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Nutritional strategies for oral comfort: Therapeutic protein diets to address xerostomia, mucositis and stomatitis in cancer patients

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Abstract

This paper explores the multifaceted challenges of cancer treatment, focusing on the impact of oral complications such as xerostomia, mucositis, and stomatitis on patients' quality of life. Emphasizing the paramount importance of oral nutrition, the study highlights the role of therapeutic protein diet counseling in addressing these challenges. Drawing upon the findings of prominent researchers and healthcare practitioners, the manuscript underscores the significance of personalized dietary recommendations and nutritional therapies in improving patient outcomes. The research specifically investigates the consumption of a protein-rich diet by cancer patients, emphasizing the critical role of comprehensive nutritional support in managing oral complications resulting from cancer therapy. An investigation with a cohort of 201 cancer patients in Bhopal was conducted to assess the effectiveness of nutritional strategies in managing xerostomia, mucositis, and stomatitis. The study underscores the importance of nutritional interventions as a beneficial adjunct in cancer treatment, demonstrating their potential to enhance patient quality of life and treatment efficacy.

Keywords: Cancer, therapeutic diet counselling, xerostomia, mucositis, stomatitis

Introduction

“Cancer is only going to be a chapter in your life, not the whole story.” - Joe Wasser

Cancer encompasses a spectrum of interconnected diseases that can manifest in various organs throughout the body. Fundamentally, cancer arises from alterations in the genetic makeup of our cells, which govern their normal functioning. Genetic mutations disrupt this balance, leading cells to aberrantly proliferate or evade programmed cell death. Consequently, these deviant cells have the potential to develop into cancerous growths (National Cancer Institute, USA). The treatment of cancer is inherently complex and often accompanied by side effects that significantly challenge the patient's quality of life. Among these side effects, oral complications such as xerostomia (dry mouth), mucositis (inflammation of the mucous membranes), and stomatitis (mouth sores) are particularly distressing. These complications can profoundly affect patients' quality of life, leading to treatment interruptions or dose reductions, thereby impacting overall treatment outcomes.

Emphasizing oral nutrition is paramount, as it remains the preferred method of feeding for patients. Incorporating oral intake into the daily routine not only supports autonomy but also fosters valuable social interactions with family and friends, mitigating feelings of isolation. Tailoring the prescribed diet to individual needs empowers patients, instilling a sense of control and serving as an effective strategy for psychological well-being [2]. The primary objective of nutritional therapy is to maintain oral nutrition by reducing any discomfort associated with food and enhancing food satisfaction. This is achieved through various strategies such as dietary guidance provided by dietitians or healthcare experts, fortifying food with additional nutrients, and incorporating oral nutritional supplements as needed [3].

Considering the significant role of nutrition in fostering recovery for cancer patients and the challenges in oral intake due to the side effects of surgery, radiation, and chemotherapy, therapeutic nutritional counseling has emerged as a supportive mechanism. Integrating therapeutic protein diet counseling into comprehensive cancer care is indispensable for meeting the intricate nutritional requirements of patients grappling with oral complications.

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Nutritional counseling is the best way to educate patients on the significance of hydration, oral hygiene routines, and dietary adjustments, thereby alleviating symptoms and promoting holistic well-being. Customized dietary guidance, tailored according to individual treatment protocols and oral health conditions, helps optimize nutritional intake while mitigating adverse effects on the oral mucosa [4].

This study was conducted on cancer-treated patients in specific hospitals in Bhopal city. A cohort of 201 patients who had undergone cancer treatment was selected for participation. They were administered therapeutic nutritional counseling and recommended a protein-rich diet with a focus on monitoring changes in xerostomia, mucositis, and stomatitis. The subsequent changes were noted and analysed [5].

Xerostomia, or dry mouth, is a distressing symptom experienced by many cancer patients undergoing treatment. Characterized by a reduction in saliva production, it causes significant discomfort, making it difficult for patients to chew or swallow food, and increasing the risk of dental caries and blunt speech. The etiology of xerostomia in cancer patients includes radiation therapy affecting the head and neck region, chemotherapy, and certain medications such as anticholinergics and antidepressants that can damage the salivary glands [6]. Managing xerostomia involves understanding its causes and implementing various treatments such as saliva substitutes, saliva stimulants, acupuncture, special mouth exercises, and dietary changes [7]. Recently, special diets with certain proteins have shown promise in enhancing saliva production and maintaining oral moisture.

Mucositis, characterized by painful sores or lesions in the oral cavity and gastrointestinal tract, is a common side effect of cancer treatments such as chemotherapy and radiation therapy. It significantly impacts patients' quality of life, often leading to interruptions in treatment or dose reductions, which can affect treatment outcomes. The etiology of mucositis involves direct damage to mucosal cells, inflammation, and alterations in the oral microbiome [8]. Management techniques for mucositis focus on pain relief, mucosal recovery, and maintaining proper nutritional intake. Nutritional interventions, particularly protein-rich diets, are pivotal in managing mucositis by promoting tissue repair and boosting immune function [9].

Stomatitis, an inflammatory condition affecting the oral mucosa, is another common side effect of cancer treatments. It manifests as painful ulcerations or sores in the mouth, causing difficulty in eating, swallowing, and speaking. The etiology of stomatitis involves direct damage to the oral mucosa by cytotoxic agents, altered immune responses, and microbial colonization [10]. Management strategies aim to alleviate pain, promote oral healing, and maintain adequate nutrition. Nutritional interventions, including protein-rich diets, play a crucial role in managing stomatitis by supporting oral tissue repair and reducing symptom severity [11].

Incorporating protein-rich diets into comprehensive cancer treatment offers a promising strategy for addressing oral complications and enhancing patient outcomes. However, further research is necessary to determine the most effective formulation and implementation of these diets.

Research Question Does the administration of a protein-rich diet alleviate Xerostomia, Mucositis, and Stomatitis in cancer patients?

This study aims to answer this question by observing the effects of a protein-rich diet on cancer patients suffering from these oral complications.

Methodology

Study Design

This study employs a cross-sectional design to evaluate the impact of a protein-rich diet on the management of oral complications—xerostomia, mucositis, and stomatitis—in cancer patients undergoing treatment. The research is based on a random sampling of cancer patients from selected hospitals in Bhopal city.

Sample Selection

A random sample of 300 cancer patients was selected from five hospitals in Bhopal city. The hospitals included in the study were JNCH (Idgaah Hills), Chirayu Hospital (Bairagarh), Bansal Hospital (Shahapura), Navodaya Hospital (Indrapuri), and Lakecity Hospital (Kasturba Nagar). The distribution of patients by hospital and gender is presented in Table-1.

Table 1: Distribution of Cancer Patients by Hospital and Gender

| S. No | Hospital Name | Hospital Location | Male | Female |
|-------|-------------------|-------------------|------|--------|
| 1 | JNCH | Idgaah Hills | 65 | 45 |
| 2 | Chirayu Hospital | Bairagarh | 35 | 15 |
| 3 | Bansal Hospital | Shahapura | 45 | 25 |
| 4 | Navodaya Hospital | Indrapuri | 30 | 25 |
| 5 | Lakecity Hospital | Kasturba Nagar | 10 | 5 |

Identification of Conditions

Out of the 300 patients, 201 were actively undergoing cancer treatment. Among these 201 patients, those who were experiencing Xerostomia (dry mouth), Mucositis (inflammation and ulceration of the mucous membranes), and Stomatitis (inflammation of the mouth and lips) were identified. The identification process involved reviewing patient medical records and consultations with attending oncologists and medical staff.

Dietary Intervention

For patients identified with Xerostomia, Mucositis, and Stomatitis, a specialized dietary intervention was implemented. The intervention focused on a protein-rich diet, designed to aid in the healing process and improve overall nutritional status. The dietary plan included high-protein foods such as lean meats, fish, eggs, dairy products, legumes, and protein supplements if necessary.

Observation and Data Collection

The effects of the protein-rich diet on the identified patients were closely monitored. Observations included:

- Improvement in symptoms of Xerostomia, Mucositis, and Stomatitis.
- Changes in nutritional status, assessed through parameters such as weight, muscle mass, and biochemical markers.
- Overall patient well-being and tolerance to the dietary changes.

Data was collected through regular follow-ups, patient self-reports, and periodic assessments conducted by dietitians and healthcare providers. The duration of the observation period varied depending on the patient's condition and response to the dietary intervention.

Data Analysis

The collected data was analyzed to determine the effectiveness of the protein-rich diet in managing symptoms

and improving nutritional status among the cancer patients with Xerostomia, Mucositis, and Stomatitis. Statistical methods were employed to compare pre- and post-intervention data, and to identify any significant improvements or trends.

Results and Discussion

Following tables show the number of cancer patients benefitted from therapeutic nutritional counselling of protein rich diet.

Table 2: Pathological condition before and after intervention

| Pathological condition | Before therapeutic nutrition counselling (out of 201) | After therapeutic nutrition counselling and protein rich diet intervention, patients benefitted |
|----------------------------|---|---|
| Patients facing Xerostomia | 73 | 45 |
| Patients facing Mucositis | 79 | 38 |
| Patients facing Stomatitis | 147 | 26 |

The table provides insightful data on the effectiveness of therapeutic nutrition counseling and a protein-rich diet in alleviating symptoms among patients suffering from various conditions. Here's a detailed interpretation of the findings:

Xerostomia

Xerostomia, commonly known as dry mouth, affected 73 out of the 201 patients included in the study. Among these 73 patients, 45 experienced significant relief from their symptoms after receiving therapeutic nutrition counseling combined with a protein-rich diet. This translates to an impressive 61.6% positive response rate. The high percentage suggests that a protein-rich diet, possibly enhancing saliva production or maintaining oral moisture levels, can be particularly beneficial for those struggling with Xerostomia. This intervention appears to be a promising complementary approach to conventional treatments for dry mouth, potentially improving the quality of life for these patients by alleviating discomfort and associated complications.

Mucositis

Mucositis, characterized by inflammation and ulceration of the mucous membranes lining the digestive tract, impacted 79 of the 201 patients. Of these, 38 found relief through the combined approach of therapeutic nutrition counseling and a protein-rich diet, reflecting a 48.1% positive response rate. Although this response rate is lower than that observed for Xerostomia, it is still significant, indicating that nearly half of the patients with Mucositis could benefit from nutritional interventions. The protein-rich diet might play a role in enhancing mucosal repair and reducing inflammation, thus providing symptomatic relief. The data underscores the

potential of nutrition-based interventions in managing Mucositis, especially in patients undergoing treatments like chemotherapy or radiation, which are known to exacerbate mucosal damage.

Stomatitis

Stomatitis, involving inflammation of the mouth and lips, was the most prevalent condition among the patients, affecting 147 out of the 201. However, only 26 patients responded positively to the intervention of therapeutic nutrition counseling and a protein-rich diet, resulting in a 17.7% response rate. This lower response rate might be attributed to the multifactorial nature of Stomatitis, which can be caused by infections, nutritional deficiencies, allergies, or systemic diseases. The data suggests that while a protein-rich diet can be beneficial, its effectiveness may be limited to certain underlying causes of Stomatitis. Therefore, a more tailored approach might be necessary, incorporating specific dietary modifications based on the individual patient's condition and etiology of Stomatitis.

Overall Implications

The data from the table collectively highlights the varying degrees of effectiveness of therapeutic nutrition counseling and a protein-rich diet across different oral and mucosal conditions. The high response rate in Xerostomia cases suggests that this intervention could be particularly effective for dry mouth symptoms. In contrast, the moderate response in Mucositis and the lower response in Stomatitis suggest that while a protein-rich diet can be beneficial, its effectiveness may vary depending on the specific condition and its underlying causes.

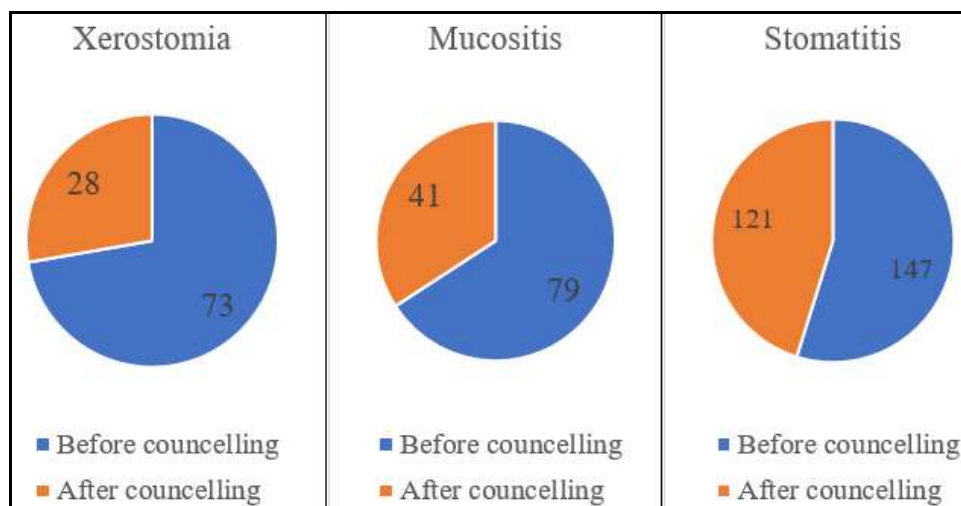


Fig 1: Impact of counselling before and after intervention

These findings emphasize the importance of personalized nutrition therapy in clinical practice. Health professionals should consider incorporating dietary counseling as a complementary approach to traditional treatments, especially for conditions like Xerostomia and Mucositis. Further research could explore the specific components of the protein-rich diet that contribute to its effectiveness, and whether other dietary adjustments might enhance its benefits for conditions like Stomatitis.

Therapeutic nutrition counseling combined with a protein-rich diet demonstrates a significant potential to improve symptoms in patients with Xerostomia and Mucositis, while its benefits in Stomatitis are less pronounced. This highlights the necessity for a nuanced, individualized approach in dietary interventions for oral and mucosal health conditions.

Conclusion

The implementation of therapeutic nutrition counseling and a protein-rich diet has demonstrated positive outcomes in reducing symptoms of Xerostomia, Mucositis, and Stomatitis among cancer patients. The findings suggest that incorporating a protein-rich diet into comprehensive cancer treatment can effectively alleviate Xerostomia in a significant number of patients. Moreover, the benefits of a protein-rich diet extend beyond Xerostomia to other oral issues such as Mucositis and Stomatitis. Previous research underscores the potential of protein-rich diets in promoting tissue repair, enhancing immune function, and reducing inflammation—all critical factors in managing Mucositis and Stomatitis effectively. In summary, these results highlight the importance of therapeutic nutrition counseling and protein-rich diet interventions in addressing the complex oral health challenges faced by cancer patients. By increasing nutritional intake and supporting oral tissue health, protein-rich diets offer a promising strategy for improving patient well-being, enhancing treatment tolerance, and ultimately boosting the overall quality of life for individuals undergoing cancer therapy. Further research is warranted to determine the optimal composition and application of protein-rich diets in managing oral complications associated with cancer treatment.

Compliance with Ethical Standards

I undertake the responsibility to comply with ethical standards as may be desired and expected as a member of academic research community.

Conflict of Interest Declaration

I undertake and state that there is no conflict of interest of whatsoever nature.

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