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Oral education for nursing home staff: minimum data set 3.0

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Oral Education for Nursing Home Staff: Minimum Data Set 3.0.

A Thesis

Presented in Partial Fulfillment of the Requirements for the

Degree of Masters of Science

in

Dental Hygiene

in the

College of Graduate Studies

Eastern Washington University

by

Katie Pudwill

June 2013

Thesis Adviser: Rebecca L. Stolberg, RDH, MSDH

Thesis of Katie Pudwill Approved By:

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Rebecca L. Stolberg, GRADUATE STUDY COMMITTEE

_____ DATE_____
Ann O'Kelley Wetmore, GRADUATE STUDY COMMITTEE

_____ DATE_____
Jeanette Porter, GRADUATE STUDY COMMITTEE

MASTER'S THESIS

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Human Subjects Approval

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February 7, 2012

Katie Pudwill
203 Catalina Ave
Vermillion SD 57069

Dear Ms. Pudwill:

Concerning the following Study:
Our Study # 2012.008E
Protocol Title: Oral *Education for Nursing Home Staff Based on the Minimum Data set (MDS) 3.0*

The Avera Institutional Review Board reviewed the above listed protocol and accompanying study information. Your application has been examined and the research project does fall into one of the common rule exempt categories. *A Study granted exempt status is not subject to annual renewal requirements.*
Please note: exempt research will not be monitored by the IRB on an ongoing basis. Thus, there are no reporting or record-keeping requirements with the IRB after the original report has been accepted.

The determination of Exemption was based on the following common rule citation; "45 CFR 46.101(2)"
2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, if the information is gathered in such a manner that subjects cannot be identified either directly (such as if you use photographs, video tapes, or voice recordings) or indirectly through identifiers linked to individual.

NOTE: *Once your exempt study has been completed please provide the IRB with a* ***Final Report*** *and any findings to allow for closure of the study. Final reports may be filed with the IRB by completing the Continuing Review/Final Report form (Continuing Review Request) found on the Avera IRB web site at http://www.avera.org/experience/institutional-review-board/irbhome.aspx*

Please understand that any changes to this research study must be submitted to the Avera IRB, prior to implementation, in order to determine if the study still qualifies for exempt status. Do not hesitate to contact me directly at 605-322-4755 if you have questions about this decision or if you require additional information.

Respectfully yours,

Jovette Van Hoorn, CIM, CIP
Manager, Avera Institutional Review Board

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210 Showalter Hall, Cheney, WA 99004-2444
509-359-6567

TO: Ms. Katie Pudwill, Department of Dental Hygiene

FROM: Ruth A. Galm, EWU Human Protections Administrator RG

DATE: February 23, 2012

SUBJECT: Oral Education for Long-Term Care Facility Staff Based on the Minimum Data Set 3.0 (HS-3931)

Human subjects protocol HS-3931 entitled "Oral Education for Long-Term Care Facility Staff Based on the Minimum Data Set 3.0" and previously approved by the Avera IRB on February 7, 2012, is also approved by EWU as an exemption from federal regulations under CFR Title 45, Part 46.101(b)(1-6).

Student research qualifying for an exempt IRB review is valid for a period of one year. Thus, the end date of your approval is February 6, 2013. If subsequent to initial approval, the research protocol requires minor changes, the Office of Grant and Research Development should be notified of those changes. Any major departure from the original proposal must be reviewed through a Change of Protocol application submitted to the IRB before the protocol may be altered. Please refer to HS-3931 on future correspondence as appropriate as we file everything under this number.

Cc: HS-3931 file
Sarah Jackson, RPI
Graduate Office

Abstract

This research study is based on an educational module presented to nursing home staff addressing assessment criteria of the Minimum Data Set 3.0 (MDS) dental section, a tool used by staff to evaluate residents' overall health. Relationships were tested between educating nursing home staff on the dental section and accurate completion of the MDS; between educating staff on correct oral assessment and resulting subsequent referrals for dental treatment; and between dental education and staff perceptions regarding the provision of oral assessment and home care. MDS assessments for nursing home residents (N=176) were collected pre- and post-implementation of the educational module, showing an increase in oral conditions identified by nursing home staff but a decrease in total assessments completed. Referral rates were collected and statistically significant difference was found using McNemar's test (p=.0018) between the pre-implementation referral rate of 16% and post-implementation referral rate of 30%. Nursing home staff were given pre-implementation and post-implementation Likert surveys. Wilcoxon Signed Rank Test found the education module made them feel more comfortable performing oral assessments (p=.0009) and referring for subsequent dental treatment (p=.0313). These results suggest educating nursing home staff on identification of oral conditions and completing the MDS 3.0 dental section increases their knowledge and perceptions in providing oral assessments. Additionally, referrals to an oral health care provider may increase. Further longitudinal studies may determine best practices for educating nursing home staff to increase their ability to assess the oral cavity and provide appropriate measures to improve oral health of nursing home residents.

Acknowledgments

I would like to extend my extreme gratitude to everyone who supported me during the development of this thesis.

First I would like to thank my thesis committee for guiding me through the process of completing this research project. Sarah Jackson, my initial thesis advisor, was paramount in helping me develop my proposal. Rebecca Stolberg, my current thesis advisor, willingly took over as my first chair and has guided me through the statistical analysis of my final research results. Ann O'Kelley Wetmore, my second thesis chair, has taught me so much about the scientific writing style and APA formatting. Jen Porter, my third thesis chair and experienced nursing home administrator, has helped me understand nursing home management and the MDS.

Second, I would like to thank Avera for their permission and support of my research within their nursing homes. Not only did they allow me to conduct this research, but their employees were helpful and welcoming. Aireen Guzman, my statistician, helped develop my proposal and analyze my statistics. Jovette Van Hoorn graciously assisted me with the Avera IRB process.

Third, I would like to thank all of my family and friends for their support. This experience would not have been possible without the assistance of my wonderful parents, Ginger and Byron Pudwill.

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Chapter 1: Introduction

Introduction to Research Question

This research is based on the theory that educating nursing home staff about oral health screenings will improve compliance in the standard of care and increase referrals of residents with dental needs to dental professionals. The study is based on an educational program that addresses the assessment criteria of the dental section of the Minimum Data Set 3.0 (MDS), a tool used by nursing home staff to assess resident overall health. The MDS is an assessment tool used in nursing homes that participate in the federal funding programs Medicaid and Medicare, which the majority of nursing homes do. It is currently in its 3rd version, and it began in 1990 (J. Porter, personal communication, 2011). It addresses the resident's functional capabilities in all aspects of health care and is used to manage the medical treatment and physical care provided to residents by physicians and other staff (Centers for Medicare and Medicaid Services, 2011). This study addresses the need for more efficient and appropriate handling of the dental needs of residents. This chapter presents the background of the topic, the purpose and relevance of this information, and an introduction to the methodology of the study.

Background of Study

Oral care in nursing homes has been a topic of research and debate for many years. There are many considerations such as observations of residents' oral self-care, staff roles and responsibilities for providing oral care when residents are unable, and residents' refusals of oral care. Another consistent problem is the lack of referral for timely and appropriate dental treatment, whether due to finances or failure to recognize

the problem (Miegel & Wachtel, 2009). These considerations all contribute to the need for intervention in the nursing home setting.

There is a risk that the aforementioned problems will continue as long as they are not addressed in an efficient and applicable manner. With limited funds, understaffing, and minimal resources for nursing home staff, it is important that dental treatment and oral care be time efficient and affordable (Miegel & Wachtel, 2009). This is especially important with the growing number of elderly residents moving into nursing homes. An increasing aging population requires that nursing homes address dental health in order to minimize and prevent dental disease and provide expedient treatment for dental problems (Miegel & Wachtel, 2009; Finkelstein, 2011; Fitzpatrick, 2000).

In order to create a workable and sustainable solution, the solution needs to address these setbacks while still implementing an oral regimen that meets the standards of care and needs of the residents. The question becomes: Who is responsible for implementing and overseeing this solution? Wårdh, Hallberg, Berggren, Andersson, & Sörensen (2003) found nursing home staff felt they had inadequate dental education, that oral care was undefined and not based on systematic information, and oral health care was not their responsibility alone. Nursing home administration may have the authority to mandate such protocols but without the support of nursing home staff, implementation may be an issue.

Ideally, dental professionals would be very active in the oral care and treatment of nursing home residents. However, this is rarely the case due to state regulations on dental hygiene practice laws, busy dentist schedules, and limited resources in a nursing home setting. A literature review conducted by Miegel and Wachtel (2009) outlined the

lack of communication and leadership in the dental profession and shows the frustration of nurses with dental support. Lack of training and education was cited by a group of nurses as a barrier to delivery of oral care, along with a desire to have instruction from a dental professional (Fitzpatrick, 2000). This information may be the foundation for the development of a tool to be used in nursing homes for referrals, treatment planning, and conducting oral hygiene procedures.

It is important for dental professionals to work with nursing homes and provide them with resources and general knowledge of dental conditions and treatments (Fitzpatrick, 2000). Interprofessional treatment of health conditions is a growing movement evident in new medical trends. Dental professionals can help nursing home staff assist residents in making the most informed decisions when addressing their oral health care. This also supports the expectation of the Center for Medicare and Medicaid Services for evidence-based work to be used as the basis for the facility's tools and plans in evaluating their overall care process (J. Porter, personal communication, 2011; & Centers for Medicare and Medicaid Services, 2011). The goal is to ultimately develop a standardized and cost efficient method to document and treat oral disease (Miegel & Wachtel 2009). Using the MDS would be a cost effective solution because it is a standard and mandated documentation system in any federally funded nursing home and familiar to nursing home staff.

Statement of Problem

Many research articles show the lack of attention to oral health care in nursing homes (Coleman & Watson, 2006; de Mello, Schaefer, & Padilha, 2009; Fitzpatrick, 2000; Forsell, Sjogren, & Johansson, 2009; Miegel & Wachtel, 2009). As the elderly

population in nursing homes increases, oral health care needs to be spotlighted because current methods are not proving to be effective (Cai, Salmon, & Rodgers, 2009). This is especially important with regard to proper nutrition, the ability to ward off infections, and prevention of diseases, such as aspiration pneumonia and diabetes, that are associated with dental problems (Taylor, Loesche, & Terpenning, 2000).

Research Hypotheses:

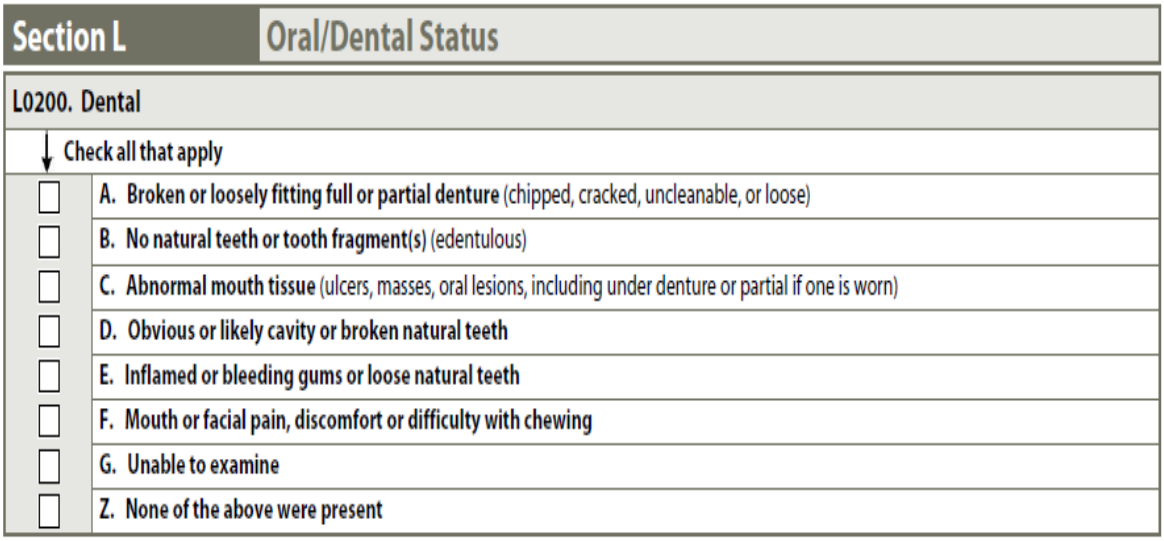
1. There is a relationship between educating nursing home staff on the dental section of the MDS and accurate completion of MDS assessments.
2. There is a relationship between educating nursing home staff on how to perform an oral assessment and identify oral conditions and subsequent referrals for dental treatment.
3. There is a relationship between dental education and nursing home staff perceptions regarding the provision of oral health assessments and oral home care.

Significance of the Study

The significance of this study is the potential of determining a solution to the lack of oral care in nursing homes by focusing on methods that are affordable, effective, and applicable. By using the MDS to identify oral problems and needs, referrals can be made to the appropriate provider and nursing home staff time would be used more efficiently. There is no additional cost to using the MDS; it is a tool that is already in place. The MDS education given to the nursing home staff provided knowledge on how to apply the information from the MDS to better treat the oral needs of residents.

Overview of Methodology

This quantitative study was conducted in two nursing homes in Sioux Falls and Yankton, South Dakota that utilize the MDS for assessment to support Medicare and Medicaid reimbursement. The MDS will be explained in further detail in the Methodology chapter of this thesis. The oral section of the MDS, as seen in Figure 1, includes various areas of oral health such as denture fit and function and status of teeth and oral tissues.



Section L	Oral/Dental Status
L0200. Dental	
↓ Check all that apply	
☐	A. Broken or loosely fitting full or partial denture (chipped, cracked, uncleanable, or loose)
☐	B. No natural teeth or tooth fragment(s) (edentulous)
☐	C. Abnormal mouth tissue (ulcers, masses, oral lesions, including under denture or partial if one is worn)
☐	D. Obvious or likely cavity or broken natural teeth
☐	E. Inflamed or bleeding gums or loose natural teeth
☐	F. Mouth or facial pain, discomfort or difficulty with chewing
☐	G. Unable to examine
☐	Z. None of the above were present

Figure 1. MDS oral assessment section.

Within each nursing home, pre-implementation data was taken, including the MDS values of the most recent dental exam for each resident, rate of referral for all residents, and a survey measuring the perceptions of nursing home staff towards the MDS education and oral health care. The nursing home staff at each facility received an oral health educational program that included a decision tree based on the MDS 3.0 items and guidance on recommended treatment based on findings. After education, data collection was conducted once a month for three months to insure that every chart was reviewed

following implementation to measure accuracy of the MDS dental section and referral rate. In addition; a post-implementation survey was repeated at the completion of data collection.

Definitions

Minimum Data Set (MDS) 3.0 – a tool used in nursing homes for assessment of residents designed to address all aspects of health care, and used to assist facilities in planning treatment and daily care for residents (Centers for Medicare and Medicaid Services, 2011).

Activity of Daily Living – basic skills that allow people to care for themselves physically, i.e. bathing, dressing, and eating (Encyclopedia of Nursing and Allied Health, 2006).

Instrumental Activity of Daily Living – skills that allow a person to function successfully in home, work, and social environments, i.e. paying bills, shopping, taking medication (Encyclopedia of Nursing and Allied Health, 2006).

Edentulism – the loss of teeth, the condition may refer to complete tooth loss or partial tooth loss (Wilkins & Wyche, 2008).

Gingiva – informally known as the "gum," the surrounding epithelial tissue of the teeth and bone (Wilkins & Wyche, 2008).

Nursing Home Staff – all staff within nursing home that provides nursing care, (registered nurse, licensed practical nurse, certified nurse's assistant).

Oral Mucosa – tissue lining of the oral cavity composed of mucous membranes (Wilkins & Wyche, 2008).

Oral Self Care – residents' ability to clean their mouth without assistance.

Periodontal Disease – bacterial infection of the periodontium (bone and surrounding tissues) that can cause bone loss, tooth mobility, and premature tooth loss (Wilkins & Wyche, 2008).

Standards of Care – standards nursing home staff utilize to address resident oral health needs, defined in Table 1 (O'Connor, 2010).

Toothette – a sponge swab used in hospital-type settings for oral hygiene and moisturizing of oral tissues

Table 1

Standards of Care for Geriatric Patients (O'Connor, 2010).

Standard	Definition
Assessment	Should be done daily and include assessment of all oral structures and any abnormalities documented.
Dependent Mouth Care of Edentulous Patient	Remove dentures if applicable and brush inside and outside of denture, brush patients tongue and seat dentures, and apply lip moisturizer.
Dependent Mouth Care of Patient with Teeth or Partial Denture	Remove partial denture and clean same way as denture, brush teeth and tongue, and apply lip moisturizer.
Assisted/Supervised Care	Assessment of capability, provide assistance as needed and provide residents with oral health tools needed for self-care.

Summary

Overall, the purpose of this research was to improve the way oral care is approached in nursing homes and open the lines of communication between dental professionals and nursing home staff. This study was intended to facilitate the

implementation of oral care in nursing homes by means that are applicable to everyday practice. Utilizing an assessment tool that is easy to use and understand has the potential to improve the chances of compliance in all areas of oral care. If effective, implementation of study results may lead to an increase in referral rates of needed dental treatment and assist nursing home staff in planning daily oral care.

Chapter 2: Review of Literature

Overview of Research

Oral health care and the importance of oral health, as it relates to the human body, have become increasingly influential in the United States in the past few years. Researchers have shown there are connections between the mouth and the rest of the body (Adachi, Ishihara, Abe, & Okuda, 2007; Bailey, Gueldner, Ledikwe, & Smiciklas-Wright, 2005; Miegel & Wachtel, 2009; Fitzpatrick, 2000). Periodontal disease has been linked to diabetes and cardiovascular disease, and great measures have been taken to inform the public of the importance of maintaining oral health (Finkelstein, 2011; Genco, Offenbacher, & Beck, 2002; Genco & McMullen, 1982; Shay, 2002; Santacroce, Carlaio, & Bottalico, 2010). As people age, it becomes more critical to keep the mouth clean and free of infection (Finkelstein, 2011, Adachi et al., 2007; Fitzpatrick, 2000). For this reason, it is important for healthcare providers to understand who can and cannot take care of their own teeth and mouth, and how to assist those who cannot.

There is limited knowledge or agreement among nursing home caregivers about who determines the amount and type of oral health care given to a long-term care resident (Miegel & Wachtel, 2009; de Mello et al., 2009; Bailey et al., 2005; Fitzpatrick, 2000;). A current literature review shows there is a lack of support from the dental profession to incorporate protocols for long-term care facilities (Miegel & Wachtel, 2009). Most of the research done to determine the oral health care of long-term care facilities is frequently self-reported by nursing home staff. This causes some discrepancy about who is actually performing these duties and why there are such differences in the reporting of care

provided as it relates to poor oral health status of residents (Miegel & Wachtel, 2009). Without proper training, it may be difficult to determine if a resident has ineffective oral self-care and direct intervention as needed. Also, if it is verified an intervention is required through the observation of inadequate or ineffective oral self-care; deciding how to provide care can be a daunting task for nursing home staff without prior training. Developing an individualized treatment plan for each resident is necessary because each resident's needs are different, and to do this all health care providers should be included in training and application of oral health care.

Related or Theoretical Frameworks and Supporting Research

Importance of Oral Health Among Elderly. As awareness of the health connection between the body and mouth grows, maintenance of natural dentition and oral hygiene has a huge impact on the overall quality of life (Bailey et al., 2005; Fitzpatrick, 2000; Finkelstein, 2011). *Streptococci Mutans*, a bacteria that lives solely in the oral cavity and is one of the main bacteria linked to dental caries, causes at least 27% of bacterial endocarditis infections (Shay, 2002). Edentulism has been shown to negatively affect nutrition, social interaction, and behavior (Rivett, 2006).

The effect of periodontal disease on the rest of the body is known to have important implications to the overall health of the body (Bailey et al., 2005; Genco et al., 2002; Genco & McMullen, 1982; Page, 1998; Santacroce et al., 2010; Shay, 2002). There is an established link between periodontal disease and cardiovascular disease (Genco et al., 2002; Santacroce et al., 2010;), as well as with periodontal disease and diabetes (Genco & McMullen, 1982; Santacroce et al., 2010;). Periodontal disease has now been added as the sixth main complication of diabetes (Shay, 2002). Evidence is

also showing a link between poor oral hygiene and pneumonia (Taylor et al., 2000; Paju, & Scannapieco, 2007).

Pneumonia (an infection of the lungs) and influenza (a viral infectious disease), together are the leading causes of death in residents of long-term care facilities (Paju, & Scannapieco, 2007). Research is demonstrating that pneumonia could be caused by bacteria found in oral biofilm (Paju, & Scannapieco, 2007). There are two different types of pneumonia; the community acquired type caused by certain bacteria, and the nosocomial pneumonia type only seen in residents or patients of hospital settings. Research has shown that unlike community-acquired pathogens such as *Streptococcus pneumoniae, Haemophilus influenzae*, and *Mycoplasma pneumonia* bacteria that routinely colonize in the oropharynx, *Pseudomonas aeruginosa* and *Staphylococcus aureus* only colonize in nursing home or hospital settings and cause pneumonia that is more resistant to treatment (Paju, & Scannapieco, 2007).

One type of pneumonia directly related to oral pathogens is aspiration pneumonia. As people age, gag and swallow reflexes diminishes causing aspiration of bacteria found in the oral cavity and gastric secretions into the lower respiratory tract (Yamaya et al., 2001). The overuse of antibiotics triggers opportunistic bacteria to outnumber the normal flora of the oral cavity and in turn causes infections, thus optimal oral hygiene is one of the best preventions for aspiration pneumonia (Yamaya et al., 2001). Treatments for the loss of gag reflex, such as increasing dopamine through an intravenous administration of levodopa are currently being examined, and show promising advancements in improving gag reflex (Yamaya et al., 2001).

Professional Oral Hygiene Care (POHC) is a term used by researchers in Tokyo who studied the effectiveness of intervention by a dental hygienist to decrease the levels of aspiration pneumonia in long-term care facility residents (*N*=92) (Adachi et al., 2007). In these studies, a control group and a sample group were used to demonstrate how POHC can be beneficial in decreasing the bacteria load of the oral cavity and therefore prevent aspiration pneumonia. The group(*n*=40) that received POHC had fewer incidences of fevers and only 2 out of 10 deaths in this group were caused by aspiration pneumonia (Adachi et al., 2007). In comparison, the control group (*n*=48) had 15 deaths total, 8 of which were caused by aspiration pneumonia (Adachi et al., 2007). A significant decrease (*p*=0.008) in the number of pneumonia causing pathogens was seen when dental hygienists performed POHC in a nursing home setting (Adachi et al., 2007).

Diabetes causes delayed healing, but evidence has shown other factors associated with diabetes could cause a diabetic to be at a higher risk for periodontal disease (Santacroce et al., 2010; Shay, 2002; Taylor et al., 2000). Diabetes can cause alterations in crevicular fluid of the gingival sulcus, collagen metabolism, subgingival flora, and host defenses (Shay, 2002; Taylor et al., 2000). Not only does diabetes contribute to periodontal disease but Santacroce et al. (2010) explains how periodontal disease could affect the management of diabetes. It is well known that infections in the body hinder the ability for diabetics to control their blood sugar. The relationship between the periodontal pocket and bacteria in the mouth is unique because the epithelium within the pocket is non-keratinized tissue that is highly vascular, thus providing a direct pathway for bacteria to enter the cardiovascular system which increases chances of bacteremia (bacteria in the blood) and endotoxemia (endotoxins from bacteria in the blood)

(Santacroce et al., 2010). The presence of bacteria and their endotoxins in the blood increases the serum proinflammatory cytokines that alter the metabolism of lipids and cause hyperlipidemia and hyperglycemia (Santacroce et al., 2010).

Nursing Home Admissions and Treatment Planning. As the baby boomer generation ages the likelihood of a surge in nursing home population increases as well. Two types of models, the multivariable logistic regression and the Cox proportional hazards model, have been used to predict and compare the patterns of nursing home admissions (Cai et al., 2009). It is especially important for social workers to prepare for the transition of moving this population into appropriate care settings.

Long-term care placement in residential care depends on certain scores that rate how well the person performs Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs). According to the Occupational Therapy Practice Framework Domain and Process (OTPFDP) (2002), brushing teeth, flossing gums, and the cleaning and removal of dentures are considered to be a part of the *personal hygiene and grooming* category of ADLs. The IADL category of *health management and maintenance* includes the ability to maintain health routines to prevent diseases, which could involve making regular trips to the dentist for prevention of oral infections and diseases (OTPFDP, 2002).

Many health professionals are involved in the care plan of a resident upon admission into a long-term care facility, each focusing on areas of their specialty. Along with some of the traditional roles such as doctors, nurses, certified nurse's assistants (CNA), and licensed practical nurses (LPN), other professionals are paramount in determining the ability of a resident to do certain tasks. Physical therapists, for example,

focus on the ability of a resident to move functionally and assist with issues such as training muscles, using walkers, and modifying the environment to make it safer for the resident (Encyclopedia of Nursing and Allied Health, 2006). Similarly, occupational therapists focus on the ability of a resident to perform functions vital in everyday life. They work with residents and adapt tools to make it easier to reach, grasp, and extend so they can continue independence when dressing or eating (Encyclopedia of Nursing and Allied Health, 2006). Since hand function plays a key role in the' ability of residents to brush their teeth and care for their mouth, impaired hand function directly affects their oral health (Padilha, 2007).

Just as other professionals assess the ability of residents to dress, bathe, and ambulate properly, dental professionals should assess the ability of residents to properly care for their mouth. As the number of residents increases so does the number of people retaining their natural teeth; this is due to the increasing awareness of the American public about the importance of a healthy mouth and the acceptance of fluoridated water into communities (Bailey et al., 2005). One of the biggest problems facing long-term care facilities in the future is dealing with the changing needs of residents who require more oral health care to maintain the health of their natural teeth, not just their dentures (Bailey et al., 2005). While care of dentures is relatively simple, a more detailed and time-consuming routine of oral hygiene is necessary for optimum treatment of a natural dentition (Bailey et al., 2005). Also, an in-depth knowledge of the oral cavity is paramount in detecting pathologies that need to be examined by a dentist (Bailey et al., 2005). Knowing what healthy gingiva and oral mucosa looks like could be the key in etecting oral disease faster and result in quicker treatment by a dentist or dental hygienist.

As people age their ability to efficiently remove plaque from the oral cavity decreases and causes a higher risk for tooth decay and periodontal disease (Bailey et al., 2005; Padilha, 2007; Fitzpatrick, 2000; Miegel & Wachtel, 2009). Thus, residents who need assistance with daily oral hygiene need to be recognized and assessed by professionals who can accurately determine whether or not oral hygiene is being performed at a sufficient level (Bailey et al., 2005; Miegel & Wachtel, 2009; Fitzpatrick, 2000). When intervention is needed, a dental hygienist would be well equipped to adapt tools for easier cleaning and assist residents in different techniques of oral health care (Bailey et al., 2005).

Responsibilities of Oral Health in Long-Term Care Facilities. When it comes to providing oral care to residents, several studies show there are some misunderstandings about who is responsible for organizing and carrying out this treatment (Fitzpatrick, 2000; Miegel & Wachtel, 2009). World-wide, there are a limited amount of protocols or standards for oral care in nursing homes. Different countries are using different types of tools and methods to measure what type of oral health care is being delivered and whether or not it is meeting the needs of the elderly population in long-term care facilities.

One of the most complex and detailed studies recently conducted in New York state involved the observation of a group of CNAs in five different nursing homes to determine the frequency, type, and extent of oral health care being delivered to residents. Researchers observed the morning routines of a sample of 67 residents and 41 CNAs while looking for certain standards set by a group of nurses, dentists, and dental hygienists (Coleman & Watson, 2006). These eight standards included: wearing new

clean gloves for each resident; asking residents about pain or concerns and assessing oral health status; brushing with a full sized toothbrush and fluoride toothpaste instead of a toothette; brushing for full two minutes, brushing the tongue, flossing, rinsing with water, and rinsing with mouthwash (Coleman & Watson, 2006).

The results of the Coleman and Watson study were very insightful in the realm of oral health care in nursing homes and gave an insider view into the morning routines of caregivers. The average time for the morning routines of each resident ranged from around ten to fifty minutes and observations of these routines revealed that only 11 out of the 67 residents involved in the study received any oral care at all, which is approximately 16% (Coleman & Watson, 2006). The total time for the 11 residents who received oral health care averaged about one minute and twelve seconds; 5 of the 11 residents had assistance from a CNA to approximate 16 seconds of brushing, and 6 of the 11 residents brushed their own teeth for an average of 39 seconds (Coleman & Watson, 2006). Each resident who did brush their own teeth was prompted to stop before they had finished on their own and offered to rinse afterward with water, never mouthwash (Coleman & Watson, 2006). Out of the remaining residents who did not brush, eight of them had their teeth swabbed using a toothette (Coleman & Watson, 2006). None of the CNAs changed their gloves before assisting with oral health care, including the eleven residents who received help with brushing and the eight residents who received help with swabbing, and no floss was present (Coleman& Watson, 2006).

A study done conducted by de Mello et al. demonstrated that while oral health care was on the list of daily activities the caregivers (N=36) were responsible for, most supervisors felt oral health was the responsibility of the resident themselves or family

members so daily routines were not regulated or encouraged (2009). The same study displayed some frustration over lack of cooperation between family members and caregivers about the needs of residents (de Mello et al., 2009). De Mello's study suggested standardization of oral health care and treatment by dental professionals and other caregivers would create a more open and informed atmosphere when dealing with residents and family (2009).

In Australia, a team of nurses attempted to implement six criteria based on a computer generated program to audit dental care (*N*=50) in four area long-term care facilities (Georg, 2006). The criteria included documentation of each: a dental screening upon admission into the facility; a dental screening every 12 months by a dentist; nursing home staff training within the last 12 months; toothbrush and fluoride toothpaste for every dentate resident; removal and cleaning of every removable dental appliance or prosthetic; and resident's identification on each denture (Georg, 2006). The best compliance was the placement of toothpaste and a toothbrush into each room at 80-100% (Georg, 2006). However, compliance with other criteria was not as positive. Dental screenings upon admission was the worst compliance out of the group at 0% compliance across all four sites (Georg, 2006). Other criteria did not show much improvement, with yearly dental assessments and nursing home staff training lower than 10% compliant, and regular removal and cleaning of dentures lower than 60% compliant (Georg, 2006). Labeling of dentures had the biggest range between the four sites, ranging from 6.7% to 36.4% (Georg, 2006). After the initial audit, project leaders wanted to go back and re-audit the sites. However, due to no change in management procedures, only cleaning and removal of dentures and labeling dentures were re-audited (Georg, 2006). Despite some

increase and decrease in site specific compliance, the second round of auditing showed an overall statistically significant increase in compliance ($\chi 2 = 80.20$ $p \leq 0.001$). (Georg, 2006).

This study conducted by Forsell et al. had a large sample (*N*=22,453) and had a good representation of the elderly population in three different regions (Forsell et al., 2009). Dental hygienists had the role of determining which residents needed assistance with oral care (based on the aforementioned scale) and whether or not an intervention was required. This Swedish study allowed dental hygienists to go into nursing homes and rate oral hygiene care on a scale from one to four; one representing *no biofilm present on teeth and dentures*, two representing *traces of biofilm present in hard to reach areas*, three representing *moderate (visible) amounts of biofilm present*, and four representing *gross amounts of biofilm and food debris present in the oral cavity* (Forsell et al., 2009). Of the entire sample size of all three regions, a large number, approximately 77% of the residents, had inadequate oral hygiene and needed assistance from nursing home staff, while only 6.9% of residents were receiving assistance (Forsell et al., 2009).

Representative samples of nurses in the UK (*N*=364) and Scotland (*N*=48) have been surveyed and findings revealed there is little collaboration among nursing home staff regarding oral care of the elderly (Fitzpatrick, 2000). One of the main reasons is because the nursing home staff feels dental care should be common sense and training would be a waste of time (Fitzpatrick, 2000). However, most of the nursing home staff working in long-term care facilities feels the oral well-being of residents is not being assessed or addressed (Fitzpatrick, 2000).

Low Priority in Overall Care Plan. Problems with nursing home staff compliance related to oral health care have much to do with lack of knowledge, experience, and time. A study that looked at reasons why oral health care was held at such a low priority among nursing home staff showed lack of cooperation by the residents seemed to be the most daunting aspect (Wårdh, et al., 2000). Respondents stated it was frustrating to try to get residents to open their mouths, and when they did the provider could not tell whether or not the resident was in pain, which in turn made nursing home staff feel like they were violating the resident (Wårdh, et al., 2000). A literature review done by Miquel and Wachtel (2009) explained that due to lack of funding, there were understaffed facilities thus leading to high workloads for care providers. Since nursing home staff had a high workload, not all provisions were being made to ensure standards of oral care were adequate (Miguel & Wachtel, 2009).

Another respondent-identified issue was nursing home staff normally received direct orders from a doctor stating what they needed to do; however, dental visits either occurred off site with no feedback or had little follow up which caused confusion about residents' needs (Wårdh, et al., 2000). Studies have compared the difficulty of giving oral health care to bathing. Bathing is one of the last things an elderly person wants help with due to the private nature of the task. Quality of care depends strictly and individually on the nursing home staff member providing the care. The most successful providers are those who have a genuine interest and patience with the elderly, thus having an empathetic demeanor and a creative insight into persuasive abilities (Wårdh, et al., 2000).

Collaborations for Effective Care Plans. An effective care plan has been shown to be a crucial part of the resident's oral care. In order to best treat each resident, individual assessments should be made of oral needs and met accordingly (Thai, Shuman, & Davidson, 1997; Connell, McConnell, & Francis, 2002; Pearson & Chalmers, 2004; Forsell et al., 2009; Fitzpatrick, 2000; Miegel & Wachtel, 2009). Connell et al. (2002) conducted a study that focused on developing care plans for residents with dementia. The study followed five residents and showed how nursing home staff of a nursing home altered each resident's environment and tools to make it easier for the resident to achieve optimum oral hygiene independently (Connell et al., 2002). The nursing home staff assessed the barriers to independence, creating a strategy for improvement, setting a goal, and modifying the environment to achieve the goal (Connell et al., 2002). While nursing home staff and residents were initially hesitant, at the end of the study both parties were extremely satisfied with the outcomes because of the increased efficiency and organization (Connell et al., 2002).

Two recently published indices assess the status of oral health in long-term facility residents; one validated assessment tool specifically for dementia patients and one for more independent residents (Pearson & Chalmers, 2004). The Brief Oral Health Status Examination (BOHSE) is used for dementia patients and is accepted for its validity for use in dementia cases (Pearson & Chalmers, 2004). The Activities of Daily Oral Hygiene (ADOH) is for more independent adults and measures self-care ability of residents (Pearson & Chalmers, 2004).

The assessment tool the present study addresses is the MDS, previously described in Chapter 1. There is limited research on the oral health section of the MDS; however

one study done by Thai et al. provided a glimpse of the issue that exists in the long-term care setting. The findings bring doubt to the quality of oral assessments being performed and the results of the assessments once completed. Out of 135 residents with a completed MDS assessment, only 3% of dental exams performed revealed broken, carious, or loose teeth, 3.2% of residents had plaque or debris in their mouth, 0.2% of residents had oral pain, and only 0.9% of residents had tissue inflammation (Thai et al., 1997). Although examinations were not done by dental professionals in this study to confirm the results, the data does not follow the typical pattern of oral conditions in long-term care facilities as demonstrated in other studies (Forsell et al., 2009; Fitzpatrick, 2000; Miegel & Wachtel, 2009). Also, the results showed no relationship between positive triggers on the dental exam (a 1 on the MDS meaning the condition exists) and dental visits or oral care intervention (Thai et al., 1997).

Interventions to Improve Oral Hygiene Care. There are different theories for how best to implement oral hygiene care into nursing homes. Several methods have been studied including oral care aides, dental hygiene education for nursing home staff and residents, and software programs to increase compliance (Wårdh et al., 2003; Munoz, Touger-Decker, Byham-Gray, & Maillet, 2009; Wyatt, 2009; Sjögren, Kullberg, Hoogstraate, Johansson, Herbst, & Forsell, 2010; Rivett, 2006). These studies show there are steps that can still be taken to increase oral health care.

A follow-up to the previously discussed study conducted by Wardh et al. (2000) was performed after some changes were made in the management of this nursing home. Nursing assistants (N=4) were selected to work as oral care aides and their time was only spent cleaning mouths of residents (Wårdh et al., 2003). The increased responsibility

helped the attitudes of the oral care aides; therefore, after some training and experience they felt confident cleaning the oral cavity and comfortable consulting a dentist when they found sores or suspicious areas in the mouth (Wårdh et al., 2003).

Another type of intervention is education programs for nursing home staff to teach them about oral diseases and available interventions. Research indicates educating nurses regarding oral health can improve documentation of oral conditions, increase dental follow-up visits, and increase the motivation of nurses to continue providing oral care if the education is done continuously (Munoz et al., 2009; Wyatt, 2009; Sjögren et al., 2010). These studies demonstrate different ways of incorporating dental hygiene education for nurses. This supports the ability of nursing homes to sustain improvements made in evidence-based training in the field of oral health (J. Porter, personal communication, 2011).

Munoz et al. (2009) study involved a curriculum including the importance of oral health, results of poor oral hygiene, regulations set by state and federal laws, oral components of nursing and nutrition assessment, and instructions for performing an extra-oral examination. A pre-test and post-test showed no improvement in scores, but proved that educating nurses on how to perform extra-oral exams can help improve nursing practices when documenting oral conditions (Munoz et al., 2009).

The second study conducted by Wyatt (2009) included nurse training involved a computer program called the Clinical Oral Disorders in Elders, or CODE, where dentists input information from an initial exam that could be referenced for treatment and instructions. To test the effectiveness of the program, a follow-up was done five years later. The number of residents (N=139) receiving dental follow-up treatment increased

from 45% to 56%-72%, and the number of residents who received dental hygiene care increased from 62% to 76%-86% (Wyatt, 2009).

The third study by Sjogren et al., (2010) demonstrated why emphasis on oral care is necessary. Plaque scores tested on the residents (*N*=60 initially and *N*=41 1.5 years later) living in the facility remained the same even one and one half years after implementation of dental education provided by a dental hygienist. All residents were given chlorhexidine gluconate gel, electric toothbrushes, fluoride toothpaste, and antibacterial rinse and the nurses were given hands-on training on how to provide assistance in oral care (Sjogren et al., 2010). Although the use of chlorhexidine and electric toothbrushes declined, education still motivated nurses to provide oral care (Sjogren et al., 2010). Sjogren , et. al (2010) recommended subsequent education to update nurses on new information and research as well as re-emphasize the importance of oral health.

Education not only applies to caregivers, but to residents. As age increases, so does loss in gross and fine motor skills which is one of the causes for the decrease in a resident's ability to care for themselves (Rivett, 2006). Occupational therapists are trained to help residents make adjustments and utilize tools to function more efficiently while doing daily tasks. Similarly, a dental hygienist is trained in oral care techniques useful for adjusting and assisting with the oral care routine of residents. A study done in Germany by Schiffner, Bahr, & Effenberger (2007) tested different methods of oral care performed by a group of elderly selected from senior living centers and meeting places. The sample population (*N*=106) was split into groups of four (*n*=24 per group), each with a different routine of oral hygiene (Schiffner et al., 2007). The control group had no

intervention on oral hygiene, but the other three groups were split into mechanical plaque control, chemical plaque control, and both mechanical and chemical plaque control (Schiffner et al., 2007). All four groups showed improved plaque scores, but only the groups that included mechanical plaque control showed a statistical improvement when compared to the control group (p=0.001 and 0.003) (Schiffner et al., 2007).

Problem as Developed from Theories and Research

There is alarming evidence that supports the neglect of oral health care in long-term care facilities (Wårdh et al., 2000; Coleman & Watson, 2006; de Mello et al., 2009; Bailey et al., 2005; Fitzpatrick, 2000; Miegel & Wachtel, 2009). Oral hygiene needs will increase due to the growing number of dentate elderly entering into these facilities. Caregivers need to be prepared to deal with this changing trend. Dental disease not only affects the eating habits, nutrition, and confidence of the residents; but also their overall health (Bailey et al., 2005; de Mello et al., 2009; Fitzpatrick, 2000; Miegel & Wachtel, 2009). Implementing a dental assessment tool to identify oral disease and help plan daily oral hygiene would solve this problem. In order to successfully implement a dental assessment tool, it would have to be easy to use, effective, and affordable.

Summary

There are different strategies for increasing oral hygiene care in long-term care facilities, including audit systems and education of nursing home staff and residents. By studying these different types of indices and curriculums, it can be determined what works to provide the best standard of care. Currently, more research needs to be conducted to find lacking areas in oral health care delivery and train nursing home staff accordingly to meet the needs of the growing number of elderly populations entering

long-term care facilities. Health care workers can collaborate with dental professionals to develop a curriculum in which nurses and nursing aides can learn about the oral cavity. Finding efficient ways to provide oral health care to elderly populations would be extremely beneficial to caregivers and residents alike.

Chapter 3: Methodology

Design

Research Design. This cross-sectional comparison retrospective chart review was quantitative and conducted in two nursing homes with the same administration framework and charting system. The purpose of the quantitative research design was to compare the relationships between the variables (Burns & Grove, 2005). An initial audit of data was collected by the primary investigator. Within each nursing home, pre-implementation data was gathered regarding MDS completion of the most recent oral assessment for each participant, rate of referral for all residents, and the opinions of the nursing home staff regarding dental education and their perceptions when providing oral care for using a Likert style survey. The disadvantage to this type of study is the presence of unknown variables that could affect the relationship (Burns & Grove, 2005).

The primary investigator provided dental education to nursing home staff including a presentation on oral health (see Appendix A) and distribution of a decision tree (see Appendix B) based on the MDS triggers (see Appendix C) as well as how referral and oral care should proceed based on findings.

The education module presented to the nursing home staff was developed to address each item on the MDS assessment. The module begins by explaining dental implications on systemic diseases and how oral health affects overall health. Then, techniques were presented on how to complete an oral assessment of each category on the MDS. An investigator designed decision tree helped nursing home staff make proper referrals and adjustments to oral home care. The tree was given to nursing home staff

and they were encouraged to use it while performing MDS assessments and when providing routine oral home care. They were shown intraoral photographs of healthy oral conditions, abnormalities, and pathologies to help them identify specific conditions needing referrals or adjustments. Also, nursing home staff were taught common problems of ill-fitting dentures and how to identify cracks, improper fit, and broken dentures. This module covers all the basics of identifying oral conditions and addresses these assessments in the order and verbiage of the MDS.

The education included evidence on why oral assessments and the resulting findings are necessary. It also enabled nursing home staff to implement more effectively the daily oral care required for each resident. The presentation was done at the Avera sites as a part of their monthly training; and in order to insure all nursing home staff received the education, it was offered at various times.

For three months following the educational intervention, monthly chart reviews was conducted to collect data from newly updated MDS assessments. MDS assessments are conducted every ninety days; therefore, reviewing the charts for three months will assure that each resident has a new MDS assessment done by the end of the study.

Variables. The independent variable was the educational program along with the decision tree given to the experimental group facilities. The dependent variables were the (1) MDS completion, (2) rate of referrals, and (3) perceptions of nursing home staff regarding oral health screenings and referrals. A retrospective chart review was done initially to measure the values of MDS completion and the rate of referrals. Another chart review will be repeated three months after completion of the educational program to measure the values of MDS completion and rate of referrals.

Description of Setting.

The setting for this study was a group of nursing homes in the state of South Dakota. The Avera Medical Group is a group of medical providers located in North Dakota, South Dakota, Minnesota, Iowa, and Nebraska. They have nursing homes throughout these Midwestern states, and two Avera nursing homes in the surrounding area agreed to take part in this study.

The main criterion for choosing nursing homes was they utilized the MDS for documentation since the study is based on the MDS. It was important for these nursing homes to be located in South Dakota for convenience. Limiting the setting to South Dakota nursing homes will affect generalizability of study results. These nursing homes were selected because they have similar documentation systems and administration framework. This allowed for consistent data collection and facilitated combining data from each site. The educational intervention was presented separately at each site to minimize time commitment for attendees. Nursing home staff at each site was presented the same educational presentation.

Assisted living centers were not chosen because of the uncertainty of resident dependence. Some residents of assisted living centers have a high-level of independence and do not require assistance when performing daily oral hygiene. Nursing home residents, however, generally require a certain level of assistance outlined by their ADLs and IADLs. In addition, assisted living centers do not require an MDS assessment for residents.

Sample

Human Subjects Protection. The use of informed consent was the method used to insure human subjects' protection for the nursing home staff and anonymity of nursing home staff and patient data. Institutional Review Board (IRB) approval will be gained from Avera and from Eastern Washington University before the study began. The informed consent form was provided by the Avera IRB committee and altered to fit the particular study (see Appendix D). The primary investigator completed the National Institutes of Health (NIH) "Protecting Human Research Participants" web-based training course as required by the Avera IRB committee. The primary investigator also signed the Health Insurance Portability and Accountability Act (HIPAA) regulations for Avera, and worked with Avera under a business associate agreement. The data was stored on a password protected computer.

Sample Source. After numerous attempts to contact various nursing home companies and groups in South Dakota, the health care system, Avera, agreed to participate in this study. Avera is a group of healthcare facilities that includes hospitals, clinics, assisted living centers, nursing homes, rehabilitation therapy centers, hospice care, and home care. Their nursing homes in Yankton and Sioux Falls, South Dakota, agreed to participate in the study. Avera Sister James Care Center in Yankton is a 112-bed skilled nursing facility and Avera Prince of Peace Retirement Community in Sioux Falls has an 86-bed skilled nursing unit. Avera is licensed by the South Dakota State Department of Health, Medicare-certified, and accredited by the Joint Commission on Accreditation of Healthcare Organizations.

Criteria for Sample Selection. It was important to use a group of nursing homes with similar administration and documentation structuring so data collection was uniform in all of the facilities tested. All residents and nursing home staff from both locations were included in the study. The data was collected using information from both nursing home staff and residents. It was also necessary to make sure the facility was a nursing home instead of an assisted living center to insure the needs of the residents were at consistent levels. The study was limited to using nursing home facilities that utilize the MDS.

Sampling Plan. The sample used was a convenience sample collected by referral. Multiple nursing homes throughout the state of South Dakota were contacted to participate and Avera facilities were the only sites to respond and agree.

Sample Size. A minimum sample size of 145 (residents) was found using the McNemar's test. Setting the power at 80%, the sample size was large enough to find an estimated 14% increase in referral rate. The maximum sample size available between the two nursing home sites participating in this study was 198 (residents). There were a total of ten residents who were discharged or their charts were no longer available at the end of the study, and the total sample size of the residents was 176. To supplement the information found from the referral data, the nursing home staff at each facility was surveyed to find the efficiency and usefulness of the MDS as an assessment tool.

Data Collection

Method. The method of collecting data was chart reviews and Likert surveys. A 5-point Likert-type survey determined the efficiency of the MDS as an assessment tool and the usefulness of the information from the educational module provided to the

nursing home staff. The survey was a 12 item questionnaire with an additional needs list and barrier list. Demographics including age, gender, degrees obtained, position title, length of employment at Avera, and length of experience in the field were included to describe the sample size of the nursing home staff. This information was collected anonymously and not correlated with survey data to ensure no individuals are identified.

Four retrospective chart reviews made up the majority of the data collection. The first was conducted before the implementation of the educational module and included all MDS charts and referral for treatment statistics from three months prior to the date of the review. The final three were completed after the implementation of the module. Post study data collection included all MDS charts and referral for treatment statistics from the date of the educational program implementation to the end of this study.

Instruments. The MDS was the instrument used to collect resident data, and was found in the residents' charts. The MDS in its entirety is a very lengthy assessment document required upon admission into a nursing home, when significant change in health happens, or every ninety days. Also, residents may have more than one MDS assessment done in the study period due to significant change in health or change in Medicare coverage. There were several residents who had more than one MDS assessments done within the study period due to this reason, but for these intermediate assessments the dental section was not completed. The MDS is written and amended by the Center for Medicare & Medicaid Services, and version 3.0 went into effect in October, 2010 (J. Porter, personal communication, 2011). The dental portion of the MDS is a small, half page long section located on page twenty-two. Reimbursement from Medicare and Medicaid is based on the completion of the MDS for each resident, and

Avera has MDS coordinators to insure the MDS gets completed. The MDS data was considered complete if *unable to examine* was not marked. The referral data was gathered from the resident's chart as well, and was recorded as either a yes (resident has been referred) or no (resident has not been referred).

The Likert survey gauged the perceptions of nursing home staff about the information presented to them in the educational module. The benefits of a Likert style survey are the decrease in biased results, ease of analysis and presentation, high degree of anonymous results, and fast access to results (Seibert, 2002). The Likert style was chosen on a 5 point scale, ranging from strongly agree to strongly disagree. The pre-implementation survey (see Appendix E) included this scale, as well as items that addressed what nursing home staff felt they needed in order to provide more thorough oral care in addition to perceived barriers to providing this care. The post-implementation survey (see Appendix F) included the same items as the pre-implementation survey, as well as a course evaluation of the module.

Reliability and Validity. The Likert survey is a tool commonly used in research studies. The survey was developed with the help of a statistician and a panel of experts including five graduate faculty members from Eastern Washington University to increase the validity. The statistician helped with wording of the survey items reinforcing that the results are quantitative than qualitative, determining what each item was going to measure and the rating scale. The panel of experts analyzed the relevance of each item to the nursing home staff's perception of oral health care in the facility, the clarity of each item in order to ensure nursing home staff understanding of what is being asked, and the scale being used. This increased utilization of this data and survey validity. Another

measure to increase validity was to adjust the scale from three choices to five choices to increase the number of responses the nursing home staff could choose from (Lozano, Garcia-Cueto, and Muniz, 2008).

The validity for the Likert survey was tested using a Cronbach's Alpha test, and was given to ten nurses with nursing home experience to measure the internal consistency of each question. The Alpha result was a .709, meaning the survey provides acceptable internal consistency for survey items. The nurse's feedback from this initial validity survey also helped develop the qualitative barriers and needs portion of the pre- and post-implementation survey.

The MDS 3.0 is deemed valid as an assessment tool by Centers for Medicare & Medicaid Services (Saliba and Buchanan, 2008). The oral section has been modified with the help of the American Dental Association from the previous version to reflect more appropriate groups of pathology, and to increase the ability to identify oral conditions (Saliba and Buchanan, 2008).

Procedure. Initially, a retrospective chart review was done to collect data from the MDS and referrals for dental treatment. Subsequently, the oral assessment module was presented as a part of a monthly continuing education meeting and only included staff scheduled to work on the day the education was presented. The decision tree was included in the module and given as a handout to the nursing home staff (see Appendix B). They were encouraged to use the decision tree while performing oral assessments and also while providing daily oral home care. Nursing home staff were given pre-implementation and post-implementation Likert-type surveys. Additionally, module participants were asked to complete an evaluation of the module contents. A second

retrospective chart review collected data once a month from the day of the oral assessment module presentation for a period of three months.

Statistical Analysis.

Data collected from residents' charts was entered into Microsoft Excel©. The tests will be run using Excel functions and the statistical software SAS version 9.2. The McNemar's test was used to analyze the referral data as well as the MDS completion data. This test measures different correlated proportions and assesses the significance of the difference between them (Lowry, 2011). Demographic data of nursing home staff was collected in terms of age, gender, length of current employment, length of employment in the field, and position/title and analyzed by taking averages and percents. The Likert survey was measured using the responses to each item in the survey and compiled to find trends and percentages. The statistical test used to analyze the Likert survey scores was the Wilcoxon Signed Rank Test. The pre-implementation and post-implementation survey scores for each item were paired and randomly numbered to maintain anonymity. The course evaluations were also analyzed by finding cumulative percentages to determine the overall effectiveness of the module as reported by the nursing home staff.

Summary

This study includes information collected from a six month period, three months prior to implementation of an educational module and three months after implementation. The data collected included referral rate of dental treatment, rate of completion of MDS assessment, and nursing home staff perceptions of oral health care in nursing homes and the use of the MDS as an assessment tool in the format of a Likert survey. The data was

collected and analyzed using the McNemars Test and the Wilcoxon Signed Rank Test. The information obtained from the data helped determine whether or not the MDS was effective as an assessment tool and useful to identify and refer oral diseases in the nursing home setting.

Chapter 4: Results

Introduction

This cross-sectional comparison used retrospective chart reviews and completed Likert surveys of nursing home staff to test the following hypotheses:

1. There is a relationship between educating nursing home staff on the dental section of the MDS and improved completion of MDS assessments.
2. There is a relationship between educating nursing home staff on how to perform an oral assessment and identify oral conditions and subsequent referrals for dental treatment.
3. There is a relationship between dental education and nursing home staff perceptions regarding the provision of oral health assessments and oral home care.

This chapter presents study results utilizing data from audits of resident chart data and Likert-type surveys completed by nursing home staff before and after implementation of an oral assessment module. The module included a PowerPoint® presentation that included tools and techniques to help nursing home staff provide oral assessments and care to nursing home residents. Since the MDS is already an assessment tool used in nursing homes, it was chosen as an assessment tool the staff could use to perform assessments while performing oral hygiene procedures. The decision tree was provided in the module to help staff decide what conditions need increased attention during home care and what conditions need to be referred for professional dental treatment. Another portion of the module included pictures of common oral conditions, abnormalities, and pathologies that would be easy for nursing home staff to recognize.

Description of Sample

Two Avera nursing homes, Sister James Care Center in Yankton and Prince of Peace Retirement Community in Sioux Falls were selected as sites for this study. Data was gathered from anonymous resident chart reviews and nursing home staff surveys.

A minimum of 145 charts were needed for the sample size to show a significant difference in referral rate, and between the two sites there were 198 beds available in the nursing homes. At the end of the study a total of 176 charts were reviewed. Charts discarded from the sample were charts of residents who no longer resided at study site facilities or had passed away.

Demographics of the nursing home staff were gathered for descriptive purposes and are not generalizable. Table 2 describes the demographics of the nursing home staff who attended the oral assessment education. The average age for the nursing home staff was approximately 39 years, but ranged from 22 to 63 years. Females made up the majority of the population at 88.46%, while there were only 11.54% males. The length of experience in a nursing home setting and the length of employment within an Avera facility were both approximately 8-9 years. The nursing home staff consisted of Certified Nursing Assistants (CNA), Licensed Practical Nurses (LPN), and Registered Nurses (RN). The majority of the staff were CNAs and RNs totaling 88.46%, while 11.54% of the staff were LPNs. The educational background of the nursing staff was diverse. The percentage of nursing home staff with a high school diploma was 34.62%, making up a small majority of the total staff. Another 19.23% of the staff had Associates degrees in Nursing. There were also small percentages of the staff with other various degrees as provided in Table 2.

Table 2

Demographic description of nursing home staff

Sample size in this study (*N*=26)		
Age	*M*: 38.65 yrs	
Gender	Male	(*n*=3) 11.54%
	Female	(*n*=23) 88.46%
Length of Experience in Nursing Home Setting	*M*: 8.19 yrs	
Length of Employment with Avera	*M*: 8.65 yrs	
Position	Certified Nursing Assistant	(*n*=13) 50%
	Licensed Practical Nurse	(*n* =3) 11.54%
	Registered Nurse	(*n* =10) 38.46
Education Background	High School Diploma	(*n*=9) 34.62%
	Associates of Science (A.S.)	(*n*=1) 3.85%
	Associates of Science Nursing (A.S.N.)	(*n*=5) 19.23%
	Licensed Practical Nurse	(*n*=3) 11.54%
	Bachelors of Science (B.S.)	(*n*=3) 11.54%
	Bachelors of Science Nursing (B.S.N.)	(*n*=4) 15.38%
	Registered Nurse	(*n* =1) 3.85%

Statistical Analysis

The data was collected using pre- and post- implementation resident chart reviews and Likert style surveys. The pre-implementation and post-implementation chart reviews were evaluated to determine if the oral assessment module and the use of the MDS as an assessment tool resulted in an increase in the number of resident referrals for dental treatment. The pre- and post-implementation surveys were compared to determine if the oral assessment module could be used as a valuable learning tool for nursing home staff. A course evaluation was included in the post-implementation survey, and analyzed to determine how effective the module was to the nursing home staff. A statistician was hired by the primary investigator to assist with the statistical analysis.

The first hypothesis states that there is a relationship between educating nursing home staff on the dental section of the MDS and improved completion of MDS assessments. Due to constrictions of time, staff, and ability to keep resident data anonymous, there was no way the MDS assessments could have been replicated by the primary investigator or other dental professionals to test the accuracy of the MDS assessments conducted by the nursing home staff. Thus, this hypothesis was addressed by collecting data of the MDS assessments completed post-implementation of the oral assessment module and comparing it to pre-implementation MDS assessments. Improved completion of the MDS assessments was measured by an increase in the detail of selected answers.

Table 3

Statistical Analysis of MDS Item Completion

Sample size in this study (*N*=176)	Pre-Implementation	Post-Implementation
A. Broken or loosely fitting full or partial dentures.	*n*=2	*n*=4
B. No natural teeth or tooth fragments (edentulous).	*n*=42	*n*=42
C. Abnormal Mouth Tissue (ulcers, masses, oral lesions, including under dentures or partials if one is worn).	*n*=1	*n*=1
D. Obvious or likely cavity or broken natural teeth.	*n*=32	*n*=27
E. Inflamed or bleeding gums or loose natural teeth.	*n*=1	*n*=3
F. Mouth or facial pain, discomfort or difficulty chewing.	*n*=14	*n*=14
G. Unable to examine.	*n*=3	*n*=6
Z. None of the conditions were present.	*n*=91	*n*=80

The items with an increased amount of selection were A (*broken or loose fitting full or partial dentures*), E (*inflamed or bleeding gums or loose natural teeth*), and G (*unable to examine*). The items with a decreased amount of selection were D (*obvious or likely cavity or broken natural teeth*) and Z (*none of the conditions were present*). The items with no change were B (*no natural teeth or tooth fragments*), C (*abnormal mouth tissue*), and F (*mouth or facial pain, discomfort or difficulty chewing*). The largest change was a decrease of 91 residents to 80 residents in the item Z, stating none of the conditions were present. The number of residents who were unable to be examined increased from three residents to six residents, which suggest a decreased completion of the MDS. However, the decrease in the total of residents who had no conditions present

could also suggest an increase in the identification of oral conditions and improved completion of the MDS as hypothesized.

The second hypothesis states there is a relationship between educating nursing home staff on how to perform an oral assessment and identify oral conditions and subsequent referrals for dental treatment. This hypothesis was addressed with the chart reviews of the residents in both nursing homes. The McNemar's test was used to analyze the chart reviews. Out of 176 residents total between the two nursing homes, 29 of the residents had been referred for dental treatment in the three months prior to implementation, resulting in a referral rate of 16%. After the implementation, 53 of those same 176 residents had been referred for dental treatment resulting in a 30% referral rate. McNemar's test computed a *p* value of .0018, which strongly suggests a difference in the marginal rate of referral before module implementation and the rate of referral after implementation proving this hypothesis (see Figure 4).

Frequency	No Referral Post-Implementation	Referral Post-Implementation	Total
No Referral Pre-Implementation	*n*=107	*n*=40 (*p*-.0018)*	*n*=147
Referral Pre-Implementation	*n*=16	*n*=13	*n*=29
Total	*n*=123	*n*=53	*N*=176

Note: *p<.01*

Figure 2. Analysis of chart review using McNemar's test

The third hypothesis states there is a relationship between dental education and nursing home staff perceptions regarding provision of oral health assessments and oral home care. A statistically significant difference in nursing home staff perceptions of oral assessments was found in three items (see Table 4).

Table 4

Analysis of survey using Wilcoxon Signed Rank Test

Sample size (*N*=26)			
Survey Item	*Mdn*	Range	*p*-value
SI1. Prevention of oral disease is important for all residents.	0.0	1.0	1.0
SI2. Prevention of oral disease is important for medically-compromised residents.	0.0	1.0	0.5
SI3. Referral for dental treatment is important in maintaining overall health of residents.	0.0	3.0	0.53
SI4. Referral for dental treatment is responsibility of the resident.	0.46	4.0	0.0264*
SI5. Referral for dental treatment is the responsibility of the treating physician.	0.0	4.0	0.45
SI6. Referral for dental treatment is the responsibility of the treating nurse.	0.0	3.0	0.23
SI7. Referral for dental treatment is the responsibility of anyone who finds suspicious oral conditions.	0.0	4.0	0.21
SI8. The MDS alone is a useful assessment tool.	0.0	4.0	0.12
SI9. The communication from dental providers is adequate for directions on providing oral homecare.	0.0	3.0	0.11
SI10. I feel comfortable performing an oral exam.	0.62	4.0	0.009*
SI11. I feel comfortable identifying oral conditions that need referral.	0.038	2.0	0.0313*
SI12. When unable to provide oral care or assessment, a second attempt is made.	0.0	3.0	0.36

Note: *$p<.01$

The significant difference in scores of SI4 implies a stronger agreement to the statement *Referral for treatment is the responsibility of the resident* ($p= 0.0264$). The significant difference in scores of SI10 indicates a stronger agreement among staff members to the statement *I feel more comfortable performing an oral exam* post-implementation as compared to pre-implementation ($p= 0.009$). The significant

difference in scores of SI11 suggests there was a stronger agreement to the statement *I feel more comfortable identifying oral conditions that need referral* among staff members post-implementation as compared to pre-implementation (p= 0.0313).

While conducting analysis of the survey to prepare for this thesis research, open ended questions were included on the survey to gain perspective on the perceptions of certain factors nursing home staff felt hindered their ability to provide oral health care. These items addressed their personal needs to help them better care for the residents. Additionally, items were added identifying perceptions of potential barriers preventing nursing home staff from better providing oral health care. Barriers were related more to the environment rather than the personal knowledge of the nursing home staff. These perceptions were then included on the survey to identify how many of the staff members agreed with these needs and barriers, and analyzed using the McNemars test. While there was no statistical significant difference in pre-implementation scores and post-implementation scores, results provide a qualitative overview of how these nursing home staff felt their needs for knowledge and guidance were being met as well their perception of barriers hindering their ability to provide oral health care (see Table 5).

The needs category in the qualitative portion of this analysis shows the number of nursing home staff who felt they needed precise direction from a dental professional, adequate training in oral health care, and cooperation from the resident all increased by 10% to 11% after implementation of the module. Adequate time is the one need item that decreased by 11%, from 85% to a 69%.

Table 5

Analysis of needs and barriers among nursing home staff

Sample size in this study (*N*=26)			
	Percent who said Yes (%)		*p*-value
NEEDS:	Pre	Post	
Precise Direction	*n*=16 (62%)	*n*=19 (73%)	0.45
Adequate Training	*n*=18 (69%)	*n*=21 (81%)	0.37
Adequate Time	*n*=22 (85%)	*n*=18 (69%)	0.69
Cooperation	*n*=23 (88%)	*n*=25 (96%)	0.62
BARRIERS:	Pre	Post	
Lack of Orders	*n*=8 (31%)	*n*=12 (46%)	0.29
Resident Refusal	*n*=26 (100%)	*n*=22 (85%)	0.0455*
Time Restraints	*n*=15 (58%)	*n*=18 (69%)	0.45
Unsure how to provide care	*n*=9 (35%)	*n*=14 (54%)	0.12

Note: *result approaches $p<.01$, suggesting marginal significance

The barriers category had similar results. The amount of staff who felt a lack of orders from dental professionals was a barrier increased by 10%. The barrier time restraints item showed an increase by 11%. The number of staff who were unsure how to provide oral care was barriers of providing oral health care increased 19%. The one barrier that decreased at a marginally significant rate ($p= 0.0455$) was resident refusal by 15%.

The final statistical analysis of this study was a course evaluation of the oral assessment module post-implementation (see Table 6). The evaluation gained feedback from the nursing home staff to improve the course for future use. Statistical analysis of course evaluations showed approximately 90% of nursing home staff agreed or strongly agreed the course was clear and understandable. Satisfaction was high among the staff, with about 88% who would agree or strongly agree they were satisfied with the knowledge presented. About 88% of the staff felt the module was applicable to performing oral assessments in nursing homes, and 92% of the staff felt the oral

assessment module presented along with the MDS assessment could be used to find oral problems.

Table 6

Analysis of course evaluation by nursing home staff

Sample size (*N*=26)					
	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
CE1. The education presented was clear and understandable.	*n*=0 (0%)	*n*=1 (3.85%)	*n*=1 (3.85%)	*n*=16 (61.54%)	*n*=8 (30.77%)
CE2. The education presented was applicable to providing oral assessments in nursing home residents.	*n*=1 (3.85%)	*n*=0 (0%)	*n*=2 (7.69%)	*n*=17 (65.38%)	*n*=6 (23.08%)
CE3. I am satisfied with the knowledge I have gained about providing oral assessments in nursing home residents.	*n*=1 (3.85%)	*n*=0 (0%)	*n*=2 (7.69%)	*n*=16 (61.54%)	*n*=7 (26.92%)
CE4. The education presented can be used to find oral problems.	*n*=0 (0%)	*n*=1 (3.85%)	*n*=1 (3.85%)	*n*=19 (73.08%)	*n*=5 (19.23%)
CE5. The education presented along with an MDS assessment tool can be used to find oral problems.	*n*=0 (0%)	*n*=1 (3.85%)	*n*=2 (7.69%)	*n*=16 (61.54%)	*n*=7 (26.92%)

The significant increases of the responses to the pre- and post- Likert surveys prove the third hypothesis; stating dental education improves nursing home staff perceptions regarding provision of oral health assessments and oral home care. This is especially reinforced by the increase in responses to the specific survey items *I feel more comfortable performing an oral exam* and *I feel more comfortable identifying oral conditions that need referral*.

Summary

The results of this study can be outlined and summarized by addressing each hypothesis individually. The first hypothesis was analyzed by looking at the selection of MDS items pre- and post- implementation. The amount of item G *unable to examine* increased by 3 residents suggesting an increase in the amount of assessments that were not completed. However, the largest change was a decrease of 91 residents to 80 residents in the item Z *none of the conditions were present*. This suggests an increase in identification of conditions and an improved completion of the MDS. The second hypothesis was explored by looking at referral rates pre- and post-implementation. The referral rates before the oral assessment module (16%) were significantly lower than the referral rates after the module was presented (30%), thus suggesting that the module significantly increased the amount of referrals made (p= 0.0018). The third hypothesis, stating that perceptions of nursing home staff would increase after the module, was explored using a Likert type survey. Statistically significant survey items included *Referral for treatment is the responsibility of the resident* (p=0.0264), *I feel more comfortable performing an oral exam* (p= 0.009), and *I feel more comfortable identifying oral conditions that need referral* (p= 0.0313). The amount of nursing home staff who felt they needed more direction, more training, and increased resident cooperation increased, while the need for more time decreased. Also, the amount of nursing home staff who felt that lack of orders, time restraints, and uncertainty of how to provide oral care created a barrier increased while resident refusal decreased. A large majority, about 90%, of the nursing home staff were satisfied with the oral assessment module presented and felt it was applicable and could be used to find oral problems.

Chapter 5: Discussion

Summary of Major Findings

The findings of this study can be outlined in regards to the hypotheses posed in Chapter 1 and reiterated throughout the development of this research study. The hypothesis there is a relationship between educating nursing home staff on the dental section of the MDS and improved completion of MDS assessments had conflicting results. The amount of G *unable to examine* items increased by three suggesting a decrease in oral assessments completed, but the amount of Z *no conditions were present* decreased by 11 suggesting an increase in conditions identified. The hypothesis stating there is a relationship between educating nursing home staff on how to perform an oral assessment and identify oral conditions and subsequent referrals for dental treatment suggests a statistically significant different (p=.0018) between the pre-implementation referral rate of 16% and the post-implementation referral rate of 30%. The hypothesis stating there is a relationship between dental education and nursing home staff perceptions regarding the provision of oral health assessments and oral home care was proved using Likert style survey scores and implementation of an oral assessment module. A statistically significant difference in nursing home staff perceptions of oral assessments was found in survey item 4 *Referral for treatment is the responsibility of the resident* (p= 0.0264), survey item 10 *I feel more comfortable performing an oral exam* (p= 0.009), and survey item 11 *I feel more comfortable identifying oral conditions that need referral* (p= 0.0313). The amount of nursing home staff who felt they needed more direction, more training, and increased resident cooperation increased, while the need for

more time decreased. Also, the amount of nursing home staff who felt that lack of orders, time restraints, and uncertainty of how to provide oral care created a barrier increased while resident refusal decreased. Approximately 90% of the nursing home staff were satisfied with the oral assessment module presented and felt it was applicable and could be used to find oral problems. This chapter discusses the significance of these findings, limitations of this study, and suggestions for additional research.

Discussion

Significance. The disparities of oral health care in long-term care settings such as nursing homes are clearly outlined and demonstrated in previous research. Research has shown evidence of the neglect of oral health care in nursing homes and the importance of addressing the growing population that reside in these facilities (Wårdh et al., 2000; Coleman & Watson, 2006; de Mello et al., 2009). This thesis research results provide empirical data on the methods of assessment and referral of dental needs currently used in nursing homes. Because the MDS is an assessment tool already used in nursing homes, it was chosen as an assessment tool the nursing home staff could use to perform assessments while performing oral hygiene procedures. The decision tree was also used in the module to help nursing home staff decide which oral conditions need increased attention during home care and which conditions need referral for professional dental treatment.

Hypothesis 1: Relationship between educating nursing home staff and improved MDS completions . The first hypothesis states there is a relationship between educating nursing home staff on the dental section of the MDS and improved completion of MDS assessments. The MDS items with an increased amount of selection were A

(*broken or loose fitting dentures*), E (*inflamed or bleeding gums, or loose natural teeth*), and G (*unable to examine*) (see Figure 1). The MDS items with a decreased amount of selection were D (*obvious or likely cavity or broken natural teeth*) and Z (*none of the conditions were present*) (see Figure 1). The items with no change were B (*no natural teeth or tooth fragments*), C (*abnormal mouth tissue*), and F (*mouth or facial pain, discomfort or difficulty chewing*) (see Figure 1). The largest change was a decrease of 91 residents to 80 residents in the item Z, saying that none of the conditions were present (see Figure 1). This finding suggests there was an increase in the number of conditions identified in residents who the nursing home staff were able to examine. The increase in identification of conditions could be related to the portion of the oral assessment educational module that identified oral conditions in intraoral photographs and instructed the nursing home staff of what and how to look for them. The number of residents who were unable to be examined increased from 3 residents to 6 residents suggesting a decreased completion of the MDS. This result may be due to a decline in resident physical or mental health, or uncertainty of how to perform an exam by the nursing home staff.

Study results signify that the implementation of an oral assessment educational module and use of the MDS as an assessment tool may increase the identification of conditions present in nursing home residents. There is evidence to support the findings of this study that new assessment and evaluation techniques increase the amount of oral care residents receive (Munoz et al., 2009).

Additionally, the first hypothesis assumes oral care and oral assessments are provided to nursing home residents on a regular basis by the nursing home staff. One of

the biggest unexpected outcomes of this study was the increase of the amount of MDS assessments that were not completed. The number of assessments that G *unable to examine* was selected increased from 3 residents to 6 residents. One explanation of this outcome could be that after the module was presented the nursing home staff felt less confident in performing an oral assessment to the standards presented in the educational module. Theoretically, the result of proving this hypothesis suggests providing nursing home staff with the MDS to provide regular oral assessments and educating them on the importance of oral hygiene will increase the amount of conditions identified and thus, improve the completeness of the MDS assessments.

Hypothesis 2: Relationship between education on oral assessment, identification of oral conditions, and referrals. The second hypothesis states there is a relationship between educating nursing home staff on how to perform an oral assessment and identify oral conditions and subsequent referrals for dental treatment. The results suggests a statistically significant difference (p=.0018) between the pre-implementation referral rate of 16% and the post-implementation referral rate of 30%. An increase in referral rate after the oral assessment module was delivered was a significant finding that demonstrated educating these nursing home staff on oral conditions that do or do not need referral increased the amount of conditions actually referred.

Study results relate to previous research demonstrating education motivated staff to increase the amount of oral health care they were providing (Sjogren et al., 2010). It was assumed nursing home staff were aware of their duties as health care providers to address oral health care needs of nursing home residents and refer conditions that required professional dental treatment. The assumption nursing home staff takes

responsibility of the resident's oral health is pivotal to this research because if staff do not understand the importance of their duties, the importance of the oral care provided and assessments given to determine the status of oral health is diminished. There were no unexpected findings when proving this hypothesis. The implication of study results is providing nursing home staff access to resources such as the decision tree may lead to guided decisions for providing oral care to nursing home residents. Additionally, supplying a directed method of assessing the oral cavity for conditions that require referral may result in more referrals of residents to oral health care providers for needed treatment (Munoz et al., 2009 &).

Hypothesis 3: Relationship between education and nursing home staff perceptions of oral health. The third hypothesis states there is a relationship between dental education and nursing home staff perceptions regarding the provision of oral health assessments and oral home care. The pre-implementation and post-implementation surveys explored this hypothesis and found several significant findings among the nursing home staff. The significant difference in responses to survey item 4 (*Referral for treatment is the responsibility of the resident*) shows that after nursing home staff participated in the oral assessment module they felt residents reporting oral conditions or pain was a key step in the referral process. It also suggests staff felt the resident needs to verbalize the need or desire for a referral before a referral would be made. The significant difference in responses to survey item 10 (*I feel comfortable performing an oral exam*) suggests the oral assessment module provided nursing home staff with adequate information and proper tools, such as the decision tree and the oral portion of the MDS, so they feel comfortable performing oral exams. The significant

difference in responses to survey item 11 (*I feel comfortable identifying oral conditions that need referral*) suggests the education provided the nursing home staff with enough information about oral pathologies and abnormalities for them to understand which conditions need to be referred, or monitored, and are unique but not abnormal. These findings support the literature and suggest oral assessment education presented to nursing home staff may help them feel more comfortable performing oral assessments on residents and referring them for dental treatment (Wyatt, 2009).

This hypothesis assumed that nursing home staff held value in completing regular oral assessments and recognized the need for routine dental care. The statistical results of the surveys showed a few unexpected findings. First, there was a statistically significant increase in the amount of *agree* or *strongly agree* responses to survey item 4 *Referral for treatment is the responsibility of the resident*. This result was unanticipated because the module did not contain any information regarding resident reporting of oral conditions. One conjecture of this result is the nursing home staff feels it is important for residents to report if they are having a problem or are in pain. In addition, the staff may not feel confident enough to judge what conditions or amount of pain needs to be referred resulting in them feeling it is the responsibility of the resident to ask for a referral. Second, there was no statistically significant difference in the amount of *agree* or *strongly agree* responses to survey item 7 *Referral for dental treatment is the responsibility of anyone who finds suspicious oral conditions*. This result was unanticipated because one of the main points stressed in the oral assessment module presentation was the fact all suspicious oral conditions need to be documented and referred to a dental professional. This could be explained because nursing home staff felt

it was important for them to refer residents for dental treatment prior to the education or because they still do not feel confident enough to refer. Inference of study results may increase awareness of nursing home staff about the importance of oral care and addressing oral conditions of residents. Additionally, nursing home staff being mindful of the importance of oral care could increase the acknowledgement of the need for oral care for residents and amount of attention given to meet the residents' oral health needs (Sjogren et al., 2010).

The course evaluations provided some insights into how effective the oral assessment module was and how well the nursing home staff felt the information was presented. The majority (around 90%) of the nursing home staff was satisfied with the content of the module, felt the module was clear and understandable, and applicable to performing oral assessments. This information can be used by other nursing homes to present the module in the future.

Dental professionals' involvement in nursing home settings. The results of this study show that even after the education module and decision tree were presented, there was still uncertainty on how to perform oral assessments on all residents. The increase in the number of *unable to examine* MDS assessments is concerning since the identification of oral disease is so important. One solution is dental and dental hygiene professions taking a more active role in nursing home resident assessment and provision of regular oral care. This theory is supported by studies where dental hygienists in nursing home settings decrease influenza and pneumonia, increase the use and enforcement of oral hygiene protocols, and are able to determine the need for oral hygiene intervention (Adachi et al., 2007; Bailey et al., 2005; Forsell et al., 2009; Pearson & Chalmers, 2004).

The inclusion of dentists and dental hygienists in the nursing home environment may be difficult because of financial implications and varying supervision clauses and scopes of practice for dental hygienists.

Limitations.

This study was conducted in two sites at Avera nursing homes, thus only allowing results to be generalized to this group of nursing homes. Other nursing homes or long-term care facilities may have different types of assessments, management structures, or nursing staff education procedures.

Also, the MDS assessments were not able to be replicated and deemed accurate by a dental professional, which limits the data to only allow the *completeness* of the assessment, not the *correctness.* Due to constrictions of time, staff, and ability to keep resident data anonymous, there was no way the MDS assessments could be replicated by the primary investigator or other dental professionals.

Additionally, nursing home staff who participated in the education and completed course evaluations and surveys were only staff on shift at the time of the presentation. The night or weekend shifts did not participate because the nursing home would have to pay them to come into work in order to be included. Therefore, the statistical outcome of the surveys cannot be generalized to the entire staff at Avera nursing homes.

Recommendations

The results of this study implies education of nursing home staff increases the comfort level they have for providing oral assessments and identifying oral conditions for the residents of a nursing home. Furthermore, regular education on oral health may increase nursing home staff's knowledge of oral conditions and in turn increase the

amount of oral care residents receive. One idea is to emphasize the importance of oral health care, especially in long-term care settings, within the curriculum of nursing programs. Learning about the oral cavity and its' relationship to overall health as part of nursing education could provide nursing staff with knowledge and understanding of oral health instead of receiving on-the-job experience and training.

In addition, results indicate education of nursing home staff and the use of the decision tree and MDS as an assessment tool may be viable modes to increase the amount of dental referrals residents receive. Providing staff with tools to help them perform oral assessments and determine what dental conditions need professional attention has potential to increase the amount of oral care residents receive.

Suggestions for Additional Research

Due to the limitations of this study, more research is needed to determine the accuracy of the MDS assessments currently being performed in nursing homes. This requires more investigators and increased access to residents so licensed oral health care providers could verify accuracy of MDS assessments by nursing home staff. It could also imply further research where dental professionals complete the MDS assessments after the nursing home staff to determine if all oral conditions and pathologies are correctly recorded.

Additional qualitative research could ascertain how nursing home staff pre-conceptions of dental treatment and oral hygiene affect their provision of oral care for residents under their care. Education levels, income levels, family history, and individual values may change nursing home staff's opinions and values in regards to dental care. It could be hypothesized if nursing home staff do not value dental treatment and or provide

themselves with adequate oral hygiene then consequently they would not feel it necessary to provide residents with this care.

More research could also be done in regards to the decision tree, and how it affected the outcomes of this initial research. The decision tree was designed to help the nursing home staff make guided decisions on whether or not oral conditions needed referral or intervention. If research could prove that decisions trees like this could help improve dental care in nursing homes, they could be implemented as a standard of dental care.

Conclusions

The overall outcome of the present thesis is deduced in a few main points. The oral assessment education module increased the amount of conditions identified in the MDS assessments, but did not increase the amount of completed exams. The amount of referrals for dental therapy made at each site increased after implementing the oral assessment education module. The education provided to the nursing home staff made them feel more comfortable with performing dental exams and referring dental conditions to dental professionals. Stakeholders in nursing homes desiring to improve the oral health of nursing home residents may use these three premises. Information from this thesis provides a basis for more studies that look further at access to oral care in nursing homes.

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Appendix A

MDS Presentation Outline
Outline of MDS presentation
Oral Exams for the Minimum Data Set (MDS) 3.0
Presentation by Katie Pudwill, BSDH
Background
Dental disease can affect overall health
Endocarditis, Heart Disease, Stroke, Clogged Arteries, Diabetes
Periodontal disease
Polypharmacy, Sjogren's, Osteoporosis
Xerostomia
Gingival overgrowth
Decay
Sores
Bone loss and periodontal disease

Using MDS 3.0 dental section
Performing an oral exam safely and efficiently
Goals
1: If able, discuss concerns and problems with resident or possibly a relative or care taker.

2: Explain procedure to resident before and during exam, gain consent.

3: Employ techniques that are safe for resident and examiner.

4: Explain findings to resident.

Dialogue
Identify problems, pain, or concerns.
Gain trust, and consent!
Keep routine, do exam while performing daily oral hygiene.
Safe surroundings (i.e. towel and basin if they have dentures)

Tools for Exam
Personal Protective Equipment
Disposable mirror (if available) or other retraction device
Flashlight
If patient has removable prosthesis, a basin with a towel.

Performing the Exam
Lips and Vermillion Border
Using both hands, feel upper and lower lip
Oral Mucosa and Gingiva
Use retraction device to retract cheek and other hand to inspect outer gums
Roof and Floor of Mouth
Tilt patients chin up and look at hard and soft palate

Have patient lift tongue, or retract with device to view floor
Tongue
Have patient move tongue side to side, or retract and feel with a finger
Oropharynx
Patient open, say Ahh, and depress tongue to view oropharynx
Teeth
Retract and examine teeth.

Explanations
After consent is gained, throughout the exam patient comfort can be maintained by explanation.
Tell the patient what you are going to do before you do it.
Finding something abnormal could lead to other findings and also help in solving the problem. Ask patient about it!

Identifying Healthy and Unhealthy Tissue
Goals
1: Name landmarks in the oral cavity.

2: Recognize healthy tissue that may look abnormal.

3: Recognize unhealthy tissue and conditions.

Oral Landmarks
Lips and Vermillion Border
Oral Mucosa
Gingiva
Roof and Floor of Mouth
Tongue
Oropharynx
Teeth

Identifying Functional or Broken Dentures
Goals
1: Tell whether denture fit is functional.

2: Determine whether or not fit can be improved with other resources.

3: Identify cracks or broken dentures.

Denture Fit
This is something you will look for when the resident is talking or eating. Over-compensating with their lips or tongue to keep the denture in will be noticeable, as will difficulty speaking without a “floating denture”

Denture Fit Cont.

This also has to do with the gingiva underneath the gums.
Denture sores are caused from ill-fitting dentures rubbing on tissues.
Dentures causing sores can be very painful to eat with.
Options to improve fit

Over-The-Counter Option
Poligrip
Seabond
Fixodent

Dental Office
Denture adjustment
Soft Reline
Hard Reline
Looking for problems
Inspect outer borders for edges
Teeth
Cracks

After the Exam:
Where do we go now?
Goals
1: Correctly score these conditions into the MDS 3.0

2: Identify conditions that require intervention in daily hygiene.

3: Identify conditions that require referral to treating dentist.

Scoring MDS Dental: 0, 1, -, ^
Categories possibly triggering Dental Concerns
Cognitive Problems
Functional Impairment
Dry Mouth
Diseases and Conditions

Daily Interventions
Cold Sores, Dry Cracked Lips, Angular Cheilitis
Aphthous Ulcers
Gingivitis
Geographic, Fissured, and Black Hairy Tongue
Caries
Denture sores: treat as Aphthous Ulcer.

Referrals
Anything that looks precancerous.
Periodontal disease and Gingival Hyperplasia

Abscessed tooth, pimple on gums.
Stomatitis
Median Rhomboid Glossitis and Leukoplakia
Petechiae at back of throat
Caries/Chipped teeth
Denture sores, Broken Dentures

Resources
Finkelstein, Michael. Gallagher, George T. Kabani, Sadru P. Oral Pathology Database.
http://www.uiowa.edu/~oprm/AtlasWIN/AtlasFrame.html

The American Dental Association website link on Dentures provides information on dentures.
http://www.ada.org/2996.aspx

This website outlines denture care.
http://www.dentalgentlecare.com/dental_care_in_nursing_home.htm

Tips for Care Givers
http://www.cda-adc.ca/en/oral_health/cfyt/dental_care_seniors/tips.asp

Smiles for Life, information about hygiene topics and common setbacks for an elderly person
http://www.cda.org/library/pdfs/cda_sfl.pdf

Common Oral Health Problems and interventions
http://www.vahealth.org/dental/adultoral/documents/2008/pdfs/elderly.pdf

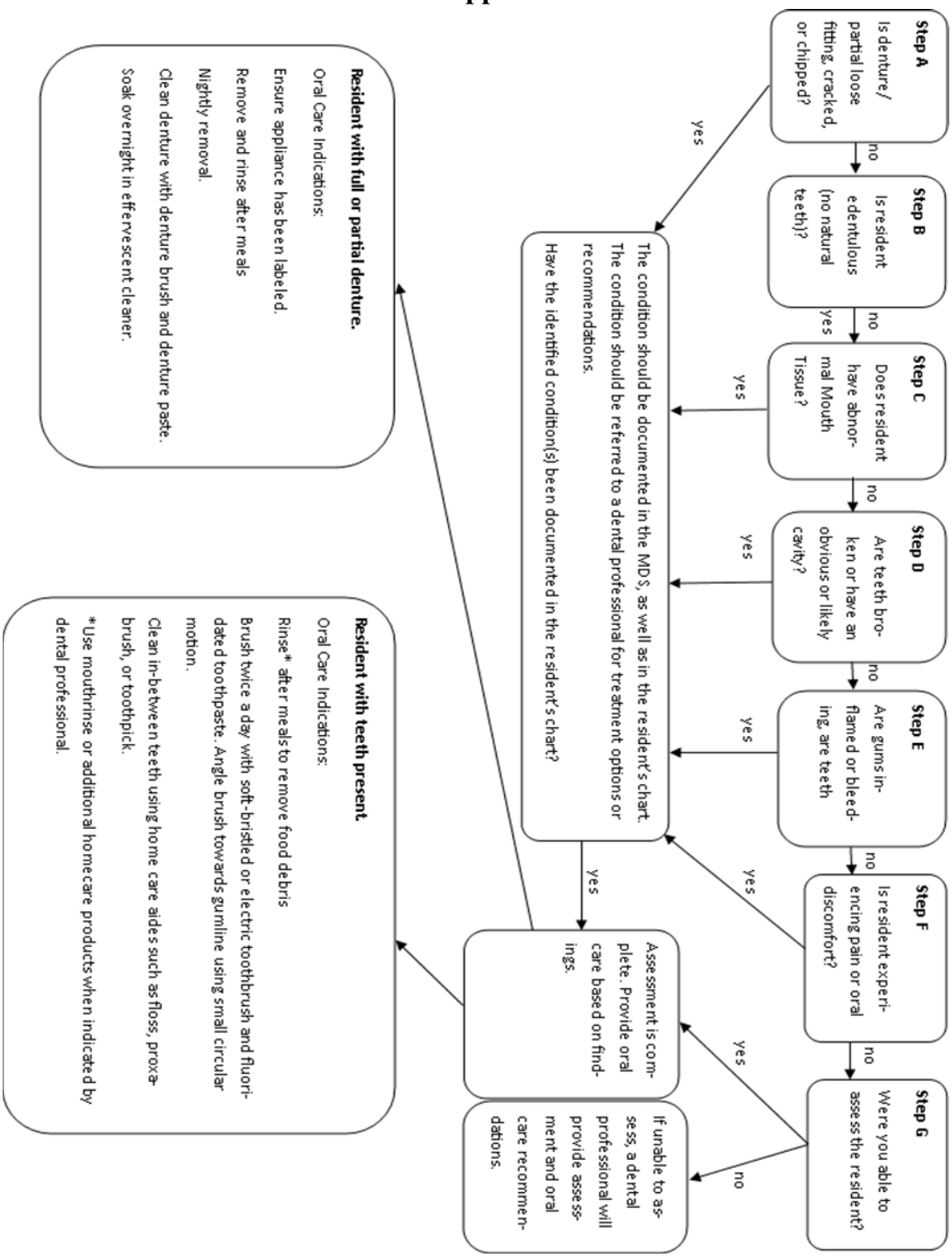
How Dental disease affects overall health.
http://www.mayoclinic.com/health/dental/DE00001/NSECTIONGROUP=2

Dental vocabulary while performing exams.
http://quizlet.com/2777292/eoio-inspections-flash-cards/

American Family Physician, common oral diseases in elderly population
http://www.aafp.org/afp/2008/1001/p845.html

Geriatric Oral Health
http://www.geriatricoralhealth.org/default.aspx

Appendix B


Step A
Is denture/ partial loose fitting, cracked, or chipped?
yes
no
Step B
Is resident edentulous (no natural teeth)?
yes
no
Step C
Does resident have abnormal Mouth Tissue?
yes
no
Step D
Are teeth broken or have an obvious or likely cavity?
yes
no
Step E
Are gums inflamed or bleeding, are teeth
yes
no
Step F
Is resident experiencing pain or oral discomfort?
yes
no
Step G
Were you able to assess the resident?
yes
no
The condition should be documented in the MDS, as well as in the resident's chart.
The condition should be referred to a dental professional for treatment options or recommendations.
Have the identified condition(s) been documented in the resident's chart?
yes
Assessment is complete. Provide oral care based on findings.
If unable to assess, a dental professional will provide assessment and oral care recommendations.
Resident with full or partial denture.
Oral Care Indications:
Ensure appliance has been labeled.
Remove and rinse after meals
Nightly removal.
Clean denture with denture brush and denture paste.
Soak overnight in effervescent cleaner.
Resident with teeth present.
Oral Care Indications:
Rinse* after meals to remove food debris
Brush twice a day with soft-bristled or electric toothbrush and fluoridated toothpaste. Angle brush towards gumline using small circular motion.
Clean in-between teeth using home care aides such as floss, proxabrush, or toothpick.
*Use mouthrinse or additional home care products when indicated by dental professional.

Appendix C

MDS Trigger

CAT Specifications: 15 Dental Care

Items Used

Item	Description	Length	Values
L0200A	Dental: broken or loosely fitting denture	1	0,1,-,^
L0200B	Dental: no natural teeth or tooth fragment(s)	1	0,1,-,^
L0200C	Dental: abnormal mouth tissue	1	0,1,-,^
L0200D	Dental: cavity or broken natural teeth	1	0,1,-,^
L0200E	Dental: inflamed/bleeding gums or loose teeth	1	0,1,-,^
L0200F	Dental: pain, discomfort, difficulty chewing	1	0,1,-,^

Triggering Conditions (any of the following):

1. Any dental problem indicated by:
   (L0200A = 1) OR
   (L0200B = 1) OR
   (L0200C = 1) OR
   (L0200D = 1) OR
   (L0200E = 1) OR
   (L0200F = 1)

Pseudocode (SAS)

```
*CAT15 Logic;
*Initialize CAT indicator to not triggered;
V0200A15A = '0';

*Trigger on Condition 1;
IF (L0200A = '1') OR
   (L0200B = '1') OR
   (L0200C = '1') OR
   (L0200D = '1') OR
   (L0200E = '1') OR
   (L0200F = '1') THEN V0200A15A = '1';
```

Appendix D

Informed Consent Form

AVERA
RESEARCH SUBJECT
INFORMED CONSENT FORM

Protocol Title: Oral Education for Long-Term Care Facility Staff Based on the Minimum Data Set 3.0.

Principal Investigator: Katie Pudwill
203 Catalina Ave
Vermillion SD
701-541-7250

Emergency Contact: (Or Study Coordinator) Sarah Jackson
Assistant Professor
Eastern Washington University
Dental Hygiene Department
310 N. Riverpoint Blvd. Box E
Spokane, WA 99202
(509) 828-1299

Why am I being asked to volunteer?

You are being asked to volunteer because you qualify to be in the sample. Your participation is voluntary which means you can choose whether or not you want to participate. If you choose not to participate, there will be no negative consequences. You may leave the study at any time after it begins. There is no compensation for this study.

What is the purpose of this research study?

This is a study of the effectiveness of the MDS oral exam and how it can be used to increase identification and referral of dental disease in residents. This study will last approximately three months. It includes the nursing staff at two Avera nursing homes in South Dakota. You will be asked to participate in an educational presentation and fill out a survey before and after the study.

What are the possible risks or discomforts?

There is an estimated time commitment of around 45 minutes that will be asked of you when participating in the educational presentation and the time needed to fill out the surveys.

What are the possible benefits of the study?

The possible benefits include increased knowledge of oral health care delivery and oral diseases, increased treatment of oral disease, and increased inter-professional relationship between the medical and dental community.

What if new information becomes available about the study?

During the course of this study, we may find more information that could be important to you. This includes information that, once learned, might cause you to change your mind about being in the study. We will notify you as soon as possible if such information becomes available.

Confidentiality of Records.

Information collected for this study will be anonymous. The personal information will be completely left out of the data collection and surveys will be filled out anonymously. All demographic data collected will be protected by the investigators and secured on a password protected computer during research, then destroyed once study is over. Your permission will not expire unless you cancel it, which may be done in writing to the investigators.

Volunteer's Statement

When you sign this form, you are agreeing to take part in this research study. This means that you have read the consent form, your questions have been answered, and you have decided to volunteer. If you have additional questions about taking part in this study, you may contact Katie Pudwill at 701-541-7250, or Sarah Jackson at 509-828-1299.

You understand taking part in this research study is voluntary. You make quit the study at any time without harming future medical care or losing any benefits to which you might otherwise be entitled.

I have read and understand the above information. I agree to take part in this study. I will be given a copy of this document for my own record.

_____	_____	_____
Name of Subject (Please Print)	Signature of Subject	Date

_____	_____	_____
Name of Person Obtaining Consent (Please Print)	Signature	Date

For Use with Authorized Representative Signature

For subjects unable to give authorization, the authorization is given by the following authorized subject representative:

_____	_____	_____
Authorized subject Representative **[print]**	Authorized subject representative Signature	Date

Provide a brief description of above person authority to serve as the subject's authorized representative.

_____

Appendix E

Pre-Implementation Survey

MDS Assessment Evaluation Pre-Implementation

Do not put your name on this form.

Demographic Data:

Male/Female:_____ Age:_____ Position/Title:_____

Length of employment at Avera:_____

Length of experience in this field:_____ Degrees Obtained:_____

Oral Health Survey	**Strongly Disagree**	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
Prevention of oral disease is important for all residents.					
Prevention of oral disease is important for medically-compromised residents.					
Referral for dental treatment is important in maintaining overall health of residents.					
Referral for dental treatment is responsibility of the resident.					
Referral for dental treatment is the responsibility of the treating physician.					
Referral for dental treatment is the responsibility of the treating nurse.					
Referral for dental treatment is the responsibility of anyone who finds suspicious oral conditions.					
The MDS alone is a useful assessment tool.					
The communication from dental providers is adequate for directions on providing oral homecare.					
I feel comfortable performing an oral exam.					
I feel comfortable identifying oral conditions that need referral.					

When unable to provide oral care or assessment, a second attempt is made.					

For each item please check all that apply	
<u>The needs of nursing home staff to provide adequate oral health care include:</u>	
Precise direction from dental professionals	
Adequate training in oral health care	
Adequate time to provide oral health care	
Cooperation from resident	
Other, please specify below	
<u>The largest barriers nursing home staff encounter in providing oral health care include:</u>	
Lack of orders from dental professionals	
Resident refusal	
Time restraints	
Unsure how to provide oral health care	
Other, please specify below	

Appendix F

Post-Implementation Survey

MDS Assessment Evaluation Post-Implementation

Do not put your name on this form.

Demographic Data:

Male/Female:_____ Age:_____ Position/Title:_____

Length of employment at Avera:_____

Length of experience in this field:_____ Degrees Obtained:_____

Oral Health Survey	**Strongly Disagree**	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
Prevention of oral disease is important for all residents.					
Prevention of oral disease is important for medically-compromised residents.					
Referral for dental treatment is important in maintaining overall health of residents.					
Referral for dental treatment is responsibility of the resident.					
Referral for dental treatment is the responsibility of the treating physician.					
Referral for dental treatment is the responsibility of the treating nurse.					
Referral for dental treatment is the responsibility of anyone who finds suspicious oral conditions.					
The MDS alone is a useful assessment tool.					
The communication from dental providers is adequate for directions on providing oral homecare.					
I feel comfortable					

performing an oral exam.					
I feel comfortable identifying oral conditions that need referral.					
When unable to provide oral care or assessment, a second attempt is made.					

For each item please check all that apply	
<u>The needs of nursing home staff to provide adequate oral health care include:</u>	
Precise direction from dental professionals	
Adequate training in oral health care	
Adequate time to provide oral health care	
Cooperation from resident	
Other, please specify below	
<u>The largest barriers nursing home staff encounter in providing oral health care include:</u>	
Lack of orders from dental professionals	
Resident refusal	
Time restraints	
Unsure how to provide oral health care	
Other, please specify below	

Course Evaluation	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
The education presented was clear and understandable.					
The education presented was applicable to providing oral assessments in nursing home residents.					
I am satisfied with the knowledge I have gained about providing oral assessments in nursing home residents.					
The education presented can be used to find oral problems.					
The education presented along with an MDS assessment tool can be used to find oral problems.					

Additional Comments:

Curriculum Vitae

Katie Pudwill, RDH, BSDH
Dental Hygienist

Office Address:
Department of Dental Hygiene
East Hall Room 120
University of South Dakota
414 E. Clark St. Vermillion SD 57069
(605) 677-5378 (USD main campus)
(605) 668-5433 (clinic)
Katie.Pudwill@usd.edu

Citizenship:
United States of America

Graduate Education:

2010-2013	M.S.D.H.	Eastern Washington University Cheney, Washington

Undergraduate:

2006-2009	B.S.D.H.	University of South Dakota Vermillion, South Dakota
2005-2006	General Studies	Minnesota State Community and Technical College Moorhead, Minnesota
2004-2005	General Studies	South Dakota State University Brookings, South Dakota

Academic Appointments:

2013	DHYG 199 "Introduction to the Dental Hygiene Profession" University of South Dakota Vermillion, South Dakota

2012	Academic Practicum Internship Department of Dental Hygiene University of South Dakota Vermillion, South Dakota

Professional Experience:

2010-2012	Heartland Smiles (Hygienist) With Drs. Jenna Renshaw, Don Leonard, and Devren Anderson 117 E. Cherry St. Vermillion, SD 57069 (605) 624-0070
2009-2010	Carson Family Dentistry (Hygienist) With Dr. Nolan Carson 707 Chestnut St. Springfield, SD 57062 (605) 369-2226

Licensure:

9/09-present	Registered Dental Hygienist State of South Dakota Board of Dentistry
9/09-present	Nitrous Oxide Sedation and Local Anesthetic State of South Dakota Board of Dentistry

Certification:

2011-present	CPR and AED for the Professional Rescuer
2009	Associate Fellow for the World Clinical Laser Institute

Professional Organizations (and Committees of these):

9/10-present	American Dental Education Association Student Member
6/09-present	University of South Dakota Alumni
6/09-present	American Dental Hygienists' Association Member

Community service:

2011	Volunteer Dental Hygienist for "Iowa Mission of Mercy" free dental day in Sioux City, IA
2008-2009	Fluoride Varnish Clinics at Terry Redlin and Longfellow Elementary Schools in Sioux Falls, SD
	Geriatric Health Fair, Sioux Falls, SD
	Sioux Empire Mall Health Fair, Sioux Falls, SD
	Oral Health Education at Local Elementary Schools

Administrative responsibilities:

4/12	Assisted in the development of the University of South Dakota Dental Hygiene Department Vision and Strategic Planning statement
4/12	Various accreditation tasks including organization of competencies and inventory of faculty tasks required to meet accreditation standards
4/12	Development of peer teaching assessment survey for students and faculty
4/12	Development of Excel® spreadsheet for clinic supplies inventory

Presentations:

5/12	"Oral Education for Long-Term Care Facility Staff Based on the Minimum Data Set 3.0." delivered to nursing staff of two nursing homes in South Dakota as part of ongoing Thesis research, EWU
10/11	"Sterilization and OSHA" delivered to pre-dental students as part of shadowing orientation.

Teaching responsibilities:

2/12	"Meth Use and Dental Implications" University of South Dakota Practicum II
3/12	"Rheumatoid Arthritis and Periodontal Disease" University of South Dakota Periodontology II
5/12	"Diagnodent: Efficacy and Current Research" University of South Dakota Practicum II

Research Experience:

6/11-present	"Oral Education for Long-Term Care Facility Staff Based on the Minimum Data Set 3.0." ongoing Master's Thesis Research, EWU