

# The Impact of an Oral Hygiene Education Module on Patient Practices and Nursing Documentation

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**Background:** Oral hygiene is inconsistent among patients with cancer and is a national patient care issue. To promote comfort and nutritional status, oral hygiene for patients with cancer is important.

**Objectives:** The purpose of this study was to develop an evidence-based oral hygiene educational module (EM) for nursing and patient care technician (PCT) staff to promote consistent oral hygiene patient education; evaluate patient understanding of oral hygiene practices post-EM; and determine staff documentation frequency of oral hygiene care.

**Methods:** Pre- and post-EM data were collected using a developed oral hygiene assessment tool; nursing documentation data were collected by chart review. Post-EM data were collected eight weeks post-EM. Data were analyzed using frequencies and the Mann-Whitney U test.

**Findings:** Twenty-two patient documentation pairs were collected. Compared to pre-EM, admission teaching, patient education, and patient oral hygiene practices improved post-EM. Post-EM oral hygiene documentation and PCT teaching increased.

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Research supports that adherence to oral hygiene care can aid in the reduction and severity of mucositis in patients with cancer (Harris, Eilers, Harriman, Cashavelly, & Maxwell, 2008; Lalia & Ashbury, 2013). Oral complications are estimated to be 80% for hematopoietic stem cell transplantation in which myeloablative regimens are used (National Cancer Institute, 2011). The most common oral complications related to cancer therapies are mucositis, infection, salivary gland dysfunction, taste dysfunction, and pain. The dry oral cavity promotes increased adherence of food particles to the teeth and surrounding tissues, causing irritation and mouth pain as well as bacterial growth (Epstein, 2007). The impact of oral mucositis can be devastating to patients and caregivers because of increased mouth pain, difficulty eating and drinking, and subsequent nutritional compromise.

In addition, the breakdown of the mucosal lining creates an open entry for pathogens to enter the bloodstream and cause systemic infections, possibly leading to sepsis in patients who are immunocompromised (Sonis, 2007). Mucositis also may cause delays in treatment plans, an increase in hospital stays, and an increase in costs (Eilers & Million, 2007; Elting et al., 2003).

Oral hygiene consists of performing regular assessments of the mouth and keeping the oral cavity moist and free of pathogens. This, in turn, will lead to decreased discomfort and frequency of infection, and improvement in overall quality of life (Harris et al., 2008). A high degree of variability exists among patients with cancer in their oral hygiene regimen and among healthcare providers in their recommendations for oral hygiene care. At the bedside, RNs and patient care technicians (PCTs) do not always teach or perform consistent oral hygiene

practices, which can be confusing to patients. Nursing staff may overlook the importance of oral hygiene care, documentation, and follow-up interventions, as they provide higher skilled care. Oral hygiene information often is obtained by patients from a variety of providers from inpatient settings, ambulatory settings, and outpatient clinics who recommend different protocols and products. In addition to receiving multiple sources of information that can be confusing, patients with cancer frequently face barriers to performing oral hygiene care, including fatigue and knowledge deficits (Epstein, 2007). The purpose of this study was to evaluate patient knowledge and practices and staff documentation of oral hygiene care, develop and test an evidence-based educational module (EM) for RNs and PCTs to provide consistent patient education, and determine the effects of the EM on patient practices and staff documentation related to oral hygiene care.

## Methods

The institutional review board approved the study protocol. The study had three phases. Phase I involved data collection to determine patient oral hygiene knowledge and practices and the daily number of times nursing staff documented oral hygiene care. Phase II involved developing and delivering an EM for RNs and PCTs about oral hygiene care and documentation. Phase III involved evaluating the effect of the EM on patient oral hygiene practices and frequency of daily nursing staff documentation. The hypothesis was that consistency in patient oral hygiene practices and the frequency of nursing staff documentation of oral hygiene would increase after participation in the EM. The current study defined oral hygiene as frequent (four times per day) oral assessments and current interventions to keep the mouth moist (e.g., oral swabbing, tooth brushing, oral rinsing), and credited RNs and PCTs for documenting any of these oral hygiene interventions.

For all phases of the study, data were collected on two oncology tertiary care inpatient units at an urban Midwestern academic medical center. The two samples for this study were unit-based nursing staff and patients with cancer. The first sample included all nursing staff of the two oncology units (N = 44 RNs and 6 PCTs). Nursing staff were full- or part-time employees and provided direct care to patients with cancer in an inpatient setting. All RNs successfully completed the Oncology Nursing Society (ONS)/Oncology Nursing Certification Corporation Chemotherapy Biotherapy Certificate Course in accordance with the curriculum of ONS (2003).

The second sample included all patients with cancer diagnosed with hematologic malignancies on the two oncology units over a three-day period (N = 30). Participants were admitted in various stages of the treatment process, including, but not limited to, bone marrow transplantation, workup for neutropenic fever, and management of nausea and vomiting. Eligibility criteria included the ability to speak, read, and write English, and receiving chemotherapy or having had received chemotherapy within the past six months. Patients were approached by the principal investigator to participate in the study, and informed consent was obtained. RNs and PCTs did not sign written consents because data were collected retrospectively from the medical records.

- Where did you get your initial treatment?
- What were you taught about mouth care?
- When were you taught (in relation to treatment)?
- Who taught you?
- What are your favorite products for mouth care?
- What works best?
- How does your mouth feel?
- Does mouth pain interfere with eating or talking?
- Does mouth care help with the pain?
- Have you had mouth sores during your treatment?
- Have you done mouth care since you were admitted?
- Do you need help with mouth care?
- Who helps you with mouth care?

FIGURE 1. Patient Interview Guide

### Phase I: Patient Oral Hygiene Practices and Staff Documentation

Patients were interviewed during the three-day data collection period using an oral hygiene assessment tool developed from the literature (Daniel, Damato, & Johnson, 2004; Southern, 2007) to determine when they first were taught about oral hygiene, how frequently they performed oral hygiene care, the presence of oral pain or discomfort, and oral hygiene product use. The assessment tool consisted of eight open-ended questions and five closed-ended questions (see Figure 1). This information then was used to develop key topics for the phase II EM.

Nursing staff documentation was assessed through retrospective medical record review of similar patients from each unit. The medical record included a nursing assessment form with paper medical records, including the progress notes and patient education record. Medical records were audited to determine the frequency of daily nursing documentation and the most common location of oral hygiene documentation by the nursing staff. In addition, the researchers examined the presence or absence of oral hygiene care teaching documentation on the patient education record.

### Phase II: Developing the Education Module

The EM was designed to provide standardized care practices (i.e., oral care four times daily, particularly after meals and at bedtime) and documentation for oral hygiene based on the latest evidence and guidelines (Fulton, Middleton, & McPhail, 2002; Harris et al., 2008). Key topics for the EM also were based on findings from the phase I data. From the phase I data, inconsistencies were apparent in patient knowledge and oral hygiene practices as well as the completeness of nursing documentation in the medical record and patient education record. Based on the phase I findings, the oral hygiene EM included a 10-minute oral hygiene care in-service for RNs and PCTs that included specific teaching about (a) the importance of oral hygiene; (b) use of products including Biotene® mouthwash (Eilers & Million, 2007), a soft toothbrush, and oral balance gel; (c) performing oral hygiene four times a day (after meals and at bedtime); and (d) documenting the oral assessment results, how often oral hygiene was performed, and the intervention used for oral hygiene. The nursing staff also were taught the importance of teaching patients with cancer about oral hygiene

care on admission and reinforcing it during their hospital stay and at discharge. The EM content was presented to all nursing staff on each of the two patient care units. The EM was repeated at various times throughout a two-week period to ensure teaching the majority of staff and was conducted by the principal investigator.

To assist in remembering to perform oral hygiene care, reminder signs for patients and staff were developed and placed in patient rooms. The nursing staff were taught during the EM to highlight the reminder signs when teaching patients about oral hygiene. At the completion of the EM, a short quiz was given to the staff to assess knowledge acquisition. A handout with the key points of the EM and a penlight were given to each nursing staff member to perform oral assessments. In addition, non-oil-based lip moisturizers were made available for patients.

## Phase II: Implementation of Electronic Health Records

During phase II, between the two data collection time points, the medical center converted to electronic health records (EHRs). Phase I data were used to develop a more comprehensive and specific computerized screen for nurses to document frequency and findings of oral assessments and frequency and interventions used for patient oral hygiene. The EHR included a more comprehensive oral assessment and oral hygiene intervention documentation section. The new EHR included four different sections for oral assessment specifically addressing appearance, location, sensation, and color of the patient's mouth. In addition, the oral hygiene section was modified to include the World Health Organization mucositis grading scale. This grading scale includes a 1–4 scale to document mucositis findings as oral soreness and erythema (1); ulcers present but able to eat solid foods (2); oral ulcers present and able to take liquids only (3); and oral alimentation impossible (4) (Keefe et al., 2007).

## Phase III: Effects on Patient Practices and Staff Documentation

At the time of phase I data collection, the oral assessment was documented using a limited-space comment box for a narrative note in the oral hygiene section of the paper medical record. For phase III data collection, the newly developed and implemented EHR was used for data collection. The EHR was developed from phase I data, and nursing staff were able to provide input to the format. The record was more comprehensive and provided a better assessment of the oral health of patients with cancer. Eight weeks after the EM content was presented to the nursing staff, a second sample of patients were interviewed to assess their oral hygiene knowledge and practices, and the EHR was audited to determine if a change occurred in the frequency of oral assessment and hygiene documentation from pre- to post-EM by nursing staff.

## Statistical Considerations

Demographic characteristics were analyzed using descriptive statistics, or frequency distributions where appropriate. Changes from baseline (pre-EM) for continuous variables were analyzed using the Mann-Whitney U test to determine the

change in patient oral hygiene care and frequency of nursing staff documentation post-EM. All data were analyzed using SPSS®, version 16.0.

## Results

### Pre-Education Module Data

Data results are presented in Table 1. Of the 21 patients interviewed pre-EM, 9 (43%) received their treatment as an inpatient at the researchers' medical center, and 9 (43%) received treatment at another hospital or outpatient setting. Six patients (29%) did not recall being taught anything about oral hygiene. The remaining 15 patients (71%) had been taught a variety of practices, including frequency of oral hygiene care and products being used. When asked when they received education about oral hygiene, seven patients (33%) said they never were taught or did not remember. The remaining 14 patients recalled being taught before treatment ( $n = 3$ , 19%), during treatment ( $n = 4$ , 24%), or on admission ( $n = 3$ , 19%). Thirteen patients (62%) were taught by RNs, with the remaining patients being taught by other healthcare professionals ( $n = 2$ , 19%) or not being taught ( $n = 2$ , 19%). The most commonly identified products patients used for oral hygiene care included toothpaste with toothbrush ( $n = 4$ , 38%), Biotene® rinse ( $n = 1$ , 15%), and other mouth rinse ( $n = 1$ , 15%). Ten patients (48%) identified toothpaste as being the best product for oral hygiene. Since admission, 20 of the patients (95%) were able to perform mouth care independently.

In the pre-EM group, the majority had no mouth pain and said that their mouth felt good. Six patients (29%) had experienced mouth pain in the past during treatment. Of the 13 patients (62%) who were undergoing chemotherapy, only 3 (23%) said that they had a bad taste or that their mouth hurt or was swollen. Six patients (29%) were neutropenic, and three (50%) of those patients identified their mouth as dry or swollen. One patient (5%) had mouth sores but said that his or her mouth was fine or good. Only two patients (10%) felt that their mouth pain interfered with eating or talking. Of the six patients (29%) who had experienced mouth pain, five (90%) felt that oral hygiene care helped with the pain.

Post-EM, nursing documentation about oral hygiene was found in 19 (90%) of the patient medical records, with documentation found in the progress notes and nursing documentation. Documentation was only placed on the education record in nine of the charts (52%). For eight charts (44%), during three days of monitoring, mouth care was documented only once per day with the morning assessment documentation.

### Post-Education Module Data

Of the 22 patients interviewed, 13 patients (59%) received their treatment as an inpatient at the researchers' medical center and 9 (41%) received treatment at another hospital or outpatient setting. Three patients (14%) did not recall being taught anything about oral hygiene. Ten patients (45%) verbalized that oral hygiene care should be done before and after meals, or six times per day. The products most frequently used were Biotene® rinse ( $n = 7$ , 32%); brush and floss ( $n = 4$ , 18%); other mouth rinse ( $n = 5$ , 23%); and mouth swabs ( $n = 4$ , 18%).

TABLE 1. Sample Characteristics (N = 43)

	Pre-EM (n = 21)		Post-EM (n = 22)	
	n	%	n	%
Able to perform oral hygiene	20	95	20	91
Chemotherapy	13	62	6	27
<b>HCP who taught oral hygiene</b>				
Dentist	1	5	—	—
Everybody	3	14	—	—
Patient care technician	—	—	5	23
Physician	—	—	2	9
RN	13	62	14	64
Inpatient treatment	9	43	13	59
No mouth pain present	15	71	12	55
No recall of teaching	6	29	3	14
Oral hygiene improves mouth pain	5	90	12	55
Outpatient treatment	9	43	9	41
Pain interferes with eating/talking	2	10	11	55
Past mouth pain	6	29	15	68
<b>Product used</b>				
Biotene®	1	15	7	32
Brush and floss	1	10	4	18
Brush without floss	1	10	—	—
Mouth swabs	—	—	4	18
Other mouth rinse	1	15	5	23
Toothpaste and toothbrush	4	38	7	32
Toothpaste only	10	48	6	27
<b>Taught oral hygiene frequency</b>	15	71	—	—
Once per day	2	10	—	—
Twice per day	1	5	—	—
Three times per day	1	5	—	—
Before and after meals	2	14	10	45
<b>When taught oral hygiene</b>				
Do not recall	7	33	1	5
Before treatment	3	19	3	14
During treatment	4	24	3	14
On admission	3	19	15	68

EM—education module; HCP—healthcare provider

When asked when they received education about oral hygiene, only one patient (5%) said he or she never was taught or did not remember. The remaining patients were taught on admission (n = 15, 68%), before treatment (n = 3, 14%), or during treatment (n = 3, 14%). Fourteen patients (64%) were taught by RNs, with the remaining patients being taught by a PCT (n = 5, 23%), being taught by a physician (n = 2, 9%), or not being taught (n = 3, 14%). In this group, the most commonly identified products used for oral hygiene care included Biotene® rinse (n = 7, 32%), toothpaste (n = 6, 27%), and toothbrush with toothpaste (n = 7, 32%). Biotene® rinse (n = 10, 45%) was most frequently identified by the patients as being the best product for oral hygiene. Since admission, 20 patients (91%) were able to perform mouth care independently.

In the post-EM group, 12 patients (55%) had no mouth pain and said that their mouth felt good. Fifteen patients (68%) had experienced mouth pain in the past during treatment. Of the six patients (27%) who were undergoing chemotherapy, four (67%) stated that their mouth was fine or good, and only two (33%) said that they had a bad taste, their mouth hurt, or their

mouth was swollen. Four patients (18%) were neutropenic, with two patients (50%) rating their mouth as fine or good and two patients (50%) having a dry mouth. No patients had mouth sores in this group. Eleven patients (50%) felt that their mouth pain interfered with eating or talking. Of those with mouth pain, 12 patients (55%) felt that oral hygiene care helped with the pain.

Nursing staff oral hygiene documentation was found in 20 of the EHRs (91%), with documentation being found in the progress notes of only 5 (27%). Documentation on the education record was completed in 14 (68%) of the charts. Over three days of monitoring, oral hygiene care was documented only once per day with the morning assessment documentation in eight charts (41%).

## Discussion

The purpose of this study was to assess patient oral hygiene practices and nursing staff documentation before and after implementing an oral hygiene EM. Phase I data findings suggested a lack of patient knowledge about the frequency of oral hygiene performance and which products were best to use. However, patients were stressed when admitted to the inpatient setting, which may contribute to their inability to retain any information they may have obtained prior to admission.

Consistent with evidence-based guidelines, the frequency of the use of a soft toothbrush and regular flossing increased from 10% to 18% after completion of the EM. Prior to the EM, 10 patients (48%) were using toothpaste. Gentle brushing with a soft toothbrush only and regular flossing habits, particularly after meals, are most important to maintain tissue integrity (Sadler et al., 2003). The use of oral rinses also increased, with the use of Biotene® increasing from 15%–32%. Between meals, the use of a mouth rinse may be easier and less fatiguing than brushing and flossing. Both of these practices have been shown to help prevent mucositis or reduce pain (Harris et al., 2008; Sadler et al., 2003).

According to Harris et al. (2008), frequent oral hygiene practices help to reduce or improve mouth pain. In the current study, of the pre-EM patient group, two patients (10%) felt that their mouth pain interfered with eating or talking and, of those with mouth pain, 11 patients (55%) felt that mouth care helped with the pain. The post-EM patient group data findings were the same as the pre-EM group data findings; of those with mouth pain, 12 patients (55%) felt that mouth care helped with the pain. Patient oral hygiene frequency increased, and the consistency in products used was improved in the post-EM group. Small sample size may be a reason that no difference was detected.

The data showed fragmented documentation and inconsistent nursing practices in the frequency and type of oral hygiene practices that were taught. These findings are consistent with the literature that previously has identified a lack of patient and nursing staff knowledge of oral hygiene practices as a barrier to implementing established oral care standards (Daniel et al., 2004). After completion of the EM, frequency of patient teaching and documentation improved on the patient education record from 52% to 68%. The most often documented time that oral hygiene was completed and documented was in the morning (pre-EM = 44% versus post-EM = 41%). Although an



## Implications for Practice

- ▶ Provide specific evidence-based education about oral hygiene to patients and nursing staff to improve oral hygiene practices.
- ▶ Implement multifaceted strategies to ensure that oral hygiene is completed and documented throughout the day.
- ▶ Include ancillary staff in the education, documentation, and delivery of oral hygiene care.

increase of 3% was seen in documentation at other times of the day that oral hygiene care was performed, the data suggest that nurses regularly incorporate oral hygiene during their morning assessments but may not consistently assess oral hygiene beyond breakfast. For this reason, additional strategies are needed to ensure accurate documentation of patient oral hygiene practices to be sure that oral hygiene is being performed by the patient four times a day.

The researchers were able to use the phase I data to develop the phase II EM for RN and PCT staff. The EM included a multifaceted, evidence-based approach to oral hygiene practices and the importance of documentation. This approach was based on studies suggesting that multifaceted oral hygiene practices are more successful at improving oral hygiene outcomes than single-faceted strategies alone (Goss, Coty, & Myers, 2011). The researchers deliberately planned for the EM in-services to be brief, lasting 15 minutes at various times throughout all shifts to accommodate and capture all nursing staff.

Phase III post-EM data were collected using the same interview guide and chart audit tools as for the pre-EM data collection. The frequency of oral hygiene by the patients improved, as did the frequency of documentation of oral hygiene practices by the nursing staff. In addition, the staff responsible for performing oral hygiene changed, with the inclusion of PCTs in the EM. A 23% increase was seen in PCTs assisting patients. Harris et al. (2008) found that, after participating in an education intervention, auxiliary personnel most often were the staff who performed oral hygiene in patients with cancer, and then they reported the results to the RN. Including PCTs in the care plan can provide the needed patient encouragement and patient reminders to perform oral hygiene four times a day, particularly in fatigued patients with cancer.

## Limitations

Despite the positive results, the study had several limitations. The participants were obtained from a nonrandomized convenience sample, and the sample size was small. The researchers did not include a knowledge pretest or overall evaluation of the EM. Between the pre- and post-data collection time points, the medical center implemented a more comprehensive EHR. Although this didn't affect the ability to collect data, the perceived ease of use may have had an impact on the frequency of nursing documentation, as opposed to the improved documentation rate being a result of the EM. A final limitation may be a placebo effect from nursing staff, because they knew that data were being collected for the study.

## Clinical Implications

The data suggest that the development and delivery of an EM improved the frequency and documentation of oral hygiene in patients with cancer. Nurses regularly incorporated oral hygiene during their morning assessments but were not consistent in assessing and documenting oral hygiene throughout the rest of the day. Different strategies need to be tested to improve oral hygiene practices for patients and nursing staff throughout the day.

The results of this study have been used to improve the in-room reminder signs to include a tear pad for nurses to collect at the end of the day and document how often patients performed oral hygiene and which products were being used. Additional in-services will be conducted to highlight the new signs and to reinforce the content taught in the first EM.

## Conclusions

Nurses assist patients with oral hygiene care in the morning, and implementation of an EM and patient room reminder signs improved the frequency of oral hygiene practice and consistency in products used by the patients as well as documentation of the morning oral assessment by nursing staff. Additional evidence-based strategies need to be tested to promote oral hygiene practices based on the guidelines and clearly documented by nursing staff to promote continuity of care and minimize the potential for mouth pain and development of mucositis. Once that is accomplished, patient outcomes can be evaluated for impact.

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