Oral Care for Head and Neck Cancer Symptom Management

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When patients are told they have cancer, the diagnosis can be overwhelming. As a result, many don't consider the treatment side effects that can occur. Nurses, as essential members of the interprofessional team, play a key role in supporting and guiding patients through treatment decisions and symptom management. For people with head and neck cancer, the treatment journey often includes surgery, chemotherapy, and radiation. Most patients will experience oral mucositis, an almost universal and painful side effect of treatment for head and neck cancer. Oral mucositis results from molecular, cellular, and tissue injuries that cause local and systemic changes, and it requires preventive and treatment interventions. Patient-friendly oral care (care that is convenient and easy to use) is thus an essential part of a comprehensive cancer symptom management program, and nurses are the ideal health care providers to direct and oversee such care.

A radiation oncology center in a large academic medical center in the Midwest implemented and evaluated a practice change using an evidence-based oral care intervention to reduce oral mucositis severity and discomfort in adults treated for head and neck cancer. This project is part of a multiyear, evidence-based practice program for oral mucositis and cancer symptom management across the institution. Three staff nurses who worked on adult inpatient oncology units and at the outpatient clinic were instrumental in providing the impetus for the formation of the interprofessional oral mucositis committee that has overseen this program. The institution's Office of Nursing Research, Evidence-Based Practice, and Quality supported this initiative, and the revised Iowa Model provided the project framework (see *The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care* [1]).[1, 2]

Background:

More than 36,000 Americans were diagnosed with head and neck cancer in 2010.[3] By 2020, the National Cancer Institute predicts that approximately 300,000 people will have been diagnosed with head and neck cancer,[4] and total treatment expenditures for these types of cancer will likely exceed $4 billion.[5] Tobacco and alcohol use continue to be major risk factors for head and neck cancer, and the incidence of human papillomavirus–related head and neck cancer is increasing.[6]

People with head and neck cancer are at high risk for experiencing treatment side effects. Oral mucositis is among the most distressing of these and develops on a continuum, from inflammatory changes to ulcerative lesions.[7, 8] Mucosal injury to normal oral cavity tissue is stimulated by toxicity that correlates with radiation treatment or a chemotherapy dose.[8, 9] Oral mucositis occurs in almost all patients receiving treatment for head and neck cancer and has been found to peak (is at its highest severity) around treatment week 5 in patients receiving radiation.[10] Ninety-three percent of patients experience xerostomia (dry mouth) during radiation, and this problem persists in nearly three-quarters of patients for one to three months after

treatment.[11] Both chemotherapy and radiation therapy induce cytotoxic effects on the epithelial cells of the oral mucosa and on the salivary glands. Although oral mucositis and xerostomia are separate side effects of treatment, the presence of xerostomia can make patients more likely to experience the more significant and severe effects of oral mucositis.[12]

Oral mucositis is painful, interferes with eating and drinking, increases the risk of infection, and impacts quality of life.[9, 13, 14] Oral symptoms continue throughout treatment and can lead to a less than optimal treatment dose, negatively impacting survivorship.[11] Goals for care include reducing the severity of oral mucositis and managing its symptoms. Evidence-based interventions are needed.

Prevention and Treatment of Oral Mucositis:

Oral health is essential for wellness and starts with appropriate oral hygiene. This is especially important in patients treated for cancer. Oral mucositis was once thought to be an inevitable consequence of treatment.[9] Although natural interventions remain elusive,[15] preemptive identification of at-risk patients and professional dental care are now known to help prevent and reduce the severity of this side effect.[12, 16] Nurses play an important role in improving oral care in patients who have head and neck cancer.

Research demonstrates that oral care can reduce oral mucositis severity.[17, 18] Likewise, education on the importance of routine oral care prior to cancer treatment may reduce oral mucositis pain and severity.[19] Clinical practice guidelines and systematic reviews consistently support oral care but include insufficient evidence for specific oral care protocols or effective oral rinses,[14, 20, 21] except for advising against the use of chlorhexidine and misoprostol[14, 22] and products containing alcohol.[12] In addition, as a participating organization in the American Board of Internal Medicine Foundation's Choosing Wisely campaign, the American Academy of Nursing recommends against the use of “magic mouthwash”—a mixed medication formulation that typically includes anticholinergic medications, an anesthetic, and an antacid or mucosal coating agent—which has been traditionally prescribed as a treatment intervention but is not effective.[23]

Management of oral mucositis thus requires assessment and interventions to reduce the severity of this condition and control any pain the patient may be experiencing. Well-developed and disseminated clinical practice guidelines are readily available,[12, 14, 24] yet their adoption has been inconsistent. The application and evaluation of clinical practice guidelines addressing oral mucositis is a key challenge affecting patient care.[9]

The Intervention:

In the development of this evidence-based practice oral care project, the interprofessional team followed the Iowa Model, first identifying the need for the practice change, then designing and piloting the intervention, and, finally, integrating and sustaining the practice change.[1] The facility's institutional review board determined that this project did not require its approval.

Participants. The project's participants included adults with head and neck cancer receiving outpatient radiation therapy with or without concurrent chemotherapy. Patients were included in either the usual care or the intervention group. The timeline was sequential as follows: first, a date was set to start recruiting the next 20 patients seen consecutively in the radiation oncology

center (the usual care group). The collection of data, which took the form of patient feedback in response to questionnaires on oral care practices, occurred at the following times during the usual care group's treatment course: pretreatment, during week 4 to 5, and one month after treatment ended. Next, a date was chosen for the beginning of the evidence-based practice change, at which time the next 85 consecutive patients were enrolled in the intervention group. Their feedback was obtained in the same way as that of the usual care group and at the same time points. Feedback was also obtained from clinicians (nurses, physicians, and radiation therapists) before the usual care group began treatment and again after the intervention's "go live" phase.

Usual care. All patients treated at the radiation oncology center, including the head and neck cancer patients enrolled in the project, received extensive oral care preparation prior to radiation treatment. This included a visit with an oncologic dentist for a professional dental evaluation, fluoride treatments, the provision of oral care supplies, and tooth extraction if needed. Radiation treatment was then provided daily, Monday through Friday, until the treatment course was completed. The nurse care coordinator routinely saw these patients throughout their six-to-eight-week treatment course and had a lead role in this project.

The nurse care coordinator assessed and monitored the usual care patients, providing education on oral care to patients and/or their family members; coordinated with the interprofessional team on the management of pain, dysphagia, and other health care needs; and completed nursing documentation. Education included a brochure, video, and supplemental information provided if patients had questions and when indicated by the nursing assessment, which was conducted in conjunction with the patient's weekly appointments with the radiation oncologist. The dentist provided samples of oral hygiene products. Patients with thick secretions received a prescription for a home suction machine. Patients were also given verbal and written information about nutrition and ways to manage other common symptoms.

Practice change. Those in the intervention group received the same care as those in the usual care group plus targeted education, a comprehensive oral care kit, and information on how to use the kit. The targeted education included a brochure from the U.S. Department of Health and Human Services, *Head and Neck Radiation Treatment and Your Mouth*,[25] and a one-page insert, which was developed by the team, translated into Spanish for use as needed, and placed inside the brochure (see *Oral Care Brochure Insert*).

Each oral care kit included the following products, which were either approved by the American Dental Association or did not contain irritating ingredients (such as phosphates) known to negatively affect the oral squamous epithelium:

- Soft and more effective toothbrushes[12, 21, 26, 27]
- Biotene toothpaste[28-31]
- Lanolin lip care products[32]
- Waxed floss[20, 33]
- Prepackaged salt and baking soda packets[12, 21, 27, 34, 35]
- A timer, to encourage thorough brushing

The salt and baking soda packets made it easy for patients to prepare a nonirritating oral rinse when they were away from home. Patients staying at the local American Cancer Society Hope Lodge or a nearby hotel received a larger quantity of prepackaged mixtures to ensure they had oral rinses available throughout their stay.

The oral care products were included in a branded kit—a plastic bag labeled with the names of both the University of Iowa Hospitals and Clinics and the DAISY Foundation, as an acknowledgment of the latter's funding support. The first oral care kit was distributed by the oncologic dentist and nurse care coordinator before radiation therapy began, ensuring that patients had the correct supplies and appropriate educational materials before treatment. The nurse care coordinator replenished the contents of the oral care kits, when needed, throughout treatment. A second oral care kit that included all the supplies was provided by the nurse care coordinator following data collection at the week 4 to 5 treatment visit.

Implementation:

An implementation plan promoted awareness, knowledge, adoption, and integration of this practice change, creating a sustained improvement for patients seen at the radiation oncology center. The implementation plan included effective, interactive strategies to ensure that the practice change would be sustainable, which required changing both clinician and patient behavior. Previously published “Implementation Strategies for Evidence-Based Practice” provided the implementation framework.[36] An overview of the phased implementation approach is described below.

Project leaders worked with the radiation oncology leadership team—which included the nurse manager and medical director—in designing and piloting this practice change. The lead radiation therapist also played a key role. Raising awareness of the practice change among radiation therapists, for instance, led these clinicians to quickly recognize they could identify when patients’ symptoms of oral mucositis required a nursing consultation. Including various clinicians on the leadership team helped to publicize the project and garner support throughout the center. To create awareness and interest among the nursing staff, the new oral care process was discussed at regular staff meetings, where the kits were also showcased.

The focus then shifted to building knowledge and commitment. Key strategies included using existing resources to support the practice change. Input was obtained from the nursing staff regarding who should put the oral care kits together and the best place to store them in the clinic. This ensured that the oral care kits and written patient educational materials were readily available for team members to distribute.

Communication and collaboration among members of the interprofessional team were essential for the project's success. Team members included nurses who primarily cared for adults with head and neck cancer, as well as nurses who cared for other patients receiving radiation treatment; medical or nursing assistants; physicians; radiation therapists; dentists; and speech-language pathologists. All team members helped to screen and monitor patients for early indications of oral mucositis development in addition to providing and reinforcing patient education on evidence-based oral care practices.

Implementation strategies used during the “go live” phase—when patients in the intervention group were first given the oral care kit and educational materials—focused on promoting action and adoption of the practice change. The nurse care coordinator acted as a role model, answering

questions, providing guidance, and encouraging other members of the interprofessional team. Documentation of the new practice was updated in the electronic health record to support the new screening, assessment, and patient education standards.

The final phase of implementation focused on pursuing integration and sustained use of the practice change. In this phase, the patient and clinician evaluations were used to assess the intervention and are described below.

For a list of the strategies used in this practice change, see *Implementation Strategies Used in the Oral Mucositis and Oral Care Evidence-Based Practice Project*. A more complete description of how to use these strategies is available elsewhere.[1, 36, 37]

Evaluation:

A descriptive evaluation used evidence-based practice methods to capture feedback from patients and clinicians.[38, 39]

Clinicians. Clinician feedback was obtained before the usual care group began treatment and after the intervention's "go live" phase. Process indicators included the clinician's (nurses, physicians, and radiation therapists) knowledge of oral care and correct use of oral care products, perceptions and attitudes about oral care, and behaviors and practices related to the documentation of patients' oral health and education. Clinician questionnaires had two sections: a 27-item knowledge assessment (in multiple choice and true/false format) based on a National Comprehensive Cancer Network report on the prevention and management of oral mucositis,[40] and a section capturing clinician perceptions (using a 4-point Likert scale, ranging from 1 = strongly disagree to 4 = strongly agree) adapted from an evidence-based practice guidebook.[41] Psychometric evaluation of the questionnaire was not performed, as the intent was to evaluate for local use following evidence-based practice, not research, methods. Clinician perceptions were sought to guide implementation planning.

Clinical outcomes (such as the severity of symptoms associated with oral mucositis and xerostomia) were evaluated to demonstrate a clinically meaningful impact of the practice change, to guide revisions in the implementation plan, and to determine if rollout to other clinics and inpatient units caring for oncology patients was appropriate.

Patients. Patient feedback, obtained before radiation treatment, during week 4 to 5 of treatment, and one month after treatment, was also collected using questionnaires. The results of process evaluation of patients' knowledge, attitudes and priorities, and health behaviors related to oral hygiene practices were used in planning the rollout of the practice change, ensuring that it reflected patient preferences and values and improved patient experience. Patient questionnaires had three sections: patients' oral care practices (the frequency of care and products used, for example); patients' perceptions about oral care (feeling well prepared and the helpfulness of oral rinses, for example) rated on a 4-point Likert scale (ranging from 1 = strongly disagree to 4 = strongly agree); and oral mucositis symptoms rated on an 11-point Likert scale (ranging from 0 = none to 10 = worst possible). As with the clinician questionnaire, no psychometric evaluation was performed for this local practice change.

Results:

The data collected from clinician and patient questionnaires were analyzed to determine any clinically important effects of the practice change on oral mucositis severity and to guide further implementation of the practice change.

Clinicians. A total of 23 of 28 clinicians responded to the questionnaire given before the usual care group began treatment (preimplementation), for a response rate of 82%; after the intervention's "go live" phase (postimplementation), the response rate was 69% (n = 20/29). The percentage of clinicians with correct responses to knowledge assessment items improved from 71% preimplementation to 80% postimplementation.

The clinicians' mean scores on questions capturing their perceptions were higher postimplementation than preimplementation, reflecting more favorable perceptions of the following: oral care being important (3.8 versus 3.5); oral health influencing general health (3.7 versus 3); patient education helping to reduce oral mucositis severity (3.7 versus 3.5); patient education being important for oral mucositis prevention (3.9 versus 3.7); feeling knowledgeable about oral mucositis prevention (3.1 versus 2.7); being able to identify which patients needed oral mucositis prevention (3.2 versus 3); and patients receiving oral care at least twice per day (2.5 versus 2.1).

Patients. Feedback provided by patients during radiation treatment week 4 to 5 demonstrated improvement in oral hygiene behaviors. More patients in the intervention group reported brushing at least daily, using Biotene toothpaste, performing oral rinses at least twice a day, and using lanolin lip balm, compared with those in the usual care group (see Figure 1). Patients in the intervention group also felt more strongly than those in the usual care group that they knew how to prevent oral mucositis, felt prepared for good oral care, and were aware that Biotene toothpaste and oral rinses were helpful (see Figure 2).

Although Biotene toothpaste and lanolin lip care products were only given to patients in the intervention group, the questionnaires asked both groups of patients for their perceptions of Biotene and lanolin. This was for several reasons. First, identical questionnaires were used in both groups to increase the team's ability to understand patients' feedback. Second, both Biotene and lanolin are available without a prescription and are advertised directly to consumers. In addition, oncology patients and families at our center get to know each other in the waiting rooms and often share information about interventions for symptom management. It was therefore reasonable to expect that some patients in the usual care group might be using these products.

Based on the feedback of patients in the intervention group, compliance with the targeted education and oral care kit intervention led to a reduction in their symptoms at week 4 to 5 of radiation treatment, when symptoms are expected to peak (see Figure 3). The intervention patients reported less severity than the usual care patients regarding the following symptoms: mouth and throat soreness (3.9 versus 5), difficulty swallowing (4 versus 5.6), difficulty eating (4.9 versus 5.9), and difficulty talking (2.9 versus 4). A noteworthy finding was that patients in the intervention group reported less difficulty with xerostomia than those in the usual care group

(3.1 versus 4.1) one month following the completion of treatment, when xerostomia is expected to persist. This finding is important because patients who have undergone radiation therapy traditionally report long-lasting issues with xerostomia.

Discussion:

This project followed a well-established evidence-based practice process to improve care. The practice change was designed for use in one radiation oncology center and, as such, the results are not necessarily generalizable to other settings.

Formative evaluation is an important part of the evidence-based practice process. After the intervention began, for instance, the nurse care coordinator reported that patients were requesting additional oral care supplies more frequently than the team anticipated. This led to a revision in the timing of the oral kit replenishments. The project team learned multiple lessons during this practice change process. First, it was determined that follow-up was needed to ensure the clinicians involved in the pilot project consistently followed the same practices. Nurses, for instance, sometimes provided two different educational brochures, and physicians sporadically ordered "magic mouthwash." In addition, the lanolin lip balm inventory and that of some other supplies in the oral care kit were easily depleted and not automatically reordered. These items had to be special ordered by the nurse manager after the nurse care coordinator communicated that the inventory was getting low. It was difficult to predict demand, and sometimes there were unavoidable delays in the availability of these products. Also, as new clinicians were hired, they needed to be familiarized with the oral care intervention and their role in it.

The biggest lesson learned was when the nurse manager, who served as the project opinion leader and was thus influential in promoting adoption of the practice change, left the clinic. Consequently, there was the beginning of a "drift" back to old practice habits, rather than maintenance of the new practice. Clear expectations helped change champions (the staff nurses and nurse care coordinator) provide ongoing training to sustain the practice when staff turnover occurred. The continued commitment to the project by the interprofessional team was essential for the successful transition of responsibility among clinicians throughout the course of this project.

The implementation of this practice change shows that the distribution of standardized oral care kits and related educational materials can offer an effective way to meet patients' needs and reduce oral mucositis severity in adults treated for head and neck cancer. The success of this project also highlights the key role nurses play in cancer symptom management—before radiation therapy begins, throughout the course of treatment, and in the months afterward.

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The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care[1]

The initial steps in the iowa Model include identifying a practice problem or issue tha ttriggers the project, and formualting a clear, concise purpose statement to set boundaries around the project's work. Ensuring that the issu is aligned with the organization's priorities helps garner resources to support the execution of the project. After the project is deemed a priority, an interprofessional team is formed to devleop, implement, and evaluate the practice change.

The next step in the Iowa Medel includes conducting a comprehensive literature search, so the team can assemble, appraise, and synthesize the body of evidence and determine if there is sufficient evidene to pilot a change in practice or if additional research needs to be conduted. Desigin and piloting the practice change is multifactorial (and includes, for example, developing a localized protocol, creating an evaluation plan, and developing a phased approach to implementation) and critical to detrmining the feasibility and effectiveness of the practice recommendations. After the pilot data are collected and analyzed, the team must decide if the change is appropriate for adoption in practice or if futher rollout to additonal areas is warranted.

The final two steps in the Iowa Model are integrating and sustaing the practice change. These ensure tha tth echange is built into the system and the desired outcomes are maintained, and that results are disseminated both within and outside th organiztion.

For more information about the Iowa Model, see https://uihc.org/iowa-model-revised-evidence-based-practice-promote-excellence-health-care.

Oral Care Brochure Insert

Additional Oral Care Recommendations

- Use a non-abrasive toothpaste (Biotene®)
- Only use a pea-size amount (or smaller) of Biotene® toothpaste
- Brush for 2 minutes using a gentle rotation/circular motion while holding the toothbrush at a 45 degree angle to the tooth surface
- Floss daily with waxed floss
- Apply Lanolin (Lansinoh®) to lips to prevent dryness (or any other lanolin-based product)
- Lansinoh® is found over-the-counter in the baby care section
- Lansinoh® must be removed before radiation treatments

Recomendaciones Adicionales Sobre El Cuidado Oral

- Use una pasta dental no abrasiva (Biotene®)
- Solo use una pequeña porción de la pasta dental Biotene®
- Cepíllese por dos minutos en forma suave y circular, con el cepillo dental, en un ángulo de 45 grados cubriendo todos los dientes
- Use seda (encerada) dental todos los días
- Aplique Lanolin (Lansinoh®) en los labios para prevenir sequedad
- Lansinoh® se puede comprar en cualquier farmacia
- Lansinoh® se tiene que remover antes de cualquier tratamiento de radiación

Implementation Strategies Used in the Oral Mucositis and Oral Care Evidence-Based Practice Project

	Create Awareness and Interest	Build Knowledge and Commitment	Promote Action and Adoption	Pursue Integration and Sustained Use
Connecting with Clinicians, Organizational Leaders, and Key Stakeholders	• Highlight advantages* or anticipated impact* • Slogans and logos • Staff meetings • Unit in-services • Distribute key evidence • Announcements and broadcasts	• Education (eg, live, virtual, or computer based)* • Pocket guides • Change agents (eg, change champion,* core group,* opinion leader,* thought leader, etc.) • Disseminate credible evidence with clear implications for practice* • Clinician input* • Local adaptation* and simplify* • Match practice change with resources and equipment • Resource manual or materials (ie, electronic or hard copy)	• Reminders or practice prompts* • Resource materials • Give evaluation results to colleagues* • Incentives* • Try the practice change* • Multidisciplinary discussion and troubleshooting • Data collection by clinicians • Report progress and updates • Change agents (eg, change champion,* opinion leader*) • Role model* • Troubleshooting at the point of care	• Public recognition* • Personalize the messages to staff • Share with clinicians protocol revisions based on feedback from clinicians, patients, or family • Peer influence
Building Organizational System Support	• Senior executives' announcements • Publicize new equipment	• Teamwork* • Benchmark data* • Inform organizational leaders* • Report within organizational infrastructure* • Report to senior leaders	• Audit key indicators* • Actionable data feedback* • Nonpunitive discussion of results* • Documentation* • Patient decision aids* • Report into quality improvement program* • Link to patient/family needs • Unit orientation	• Report into quality improvement program* • Revise policy, procedure, or protocol* • Present in educational programs

* This implementation strategy is supported by at least some empirical evidence.

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Figure 1. Percentage of Patients Reporting Oral Care Practices During Week 4-5 of Raditation Treatment

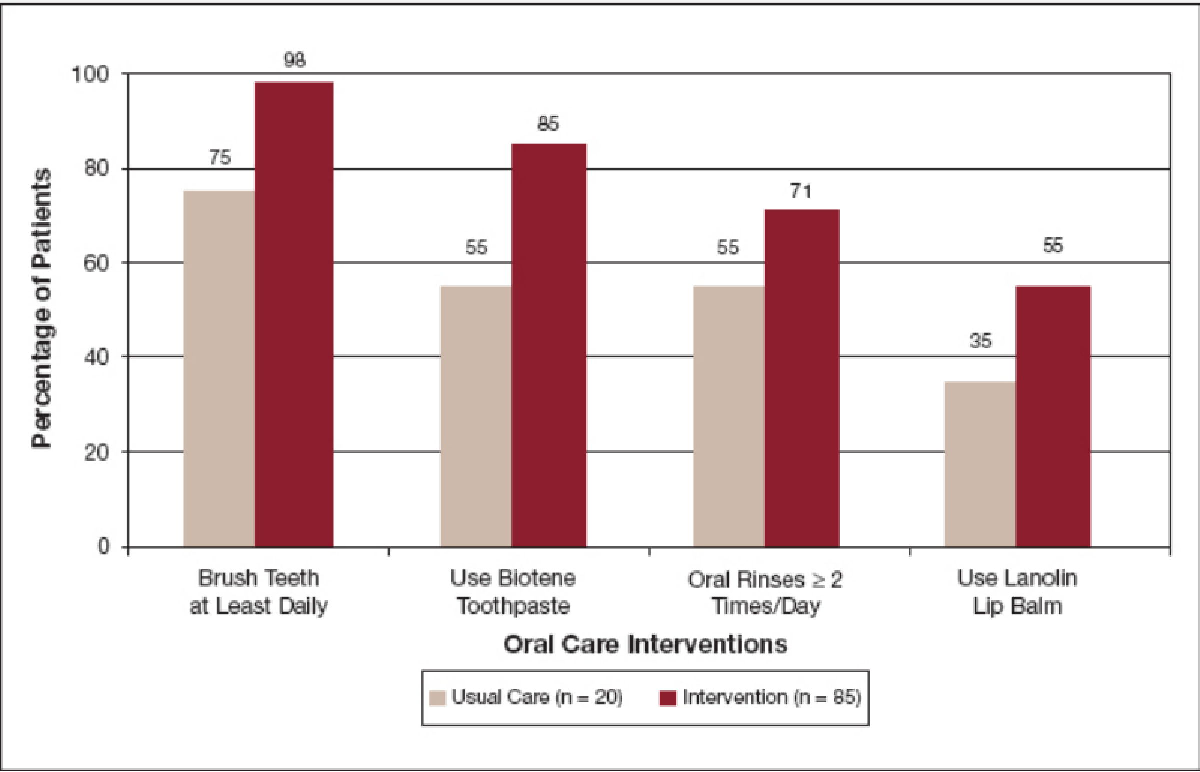

Figure 2. Patient-Reported Perceptions of Oral Care During Week 4-5 of Radiation Treatment

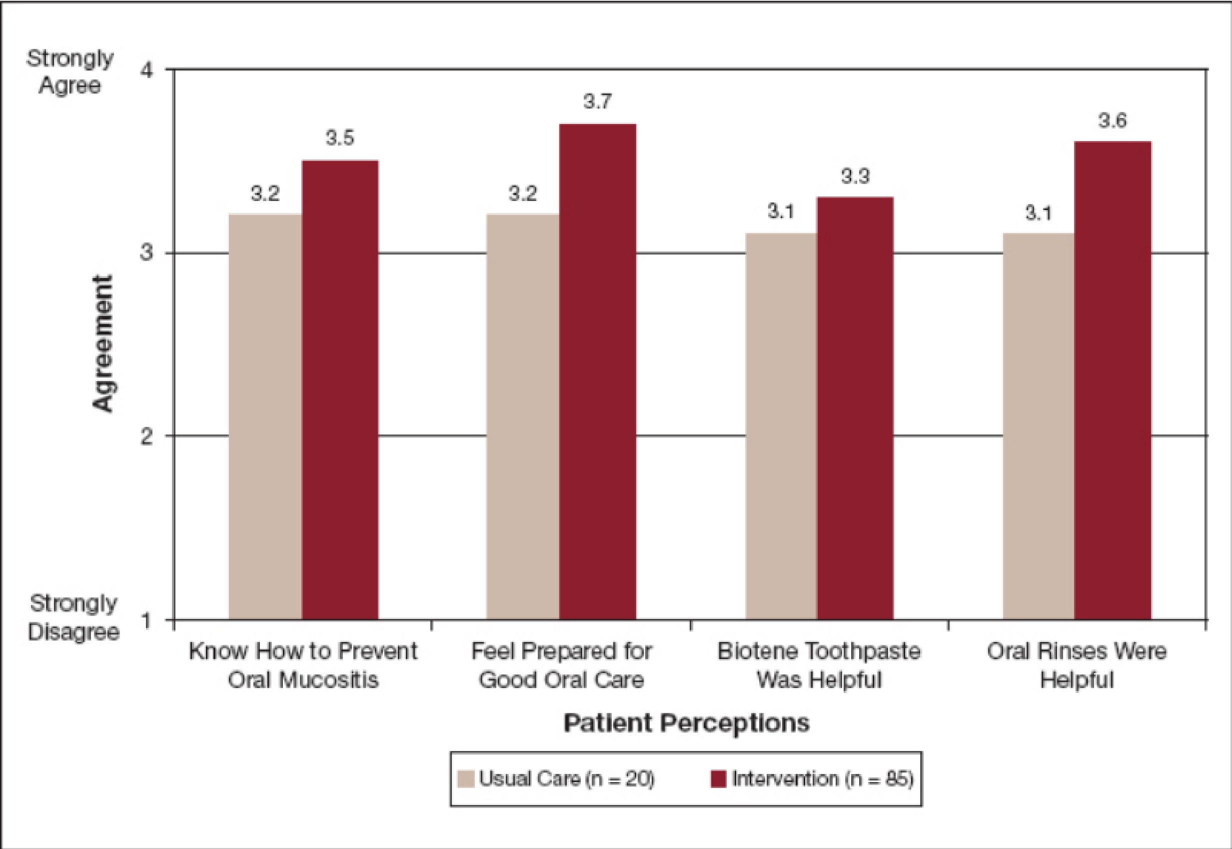

Figure 3. Patient-Reported Oral Mucositis Symptoms During Week 4-5 of Radiation Treatment