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Impact of Topical Pure Honey Application on Radiation-induced Oral Mucositis in Patients Receiving Radiation Therapy

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Abstract

This quasi-experimental study assessed the effects of pure honey on radiation-induced oral mucositis in patients with head and neck cancer undergoing radiation therapy in Kottayam. The primary objectives were to evaluate the severity of oral mucositis in both experimental and control groups, determine the effectiveness of honey in alleviating symptoms, and examine the relationship between mucositis severity and selected demographic variables. Utilizing Bertalanffy's General System Model as a conceptual framework, a quantitative approach was employed. The study included 60 patients, divided into two groups of 30, selected through purposive sampling. The severity of oral mucositis was measured using a standardized Oral Mucositis Assessment Scale on the first day. In the experimental group, pure honey was applied at three intervals: 15 minutes before, 15 minutes after, and 6 hours after radiation therapy over five days. The control group received no intervention. A post-test assessment using the same scale was conducted on the fifth day. Results indicated that the experimental group exhibited a significant reduction in the severity of mucositis post-intervention, suggesting that honey application effectively alleviates symptoms associated with radiation therapy. Furthermore, no significant correlations were found between pre-test severity scores and the demographic variables examined. In conclusion, the study supports the use of topical pure honey as a beneficial treatment for reducing radiation-induced oral mucositis in head and neck cancer patients receiving radiation therapy, highlighting its potential as a simple and effective intervention in clinical practice.

Keywords: Effect, topical application of pure honey, radiation-induced oral mucositis, head and neck cancer patients, radiation therapy

INTRODUCTION

Cancer originates in the cells within the body. It happens when abnormal cells start to multiply uncontrollably, leading to the formation of tumors or spreading to other areas of the body. Under normal circumstances, cells grow and divide as required, maintaining a balanced process. This orderly function is disrupted when unnecessary new cells form, and old cells do not die as they should. The accumulation of these extra cells leads to the development of a tumor. In 2012, worldwide, there were 14.1 million newly diagnosed cases of cancer, 8.2 million deaths linked to the disease, and 32.6 million individuals living with cancer [1–3]. Its annual incidence exceeds half a million cases globally. In 2008, the United States recorded 22,900 instances of oral cavity cancer, 12,250 of laryngeal cancer, and 12,410 of pharyngeal cancer. Head and neck cancers represent about 5% of all cancer cases. In 2009, an estimated 83,730 Americans developed cancer of the head and neck, and nearly 18,860 died of the disease [4]. In 2015, approximately 59,340

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people (43,390 men and 15,950 women) were diagnosed with head and neck cancer, while 12,290 individuals (8,900 men and 3,390 women) passed away from the disease. [5].

In India, head and neck cancers are prevalent, accounting for about 30% of cancer cases in men and 13% in women. In men, the oral cavity and pharynx are the most frequently affected areas, with the larynx being the next most common. In women, the oral cavity is the primary site of concern [6, 7].

Head and neck cancers are a category of tumors that occur in areas such as the mouth, throat, voice box, nasal passages, sinuses, thyroid, and salivary glands. Annually, more than 500,000 new cases of head and neck cancer are diagnosed worldwide, ranking it as the fifth most common type of cancer globally. Males are disproportionately affected compared to females, with ratios ranging from 2:1 to 4:1. Oral and tongue cancers are particularly common in the Indian subcontinent [8].

Radiotherapy combats cancer by employing high-energy rays to specifically target and eliminate cancer cells while protecting the surrounding healthy tissue. When used in the head and neck area, radiotherapy may cause temporary side effects, including soreness of the mouth or throat and trouble swallowing [9, 10].

Mucositis is a frequent complication of cancer treatment and significantly affects the oral mucosa. These lesions can adversely affect the patient's quality of life and increase the risk of both local and systemic infections. According to the World Health Organization (WHO), around 85% of individuals receiving high-dose radiation to the mouth area for head and neck cancer suffer from grade 3 or grade 4 oral mucositis, with all patients exhibiting some form of the condition. In clinical practice, almost all patients (97%) receiving radiation for head and neck cancer will experience oral mucositis [11].

The results showed that out of 30 patients in the treatment group, four (13%) experienced grade 3 radiation-induced oral mucositis (RIM), while none had grade 4 RIM. In comparison, 12 (40%) of the 30 patients in the control group developed grades 3 or 4 RIM ($p=0.039$). These results indicate that honey is an easy and affordable method for preventing radiation-induced mucositis [12, 13].

METHODS

Following ethical approval from the ethics committee of Caritas Hospital in Thellakom, Kottayam, data collection commenced. Formal consent was obtained from the hospital director before the beginning of the process. The radiation oncologists were informed, and their approval was secured. The data collection for the main study was conducted in the radiation unit and oncology wards of the Caritas Cancer Institute, Kottayam. Sociodemographic data were collected through an interview schedule using a structured questionnaire. Pre-test scores of oral mucositides were assessed by using the WHO Standardized Oral Mucositis Assessment Scale. In the experimental group, 20 ml of honey was applied 15 minutes prior to radiation therapy, 15 minutes following the therapy, and again 6 hours after the therapy. Each day, the severity of RIM in the oral cavity was assessed, and the process was repeated for 5 days. The post-test score was assessed on the 5th day using the WHO Health Organization Standardized Oral Mucositis Assessment Scale. In the control group, the severity of oral mucositis was evaluated over 5 days using the WHO Health Organization Standardized Oral Mucositis Assessment Scale. No treatments were provided to the control group.

RESULTS

Grading of the Samples Based on the Severity of RIM

The severity of RIM was categorized as mild, moderate, or severe (Figure 1).

1. *Mild:* 0–15
2. *Moderate:* 16–30
3. *Severe:* 31–45

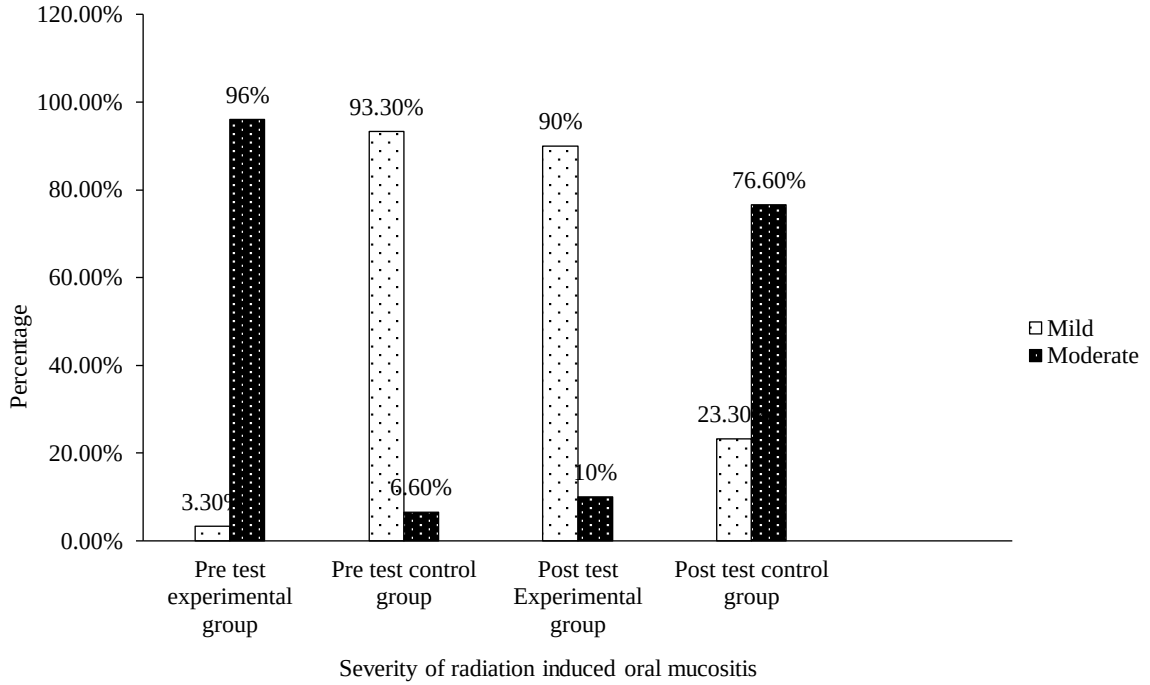

Figure 1. Bar diagram showing pre-test and post-test scores of severities of radiation-induced oral mucositis of experimental and control groups.

Assessing the Impact of Topical Pure Honey Application on RIM in Head and Neck Cancer Patients Receiving Radiation Therapy.

1. A comparison of the pre-test and post-test scores regarding the severity of RIM in head and neck cancer patients receiving radiation therapy in the experimental group..

Table 1. Mean, standard deviation, and 't' value of pre-test and post-test scores of the severity of radiation-induced oral mucositis among the experimental group (n=30).

Test	Mean	SD	df	't' value	P-value
Pre-test	17.50	2.345	29	11.884**	0.01
Post-test	12.50	1.978			

***Significant*

The data presented in Table 1 show that the calculated 't' value (t=11.884, p=0.01) was significant, suggesting that topical application of pure honey effectively reduced the severity of RIM in the experimental group.

2. Comparison of post-test scores of severity of RIM in patients undergoing radiation therapy between the experimental and control groups.

Table 2. The average, standard deviation, and t-value of the pre-test scores for the severity of radiation-induced oral mucositis in both the experimental and control groups (n=60).

Category	Mean	SD	df	't' value	P-value
Experimental Group	12.50	1.97833	58	7.772**	0.01
Control Group	16.80	2.29542			

*** Significant*

The data presented in Table 2 reveal that the calculated 't' value (t=7.772, p=0.01) was statistically significant, suggesting that the topical application of pure honey effectively reduces the severity of RIM in the experimental group.

Relationship Between Pre-test RIM Severity Scores Before Topical Pure Honey Application and Demographic Variables of Head and Neck Cancer Patients Undergoing Radiation Therapy

Chi-square analysis indicated that the calculated chi-square values were not statistically significant at the level of 0.05. Therefore, the research hypothesis was rejected, suggesting that there was no significant association between the pre-test scores of the severity of RIM and the selected demographic variables, including age, sex, education, occupation, socioeconomic status, habits, cancer site, radiation exposure cycles, radiation therapy dosage, and comorbidities [14].

Discussion

The present study results are comparable with those of other research studies which showed that topical application of honey was effective in reducing the severity of radiation-induced mucositis [15].

CONCLUSION

The results led to several conclusions: There was a significant decrease in the severity of RIM when pure honey was used (t=11.884, p=.01), and no correlation was found between the pre-test severity scores and the selected demographic variables among the participants. Consequently, the topical use of pure honey was found to be effective in alleviating RIM in these patients. Nursing administrators can apply the results of this study in the clinical setting of radiation oncology.

Limitations

- In the pre-test, most of the participants in the experimental group had moderate oral mucositis, while the control group showed mild mucositis. Therefore, the homogeneity of the samples was not achieved.
- Routine care provided in the hospital, such as warm saline gargles, antibiotics, antifungal agents, and analgesics, was received by both the experimental and control groups.
- The application of honey was done only for 5 days due to time constraints.

Conflict of Interest

None declared.

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