National Survey of Oncology Members' Knowledge, Education and Patient Management Regarding Oral Care in Cancer Therapy

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Abstract

INTRODUCTION Oral complications can be profound in patients undergoing cancer therapy, negatively impacting quality of life, and potentially postponing or disrupting treatment. While oncology team members seek to deliver optimal oral care, evidence-based management of oral complications and knowledge in the provision of oral care poses a challenge to attaining satisfactory reductions in complications such as oral mucositis, xerostomia and rampant dental caries.

METHODS A cross-sectional, random sample (N=2,000) of members of the Oncology Nursing Society were surveyed via a Web-based questionnaire to identify knowledge of oral care, oral health management practices and factors influencing provision of oral care for patients being treated for cancer. Frequencies were calculated for demographic and categorical data. Education, years of experience, and comfort levels were measured and correlated to identified subscales of knowledge, management of oral complications, and use of evidence-based protocols for high-risk patients.

RESULTS Over 75% of respondents reported *some to little* oral health content in their primary education. Significant correlations were found between the three subscales and the variables *years of experience* and *comfort levels* ($p \leq 0.05$). Use of evidence-based protocols and oral management increased with levels of oral healthcare education and years of experience ($p \leq 0.05$).

CONCLUSION Results of this investigation suggest a need for the inclusion of more education in general nursing programs addressing oral healthcare of cancer patients, as well as continuing education for practicing oncology professionals. Additionally, findings support the inclusion of dental hygienists, oral health/disease prevention experts, as members of interdisciplinary teams caring for cancer patients.

Implications for Interprofessional Practice

- Emphasizes the presence of specialized oncology members with knowledge and training in oral health, or utilizing an oral health liaison, as being crucial for the implementation of evidence-based oral management of oncology patients.

- Describes a need to increase access to and use of current evidence-based guidelines and validated assessment tools for oral complications, as well as modalities for management of oral complications.

- Provides published oral management guidelines to assist oncology professionals in the provision of standardized care for patients.

- Stresses importance of knowledge of oral health throughout all phases of cancer therapy and the use of guidelines for oral care among oncology teams as critical to the overall management of these patients.

Introduction

Assessing knowledge of oral health and practice of evidence-based guidelines among oncology teams is crucial in oral management of oncology patients (Barker et al., 2005; McGuire, 2003; McGuire, Johnson, & Migliorati, 2006; Southern, 2007; Vissink et al., 2003). Annually, over one million Americans are diagnosed with cancer and 40% of patients receiving systemic chemotherapy develop oral problems (American Cancer Society, [ACS], 2013; National Cancer Institute, [NCI], 2013; National Institute of Dental and Craniofacial Research, [NIDCR], 2011). Patients undergoing cancer therapy are immediately at risk for short- and long-term oral complications when treatment begins (ACS, 2013; NIDCR, 2011). Oral complications can be profound, negatively impacting quality of life, and potentially postponing or disrupting cancer therapy (ACS, 2013; NIDCR, 2011). Short- and long-term complications associated with head and neck radiotherapy and/or systemic chemotherapies include oral mucositis, a painful inflammation and ulcerations in the oral tissue; xerostomia, severe dry mouth resulting from reduced or absent saliva flow; trimus, a condition limiting opening of jaw with painful muscle spasms; rampant dental caries, tooth decay that affects multiple teeth and progresses rapidly ; and osteoradionecrosis, a necrosis of the jaw bone following radiation (ACS, 2013; NCI, 2013; NIDCR, 2011; Trotti et al., 2003).

Oral mucositis is a common complication among patients with cancer undergoing systemic chemotherapy and/or head and neck radiotherapy (Arora, Keerthilatha, Maiya, Vidysagar, & Rajeev, 2008; Stokman et al., 2006; Trotti et al., 2003). The Mucositis Study Group of the Multinational Association of Supportive Care in Cancer (MASCC) and International Society for Oral Oncology (ISOO) published guidelines for care of mucositis based upon a systematic review of the literature (Keefe et al., 2007). These guidelines are similar to those found in other cancer resources, such as those published by NCI and NIDCR. A systematic review by Keefe et al. (2007) concluded, depending on severity, mucositis can cause serious complications to a patient's ability to eat and maintain a healthy weight. The author also reported cancer treatment may be suspended or discontinued due to severity of mucositis (Keefe et al., 2007).

Xerostomia is another common short-term complication resulting from systemic chemotherapy, head and neck radiation, medication, and/or illness. It results from reduction of salivary output (chemical composition) and flow from salivary glands (Al Nawas & Grötz, 2006). In a clinical trial by Papas, Russell, Singh, Kent, Triol & Winston (2007) dramatic reduction of saliva was noted within the first weeks of high-dose systemic cytotoxic agents or head and neck radiotherapy (Papas et al., 2007). Without regular oral

assessment and preventive measures, xerostomia can be directly related to rampant dental caries. If xerostomia is not managed effectively, teeth can be destroyed in a matter of months and can lead to osteoradionecrosis if not addressed properly. (ACS, 2013; NCI, 2013; NIDCR, 2011; Shiboski, Hodgson, Ship, & Schiødt, 2007).

Literature Review

Oral health professionals have been identified in the literature as a valuable component to the oncology team (ACS, 2013; NCI, 2013; NIDCR, 2011). Their expertise in oral disease and health promotion can provide needed oral health evaluation prior to cancer therapy by addressing existing oral health issues which could impact cancer therapy, as well as through assessment/ treatment of oral complications (for example, see Figure 1) associated during and after completion of cancer therapy (ACS, 2013; Barker et al., 2005; Keefe et al.,

2007; McGuire, 2003; McGuire, Johnson, & Migliorati 2006; NCI, 2013; NIDCR, 2011; Öhrn & Sjödėn, 2003; Southern, 2007; Vissink et al., 2003). The role of the oral health professional may positively affect treatment outcomes for patients with various cancers, whether through direct patient care or educating oncology teams on evidence-based practices. Multidisciplinary approaches that include dental professionals have not been integrated into this population's total care (ACS, 2013; Barker et al., 2005; Keefe et al., 2007; McGuire, 2003; McGuire, Johnson, & Migliorati 2006; NCI, 2013; NIDCR, 2011; Öhrn & Sjödėn, 2003; Southern, 2007; Vissink et al., 2003).

In each phase of cancer therapy, patients need oral assessment, oral self-care education, and preventive therapy measures. Frequent oral assessments using evidence-based indices are recommended throughout cancer therapy (Keefe et al., 2007; NCI, 2013; NIDCR,

Figure 1
Ulceration and Pseudomembranous Mucosa
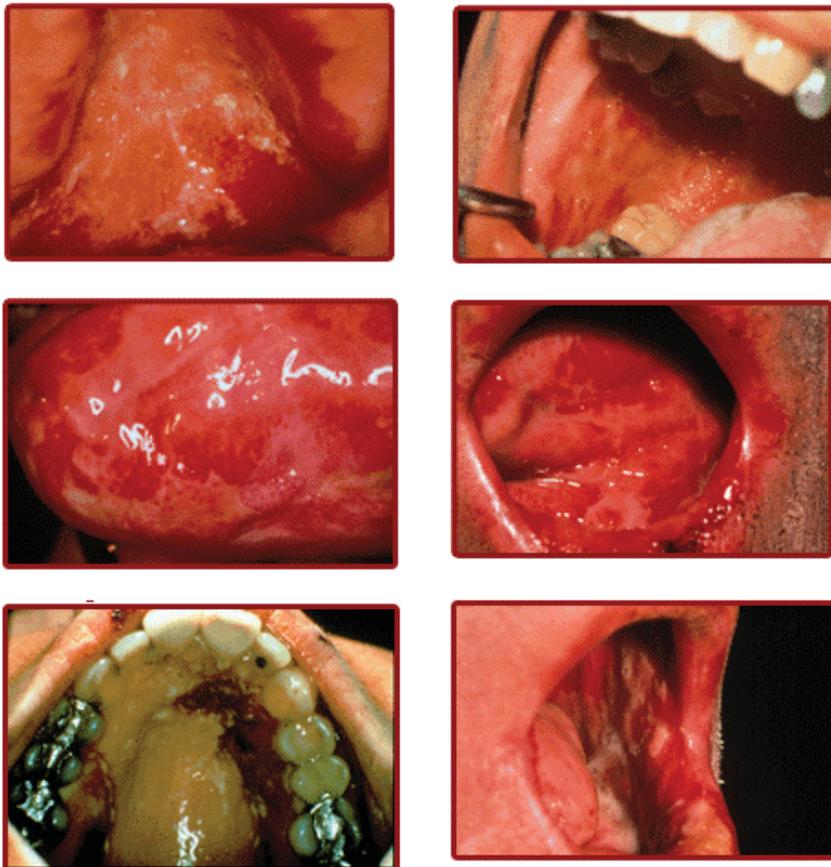
Public domain image from Hsiao, G., & Sonis, S. (2003). Oral mucositis. In M. B. Max & J. Lynne (Eds.), *Interactive Textbook on Clinical Symptom Research*. Bethesda, MD: National Institute of Dental and Craniofacial Research. http://painconsortium.nih.gov/symptomresearch/index.htm

2011; Trotti et al., 2003). Several oral indices have been included in published guidelines; however, all indices should document occurrence of oral complications and employ a scale to rate severity. A systematic review of interventions for the management of mucositis conducted by the Oncology Nursing Society (ONS) Putting Evidence Into Practice® (PEP) Group concurred with the need for use of valid and reliable assessment tools to improve comparison of interventions. This group also found evidence supporting oral mucositis management strategies and identified these techniques as promising approaches for future interventions (Harris, Eilers, Harriman, Cashavelly & Maxwell, 2008). Despite the availability of assessment tools and universal protocols, research has suggested oncology health care providers do not fully utilize these tools in oral management of oncology patients (McGuire, 2003).

Investigators in Sweden, The Netherlands, and the United States have conducted surveys among oncology staff to evaluate oral health knowledge level and patient management protocols related to oral complications of patients undergoing cancer therapy (Barker et al., 2005; McGuire, 2003; McGuire et al., 2006; Öhrn, Wahlin, & Sjödén, 2001; Öhrn, & Sjödén, 2003; Southern, 2007). Findings of research evaluating oncology nurses' knowledge of oral health indicated both professional nursing programs and continuing education (CE) courses needed to either add or extend their didactic/clinical content regarding oral health assessment and therapeutic strategies associated with cancer care (Öhrn, Wahlin, & Sjödén, 2001; Öhrn, & Sjödén, 2003; Southern, 2007). These educational experiences and introduction of evidence-based protocols are needed to keep professionals informed of current information and effective interventions to manage common oral complications (Barker et al., 2005; McGuire, 2003; McGuire et al., 2006; Öhrn, Wahlin, & Sjödén, 2001; Öhrn, & Sjödén, 2003; Southern, 2007).

A survey of nurses involved with cancer care in Ireland showed nearly half of respondents had received some educational content on oral healthcare/patient management during their primary nursing education. A large portion of respondents (43%), however, reported no education during their primary training regarding oral care related to cytotoxic agents or radiation therapy (Southern, 2007). In addition, Southern (2007) found nurses self-rated their knowledge about saliva substitutes, oral health status, and signs and symptoms of oral complications as poorest (*no knowledge*) on a 5-point Likert scale.

Three key principles regarding provision of oral care during cancer therapy have been identified for oncology teams: "1) recognizing oral care is medically necessary in patients with cancer; 2) collaborating with members of other healthcare disciplines; and 3) engaging in evidence-based practice to the fullest extent possible" (McGuire 2003, p.438). Moreover, McQuire (2003) found nurses' recommendations for high-risk management of oral complications were sometimes based on subjective evaluation and anecdotal knowledge; evidence-based modalities were not standard protocols in treatment of oral complications associated with cancer therapy.

The present study was designed to evaluate oncology team members': (a) education in and knowledge of oral disease/oral complications associated with cancer care based on didactic study within their professional or continued education; (b) patient management practices of oral complications during cancer care; (c) comfort level performing oral care for patients with cancer; and (d) knowledge/education, comfort levels, and oral management of complications based on demographic characteristics.

Methods

A Web-based survey was used to assess knowledge and educational levels regarding oral care, management practices related to oncology care for oral complications, and other influences affecting oral care of cancer patients by oncology nurses. The survey instrument used, *National Survey of Oncology Teams' Knowledge and Education about Oral Care in Cancer*, was developed and validated in Ireland by Southern (2007). The instrument was reviewed for this study by an oncology nurse in the U.S.A. for applicability of responses, and minor modifications were made in verbiage for American English and regional professional terminology. The revised questionnaire was pilot tested by a small convenience sample (*N*=8) of two oncology nurses and six registered dental hygienists (RDH).

The coded questionnaire contained 44 items related to oral health knowledge and education, evidence-based management of oral complications, evidence-

based management of patients at high risk of oral complications, comfort-level in examining and assessing oral conditions, and demographic characteristics of the respondents. Types of questions in the survey included 5-point Likert-type and closed-response multiple-choice items.

A cross-sectional, random sample of active members within the Oncology Nursing Society (*N*=2,000) was invited to participate. Inclusion criteria specified all participants be: a) a registered nurse (RN), RN with specialized oncology training, licensed independent practitioner (LIP), dietician, or oral health professional; b) directly involved with oral care of oncology patients; c) employed a minimum of 20 hours per month; and d) working for a minimum of one year.

Following approval by the University's Institutional Review Board (IRB), an invitation link to the survey was sent via e-mail directly from the ONS online database. The link directed respondents to a Web-based survey site where informed consent and the survey instrument (questionnaire) were available. Two follow-up emails were sent to non-respondents.

Data analyses

Statistical analyses included generating descriptive statistics (frequencies and percentages) for all items, and data were subsequently analyzed using factor analysis to guide the formation of subscales. Bivariate analyses (Pearson's Correlation Coefficient [2-tailed], Spearman's Rank Correlation Coefficient [2-tailed], and independent samples t-tests [2-tailed]) were conducted. These tests were used to assess strength and direction of relationships among the subscales, and between the subscales and the comfort level and demographic variables. Pearson's Correlation Coefficient explored correlations between the identified subscales and years of experience. Spearman's Rank Correlation Coefficient evaluated correlation of subscales and comfort levels in performing and educating oral complications and high-risk patient management associated with cancer therapy. The independent samples t-test was used to compare the subscale scores between those with and without oncology training. Exploratory factor analysis was performed to identify underlying subscales (such as knowledge of oral care) within the instrument. In addition to factor analysis, Cronbach's alpha was calculated to determine internal reliability of items

within the three subscales: oral health knowledge, evidence-based management of oral complications, and evidence-based management of high-risk patients by professionals; $p \leq 0.05$ was considered significant.

Results

A total of 113 surveys were completed and returned for a response rate of 6%. All of the 113 respondents were females. Of the 102 respondents who specified a profession, the sample included RNs, RNs with specialized oncology training, LIPs, and one RDH. Experience ranged from 1 to over 30 years, and respondents were drawn from all regions of the U.S. Demographic characteristics of participants are summarized in Table 1 (following page). Twenty-four ordinal scale items were analyzed for identification of constructs. Table 2 (page 7) shows the three constructs that were identified and questionnaire items associated with each construct. Cronbach's alpha analysis confirmed internal consistency reliability within the instrument (knowledge of oral care: 0.871; evidence-based management of oral complications: 0.870; evidence-based practice with high-risk patients: 0.820). Frequencies and percentages of responses from specific survey items within the three identified constructs are given in Table 3 (page 8). Pearson's correlation coefficient, as shown in Table 4 (page 9), identified significant linear correlations between the three constructs and *years of experience in oncology*. There were no significant differences in the mean subscale scores between those who did and did not have oncology training.

Statistically significant correlations were found between the constructs of knowledge of oral care and evidence-based management of oral complications (r=0.494; *n*=104; *p*<0.001) and knowledge and evidence-based management of high-risk patients (r=0.531; *n*=104; *p*<0.001). Significant correlations among constructs were also found between evidence-based management of oral complications and evidence-based practice with high-risk patients (r=0.606; *n*=111; *p*<0.001). Spearman's Rank Correlation showed no significant association between knowledge of oral health and education specific to cytotoxic agents and radiation. The second construct, evidence-based management of oral complications, was significantly associated with education regarding cytotoxic agents and radiation (r=0.286; *n*=104; *p*=0.003); however, no

Table 1

Numeric variables collected

Demographic Characteristics	Respondents (n=)	Percent (%)*
Employment Setting (*n*=102)		
• Both inpatient and outpatient	18	11
• Inpatient ward/settings	33	32
• Outpatient clinics	43	42
• Other	8	8
Age (*n*=103)		
• 20-39	26	25
• 40-59	67	65
• 60+	10	10
Years of Experience (*n*=103)		
• 1-4 yrs	14	14
• 5-9 yrs	22	21
• 10-15 yrs	20	19
• 16-20 yrs	9	9
• 21-24 yrs	12	12
• 25-29 yrs	15	15
• 30+ yrs	11	10
Employment Status (*n*=102)		
• Full time	97	95
• Part time	5	5
Continuing Education on Oral Health within last year (*n*=102)		
• < 1 hr	61	60
• 1-2 hrs	22	22
• 2-4 hrs	10	10
• 5-8 hrs	5	5
• > 8 hrs	4	4
Profession (*n*=102)		
• Licensed Independent Practitioner	11	11
• Oncology Nurse	76	74
• Registered Nurse	14	14
• Dental Hygienist	1	1
Region of the Country (*n*=103)		
• Midwest	32	31
• Northeast	25	24
• South	25	24
• West	21	20

Not all percentages total 100% due to participants' lack of response to some items

Table 2
Factor Analysis Identifying Constructs

Identified Constructs	Scale Items (Factor Loading >.3)	Mean Rating Score
Knowledge of Oral Care (*n*=104)	* 1. toothbrushing 2. oral rinsing 3. saliva substitutes 4. examination of oral cavity 5. cleaning dentures/partials 6. pain relief of the oral cavity 7. cleaning the oral mucosa	3.8
Evidence-based Management of Oral Complications (*n*=111)	** 1. How often are patients informed of oral complications associated with cancer treatment? 2. How often are patients informed of the complication - candidiasis? 3. How often are patients informed of the complication - mucositis? 4. How often are patients informed of the complication - infection? 5. How often are patients informed of the complication - pain?	4.3
Evidence-based Management of High Risk Patients (*n*=111)	** 1. To what extent are *high-risk patients* provided oral self care information? 2. To what extent are preventive recommendations performed with *high-risk patients*? 3. To what extent do you provide oral care recommendations to oncology patients with oral complications?	4.3

Likert Scale: 1=None; 2=Marginal; 3=Fair; 4=Good; 5=Excellent
**Likert Scale: 1=Never; 2=Seldom; 3=Some of the time; 4=Most of the time; 5=All of the time*

Table 3

Frequencies and Percentages of Responses within 3 Identified Constructs

Participants' Self-Rating of Knowledge Levels Regarding Oral Health	A Lot	Some	A Little	None	Don't Remember
Oral health education in professional training (n=106)	n=3 3%	n=38 36%	n=45 42%	n=3 3%	n=17 16%
Content on cytotoxic drugs and radiation therapy side effects in professional training (n=106)	n=4 4%	n=28 26%	n=41 39%	n=23 22%	n=10 9%
Oral health education in specialized oncology training program (n=100)	n=47 47%	n=42 42%	n=9 9%	n=1 1%	n=1 1%
Oral assessment indices used (n=94)	**OHRQoL**	**OHI**	**WHO (OMI)**	**None**	**Other**
	n=3 3%	n=2 2%	n=66 70%	n=19 20%	n=4 4%
Evidence-based Management of Oral Complications	**Always**	**Most**	**Some**	**Seldom**	**Never**
How often patient is informed about candidiasis (n=102)	n=33 32%	n=31 30%	n=27 26%	n=10 10%	n=1 1%
How often patient is informed about mucositis (n=101)	n=53 52%	n=40 40%	n=7 7%	n=1 1%	n=0
How often patient is informed about oral infection (n=103)	n=43 42%	n=43 42%	n=13 13%	n=4 4%	n=0
How often patient is informed about oral pain (n=101)	n=42 42%	n=46 46%	n=12 12%	n=1 1%	n=0
Oral Health Management Practices with High-Risk Patients	**Always**	**Most**	**Some**	**Seldom**	**Never**
Examination of oral cavity (n=101)	n=13 13%	n=37 37%	n=20 20%	n=30 30%*	n=1 1%
Provision of oral self-care instructions (n=103)	n=52 50%	n=29 28%	n=17 17%	n=5 5%	n=0
Assistance with oral self-care (n=103)	n=19 18%	n=2 2%	n=17 17%	n=35 34%	n=19 18%
Provision of preventive protocols (n=103)	n=42 41%	n=38 37%	n=16 16%	n=5 5%	n=2 2%
Satisfaction with Time Allowed for Oral Care (n=100)	n=7 7%	n=48 48%	n=32 32%	n=11 11%	n=2 2%

OHR Qol: Oral Health-Related Quality of Life; OHI: Oral Health Index;
WHO (OMI): World Health Organization (Oral Mucositis Index)

Table 4

Years in Oncology in Oral Care of Cancer Patients Correlated to Knowledge of Oral Care, Management of Oral Complications and High-risk Patients

Subscale	Correlation to Extent of Training
Knowledge of Oral Care (n=104)	r=0.209* p=0.033**
Evidence-based Management of Oral Complications (n=111)	r=0.215* p=0.023**
Evidence-based Management of High-risk Patients (n=111)	r=0.275* p=0.004**

*Pearson's Correlation Coefficient
**$p \leq 0.05$

significant correlation was found between the third construct of evidence-based practice with high-risk patients and education regarding cytotoxic agents and radiation. All three constructs: 1) knowledge of oral care (r=0.312; *n*=104; *p*=0.001), 2) evidence-based management of oral complications (r= 0.247; *n*=111; *p*=0.009), and 3) evidence-based practice with high-risk patients(r=0.342; *n*=111; *p*=<0.001) were found to be significantly correlated with comfort in discussing oral care and comfort in examining the oral cavity. Findings indicate as comfort levels of practitioners increased, both knowledge of oral care and evidence-based management of oral complications increased.

Discussion

Oral health professionals are not standard members of oncology teams, although their expertise in oral disease and health promotion could positively affect oral health of patients prior to cancer therapy, standardization of oral assessment tools, and evidence-based oral health management (Barker et al., 2005; McGuire, 2003; McGuire, Johnson, & Migliorati, 2006) Studies have indicated the importance of knowledge of oral health in all phases of cancer therapy and use of guidelines for oral care among oncology teams as being critical to the overall management of these patients (Keefe et al., 2007; NCI, 2013; NIDCR, 2011). Sound educational training in oral care protocols can provide an important foundation for total care (Barker et al., 2005; McGuire, 2003; McGuire, Johnson, & Migliorati, 2006; Southern, 2007; Vissink et al., 2003). Respondents reported their primary professional education provided minimal content regarding oral health. Furthermore, our findings indicate oral complications, specifically with cytotoxic drugs and radiation therapy, were minimally addressed in general professional programs; however, extensive content regarding oral health within specialized oncology education was reported by nearly half of responding oncology professionals, and an additional forty percent reported *some* content.

Published oral management guidelines, knowledge of oral care, and use of validated assessment tools can assist in the provision of standardized care for oncology patients (McGuire, 2003; NCI, 2013; NIDCR, 2011). The majority of respondents in this study reported oral assessment indices were useful, and most were using the World Health Organization Oral Mucositis Index (WHO OMI) for assessment of mucositis. Although not specifically addressed in this study, Southern (2007) reported a lack of training on how to use oral assessment tools in primary professional education. Twenty percent of respondents in this study were not using any form of oral assessment index to aid in the identification and management of oral complications.

Table 5 (below) presents an overview of validated oral assessment tools. These findings emphasize, while oncology team members are aware of assessment protocol recommendations, there may be a need for standardized courses or specialized training on how to implement evidence-based oral care practices into oncology settings. According to the ONS mucositis PEP group (Harris, 2008), CE for oncology nurses should include evidence-based oral assessment guides to help prevent, document, and/or manage oral complications from cancer treatment. See Table 6 (following page) for evidence-based recommendations for referral and oral management in cancer therapy. The inclusion of an oral health professional in an oncology team could provide direct patient care and educate other oncology team members on evidence-based guidelines and management of oral complications (Barker et al., 2005; McGuire, 2003; McGuire, Johnson, & Migliorati, 2006; Southern, 2007; Vissink et al., 2003).

Significant, direct associations were identified between management of oral complications and years of experience in oncology. This study's results show a direct association between respondents' self-reported knowledge of oral care recommendations/management and years of practice in an oncology setting. Although updates of oral care protocols through CE may be valuable for educating oncology healthcare professionals who have minimal specialized oncology training, research has shown it has not necessarily changed implementation of those protocols into practice (Bloom, 2005; Robertson & Jochelson, 2006). It is not surprising to see significant correlations between increased experience and incorporation of management protocols for oral complications; still over half of respondents were *seldom* to *never* assisting patients with their oral care.

This survey had a low response rate, as anticipated, in proportion to the total emails sent by the ONS despite repeated attempts made to increase response rate. Based on the organization's documented response rate history for surveys within their member database, the Director of Communications for the Association indicated low response was common with this professional population. According to Colbert, Diaz-Guzman, Myers, & Arroliga (2013) while popularity of online surveys has increased, overall response rates

Table 5
Validated Oral Assessment Tools

World Health Organization (WHO)

- **Oral Mucositis Assessment Scale (OMAS)**
  Primary indicators of mucositis were the degrees of ulceration and redness measured in specific sites in the mouth. Secondary indicators included oral pain, difficulty swallowing, and the ability to eat as assessed by the patient.

    Source: http://painconsortium.nih.gov/symptomresearch/chapter_17/sec7/cghs7pg1.htm

- **Oral Mucositis Index (OMI)**
  The OMI-20 consists of nine items measuring erythema, nine measuring ulceration, one measuring atrophy, and one measuring edema.

    Source: http://www.ncbi.nlm.nih.gov/pubmed/12449720

National Cancer Institute (NCI)

- **National Cancer Institute Common Toxicity Criteria (NCI-CTC)**
  Scoring Criteria includes more than 260 individual adverse events with more than 100 of these applicable to acute radiation effects.

    Source: http://ctep.cancer.gov/protocolDevelopment/electronic_applications/docs/ctcmanual_v4_10-4-99.pdf

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Table 6

Evidence-based Recommendations for Referral and Oral Management in Cancer Therapy

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National Institute of Dental Craniofacial Research (NIDCR)
http://www.nidcr.nih.gov/OralHealth/Topics/CancerTreatment/

Referral To Oral Health Professionals	*Oral Management in Cancer Therapy*
Before Cancer Treatment To treat existing oral disease prior to initiation of cancer therapy. **During Cancer Treatment** Planning and communication is important with oral health professionals. If dental work is needed, blood work is needed to evaluate: • platelet count • clotting factor • absolute neutrophil count **After Cancer Treatment** Every 4 to 6 weeks for 6 months following cancer treatment.	**Frequent intake of water** **Thorough oral hygiene** • Use extra-soft manual toothbrush **Quality Nutrition** • Avoid sugar candies & spicy/acidic foods **Mouth rinses** • Topical analgesics and anesthetics suspensions • ¼ tsp salt & baking soda in 1 qt. (omit salt with mucositis) **Fluoride application** • 1.1% Neutral pH sodium, *unflavored* • 0.4% Stannous (**Daily**:10 minute of fluoride in mouth trays or brush-on) **High-risk inpatient and outpatient oral assessment is needed**.

National Cancer Institute (NCI)
http://www.cancer.gov/cancertopics/types/oral

Referral to Oral Health Professionals	*Oral Management in Cancer Therapy*
Before Cancer Treatment To treat existing oral disease. **During Cancer Treatment** For treatment of pain or tooth infection (high-risk for oral complications). **After Cancer Treatment** To educate and manage long-term complications: • Xerostomia • Dental caries • Osteoradionecrosis	**Mucositis**: Sodium bicarbonate rinses, analgesics. **Infections**: Referral. **Salivary dysfunction**- Frequent water intake, salivary substitutes. **High-risk inpatient and outpatient oral assessment is needed**.

Clinical Guidelines by Multi-National Association of Supportive Care in Cancer (MASCC/ISOO)

Referral to Oral Health Professionals	*Oral Management in Cancer Therapy*
Develop multidisciplinary protocols. Frequent communication and referral to oral professional.	• Soft toothbrush • Morphine for mucositis pain • DO NOT use 0.12% chlorhexidine rinses or lozenges • Use radio protective agents, or salivary sparing techniques **Both high-risk and outpatient oral assessment is needed:** • To evaluate mucositis for severity & pain level.

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have decreased significantly over the past few decades. These authors also assert that the representativeness of the sample is much more critical than the low response rate (Colbert, Diaz-Guzman, Myers, & Arroliga, 2013) The response rate found in this study, though far from ideal, may reflect this trend or may reflect a lower response rate sometimes found with online surveys of medical professionals (8.7%; Aitken, Power, & Dwyer, 2008) and surveys seeking information about an organization/team (18.8%; Baruch & Holtom, 2008). While results of this study are not generalizable to the population of oncology nursing professionals, they do support results from earlier research studies related to nurses' knowledge, education, and practices regarding oral care management of oncology patients. Despite previously established internal reliability and content validity of the survey constructed by Southern (2007), analyses of responses from this study using the original instrument showed nine items that were either unclear or had no theoretically correct response. Should the original instrument be used in future studies, these items would need revision.

Conclusions

This investigation recognizes and supports the existing literature which describes a need to increase access to and use of current evidence-based guidelines and validated assessment tools for oral complications, as well as modalities for management of oral complications. This study also emphasizes the presence of specialized oncology members with knowledge and training in oral health or an oral health liaison as being crucial for the implementation of evidence-based oral management of oncology patients. It also sets the groundwork for the inclusion of licensed dental hygienists as members of oncology care teams. By the nature and content of dental hygiene education, licensed dental hygienists are already trained to assist, collaborate, and provide education in oral care for patients undergoing cancer therapy. Additional research is needed to examine whether increased knowledge and education of oral health among oncology teams positively impacts oncology patient outcomes. Furthermore, future studies could examine how technology or interactive CE courses might positively impact standardization of protocols among oral management of cancer therapy.

Acknowledgements

References

Aitken C., Power R., & Dwyer R. (2008). A very low response rate in an on-line survey of medical practitioners. *Australia and New Zealand Journal of Public Health*, *32*, 288-9. http://dx.doi.org/10.1111/j.1753-6405.2008.00232.x

American Cancer Society. (2013). Radiation therapy to the head and neck. Retrieved from http://www.cancer.org/Treatment/TreatmentsandSideEffects/TreatmentTypes/Radiation/UnderstandingRadiationTherapyAGuideforPatientsandFamilies/understanding-radiation-therapy-radiation-to-head-and-neck

American Cancer Society. (2009). Detailed guide: Oral cavity and oropharygeal cancer. Retrieved from http://www.cancer.org/docroot/cri/content/cri_2_4_1x_what_is_oral_cavity_and_oropharyngeal_cancer_60.asp

Arora, H., Keerthilatha, M., Maiya, A., Vidysagar, M., & Rajeev, A. (2008). Efficacy of He-Na laser in the prevention and treatment of radiotherapy-induced oral mucositis in oral cancer patients. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, *105*(2), 180-186. http://dx.doi.org/10.1016/j.tripleo.2007.07.043

Barker, G., Epstein, J., Williams, K., Gorsky, M., & Raber-Durlacher, J. (2005). Current practice and knowledge of oral care for cancer patients: A survey of supportive health care providers. *Supportive Care in Cancer*, *13*(1), 32-41. http://dx.doi.org/10.1007/s00520-004-0691-5

Baruch, Y., & Holtom B. (2008). Survey response rate levels and trends in organizational research. *Human Relations*, *61*(8), 1139–1160. http://dx.doi.org/10.1177/0018726708094863

Bloom, B. (2005). Effects of continuing education on improving physician clinical care and patient health: A review of systematic reviews. I*nternational Journal of Tech Assessment and Health Care*, *21*(3), 380-385. http://dx.doi.org/10.1017/S026646230505049X

Colbert, C., Diaz-Guzman, E., Myers, J., & Arroliga, A. (2013). How to interpret surveys in medical research: A practical approach. *Journal of Medicine*, *80*(7), 423-435.

Harris, D., Eilers, J., Harriman, A., Cashavelly, B., & Maxwell, C. (2008). Putting evidence into practice: Evidence-based interventions for the management of oral mucositis. *Clinical Journal of Oncology Nursing*, *12*(1), 141-152. http://dx.doi.org/10.1188/08.CJON.141-152

Keefe, D., Schubert, M., Elting, L., Sonis, S., Epstein, J., Raber-Durlacher, J.,…Peterson, D. (2007). Updated clinical practice guidelines for the prevention and treatment of mucositis. *American Cancer Society*. Retrieved from http://www3.interscience.wiley.com/cgi-bin/fulltext/114078093/PDFSTART

McGuire, D. (2003). Barriers and strategies in implementation of oral care standards for cancer patients. *Supportive Care in Cancer*, *11*(7), 435-441. http://dx.doi.org/10.1007/s00520-003-0466-4

McGuire, D., Johnson, J., & Migliorati, C. (2006). Promulgation of guidelines for mucositis management: Educating health care professionals and patients. *Supportive Care in Cancer*, *14*(6), 548-557. http://dx.doi.org/10.1007/s00520-006-0060-7

National Cancer Institute. (2013). Oral complications of cancer chemotherapy and head/neck radiation (PDQ®), health professional version. Retrieved from http://www.cancer.gov/cancertopics/pdq/supportivecare/oralcomplications/HealthProfessional

National Institute of Dental and Craniofacial Research. (2011). Oral complications of cancer treatment: What the oncology team can do. Retrieved from http://www.nidcr.nih.gov/OralHealth/Topics/CancerTreatment/OralComplicationsCancerOncology.htm

Öhrn, K., & Sjödén P. (2003) Experiences of oral care in patients with haematological malignancies or head and neck cancers. *European Journal of Cancer Care*, *12*(3), 274-282. http://dx.doi.org/10.1046/j.1365-2354.2003.00417.x

Öhrn, K., Wahlin, Y. B., & Sjödén P. O. (2001). Oral status during radiotherapy and chemotherapy: A descriptive study of patient experiences and the occurrence of oral complications. *Supportive Cancer Care*, *9*(4), 247-257. http://dx.doi.org/10.1007/s005200000214

Papas, A., Russell, D., Singh, M., Kent, R., Triol, C., & Winston, A. (2007). Caries clinical trial of a remineralising toothpaste in radiation patients. *Gerodontology*, *25*, 76-88. http://dx.doi.org/10.1111/j.1741-2358.2007.00199.x

Robertson, R., & Jochelson, K. (2006). Interventions that change clinician behavior: Mapping the literature. National Institute for Health and Clinical Excellence. 1-37

Shiboski, C. H., Hodgson, T. A., Ship, J. A., & Schiødt, M. (2007). Management of salivary hypofunction during and after radiotherapy. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, *103*(suppl 1), S66.e1-S66.e19. http://dx.doi.org/10.1016/j.tripleo.2006.11.013

Southern, H. (2007). Oral care in cancer nursing: Nurses' knowledge and education. *Journal of Advanced Nursing*, *57*(6), 631-638. http://dx.doi.org/10.1111/j.1365-2648.2006.04159.x

Stokman, M. A., Spijkervert, F., Boezen, H., Schouten, J., Roodenburg, J., & de Vries, E. (2006). Prevention intervention possibilities in radiotherapy and chemotherapy-induced mucositis-results of meta-analysis. *Journal of Restorative Dentistry*, *85*(8), 690-700.

Trotti, A., Bellm, L., Epstein, J., Frame, D., Fuchs, H., Gwede,C.,…Zilberg, M. D. (2003). Mucositis incidence, severity, and associated outcomes in patients with head and neck cancer receiving radiotherapy with or without chemotherapy: A systematic review. J*ournal of the European Society for Therapeutic Radiotherapy and Oncology*, *66*(3), 253-262. http://dx.doi.org/10.1016/S0167-8140(02)00404-8

Vissink, A., Burlage, F. R., Spijkervet, F. R., Jansma, J., & Coppes, R. P. (2003). Prevention and treatment of the consequences of head and neck radiotherapy. *Critical Review of Oral Biology and Medicine*, *14*(3), 213-225. http://dx.doi.org/10.1177/154411130301400306

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