically every one of the patients going through chemotherapy and Bone Marrow Transplantation. 80% head and neck cancer patients are receiving radiotherapy, and a broad scope of

\*Author for correspondence

patients getting chemotherapy<sup>11</sup>. Gastrointestinal track mucus inflammation builds dying and distress and also increase the wellness maintenance cost<sup>12,13</sup>.

The majority of malignant growth patients get 5-15% of excavation of mucus due to the cause of illness treatment. Regardless, with 5-fluorouracil (5-FU), up to 40% get inflammation of mucus and 10-15% get grade 3-4 oral mucositis<sup>14</sup>. Irinotecan is connected with genuine GI mucositis in over 20% of patients. 75-85% of stem cell transplantation recipients encounter with inflammation of mucus, of which buckle mucositis is the most broadly perceived and by an large debilitating, especially when melphalan is managed. In grade 3 buccal inflammation, the patient cannot eat strong food, and in grade 4 the client cannot take fluids<sup>15,16</sup>.

Teletherapy to the head and neck or to the pelvis or mid-region of truck is related with grade 3 and grade 4 buckle or digestive track inflammation, outperforming half of clients. Amid clients going through head and neck teletherapy, torment and reduced oral capacity might drive forward long get to conclude to finish of treatment<sup>17</sup>. Fractionated teletherapy dosages expanding the danger of inflammation to > 70% of patients in numerous fundamentals. Oral redness is particularly huge and drawn out among malignant clients who *get all* out body irradiation<sup>18</sup>.

Oral inflammation of mucus happens when cancer medicines break down the quickly divided epithelial cells coating the GI track, especially in the oral cavity, leaving the mucosal tissue open to ulceration and disease. Mucositis can happen at any place along the digestive track from the mouth to the butt<sup>19,20</sup>.

Oral mucositis causes, confines oral intake, may go about as a gateway of entry for germs, every now and again adds to interference of treatment, perhaps surge the utilization of antibiotics and opiates, possibly rise the extent of hospitalization and perhaps build the general expense of treatment<sup>21</sup>. Clients with oral mucus inflammation have an overall danger of septicemia. Therefore this motivated the researcher to take up this study and evaluate the impact of coconut oil pulling on oral mucositis among cancer patients<sup>22</sup>.

Oil pulling generates antioxidants which damage the cell wall of microorganisms and kill them<sup>24</sup>. These oils will attract the lipid layer of bacterial cell membranes, and cause it to stick or get attracted, and pulled to

the oil. During oil pulling, the oil gets emulsified and surface area of the oil gets increased<sup>23</sup>. The process of emulsification of oil begins upon 5 min of oil pulling<sup>24</sup>. This oil will coat the teeth and gingiva, mucus and inhibits bacterial co-aggregation and plaque formation. Oil pulling prevents dental caries, gingivitis, oral candidiasis and periodontitis from occurring, helps to reduce tooth pain, fixes mobile teeth and achieves vigorous oral hygiene<sup>25-28</sup>.

## 2. Materials and Methods

A Quasi-experimental methodology and the study was carried out at Apollo Hospitals Gandhinagar using Non-Probability Convenience Sampling technique. A sample size of 60 were selected in all and equally divided into Control group and Experimental group. Specimens were chosen based on consideration and omission standards.

## 3. Principles Adopted to Accept or Deny Patients

- Patients not less than 20 years.
- Patients with cancer, irrespective of stage and rigorous of oral mucus inflammation.
- Clients with malignancies and who receive chemotherapy and teletherapy for cancer.
- Patient who are eager to participate in an experiment.
- Patient who are unable to follow instruction.
- Post-surgery patients.
- Unwilling participants.

The study instrument was created in English following the broad write-up of literature and specialist suggestions. It was interpret by a language master. The standardized World Health Organization (WHO) Buccal mucus inflammation Rating tool was utilized to evaluate the severity of buccal inflammation and this rating scale comprised of socio stats adaptable variable of cancer patients as similar as Age, Sex, literacy level, Monthly earnings, custom of smoking, Betel leaf chewer, Source of information, and Type of cancer treatment and also it consist of Grade 0 to Grade 4 in the scale.

World Health Organization buccal Mucus Inflammation Rating Scale was applied to the sample. The score ranged from grade 0 to grade 4 in which grade 4 being the maximum. The classification of severity of oral mucositis was done according to the scores obtained from sample by using, the quartile range. A six week of period was taken for collection of data, after obtaining their written consent. Interview method was used to analysis the severity of oral mucositis between both experimental and control group which was measured with the help of Standardized WHO oral mucositis rating scale. Both the groups were taken fifteen minutes to draw the data from the clients, including experimental and control group. About 5 ml of coconut oil was given for oil pulling early in the morning for 6–7 continuous days. The coconut oil pulling was done for complete 5 minutes. After 6–7 days of duration, severity of mucositis was assessed with oral mucositis rating scale among both the groups.

Descriptive analysis such as chi-square has been used to analyze the sample, variables being socio economic differences. The paired 't' test was used for analyzing the effectiveness of oil pulling on buccal inflammation. Association between the severities of oral mucositis among the cancer patients with the selected socio demographic variables were analyzed by using chi-square test. Based on outcomes observed and reported, the control group was also trained on the coconut oil pulling technique to address ethical outcomes.

## 4. Results

It can be concluded that over 60% of the sample analyzed belonged to the age group of between 30-50 years with the balance 40% equally distributed between the above 50 and below 30 age groups. It may be also stated that in

**Table 1.** Reported analysis of data on variables examined

S.No	Socio-Demographic Variables	Trial Class		Non-Trial Class		Total	
		n	%	n	%	N	%
1.	Age						
	1) 20-30 years	6	20%	14	46%	20	33%
	2) 30-50years	18	60%	4	13%	22	37%
	3) 50-60 years	6	20%	12	40%	18	30%
2.	Sex						
	1) Male	14	47%	16	53%	30	50%
	2) Female	16	53%	14	47%	30	50%
3.	Literacy status						
	1) Illiterate	5	16%	5	17%	10	17%
	2) Primary school	5	16%	6	20%	11	18%
	3) High school	8	27%	8	27%	16	27%
	4) Higher secondary	9	30%	5	16%	14	23%
	5) Graduate	3	10%	6	20%	9	15%
4.	Monthly income						
	1) <Rs.3000/-	4	13%	11	37%	15	25%
	2) Rs.3001-4000/-	13	43%	10	33%	23	38%
	3) Rs.4001-10000/-	10	33%	9	30%	19	32%
	4) >10001/-	3	10%	-	-	3	5%
5.	Habit of smoking						
	1) Yes	9	30%	14	47%	23	38%
	2) No	21	70%	16	53%	37	62%

both groups the majority were males (53% in the trial and 57% in the non-trial sets) (Table 1).

It also infers that regarding experimental group educational status, majority 9 (30%) have completed their graduate, 8(27%) had higher secondary education, 5(16%) had primary school education, 3(10%) had completed their graduate degree and 5(16%) of them were illiterate, In the control group the educational status shows, majority 9(30%) have completed their graduates, 5 (16%) were illiterate, 6(20%) had primary school education, 5(16%) had higher secondary education and 6(20%) had completed their graduate degree.

Similarity between the trends in both groups were also observed in the case of income. The maximum contributors belong from the class of 3001 to 4000 rupees and none were under the income group of above Rs.10,001.

It also infers that the experimental group, regarding the habit of smoking, majority 19(70%) were nonsmokers habit, 9(30%) had the habit of smoking, In the control group, regarding the habit of smoking, majority 16(53%) were nonsmokers habit, 14(47%) had the habit of smoking.

It also infers that the experimental group, regarding the habit source of information, majority 23(77%) received information from mass and informative media, 4(13%) received information from both in-service education and from friends, In the control group, regarding the habit source of information, majority 27(90%) received information from mass and informative media, 6(10%) received information from friends, 1(3%) received information from in-service education.

The experimental group, 20(63%) had a practice of paan grind, 10(33%) had no custom of paan

**Table 2.** Analysis of data on the level of oral inflammation of mucus between malignancy clients.

S.No	Socio Demographic Variables	Trial Class		Non-Trial Class		Total	
		n	%	n	%	N	%
1.	Habit of Betel leaf chewing						
	1) Yes	10	33%	7	23%	17	28%
	2) No	20	67%	23	77%	43	72%
2.	Sources of information						
	1) Mass and Information Media	22	73%	25	90%	49	82%
	2) In-service education	4	13%	1	3%	5	8%
	3) Friends	4	13%	2	6%	6	10%
3.	Type of cancer treatment						
	1) Chemotherapy	8	27%	13	43%	23	38%
	2) Radian therapy	19	63%	12	40%	29	48%
	3) Both	3	10%	5	16%	8	14%

**Table 3.** Data on impact of coconut oil pulling on oral mucositis among malignancy patients

S. No.	Grade	Trial Class				Non-Trial Class			
		Pre-trial		Post-trial		Pre-trial		Post-trial	
		N	%	n	%	n	%	n	%
1.	Grade 0	-	-	9	25%	-	-	-	-
2.	Grade 1	4	11%	17	52%	7	18%	-	-
3.	Grade 2	14	44%	10	29%	21	67%	4	11%
4.	Grade 3	15	48%	-	-	6	18%	22	71%
5.	Grade 4	-	-	-	-	-	-	7	21%

**Table 4.** The trail and non-trail group were analysed with descriptive statistics and 't' Value of Post-test of coconut oil pulling on inflammation of buccal mucus between both the malignancy group

Group	Mean	S.D.	t-value
Control group post test	4.08	0.73	14.03
Experimental group -post test	2.01	0.81	

**Table 5.** The pre and post-test group were analyzed with descriptive statistics and 't' test on coconut oil pulling among trial group

Group	Mean	S.D.	t-value
Experimental Pre test	3.47	0.78	11.37
Experimental post test	2.01	0.81	

**Table 6.** The pre and post-test group were analyzed with descriptive statistics and 't' test on coconut oil pulling among non-trial group

Group	Mean	S.D	t-value
Control group Pre test	2.08	0.6245	-12.01
Control group post test	3.50	0.6001	

**Table 7.** Socio-Demographic variables and their association between severities of oral mucositis

S. no	Demographic Variables	Grade 0		Grade 1		Grade 2		Grade 3		Grade 4		χ <sup>2</sup> Pre-test
		n	%	n	%	n	%	n	%	n	%	
1	Age											2.894 <sup>NS</sup> df =4
	1) 20-30 years	0	0	0	0	1	20	4	80	0	0	
	2) 30-50years	0	0	2	13	8	50	6	37	0	0	
	3) 50-60 years	0	0	1	11	4	45	4	44	0	0	
2	Sex											0.696 <sup>NS</sup> df =2
	1) Male	0	0	2	13	7	47	6	40	0	0	
	2) Female	0	0	1	7	6	40	8	53	0	0	
3	Educational status											2.881 <sup>NS</sup> df =8
	Illiterate	0	0	0	0	1	25	3	75	0	0	
	1) Primary school	0	0	1	17	3	50	2	37	0	0	
	2) High school	0	0	1	11	4	44	4	45	0	0	
	3) Higher secondary	0	0	1	12	4	50	3	38	0	0	
4) Graduate	0	0	0	0	1	33	2	67	0	0		
4	Monthly income											7.832 <sup>NS</sup> df =6
	1) <Rs.3000/-	0	0	0	0	1	20	4	80	0	0	
	2) Rs.3001-4000/-	0	0	3	25	6	50	3	25	0	0	
	3) Rs.4001-10000/-	0	0	0	0	5	45	6	55	0	0	
	4) >10001/-	0	0	0	0	1	50	1	50	0	0	
5	Habit of Smoking											0.297 <sup>NS</sup> df =2
	1) Yes	0	0	1	10	5	50	4	40	0	0	
	2) No	0	0	2	10	8	40	10	50	0	0	



mastication, among the control group, 7(23%) had a habit of paan leaf mastication, 23(77%) had no practice of paan grind.

Regarding the type of cancer treatment, the experimental group had, majority 19(63%) had received radiation therapy, 8(27%) had received chemotherapy, 3(10%) had received both the therapies, the control group had, majority 13(43%) had received chemotherapy, 12(40%) had received radiation therapy, 5(16%) had received both the therapies (Table 2).

It reveals that the pre and post-test trial class, none were under the grade 0 of pre-test and 9(25%) were under grade 0 of post-test, 4(11%) were under grade 1 of pre-test and 17(52%) were under grade 1 of post-test, 14(44%) were under grade 2 of pre-test and 10(29%) were under grade 2 of post-test, 15(48%) were under grade 3 of pre-test and none were under grade 3 of post-test, none were under grade 4 of pre-test and none were under grade 4 of post-test (Table 3).

It also reveals that the pre and post-trial score between the non-trial class, none were under the grade 0 of pre and post-test, 6(18%) were under grade 1 of pre-test and none were under post-test, 21(67%) were under grade 2 of pre-test and 4(11%) were under grade 2 of post-test, 6(18%) were under grade 3 of pre-test and 22(71%) were under grade 3 of post-test, none were under grade 4 of pre-test and 7(21%) were under grade 4 of post-test.

Table 4 reveals that, among the control group, the post-test mean was 4.08, the standard deviation was 0.73 and experimental group post-test mean 2.01, standard deviation 0.81 and mean difference was 28, the 't' value was 14.03 that is significant at 0.05 level. Hence, the hypothesis stated was accepted.

It discloses that, between trial class, the mean of pre-trial was 3.37 and the standard deviation was 0.78, the trial class post-trial mean was 2.0 and the standard deviation was 0.8 and also 28 was the mean difference, 11.37 was 't' value (Table 5). It justifies the significant at 0.05 level. Consequently, declared this hypothesis.

It discloses that, between non-trial class, the mean of pre-trial was 2.08 and the standard deviation was 0.6245, the trial class post-trial was 3.50, and the standard deviation was 0.6001 and also 28 was the mean difference, 12.01 was the 't' value (Table 6). It justifies

the significant at 0.05 level. Consequently, declared this hypothesis.

The chi-square study was used to conduct the association among the severity of oral mucositis and socio-demographic variables of the trial class. Data reflects no association of variables such as socio-demographic and severity of oral mucositis in the experimental group (Table 7).

## 5. Discussion

Pre- and post-trial results between the trial class, none were under the grade 0 of pre and post-test, 5(17%) were under grade 1 of pre-test and none were under post-test, 20(66%) were under grade 2 of pre-test and 3(10%) were under grade 2 of post-test, 5(17%) were under grade 3 of pre-test and 21(70%) were under grade 3 of post-test, none were under grade 4 of pre-test and 6(20%) were under grade 4 of post-test. (Table 2).

Reveals that, pre and post-trial results among the non-trial class, none were under the grade 0 of pre-test and 7(23%) were under grade 0 of post-test, 3(10%) were under grade 1 of pre-test and 5(50%) were under grade 1 of post-test, 13(43%) were under grade 2 of pre-test and 8(27%) were under grade 2 of post-test, 14(47%) were under grade 3 of pre-test and none were under grade 3 of post-test, none were under grade 4 of pre-test and none were under grade 4 of post-test. A similar study was conducted in 2001, by Singh osbarhir, Holovacs, Calvley and Spenser, the sample size was seventy, 35 patients were applied for the coconut oil pulling group, and the remaining 35 patients were in the control group. Patients who received coconut oil pulling reported less pain during sleep and more comfort than the control group. During 7 days through experimental group reported reduced frequency of pain and severity of oral mucositis and also another similar study conducted by Ohkoshi *et al.* (1999), the study was performed among 21 patients. Coconut oil pulling was treated to 10 patients and 11 patients were kept as a control group. 5 ml of coconut oil was given for pulling early in the morning for 7 continuous days; the oil pulling was done for 5 minutes immediately after and before the procedure and reduced the severity of mucositis.

## 6. Conclusions

The study infers that the 30 examples of experimental group were Graded as 3 and Grade 2, and in control group majority were graded as grade 3 and grade 2 mucositis. On evaluation, it showed a basic need to comprehend the reason for coconut oil pulling strategy in regards to the decrease in the level of buccal mucus inflammation among malignancy clients. Viability of coconut oil pulling on cancer patients with oral mucositis is to be encouraged as it has manifest the better standard of life.

### 6.1 Ethical Approval

Since this research involved human subjects, a formal ethical approval received from the institutional ethical committee.

### 6.2 Informed Consent

The participants were given informed consent and ensured for anonymity.

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