



To Assess Effectiveness of Topical Application of Pure Honey on Radiation Induced Mucositis in Cancer Patients Undergoing Radiotherapy

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ABSTRACT

Introduction: Mucositis is an inflammatory illness that affects the mouth's mucous membranes. It could be the result of an infection or an indication of something more serious. Oncology nurses play a crucial role in improving patient outcomes related to oral mucositis. Honey has long been used to prevent and cure oral mucositis.

Aim: The aim of the study to assess effectiveness of topical application of pure honey on radiation induced mucositis in cancer patients undergoing radiotherapy.

Material and Methods: The style adopted for the study is true experimental design with two group pre-tests with the experimental analysis approach was used to judge the effectiveness of topical applications of pure honey on radiation evoked mucositis patients. This study was conducted in GSL Cancer hospital Rajahmundry. The sample size consisted of sixty patients suffering type oral mucositis patients who are admitted in GSL cancer hospital at Rajahmundry. Sample random sampling technique was used for the choice of sample. Knowledge was collected by mistreatment WHO mucositis assessment scales & one observation check list to assess the grade of radiation induced mucositis in patients. Modified WHO oral mucositis assessment scale. Data were analysed using descriptive and inferential statistics.

Result: The results of this study showed that, oral mucositis score of experimental and control groups mean were 9.73 and 1.7 respectively. The standard deviation was 0.927 and 14.55 respectively. Hence calculated t' value 2.66 is greater than tabulated t' value 2, 'p' value is 0.0101 shows that there was a significant oral mucositis scores between post test scores in both experimental and control groups. Applications of pure honey was effective.

Conclusion: The findings of the study concluded that, the application of pure honey was effective on radiation induced mucositis in cancer patients undergoing radiotherapy and the level of mucositis is decrease.

Key Words: Assess, Effectiveness, Pure honey, Topical application, Radiation induce mucositis, Radiotherapy

INTRODUCTION

Man will never be so perfectly suited to his current position that his existence will be free of snags, disappointments, and sorrows, hence the concept of magnificent great well-being will never be accepted. As a result, great happiness will always conjure up images of deception. Because everything in our lives is subject to change, wellbeing has been defined as the ability of an individual to constantly adapt himself (or herself) despite changing circumstances. Disease is one of the most important risks to human health in the industrialised world, and it is spreading rapidly in developing countries.¹

Mucositis is an inflammatory illness that affects the mouth's mucous membranes. It could be the result of an infection or an indication of something more serious. Mechanical (or chemical) trauma could be the cause. As the use of oral gel becomes increasingly common, a range of topically applied pharmacological treatments for the treatment of radiation-induced oral mucositis have been examined, with mixed results. To minimise oral sores and to ensure that their nutritional needs were addressed, patients were given the product on their first visit. Honey is well-known for its therapeutic benefits, which have been well-documented in scientific studies. The research and creation of therapy guidelines for mucositis symptoms.²

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Oncology nurses play a crucial role in improving patient outcomes related to oral mucositis by incorporating oral mucositis knowledge and research into our routine operations. Radiation therapy can cause mucositis, a painful and incapacitating side effect. Pain alleviation, hydration prevention, and adequate nourishment are the three foundations of treatment. Oral cancer is one of the sixty most common malignancies recorded worldwide, having one of the highest fatality percentages among all mucositis, with over two-thirds of new cases occurring in underdeveloped nations.³

Oral mucositis is a common side effect of cancer treatment (2003) Radiotherapy for oral mucositis carcinoma of grade 34 percent was the incident that occurred. Males weigh between 85 and 100 pounds, while females weigh between 25 and 45 pounds (female). Men and women in India have age-adjusted incidence rates of 44.8 and 23.7, respectively, compared to 11.2 per 1,00000 in the US. Kerala (southern India) has a high rate of oral cancer, while Mumbai has a high rate of mouth cancer (western India) The tongue rate is 5.7 per 10,000, while the age-adjusted rate is 5.7 per 10,000. Mucositis develops at varying rates depending on the cancer treatment regimen.⁴

The current oral mucositis treatment regimen has a mucositis rate of 85-100 percent. In patients undergoing significant myeloid ablative radiation treatment, mucositis can occur at a rate of 91-100 percent with changed fractionated radiation, 89 percent with chemoradiation, and 97 percent with conventional radiation. The anti-cancer therapy approach, for example, has an impact on the severity of mucositis. The patient's age and oral hygiene diagnosis, as well as a genetic component, will be considered during treatment.

Honey has long been used to prevent and cure oral mucositis, and there is strong evidence that it can help those suffering from radiation-induced mucositis. 6 Honey has been shown to prevent oral mucositis in head and neck cancer patients undergoing radiation therapy, according to the research. As a result, the researcher wants to know if the normal hospital practise of giving honey to cancer patients undergoing radiation is more effective in reducing oral mucositis.⁵

Objectives of the study

- To assess the oral mucositis among cancer patients undergoing treatment before the application of honey in experimental and control group.
- To administer the topical application of honey in experimental group.
- To compare the pretest and posttest score oral mucositis of cancer patients. Undergoing radiation therapy in experimental Group.
- To compare the post test scores of oral mucositis among cancer patients undergoing radiation therapy in experimental and control group.

- To associate between the post test scores of oral mucositis among cancer patients in experimental group with their selected demographic variable.
- To associate between the post test scores of oral mucositis among cancer patients in control group with their selected demographic variables.

Hypothesis

H₁: There is a significance difference in oral mucositis among radiation therapy client between pre and post test score in experimental group.

H₂: There is a significance difference in oral mucositis among radiation therapy client post test score in experimental and control group.

H₃: There is a significance association between post test score in oral mucositis and their selected demographic variable among radiation therapy client in experimental group.

H₄: There is a significance association post-test score in oral mucositis and their selected demographic variable among radiation therapy client in control group.

Assumptions

- The study is based on the following assumption
- Pure honey has no adverse reaction on radiotherapy.
- Topical application of honey on reducing the mucositis.

MATERIAL AND METHODS

Research approach

The research method adopted for the present study is experimental approach

Research design

In the present study the investigator selected the true experimental design with two group pre-tests design, keeping in the view of objectives of the study.

Setting of the study

The present study was conducted in GSL Cancer hospital Rajahmundry.

Population

The population of the study includes the radiation-induced oral mucositis patients who are admitted to GSL cancer hospital at Rajahmundry

Sample and sampling technique

In the present study, simple random sampling technique use by the investigator.

Sample Size

Total sample size for this study is 60 patients suffering from oral mucositis patients who admitted in GSL cancer hospital at Rajahmundry.

Sampling criteria

Inclusion criteria:

- Patient undergoing radiotherapy for head and neck cancer Patient admitted in GSL cancer hospital.
- Mucositis patients those who are willing to participate in the study.
- Patient who has developed mucositis.

Exclusion criteria:

- An ontological client who are not willing to participate in the study.
- Patient taking the last cycle of radiotherapy.
- Irregular patient
- Patient having diabetes mellitus or hereditary problem of diabetes mellitus

Description of the tool

The data collection tool has been divided in to two sections.

Section 1: Consisting of patient's baseline information and seven items referring to demographic variables such as gender, age, education level, economic situation and kind of radiotherapy.

Section 2: To measure the severity of radiation-induced mucositis in patients, one WHO mucositis assessment scale and one observation check list were used. WHO Oral Mucositis Assessment Scale.

Interpretation of the score

The resulting scores were arranged on radiation-induced oral mucositis

Category	Score and percentage
0 (None)	0 – 3 (1% -16%)
1 (Mild)	4 – 7 (17 – 38%)
2 (Moderate)	8 – 11 (39% – 61%)
3 (Severe)	12 –15 (62 %- 83%)
4 (Life threatening)	16 - 18 (84% - 100%)

STATISTICS

Descriptive statistics

Percentage, mean, standard deviation, were used to assess the effectiveness radiation induced oral mucositis patients.

Inferential statistics

Paired' test was used for the comparison of pre-test and post-test oral mucositis score among experimental group and unpaired't' test was used for the comparison of post-test oral mucositis score among experimental and control groups. The chi – square test was used to determine the association between knowledge goes demographic variables.

RESULTS

The data were entered into master sheet for tabulation and statistical processing the obtained data were analysed, organized, and presented under the following headings:

Section -1: Demographic data of oral mucositis patients

Section -2: Frequency and percentage distribution of oral mucositis patients scores in pretest and post-test.

Section -1: Demographic data of oral mucositis patients

Table 1: Frequency and percentage distribution of oral mucositis of cancer patients according to demographic variables

(n= 60)

Demographic Variables	Experimen- tal group		Control group	
	F	%	F	%
Age in years				
20-40 years	14	47%	7	23%
41-60 years	14	47%	13	44%
61-80 years	2	6%	8	27%
81 and above	0	0%	2	6%
Gender				
Male	18	60%	20	66%
Female	12	40%	10	34%
Education				
No formal education	20	67%	10	33%
Primary education	8	27%	13	44%
Secondary education	0	0%	7	23%
Graduates and above	2	6%	0	0%
Marital status				
Single	0	0%	4	14%
Married	24	80%	22	72%
Divorced	4	14%	2	7%
Widow	2	6%	2	7%
Site of the cancer				
Oral cavity	12	40%	4	14%
Hard Pallet	12	40%	12	40%

Table 1: (Continued)

Demographic Variables	Experimen- tal group		Control group	
	F	%	F	%
Shaft Pallet	4	14%	12	40%
Buckle cavity	2	6%	2	6%
Habit				
Only alcohol consumption	6%	20%	1%	4%
Only cigarette smoking	12%	46%	3%	10%
Alcohol consumption and cigarette smoking	4%	14%	12%	40%
None of the above	6%	20%	14%	46%

Table 1 shows that

In experimental group majority of 14(47%) respondents belongs to 20-40 years of age group and 41-60 years of age group respectively and 2(6%) respondents belongs to 61-80 years of age group. In control group majority of respondents

13(44%) belongs to 41-60 years of age group and minority 2(6%) respondents belongs to 81 years and above age group. In experimental and control group majority of respondents were male rather than females. In experimental group majority of 20(67%) did not take any formal education and minority were 2(6%) respondents were graduate. In control group majority of 13(44%) completed their primary education. In experimental group 24(80%) of respondents were married and in control group 22(72%) respondents were married. Regarding to the site of the cancer majority of respondents in experimental group 12(40%) had cancer in oral cavity and hard pallet respectively and in control group 12(40%) respondents had cancer in hard pallet and shaft pallet respectively. 46% of respondents had habits of doing cigarette smoking in experimental group and in control group 46% and 40% respondents had habits of alcohol consumption and cigarette smoking and none of the habit respectively. (Table no 1).

Section 2: Frequency and percentage distribution of oral mucositis patients scores in pre-test and post-test.

Table 2: Frequency and percentage distribution of sample radiation induced oral mucositis in experimental and control group(Pre-test)**(n=30)**

	None		Mild		Moderate		Severe		life threatening	
	f	%	f	%	f	%	f	%	f	%
Experimental group	-	-	22	73%	1	3%	5	17%	2	7%
Control group	-	-	1	3%	6	20%	22	74%	1	3%

Table 2 shows that

In experimental group out of 30 samples, oral mucositis score pre-test that 22 samples (73%), had mild and 1 sample (3%), had moderate, and 5 sample (17%) had severe and 2 sample (7%), where as in control group out of 30 samples, 1 sample (3%), had mild and 6 samples (20%) had moderate, 22 samples (74%) severe and 1 sample (3%) had lifedrainning, radiation induced oral mucositis. (Table 2)

Table 3: Frequency and percentage distribution of sample radiation induced oral mucositis in experimental and control group**(Post-test)****(n=30)**

	None		Mild		Moderate		Severe		Life threatening	
	f	%	f	%	f	%	f	%	F	%
Experimental Group	30	100%	-	-	-	-	-	-	-	-
Control Group	-	-	11	37%	11	37%	8	26%	-	-

Table 3 shows that

In experimental group out of 30 samples, oral mucositis score pre-test that 30 samples (100%), had where as in control group out of 30 samples, 11 samples (37%), had mild and 11 samples (37%), had moderate, and 8 samples (26%) severe had radiation induced oral mucositis. (Table no 3)

Table 4: Difference between pre-test and post-test of oral mucositis score cancer patients in experimental group

(n=30)

Category	Mean	Mean difference	S.D	Paired 't' Test		'p' Value	Significant
				Calculated value	Table value		
Pre-test	9.73	8.03	1.36	0.885	2.13	0.0415	Significant at the level of 0.05
Post-test	1.7		0.92				

Table 4 shows that

Pre-test and post-test oral mucositis score mean was 9.73 and 1.7 respectively. The mean difference was 8.03. The standard deviation was 1.36 and 0.92 respectively Hence calculated 't' value is 0.885 greater than tabulated 't' value 2.13. 'p' value is 0.0415 shows that there was a significant difference in oral mucositis score between pre-test and post-test. Application of pure honey is was effective. Hence hypothesis H1 accepted. (Table no 4)

Table 5: Difference between post-testoral mucositis scores among cancer patients in experimental and control group.

(n=60)

Group	Mean	SD	Unpaired 't' test		'p' Value	Significant
			Calculated value	Tabulated value		
Experimental	9.73	0.927	2.66	2	0.0101	Significant at the level of 0.05
Control	1.7	14.556				

Table 5 shows that

Post-test oral mucositis score of experimental and control groups mean were 9.73 and 1.7 respectively. The standard deviation was 0.927 and 14.55 respectively. Hence calculated t' value 2.66 is greater than tabulated 't' value 2, 'p' value is 0.0101 shows that there was a significant oral mucositis scores between post test scores in both experimental and control groups. Applications of pure honey was effective. Hence hypothesis H2 accepted. (Table no 5)

Table 6: Association of radiation induced oral mucositis patients in experimental group with their selected demographic variables.

(n = 30)

Sl. No.	Demographic variables	Pure Honey application					chi square χ^2			'p' Value	inference
		none	mild	moderate	sever	Life Threatening	CV	T V	df		
1.	Age In Years						3.17	7.82	03	0.367	NS
	a) 20-40	4	2	3	0	0					
	b) 41-60	0	6	2	0	0					
	c) 61-80	2	0	4	0	0					
	d) 81 and above	4	1	2	0	0					

Table 6: (Continued)

Sl. No.	Demographic variables	Pure Honey application					chi square χ^2			'p' Value	inference
		none	mild	moderate	sever	Life Threatening	CV	T V	df		
2.	Gender										
	Male	4	4	10	0	0	0.2	3.84	0.1	0.52	NS
	Female	6	2	4	0	0					
3.	Education						13.6	7.82	0.3	0.03	S
	a) No formal education	2	4	3	0	0					
	b) Primary education	6	1	7	0	0					
	c) Secondary education	4	1	0	0	0					
	d) Graduation and above	0	2	0	0	0					
4	Marital Status										
	a) Single	1	4	10	0	0	1.1	7.82	03	0.778	NS
	b) Married	2	0	0	0	0					
	c) Divorced	0	7	0	0	0					
	d) Widow	0	1	6	0	0					
	Site of the cancer						3.69				
5	a) Oral cavity	8	2	3	0	0		7.82	0.3	0.267	NS
	b) Soft plate	0	5	2	0	0					
	c) Hard pallet	0	3	2	0	0					
	d) Buckle mu-cosa	2	0	3	0	0					
	Habits										
6.	a) Alcohol con-ception	4	0	0	0	0					
	b) Cigarette smoking	6	3	5	0	0	1.1				
	c) Alcohol consumption and cigarette smoking	1	0	5	0	0		7.82	03	0.778	NS
	d) None of the above	1	5	2	0	0					

Table 6 shows that

The association between the radiation induced oral mucositis patient in experiment group with educational status show the significant association. Age, Gender, Marital status, Site of the cancer and habit did not show significant association with the radiation induced oral mucositis patient. (Table no 6)

Table 7: Association of oral mucositis among cancer patients in control group with their selected demographic variables**(n = 30)**

Sl. No.	Demographic Variables	Pure Honey application					chi square χ^2			'p' value	inference
		None	Mild	Moderate	Sever	life-threatening	CV	T V	df		
1	Age in years						4.26	21.03	12	0.9783	NS
	20- 40	0	3	4	0	0					
	41-60	0	4	7	0	0					
	61-80	0	5	6	0	0					
	81 and above	0	0	0	0	0					
2	Gender										
	Male	0	5	12	1	1	4.24	9.49	4	0.3745	NS
	Female	0	6	6	0	0					
3	Education										
	a) No formal education	0	3	8	0	0					
	b) Primary education	0	4	6	1	0	8.43	21.02	12	0.7502	NS
	c) Secondary education	0	3	5	0	0					
	d) Graduation and above	0	0	0	0	0					
4	Marital status										
	a) Single	0	0	0	0	0	0	21.03	12	1.0000	NS
	b) Married	0	0	20	1	0					
	c) Divorced	0	9	0	0	0					
	d) Widow	0	0	0	0	0					
5	Site of the cancer										
	a) Oral cavity	0	0	0	0	0					
	b) Soft palate	0	5	5	0	0	0	21.03	12	1.0000	NS
	c) Hard palate	0	5	5	0	0					
	d) Buckle mucosa	0	5	5	0	0					
6	Habits										
	a) Alcohol conception	0	1	5	0	0					
	b) Cigarette smoking	0	2	5	0	0	4.13	21.03	12	0.9810	NS
	C) Alcohol consumption and cigarette smoking	0	5	5	1	0					
	d)None of above	0	1	5	0	0					

NS – Non significant

Table 7 show that there is no statistically significant association between oral mucositis and demographic variable. (Table no 7)

DISCUSSION

The First objective is to assess the oral mucositis among cancer patients undergoing treatment before the application of honey in experimental and control group.

In experimental group out of 30 samples, oral mucositis score pre-test that 22 samples (73%), had mild and 1 sample (3%), had moderate, and 5 sample (17%) had severe and 2 sample (7%), where as in control group out of 30 samples, 1 sample (3%), had mild and 6 samples (20%) had moderate, 22 samples (74%) severe and 1 sample (3%) had life treating, radiation induced oral mucositis

The second objective is to administer the topical application of honey in experimental group.

In experimental group out of 30 samples, oral mucositis score pre-test that 30 samples (100%), had no radiation induced oral mucositis

Third objective is to compare the pre-test and post-test score oral mucositis of cancer patients. Undergoing radiation therapy in experimental Group.

Pre-test and post-test oral mucositis score mean was 9.73 and 1.7 respectively. The mean difference was 8.03. The standard deviation were 1.36 and 0.92 respectively. Hence calculated 't' value is 0.885 greater than tabulated 't' value 2.13. 'p' value is 0.0415 shows that there was a significant difference in oral mucositis score between pre-test and post-test. application of pure honey is effective.

The team investigated the efficacy of topical application of natural honey and Benzylamine Hydrochloride in the treatment of radiation mucositis and discovered that honey-received patients had a significant reduction in mucositis when compared to 0.15 percent Benzylamine hydrochloride and 0.9 percent normal saline applied patients. The differences between the groups were statistically significant ($p < 0.001$).⁶

The scientist explored the effect of honey on radiation-induced oral mucositis in head and neck cancer patients and discovered that the proportion of mucositis (grades 3 and 4) was lower and statistically significant in the honey-treated group at the end of 6 weeks of radiation compared to the control group. In one study, honey taken orally during radiation treatment was reported to help reduce the severity of oral mucositis.⁷

According to a study conducted by a research group on the effect of topical application of pure honey in chemoradiation-induced mucositis and its clinical benefits in improving

quality of life in patients with oral squamous cell carcinoma, there was no significant ($p > 0.05$) difference in mucositis grade at the first, second, third, and however, during the fourth week of treatment, there was a significant ($p = 0.0001$) difference in mucositis grade between patients and controls.⁸

The fourth objective is to compare the post test scores of oral mucositis among cancer patients undergoing radiation therapy in experimental and control group.

Post-test oral mucositis score of experimental and control groups mean were 9.73 and 1.7 respectively. The standard deviation was 0.927 and 14.55 respectively. Hence calculated 't' value 2.66 is greater than tabulated 't' value 2, 'p' value is 0.0101 shows that there were significant oral mucositis scores between post-test scores in both experimental and control groups. Applications of pure honey were effective.

A similar study conducted and explains with "The effect of topical application of pure honey on radiation-induced mucositis: randomised clinical trial," found that honey-received patients had significantly less mucositis than controls ($p = 0.000$). Within the parameters of this investigation, the results demonstrated that using natural honey to treat radiation-induced mucositis is beneficial.⁹

The study on the effect of topical honey on the limitation of radiation induced oral mucositis: an intervention study by B. Khanal et al., (2010) found that the proportion of patients with intolerable oral mucositis was lower in the honey group, which was statistically significant ($p = 0.000$). Honey used topically to the oral mucosa of radiation treatment patients appears to have a particular effect in terms of reducing the severity of mucositis. Honey is commonly available, inexpensive, and well-liked by patients, making it an effective way to improve the quality of life of irradiated patients.¹⁰

According to a similar study shown on Honey as topical prophylaxis against radio chemotherapy-induced mucositis in head and neck cancer, no patients developed grade four mucositis and only three patients (15%) developed grade three mucositis in the treatment group. 13 patients (65%) had grade three or four mucositis in the control group ($p < 0.05$). Candida colonisation was discovered in 15% of the treatment group and 60% of the control group either during or after radiation ($p = 0.003$). During or after radiation, 15% of the treatment group and 65% of the control group had positive cultures for aerobic pathogenic bacteria ($p = 0.007$).¹¹

The fifth objective is to associate between the post test scores of oral mucositis among cancer patients in experimental group with their selected demographic variable.

The result showed that there is statistically significant association between post-test oral mucositis experimental demographic variable such as education and there is no statistically significant association between post-test oral mucositis

in the experimental group with their selected demographic variables (age, gender, education, marital status, site of the cancer, habits)

The sixth objective is to associate between the post test scores of oral mucositis among cancer patients in control group with their selected demographic variables.

There is no statistically significant association between oral mucositis and demographic variable.

CONCLUSION

The study showed that degree of mucositis can be judged either subjectively and objectively, and that topical administration of honey had the same impact on radiation-induced mucositis as Oases. Observation on base line day's 5th day and 10th day the application revealed no significant differences between the effect of and honeys same was effective in reducing the grade of mucositis.

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