Nutritional Management of Dysgeusia in the Oncology Patient

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NUTRITIONAL MANAGEMENT OF DYSGEUSIA IN THE ONCOLOGY PATIENT

by

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Preface

This project was made possible by my Papaw, Roy Wilson, who battled pancreatic cancer and experienced chemoradiation-induced dysgeusia. With a bottle of hot sauce and a jar of pickle juice at bedside, my Papaw seemingly lost the desire to consume any nutrient-dense foods after beginning treatment. My family navigated his ever-evolving taste alterations as best we could, but maintaining adequate intake became quite the challenge.

In his last days on this earth, as the foods he previously enjoyed became intolerable, I offered him a slice of homemade tomato pie. The sharp tartness of that tomato pie was a comfort to him at the time, and it has been a balm to me ever since. The grief that my family and I have experienced through this loss has propelled my drive to help restore the joy that enjoying a meal together can provide to those fighting cancer and their families. I hope that this research can help patients like my Papaw and families like mine find comfort in knowing there is work being done to provide the best possible care for patients experiencing taste changes.
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Key to Abbreviations

HNC: Head/neck cancer 1
MSG: Monosodium Glutamate 3
RDN: Registered Dietitian Nutritionist 3
SLP: Speech Language Pathologist 3
DPG: Dietetic Practice Group 6
FTE: Full-Time Equivalent 7
Abstract

Background

Dysgeusia is a side effect of chemoradiation that currently has no standard intervention. The findings of this study are intended to improve the understanding of how to best treat dysgeusia to contribute to the prevention of malnutrition and to improve quality of life in affected individuals.

Objective

This research aims to determine a need to establish best practices that can be applied in a standardized plan of care for nutritional management of dysgeusia in the adult oncology patient in order to prevent adverse outcomes and improve quality of life.

Study Design

Oncology registered dietitians in healthcare facilities across the United States were surveyed to obtain information regarding the current screening processes and practices related to the identification and treatment of dysgeusia in the oncology patient.

Participants

A total of 115 registered dietitians were surveyed via an online survey distributed through social media and the Academy of Nutrition and Dietetics Oncology Nutrition Dietetic Practice Group.

Results

Those that have a current standard protocol for the treatment of dysgeusia reported an incidence of malnutrition less than the calculated average of data collected.

Conclusion

This research demonstrates a need for increasing awareness related to the overall nutrition status of patients undergoing chemoradiation treatments and the impact that taste alterations may have on these patients’ malnutrition risk.
Introduction

Dysgeusia is a sensory disorder characterized by alterations in taste perception. This condition is often accompanied by the presence of an undesirable taste in the mouth, even when not ingesting food.\(^1\) When dealing with distortion of taste perception, a patient may experience a metallic, bitter, or sour sensation when consuming foods that they had previously perceived as pleasant-tasting foods prior to the onset of this symptom. The pathophysiology of this disorder varies, as there is a myriad of conditions that can impact perception of taste. Some of these conditions include infection with the COVID-19 virus, micronutrient deficiencies, neurologic disorders, liver disease, and chemoradiation therapies.\(^2\) Dysgeusia is considered to be a common side effect of cancer treatments, especially in HNC patients.\(^2\)

While dysgeusia caused by conditions such as vitamin or mineral deficiencies can often be corrected via supplementation, altered taste perception resulting from cancer treatment can be more complex in finding a successful resolution. For some patients experiencing taste alterations during these treatments, taste is restored without intervention soon after treatment ceases. However, because therapy can last for many months and normal taste perception may not return following treatment cessation, the duration of dysgeusia for patients can span an extended period of time, thus delaying the restoration period.\(^3\)

Though the etiology of chemoradiation-related taste distortion remains under investigation, the onset of dysgeusia during cancer treatments is frequently accredited to the progression of the other side effects associated with chemoradiation therapies. Patients undergoing radiation therapies, particularly those being treated with radiation targeted at the oral cavity or nearby region, often experience xerostomia or oral mucositis that may contribute to an altered sense of taste. If targeted at the oral cavity, this form of therapy may destroy cells in the
mood or on the tongue, causing direct damage to the taste bud receptors. It has been hypothesized that patients undergoing chemotherapy treatments may face dysgeusia as a result of the diffusion of the administered medication into the oral cavity, causing damage to the cells within the mouth.

Nutrition-related side effects of cancer treatments can exacerbate the already present risk of malnutrition development in oncology patients. It is estimated that up to 80% of cancer patients experience malnutrition, and its detrimental impact is responsible for 20% of fatalities among these patients rather than the cancer itself. As the patient undergoing treatment for cancer battles other nutrition-related side effects of therapies, such as nausea, vomiting, and loss of appetite, dysgeusia further decreases the patient’s desire to eat and ability to maintain adequate oral intake.

During active treatment, the patient’s care team may employ the use of standard protocols to manage these other nutrition-related side effects. However, the patient’s overall intake and nutritional status could continue to decline if the dysgeusia they are experiencing is not also addressed. Dysgeusia diminishes the desire for specific foods, and the patient experiencing this side effect may develop food aversions as a result of the undesirable taste associated with various foods and ingredients. This not only increases the likelihood that a patient will develop malnutrition but also decreases the patient’s quality of life.

Though the cause of the lack of screening for and diagnosis of dysgeusia in the setting of cancer is unknown, this issue has been hypothesized to be due to the assumption that this side effect is not thought to be a life-threatening condition. A patient with dysgeusia may receive a diagnosis after they bring the issue to their physician or another team member. In some cases, the screening process at each visit to the treatment facility may address any nutrition-related side
effects. After the diagnosis is made, they may receive treatment from various members of the interdisciplinary team, including the SLP, otolaryngologist, and RDN. As these team members collaborate, they may come together in providing an individualized care plan to address the issues that may arise resulting from a dysgeusia diagnosis. There is a wide array of applied treatments for this condition, but there is currently no standardized plan of care that can be implemented for the prevention of or the management of dysgeusia in the oncology patient. This research seeks to draw conclusions from collected data about gaps in current practice related to identification and treatment of dysgeusia related to malnutrition in the oncology setting.

**Literature Review**

**Current State of Research**

As there is no current widely accepted plan of care for a patient experiencing dysgeusia, researchers have explored this condition over the course of the past several decades in pursuit of an applicable treatment option. In beginning the preliminary research for this study, various interventions were analyzed to gain an understanding of the current state of research related to dysgeusia in the oncology patient population.

Supplementation with MSG has been researched and applied as an intervention to lessen the negative impact of chemotherapy on taste receptors. MSG is the salt of glutamic acid, which is an amino acid naturally present within the body. The traditional role of MSG in enhancing flavors of food inspired the researchers conducting this study to investigate its further application in restoring damaged taste receptors. Their proposed mechanism for the development of dysgeusia in HNC was the damaging effect of chemoradiation on the T1R3 taste receptor, which they believed to be the same taste receptor that MSG binds to for upregulation. Ultimately,
these researchers found this intervention to be successful, but its application to other cancers remains unknown.\textsuperscript{11}

Mineral supplementation with zinc has also been heavily researched for the past several decades with varying results in the management of dysgeusia. The proposed therapeutic effect of this supplementation results from zinc’s role in cellular maintenance and repair.\textsuperscript{12} One of the earliest studies on zinc supplementation related to dysgeusia, published in 1976, investigated the effect of zinc sulfate on chemotherapy-induced taste alterations in HNC patients.\textsuperscript{13} This study found no significant improvement in dysgeusia in these patients. Several limitations have been found within this study, as this research was conducted in the outpatient setting with no guarantee of adherence to the supplementation.\textsuperscript{14} Later research has since revealed that zinc sulfate could actually play a role in the inhibition of certain taste receptors.\textsuperscript{15} Another more recent trial involved the administration of a 140 mg daily dose of zinc gluconate to oral disease patients experiencing dysgeusia, and these researchers found a significant improvement in the intervention group’s taste receptor acuity. This study, however, was not specific to chemotherapy-induced dysgeusia.\textsuperscript{16} It should also be noted that the supplemental use of zinc is not often recommended while undergoing chemotherapy treatment, as a high antioxidant intake can interfere with the effectiveness of treatment, potentially offering a protective measure to cancer cells.\textsuperscript{17}

\textbf{Academy Recommendations}

Various tip sheets are available to patients and practitioners online through institutions, healthcare facilities, and the Academy of Nutrition and Dietetics. The Academy outlines several tips for minimizing the negative impact taste alterations may have on a patient’s overall nutrition status.\textsuperscript{18} These tips are not individualized, but rather they are intended to provide general
guidelines for tactics that can be applied in an attempt to improve quality of life and outcomes. Some of these tactics include cleansing the mouth with a baking soda rinse, using plastic utensils, and consuming more acidic foods.\textsuperscript{18}

With resources like the Nutrition Care Process and Evidence-Based Nutrition Practice Guidelines, the Academy of Nutrition and Dietetics has implemented standardized processes for the provision of care within the field of clinical nutrition.\textsuperscript{19} Within the Executive Summary of Recommendations for Oncology provided by the Academy, general guidelines are available for practitioners to follow when treating patients. These guidelines outline best practices for cancer-specific nutrition-related issues, including oral mucositis and cancer cachexia.\textsuperscript{20} There is, however, no guideline provided specifically for treating patients experiencing chemoradiation-induced dysgeusia. Without a major recommendation for practitioners to follow, the clinical judgement of the nutrition therapy department must be utilized at the individual facility level for the determination of best practices for the screening and management of dysgeusia.

The Academy’s Executive Summary of Guidelines for Oncology also recommends that during the nutrition assessment, the RDN identify all present nutrition impact symptoms the patient is experiencing, including alterations in taste.\textsuperscript{20} Because of this recommendation, dysgeusia should be identified at the initial RDN visit. However, because many patients do not receive a visit from the RDN until nutrition-related issues are recognized by another team member, screening processes are put in place at each facility for identifying any potential reason for a nutrition consult. The Academy has published recommendations for the use of malnutrition screening tools in both the inpatient and outpatient settings in treating the oncology patient population. These tools may be utilized to assess malnutrition risk according to weight loss or
decreased oral intake related to appetite, but they are not intended to identify changes in taste perception.

**Statement of Research Objectives**

This research aims to determine a need to establish best practices that can be applied in a standardized plan of care for nutritional management of dysgeusia in the adult oncology patient in order to prevent adverse outcomes and improve quality of life.

**Methodology**

**Participants**

The participants in this research were RDNs working within the field of oncology. Exclusion criteria include individuals who were not RDNs and who do not provide daily medical nutrition therapy to oncology patients. The inclusion criteria were RDN credentialing status and daily practice within the field of oncology. As the data has been collected virtually, the participants were sourced nationwide.

**Data Collection**

Data was collected through the use of a survey tool (see Appendix I). This questionnaire was tested by a panel of oncology dietitians before finalization in order to ensure reliability, accuracy, and relevance. The questions were developed to align with the goals of this study in identifying current screening and treatment practices related to dysgeusia in the oncology patient population. This survey was published to platforms available to oncology RDNs through the use of social media as well as the Academy of Nutrition and Dietetics Oncology Nutrition DPG. Postings were repeated in order to increase the pool of participants. In total, the survey was posted five times: two times to the Oncology Dietitians Facebook group and three times to the Oncology Nutrition DPG. The survey was open for data collection from June-September 2023.
Statistical Analysis

Descriptive statistics were used to analyze the data gathered from the survey. Each question was examined according to the variability of responses. Observed patterns in responses were highlighted for further consideration in drawing conclusions from the available data. After compiling the survey input into a single spreadsheet for analysis, averages of numerical responses were taken to identify trends. Through the use of these noted patterns, conclusions related to current practices can be drawn.

Results

A total of 115 participants completed the survey. Of these participants, 62% of these oncology RDNs hold board certification as a Specialist in Oncology Nutrition. The average years of experience among participants was found to be nine years. Over 90% of participating RDNs work within an outpatient cancer center with an average of four FTE RDNs per facility and an average daily patient census of 191. The total estimated prevalence of malnutrition was averaged to be 43% among all facilities surveyed, with those that reported a standard dysgeusia treatment protocol estimating a lower-than-average malnutrition incidence of 30%.
Figure 1. a) Top 5 most commonly chosen responses to primary cancer type seen in facility; b) Incidence of dysgeusia according to percentage of total patient census; c) Presence of screening protocol for dysgeusia utilized in facility; d) Presence of standard treatment protocol for dysgeusia utilized in facility.

Figure 1 displays pertinent survey data related to cancer type and dysgeusia protocols within facilities. Of the top 5 cancers selected as the primary type of cancer seen, 52% of respondents reported HNC to be the most commonly treated cancer type within their facility. The majority of responses stated that >20% of their total patient population experiences dysgeusia, while 8% of respondents reported that their facility has a screening protocol for dysgeusia. Less than 1% of the population sampled, two out of the total 115 respondents, reported a standard treatment protocol for dysgeusia.


Discussion

Based on the data collected, it is evident that many of the outpatient cancer centers surveyed throughout the United States primarily treat patients with HNC, and many of these patients experience taste distortion throughout their treatment cycles. However, the data collected from the survey reflects a general lack of screening and standardized intervention for these patients experiencing dysgeusia. Among the participants that reported a standard treatment plan, the most commonly mentioned intervention included the provision of resources related to the utilization of the Academy’s tip sheets, spice blends, and oral rinses.

Because the cause of malnutrition within oncology varies depending upon side effects and the individual patient’s disease course, it cannot be concluded that dysgeusia management is a guaranteed solution to decreasing the incidence of overall malnutrition within this patient population. However, as previously mentioned, it should be noted that the RDNs that reported the lowest prevalence of malnutrition within their facilities were those that utilize a standard dysgeusia treatment protocol. It should also be noted that no RDNs that participated in this study claimed to recommend any supplement use for the treatment of or prevention of dysgeusia.

One limitation of this study is the lack of patient input related to the experience as someone with dysgeusia. As patients were not surveyed, the perspective this study provides is from the RDN’s point of view. Further research may need to be conducted to provide data related to the patient experience. One strength that can be identified in this research is that the use of social media has allowed for a nationwide pool of participants. Because of the digital nature of this survey, the RDNs that participated in this study were not limited regionally, allowing for a broad spectrum of facilities located across the entirety of the United States.
Conclusion

This research is intended to provide useful data to the field of clinical nutrition in the standardization of the current approach to nutrition intervention in oncology. The findings of this study are intended to improve the understanding of how to best treat dysgeusia in order to contribute to the prevention of malnutrition and to improve quality of life in affected individuals. The application of this research is increasing awareness related to the overall nutrition status of patients undergoing chemoradiation treatments and the impact that taste alterations may have on these patients’ malnutrition risk. This research should be considered when assessing outcome measures and improving quality of life for patients experiencing dysgeusia.
References


Appendix I

Dysgeusia in Oncology Survey

1. Do you provide medical nutrition therapy to an average of at least one adult oncology patient per week? (Y/ N) (Those who answer no will be redirected to the end of the survey.)

2. Please mark all specialty certifications you currently hold. (choose all that apply)
   a. Board Certified Specialist in Gerontological Nutrition
   b. Board Certified Specialist in Sports Dietetics
   c. Board Certified Specialist in Pediatric Nutrition
   d. Board Certified in Renal Nutrition
   e. Board Certified in Oncology Nutrition
   f. Fellow of the Academy of Nutrition and Dietetics
   g. Certified Nutrition Support Clinician
   h. Certified Diabetes Care and Education Specialist
   i. Other (please specify)

3. How many years have you been working as an RD in oncology practice?

4. What type of facility are you currently employed in?
   a. General Inpatient Hospital
   b. Inpatient Cancer Center
   c. Outpatient Cancer Center
   d. Medical Oncology Practice

5. How many FTD RDNs are employed by your facility?

6. What is the average patient census in your facility per day?
7. How many patients are seen per RDN per day?
   a. 1-10
   b. 11-20
   c. 21-30
   d. Other (please specify)

8. What type of cancer do you primarily see in your facility?
   a. Head/Neck Cancer
   b. Breast Cancer
   c. Prostate Cancer
   d. Lung Cancer
   e. Colorectal
   f. Other (please specify)

9. How many patients do you see with dysgeusia per day in your facility?

10. Of those patients, what is the incidence of moderate and severe malnutrition?

11. Does your facility have an NCI (National Cancer Institute Center of Excellence) certification or other designation?

12. Does your facility screen for dysgeusia? If so, what tool or process does your facility use?

13. What does your facility assess in the screening process, and when does this occur in the patient’s journey?

14. Does your facility have a current standard medical nutrition therapy protocol for dysgeusia?

15. If so, what is your facility’s current standard practice for dysgeusia?

16. Is MNT covered for your patients experiencing nutritional problems?
17. What interdisciplinary team members do you work with in treating a patient? Choose all that apply.

   a. Nurse navigator
   b. Speech Pathologist
   c. Occupational Therapist
   d. Physician
   e. Pharmacist
   f. Other (please specify)