

EFFECT OF AN ORAL HEALTH EDUCATION PROGRAM FOR CAREGIVERS  
DELIVERING ORAL HYGIENE CARE TO RESIDENTS IN A LONG-TERM  
CARE FACILITY

A THESIS IN  
Dental Hygiene Education

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ABSTRACT

A convenience sample of caregivers from a long term care facility (LTCF) located in rural Missouri participated in an educational program. Various oral health indices were gathered from LTCF residents before the program and one month later to evaluate the effects of the program. A pre and post-test design was used with caregivers to evaluate the knowledge of oral hygiene, the relationship of oral health to systemic diseases, and the delivery of oral care. The presentation addressed oral health and the relationship to systemic disease. Mouth care and associated armamentarium were discussed for performing oral care.

Demographic information was summarized using descriptive statistics. Measurement of pre and post-test knowledge about oral health was analyzed using a two-tailed dependent t-test, with  $p < 0.05$  selected for statistical significance.

## APPROVAL PAGE

The faculty listed below, appointed by the Dean of the School of Dentistry have examined a thesis titled “Effect of an Oral Health Education Program for Caregivers Delivering Oral Hygiene Care to Residents in a Long-Term Care Facility,” presented by Nancy J. Horrocks, candidate for the Master of Science degree, and certify that in their opinion it is worthy of acceptance.

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## CONTENTS

ABSTRACT .....	iii
LIST OF TABLES .....	vii
ACKNOWLEDGEMENTS .....	viii
Chapter	
1. INTRODUCTION .....	1
The Elderly and Oral Health .....	1
Oral Health Measurements .....	3
Medications and Oral Health .....	8
Effects of Oral Health and Systemic Diseases .....	8
Caregiver Training Requirements .....	11
Oral Health Knowledge of Caregivers .....	12
Impact of Educational Programs for Caregivers .....	13
Problem Statement .....	16
2. MATERIALS AND METHODS .....	17
Design .....	17
Subjects .....	17
Training Program .....	18
Oral Health Assessments .....	19
Obtaining Informed Consent .....	20
Collecting Oral Health Baseline and Follow-up Data .....	20
Data Analysis .....	21

3. RESULTS .....	22
Subject Demographics .....	22
Caregivers Knowledge.....	22
Results of Oral Health Assessment.....	23
4. DISCUSSION.....	30
5. CONCLUSIONS.....	35
Appendix.....	36
LITERATURE CITED.....	38
VITA .....	42

## TABLES

Table	Page
1. Caregivers Pre/Post Test Scores .....	25
2. Dentate Residents Pre/Post Screening Results .....	26
3. Residents with Full Removable Dentures Pre/Post Screening .....	27
4. Soft Tissue Screening Results.....	28
5. Long-Term Care Facility Oral Health Assessment of Residents.....	29

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## DEDICATION

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## CHAPTER 1

### INTRODUCTION

#### **The Elderly and Oral Health**

Statistics from the United States Census Bureau suggest that by the year 2050 18.5% of the male population and 21.79% of the female population will be 65 years of age and growing older (United States Census Bureau 2009). It is also reported that the aging population, those 80 years and older, will increase by more than 230% between the years of 2008-2040 (United States Census Bureau 2009). Statistics obtained from the National Institute of Health (NIH) show that in 2006 20% of adult women ages 40-44 have no natural children to help take care of them in their declining years (United States Census Bureau 2009). Likewise, the State of Missouri projects the population to grow by 800,000 to an estimated 6.8 million by the year 2030. Those 65 years of age and older will represent one-fifth of all Missourians which will be an estimated 87% growth rate between 2000 and 2030 (Missouri Economic Research and Information Center 2007).

In the United States, it is reported that there are over 16,000 long term care facilities (LTCFs) with more than 1.6 million beds, 1.5 million residents and an occupancy rate of at least 85% (Center for Disease Control and Prevention 2012). The Missouri Department of Health and Senior Services (DHSS) reports that statewide almost 37,000 individuals reside in LTCFs (Missouri Department of Health and Senior Services 2009). The United States Census Bureau statistics reveal that in 2003, the population of people over the age of 65 living alone reached over 10 million people (United States Census Bureau 2005). The United States Census Bureau statistics during the years 2006-2010, disclose for the state of

Missouri, that there are 2,349,955 occupied housing units, of which, 28.5% are a one-person household living independently and 10% of this population are 65 years of age and older (United States Census Bureau 2010).

In an effort to determine the oral health status of the elderly living independently and in LTCFs, the State of Missouri in 2009 conducted a state-wide surveillance that examined the oral health of both well and ill elderly citizens (Missouri Department of Health and Senior Services 2009). The surveillance sites included senior nutrition centers for the well elderly and LTCFs for the ill elderly. Over nineteen hundred individuals were assessed for oral debris, dry tissues, oral lesions, untreated decay, severe periodontitis, and presence of candidiasis. In comparing the oral health conditions between the well and ill elderly, just the data on oral debris, 43% and 77%, respectively, suggests a decline in oral health for the individuals residing in LTCFs. For those well elderly that see a decline in health, physical and mental impairments, LTCFs may be the only option for qualified care.

Statistics for the United States indicate a significant increase in the elderly population and research suggests a great need for improved oral health in the individuals residing in LTCFs (United States Census Bureau 2005; Missouri Economic Research and Information Center 2007; Missouri Department of Health and Senior Services 2009; United States Census Bureau 2009, 2010; Center for Disease Control and Prevention 2012). The dental plaque that is the result of poor oral health necessitates discussion. Dental plaque serves as the source for diseases that invade the mouth. Dental plaque is a collection of aerobic and anaerobic microorganisms that increase in pathogenicity the longer the plaque remains on the teeth (Neild-Gehrig, Willmann 2008; Wilkins 1999). The degree of pathogenesis can help to initiate and manifest itself as dental caries and periodontal diseases of the supporting tooth

structures. The supporting structures include the gingiva, alveolar mucosa, cementum, periodontal ligaments, and alveolar bone (Neild-Gehrig and Willmann 2008; Wilkins 1999). Once the disease process progresses to severe levels, tooth loss will occur. This further contributes to plaque collection, nutritional deficiencies, and can promote lesions of the oral mucosa. The microorganisms living in plaque are found throughout the mouth on the teeth, tongue, cheeks, palate, and removable partials and dentures. Effectively removing plaque and oral debris decreases the bacterial load within the oral cavity and in turn, can help to reduce the risk of periodontal disease and dental decay.

### **Oral Health Measurements**

Evaluation of the oral health of individuals that are healthy and those requiring assistance can be very detailed and present a problem for those seeking to develop a profile of oral health needs. Many different types of indices are available to evaluate plaque, periodontal health, and mucosal tissues. The amount of plaque can be evaluated by using the Simplified Oral Hygiene Index (OHI-S). This index evaluates the amount of debris and/or calculus. Each can be scored individually or the scores can be combined. This index uses representative teeth from both anterior and posterior teeth in the mouth. Furthermore, the OHI-S evaluates both the facial and lingual surfaces of various representative teeth. The amount of plaque is evaluated by gently moving the side of an explorer or probe along the designated surface.

The amount of plaque adhering to the tooth is assigned a numerical value of 0 to 3. Zero indicates no plaque accumulation or presence of stain. A recording of 1 is indicative of plaque or debris that is recognizable when passing or scraping an explorer or probe along the cervical 1/3 of the tooth or when extrinsic stain is present without plaque or debris. A

recording of 2 indicates a moderate accumulation of visible plaque that extends more than 1/3 but less than 2/3 of the visible tooth. A recording of 3 represents an abundance of plaque that covers more than 2/3 of the visible tooth. The recording for the presence of calculus is scored similarly. Zero indicates no visible calculus. A score of one represents supragingival calculus that cover no more than 1/3 of the visible tooth. Two represents supragingival calculus that covers more than 1/3 but less than 2/3 of the exposed tooth but with limited amounts of calculus that extends subgingivally. A score of three represents supragingival calculus that covers more than 2/3 of the visible tooth with heavy calculus that is apparent at the cervical margin and extends subgingivally. (Wilkins 1999). Adding the total of recorded scores and dividing by the number of teeth yields the individual scores for plaque and calculus respectively.

Adding the scores for plaque and calculus reveals the overall OHI-S score. OHI-S scores are as follows: zero represents excellent oral health; 0.1 – 1.2 represents good oral health; 1.3-3.0 is indicative of fair oral health; 3.1-6.0 represents poor oral health. This index is relatively time efficient for both the examiner and the individual being assessed.

Utilization of this index is not necessarily indicative of the entire mouth but represents a general estimate of the oral hygiene of the individual. Regardless of the limitations of this index, determining the plaque level is essential in evaluating oral health of individuals.

Another useful tool to help determine the oral health of individuals is the decayed, missing, and filled teeth index (DMFT). This index uses existing teeth to determine the amount of decay past and present in the mouth. The use of a mouth mirror and limited use of an explorer is used to determine decay. The standard for determining decay is as follows: the decay is visible to the naked eye, the tip of the explorer can penetrate into a pit/fissured

area of the tooth and resist removal and or have soft material on the tip of the explorer, and/or demineralization of the tooth is present. Scoring for the DMFT varies depending on the level of data desired with the index (Wilkins 1999). The use of this tool requires cooperation from the individual from which the data is acquired. If cooperation is not completely attainable, insufficient data will result. The DMFT also requires the individual to accurately recall how each tooth was lost. For the individual with an altered or impaired memory, or when cooperation is not attainable, this index might be problematic. This index is time consuming however, with the cooperative and mentally sound individual, this is a reliable index to record past and present dental decay.

Assessing baseline periodontal conditions of individuals residing in LTCFs can be accomplished utilizing the Community Periodontal Index of Treatment Needs (CPITN). This index divides the mouth into 6 sextants, three for both the maxillary and mandibular arches. A probe designed by the World Health Organization especially for the CPITN is used with probe depth markings at 5.5, 8.5, and 11.5 for a total of 11.5 mm. A rounded ball on the working tip is used to help detect subgingival calculus and rough surfaces. Only the highest criteria of each sextant are recorded. The criteria for the CPITN is as follows: a code of zero indicates healthy periodontal tissue; 1 is indicative of bleeding after probing; a code of 2 represents sub and supragingival calculus or defective margins or restorations; 3 indicates 4-5 mm pocket depths; 4 is indicative of a pocket depth 6 mm or greater. Based on the assigned codes, a treatment of needs is scored. A score of zero results in no treatment needed. A score of I represents code 1 and necessitates oral hygiene instructions. A score of II incorporates codes 2 and 3 and indicates that scaling and root planing, oral hygiene instruction, and restoring defective margins. The final score is III and represents code 4.

Score III indicates that surgical and/or non-surgical periodontal therapy with local anesthesia is required (Wilkins 1999). This index also requires cooperation from the individual, and because working subgingivally, requires a complete health history. This index also requires some time commitment but does result in a good interpretation of the periodontal needs of the individuals being screened.

Gluhak et al. (2010) conducted an oral examination of 409 subjects from Styria, Austria living in LTCFs that utilized the DMFT, CPITN, and OHI-S. Also incorporated was a treatment urgency scale for acute pain and condition of removable prosthesis. Demographics indicated the average age for both male and female was 85 years of age. Clinical examinations using DMFT as an index measurement found 48.3% had an average of 9.9 natural teeth. Eighty-four percent had acute periodontal infections as indicated in the CPITN. A predominant probe value of 2 accounted for pocket depths greater than 5mm. The OHI-S for natural teeth and removable prosthetics was evaluated with an average score of 2.4. Acute pain was found in 28.9% of the population with extractions needed in 47.7% of those individuals in pain. Oral care was provided by nurses in a mere 7.46% of the time.

The DMFT and the Oral-Hygiene Index are useful tools to determine, in part, the status of an individual's oral health. As with all indices, the DMFT and OHI-S can be modified depending on the researchers needs. Jablonski et al. (2009) discussed the Oral-Hygiene Index (OHI) and how this was modified by the University of Mississippi. The University of Mississippi (UM) developed the UM-OHI that measured every tooth available in the dentition and divided each tooth into ten sections. Scores for the UM-OHI were 0 for no plaque up to 10 for all surfaces with plaque. The total score from the UM-OHI was calculated and then divided by the number of teeth as determined by the DMFT.

Removable dentures were also assessed using the UM-OHI for plaque retention. The indices used quantified the plaque more accurately. This method was used to assess 39 individuals from two different nursing homes in rural and urban America. The authors reported that the plaque scores on dentures were significantly lower than on natural teeth.

Another useful tool in collecting oral health information on individuals residing in LTCFs can also be collected using the Basic Screening Survey (BSS) tool (Association of State and Territorial Dental Directors 2010). This surveillance tool was developed by the Association of State and Territorial Dental Directors to collect, analyze, interpret, and distribute data for development of programs to improve overall health, thereby reducing morbidity and mortality. The BSS examines the number of natural teeth, untreated dental decay, existence of removable dentures or partial dentures, root fragments, suspicious soft tissue lesions, and urgency of treatment needs. It can also incorporate the functional posterior occlusal status, tooth mobility, dry mouth, gingival inflammation, need for periodontal treatment, and oral debris. This surveillance tool is time efficient, easy to use, and financially feasible in collecting information on groups of individuals. It should be noted this surveillance tool is not a precision instrument and should not be used in research where precision is necessary.

Most indices are designed for a specific purpose to assess particular individuals or groups of individuals. Establishing the amount of dental decay, oral debris, periodontal conditions, and missing and filled teeth is necessary in developing a plan of action to help improve oral health in individuals residing in LTCFs. Because individuals residing in LTCFs present a unique set of circumstances, such as time constraints and resistive behavior, indices must be time efficient and considerate of the individual.



## **Medications and Oral Health**

Inspection of an individual's medical history will reveal pertinent information to take into account when performing oral assessments. The use of multiple medications of individuals living in LTCFs was investigated and indicated medication induced xerostomia (dry mouth) as a major contributor to poor oral health. The lack of saliva can affect oral debris removal, induce oral ulcerations, promote the risk for fungus development infections, increase root caries, alter taste and promote malnutrition (Fitzpatrick 2000). In fact, Fitzpatrick reported in meta-analysis of studies examining LTCF residents that 88% of residents take at least one drug, 15% take more than 4 drugs, and 52% of individuals report that dry mouth was a continual problem. Of utmost significance is the undereducation of staff about the potential effects of multiple medications and xerostomia on the oral tissues. Furthermore, staffs are deficient in developing individualized oral health care plans which incorporate treatment for xerostomia (Fitzpatrick 2000).

## **Effects of Oral Health and Systemic Disease**

Compromised oral health for the elderly can have deleterious effects to overall body health. Aspiration pneumonia, cardiovascular disease, and diabetes mellitus are just three common problems that are affected by the presence of diseases in the oral cavity (Neild-Gehrig 2008). Talyor et al. (2000) and Awano et al. (2008) reported the microorganisms found in secretions from the lungs in patients with aspiration pneumonia include several periodontal pathogens. The oropharyngeal secretions containing these microorganisms are aspirated into the lungs and constitute for "13 to 48 percent of all infections" of residents in LTCF (Taylor et al 2000). While periodontal microbial pathogens can be responsible for

aspiration pneumonia, these are not the only pathogens that can initiate aspiration pneumonia.

The microbial pathogens found in plaque that are responsible for dental decay may also affect the respiratory tract. Microbial dental plaque that causes decay contains *Streptococci mutans*, *Streptococci sanguis*, *lactobacilli*, nonmutans *streptococci*, and *actinomyces* (Wilkins, 1999). Langmore et al. (1998) and Taylor et al. (2000) found residents in LTCF and inpatient and outpatient individuals from hospitals with aspiration pneumonia, had significantly more decay than those individuals without pneumonia. It is suggested that pathogens responsible for decay can be associated with aspiration pneumonia. As aspiration pneumonia is a possible consequence of poor oral health, cardiovascular disease may be affected as well.

According to the American Heart Association (2012) cardiovascular disease (CVD) encompasses high blood pressure, coronary heart disease, heart failure, and stroke. It is also reported by the American Heart Association that more than one-third of Americans suffer from some form of CVD. Of these Americans that suffer from CVD, almost one-half of these individuals are 60 years of age or older.

The relationship between poor oral health and cardiovascular disease has been studied for many years. Systemic health of individuals with untreated periodontal disease, including gingivitis, chronic and severe periodontal disease, can have an effect on atherosclerosis, myocardial infarction, and stroke. Stein and Henry (2009) reported the findings from the First National Health and Nutrition Examination Survey (NHANES I). It was proposed that the incidence of stroke increases with severe periodontal disease. Chronic periodontal disease can increase inflammatory markers such as C-reactive protein (CRP) and elevate

low-density lipoproteins (LDL) as discussed by Seymour et al. (2009) and Montebugnoli et al. (2005). In fact, the periodontal pathogen *Porphyromonas gingivalis*, has been extracted from “100 % of atherosclerosis lesions” obtained from people with CVD and “*Fusobacterium nucleatum* and *Tannerella forsythia* in up to 80%” of these lesions (Cullinan et al. 2009). Likewise, Cullinan et al. (2009), performed prospective-cohort studies, cross-sectional studies and longitudinal studies about the relationship between periodontitis and CVD in over 105,000 participants and found a statistically significant relationship between periodontitis and CVD.

As oral health declines for the aging population who suffer from physical and mental disparities, not only is aspiration pneumonia and CVD possibly affected, diabetes mellitus can be affected too. Type II diabetes is usually an adult onset disease and accounts for almost 27% of adults’ ages 65 years and older (National Diabetes Information Clearinghouse 2011). Diabetes mellitus, if not controlled, can have disastrous effects on the body. Complications from diabetes can encompass CVD including stroke, high blood pressure and amputations, kidney disease, loss of eye sight, renal disease and or failure, neuropathy, and dental disease (National Diabetes Information Clearinghouse 2011; American Heart Association 2012). Evidence suggests that diabetes can help initiate periodontal disease by affecting the gingival crevicular fluids, altering the collagen in tissue repair, disturbing the host immune response, and changing the microflora in the subgingival tissue. Likewise, it is proposed that periodontal infection promotes the inflammatory process within the body and is suggested that this inflammation process helps to promote higher blood sugar in individuals with diabetes mellitus (Taylor et al. 2000; Cullinan et al. 2009). Jansson et al. (2006) assessed HbA1c levels in individuals with Type II diabetes with and without

periodontal disease. The researchers used oral and intraoral clinical parameters to diagnose periodontal disease along with oral care of the patient. It was determined that individuals with uncontrolled periodontitis had higher levels of HbA1c than those in the control group. The evidence cited above indicates that inflammation and infection of the oral cavity can affect the systemic health of individuals. Therefore, the oral health of those individuals living in LTCF should be taken into account by the caregivers who work in the LTCF.

### **Caregiver Training Requirements**

In order to provide quality care, the caregivers in LTCF must receive education before caring for the residents. The state of Missouri requires nursing assistants to complete a training program of seventy-five classroom hours, one hundred supervised hours of on-the-job training and pass a final examination as stated in the Code of Regulations. The seventy-five classroom hours cover a variety of topics. These topics include: hand washing, gloving and infection control, emergency and safety procedures, rights of individuals/residents including abuse and neglect, and moving and transporting/transferring the resident. Also included in the topics are urinal/commode/bedpan uses, mealtime activities such as feeding the helpless and serving meals, grooming, dressing, bedmaking, promoting communication skills, and lastly, mouth care. After finishing the requirements and successful completion of the examination, continuing education and in-service training are necessary for nursing assistants. This applies to intermediate care and skilled nursing facilities (Missouri Department of Health and Senior Services 2008). The amount of topics covered in just a short amount of classroom and clinical time helps to advocate that more education is needed to promote proper oral hygiene, or at the very least, better oral hygiene given the particular circumstances of the individual.

## **Oral Health Knowledge of Caregivers**

Many studies have examined the knowledge and attitudes of the caregivers that work in LTCF. It is suggested that nurses and caregivers require more knowledge in the delivery of oral care, more education in recognizing oral health disease and the relationships to systemic diseases. Rak and Warren (1990) using a self-report questionnaire, surveyed 45 of 112 nurses and suggests that while the overall general knowledge of oral health care was adequate, many misconceptions were revealed about the etiologies of gingivitis and periodontal disease, the role plaque serves in the disease process, the role that dental floss serves and the role of oral health in relation to systemic disease.

Likewise, an in-depth interview study from caregivers found that the overall general knowledge of dental decay was sufficient. Incorrectly, many respondents felt that tooth decay was responsible for periodontal disease. While overall it was not recognized that bacteria caused periodontal disease, most of the respondents recognized that “bleeding gums, tenderness, smell, and pain” were signs of periodontal disease. The majority of the caregivers reported these were the signs to look for, but oral exams were rarely completed. With regards to medications, the respondents felt the medications taken by the clients in LTCF would cause receding gums, staining of the teeth, and decaying of teeth due to the sugar added to the medications. All respondents felt that poor oral health affected general health but only in reference to pain (McKelvey et al. 2003).

An in-depth qualitative study conducted by Paulsson et al. (1999) demonstrated oral health findings produced from nurse managers of LTCFs. This study was based on the psychological thinking of oral health care and how the nurse managers perceive oral health in general and what they believe the recipients of oral care feel. From this study several major

concepts were developed. With respect to the patients' well-being, it was determined that there was concern for the patient's self-esteem in having good oral health. It was recognized by the nurse managers that up to date education on oral health issues was important for the patient's well-being. The nurse managers also recognized that it was important to be able to adapt to the client's needs in determining the provision of oral care. This concept dealt with the principle of patient autonomy: if the resident did not want oral care performed then it was the resident's right to not accept oral care. It was also recognized by the nurse managers that client autonomy was compromised depending on the resident's mental status. If the client's mental health status was compromised, the caregiver struggled ethically with delivering oral care. The caregiver still felt the resident had the right to autonomy.

Obstacles discovered from the caregivers that led to the deficiency of oral care involved lack of time, uncooperative clients, lack of education, and attitudinal problems of care givers. Other obstacles revealed were the lack of standardization in documentation with regards to intervention for the clients, and whether or not the implementations for individual care produced positive or negative results for the client.

### **Impact of Educational Programs for Caregivers**

Caregivers in LTCFs have a multitude of responsibilities including performing routine oral care. In a one-year follow-up study, Wårdh et al. (2003) found that caregivers, delegated with the sole responsibility of delivering oral care, and receiving educational information on oral care, felt obligated and ethically responsible for the residents' oral care. Along with the ethical responsibility of delivering oral care, an improvement in the overall oral health knowledge and a more positive attitude toward the provision of oral care was seen after the oral health education program was presented to nurses and caregivers of LTCFs.

Blank et al. (1996) examined the background of nurses working in LTCFs. The interest was whether the dental background of caregivers, educational level, number of years since graduation, years of service in LTCF, and training in oral care would influence the educational ability of the caregivers after an in-service training in oral health care. A thirty minute lecture was given by a dentist on how to assess the oral cavity in 4 minutes. Oral health care training included hard and soft tissue evaluation. The findings of the pre-test showed that nurses with more experience were more accurate in evaluating hard tissue problems. After training, all nurses, regardless of background showed a more accurate assessment of hard tissues but did not score well in soft tissue evaluation. This study revealed that it is possible to educate care givers in LTCFs how to evaluate oral tissues but more education is needed.

Likewise, an educational program was given to health care workers in five different LTCFs and evaluated the oral health of seventy-eight residents over an eighteen month period. The program consisted of lecture, video, and clinical instruction. At baseline, oral mucosal disease was very prevalent among the residents. After the training program, eighteen months later, the experimental group revealed a significant reduction in oral mucosal diseases. There was also a significant improvement in denture care; more residents were leaving dentures out overnight and a significant reduction of residents left to perform their own oral hygiene care (Nicol et al. 2005).

A one and one-half year longitudinal study was conducted by Sjögren et al. (2009) that investigated an oral health care education program given to care givers in LTCF. The authors sought to find out if this education would have positive long-term effects on residents of a LTCF. The instruction included clinical, didactic, and individual instruction on the

delivery of oral care. Certain dentifrices and armamentarium were introduced to promote better oral hygiene. Plaque indices were determined right after the completion of the program and then again after one and one-half years. The findings of the study suggest that the plaque index of individuals did not increase over time, as compared to the plaque index measured immediately following the program and was not statistically significant over the measured time period. The implication of this is that oral health education can have long-term positive effects on plaque control and education does not decline over time.

A six year cross-sectional quasi-experiment conducted by Samson et al. (2009) evaluated the mucosal-plaque score (MPS) after the oral health program on the delivery of oral care. The study incorporated lecture, case based discussions, the use of pictorial aids distributed in each client's room that illustrated the needs of that particular individual, and the distribution of armamentarium specific to the client's needs. The study also incorporated a new policy to account for the proper and timely measurement of the MPS. An "oral-care contact" person was held responsible for teaching the appropriate individuals delegated to the oral care of the residents. Mucosal plaque scores were taken right after the completion of the program, 3 months later, and again after 6 years. The results show a statistically significant improvement of MPS overall and again between the 3 month and 6 year evaluation.

Literature has discussed the implications of poor oral health to three of the most prevalent diseases for the elderly living in LTCFs: aspiration pneumonia, cardiovascular disease, and Type II diabetes. Examination of oral health care from the perspective of in-depth interviews, self-report questionnaires, and educational programs can help to shed light on the knowledge and attitudes of caregivers working in LTCF about oral health. It is apparent the knowledge of oral care and the relationship between oral health and systemic



disease needs to be addressed. While it is important to understand the psychological nature behind the knowledge and attitudes of caregivers about oral health care in LTCF, the clinical aspect of performing proper oral care in LTCF can have a positive effect on the client's oral health. One way to enhance the clinical aspect of performing proper oral care is to deliver oral health programs to caregivers. These programs can have lasting positive effects on the oral health of residents in LTCFs.

### **Problem Statement**

The purpose of this study is to determine the effects of an oral health education program presented to caregivers in a long term care facility. Specifically: (1) How would the oral health knowledge level of the LTCF caregivers regarding oral health issues be affected following an oral health education program? (2) Would the amount of oral debris in residents' mouths be affected by an oral health education program? (3) Would the effects, if any, be sustained over a one month time period?

## CHAPTER 2

### MATERIAL AND METHODS

#### Design

This study utilized a pre and post-test design examining (1) the oral health knowledge level of the LTCF caregivers and (2) the baseline and follow-up oral health conditions of residents. Oral hygiene education was presented in a thirty minute interactive program to caregivers of residents in a LTCF. The program discussed the relationship of oral health to aspiration pneumonia, cardiovascular disease, and Type II diabetes. Knowledge level of the caregivers of the LTCF was obtained prior to and immediately following the program. The program also instructed the caregivers on proper plaque removal techniques to use for residents residing in a LTCF. Furthermore, a baseline oral health assessment of residents in the LTCF was conducted prior to the presentation and compared to the oral health assessment on month post-education.

#### **Subjects**

A convenience sample of 24 caregivers working in a LTCF in Northwest Missouri were asked to participate in the study. Demographics obtained included job title, birthdate, education level, years working as a caregiver, age, and gender.

Thirty-four individuals resided in the LTCF. The age range of the residents was from 35 to 90 years of age. The diet of the residents was dependent on the health issues of the individual resident. These diets consisted of a regular or soft diet. Tubes fed residents were not included in the survey. All of the residents were dentate or edentulous, with or without removable prosthesis. It is the policy of the LTCF that each resident receive oral care after each meal by his/her assigned caregiver. It is not known whether or not the oral hygiene care

was actually provided after each meal. Some residents have a snack after the last meal of the day and it is not known whether or not oral hygiene is performed after consuming the snack.

Oral care products that were available for oral hygiene procedures were toothbrushes, toothpaste, and denture cleaner. These were provided by the LTCF.

### **Training Program**

A thirty minute in-service training program was presented at 2:30 in the afternoon during the LTCFs staff meeting and consisted of all 24 caregivers. A PowerPoint presentation, developed by the researcher, included research on the relationship of oral health/hygiene to aspiration pneumonia, cardiovascular disease, and Type II diabetes found in individuals living in LTCFs. The relevance of plaque and how it affects the clinical aspects of the periodontal tissues was examined. The development of dental caries was discussed as well. The PowerPoint presentation discussed how to perform oral care on residents in the LTCF that may or may not be bedridden, how to assist those individuals needing help with oral hygiene, and how to evaluate overall oral care/hygiene. Photos displaying healthy and diseased oral tissues were shown and discussed. Armamentarium for oral hygiene and adaptations to the armamentarium for those individuals that perform their own oral care was discussed as well. At the conclusion of the PowerPoint presentation, a thirteen minute video presentation was shown to help reiterate the PowerPoint presentation.

The video was produced by the University of the Pacific, Arthur A. Dugoni, School of Dentistry, titled "Overcoming Obstacles". This video discussed reasons for good oral hygiene, signs and symptoms of good/poor oral hygiene, how to make changes to oral hygiene to fit the specific needs of the individual, and how to care for dentures. Also, the video revealed how to approach individuals that might be resistive to assisted oral hygiene.

At the conclusion of the video, participants had a chance to ask questions and look at various types of armamentarium designed to help assist in the delivery of oral health care.

### **Oral Health Assessments**

A multiple-choice pre-test was administered immediately before the commencement of the presentation to 24 care givers in the LTCF. Arthur A. Dugoni testing items were modified by the researcher to assess oral health and the relationship that oral health serves in systemic disease, oral health care/delivery knowledge, and assessing the oral tissues. A post-test was given to the caregivers immediately after conclusion of the presentation. The questions on the post-test were the same as the pre-test items but arranged in a different order to help account for order recognition. It was determined by the researcher that a more accurate assessment of the caregiver's knowledge would be possible if there were two different versions of the pre and post-test using the same questions arranged in a different order. It was also determined by the researcher that in order to obtain a higher follow-up response rate that the post-test be delivered immediately after the program. By doing so the researcher would be able to contact all those who had been part of the pre-test portion of the program.

Demographic information was collected as part of the pre-test. This information included the level of education, employment credentials, years working as a caregiver, age, and gender. Pre and post-tests were coded by using the month and date of birth, first and last initial of each participant in order to match pre and post test results so that the oral health knowledge of the caregiver could be assessed. All data collected were stored on a password protected thumb drive and kept at UMKC School of Dentistry. Once the data analysis was complete, the identifying information was destroyed.

### **Obtaining Informed Consent**

Prior to collecting oral health data on the residents, consent forms were mailed to the legal guardians. A postage paid envelope was provided to help ensure the return of the consent form. The consent form was mailed three weeks prior to the data collection process. A follow-up phone call was made one week prior to the deadline to those guardians that had not returned the consent form to allow the guardian to ask questions about the consent form or the data collection process. Consent forms were read to the caregivers prior to the commencement of the program and those that agreed to participate signed the consent form.

### **Collecting Oral Health Baseline and Follow-Up Data**

Oral health data were obtained using a form developed by the researcher based on the format used by the Association of State and Territorial Dental Directors Basic Screening Survey (2011). Data were obtained on all residents of the LTCF who had consented to participation in the study prior to the presentation. The oral health survey data form was coded with the room number and initials of the resident for the initial and follow-up oral screening. This coding allowed the researcher to match initial and follow up data results because it was possible to have residents no longer living at the LTCF at the time of the follow-up screening. To help eliminate the need for calibration, a single examiner with eight years of clinical public and private dental hygiene experience collected all data. The examiner used a smooth plastic flashlight and disposable mouth mirror to conduct the oral screening. The examiner was assisted by a recorder who was instructed what score to record on each section of the oral health survey form. The assistant was familiarized with the form prior to conducting the oral screening. Data were recorded on a paper chart using a pencil. A face mask was worn by the examiner and nitrile gloves were worn to avoid any latex

allergies. Individual disposable cups containing sterile cotton 2x2's moistened with distilled water were used to help remove any loose food debris and to moisten dry lips prior to oral examination. The flashlight and pencil were disinfected between each use by wiping with disinfecting cloths. All used mouth mirrors were placed in a plastic container labeled not-sterile. All gloves, face masks, cups, 2x2's and used disinfecting cloths were disposed of in a trash bag that was disposed of by the examiner. A one month follow-up oral screening utilized the same procedures.

Data obtained included a visual evaluation of the hard and soft tissues. These data included the number of existing teeth, presence of removable dentures or partial dentures, presence or absence of caries, oral debris, evaluation of oral mucosa for soft tissue lesions, and evaluation of the gingival tissues.

The residents' charts were examined for data concerning the number of medications and the presence of systemic disease. These data were only visible to the researcher. This chart examination took place after each oral health screening assessment was completed.

### **Data Analysis**

Demographic information related to caregivers was summarized using descriptive statistics. Comparison of caregivers' pre and post oral health knowledge was analyzed using a paired sample dependent t-test. P-value < 0.05 was chosen for statistical significance. Descriptive statistics were utilized to compare baseline and follow-up oral health assessments of the residents. Further analysis was not possible due to the low number of residents assessed.

## CHAPTER 3

### RESULTS

#### **Subject Demographics**

Twenty-four caregivers participated in the training program. The majority of caregivers participating were certified nursing assistants. Others had the educational background of licensed practical nurses and registered nurses. It should be noted that some of the participants chose to leave before completing the post-test. The average age of those participating was late twenties with a range of 21 to 57 years old. All participants were female. Length of employment ranged from 2 months to 7 years. The matched pair subject's data for the study participants are presented in Table 1. The majority of caregivers were certified nursing assistants (60%). Demographic information sought after included job title, month and day of birth, education level, years working as a caregiver, age, and gender. However, the only consistent information that was reported that enabled for the matched pair subject design was job title, month and day of birth.

#### **Caregiver's Knowledge**

Oral health knowledge was analyzed using pre and post-test scores of participants that completed both tests (n=15). Table 1 displays the pre and post-test scores of the caregivers' knowledge of oral health. Baseline pre-test oral health knowledge scores for the group were analyzed with the following results; mean pre-test score was 14.53, with a standard deviation 1.356, and a standard error of the mean of 0.350. Post-test oral health knowledge mean score for the group was 16.00, with a standard deviation of 1.309, and a standard error of the mean of 0.338. Since the standard deviation is similar for both pre and post-tests (1.356 and 1.309)

respectively, it can be noted that the average score on the post-test was 1.5 points higher than on the pre-test. A two-tailed paired sample t-test resulted in a mean score difference of -1.467. The observed t score was -4.785. With a p-value set at <0.05, this increase in test score can be considered statistically significant.

### **Results of Oral Health Assessment**

Evaluation of the hard and soft tissues of the residents in the LTCF suggests that the improved knowledge of the caregivers did not translate to better oral care for the residents. Seven residents took part in the base-line and follow-up oral health assessments. The results of the pre and post hard and soft tissue evaluation were categorized by dentate, edentulous and soft tissue evaluations. Table 2 displays the hard tissue evaluation of residents with existing teeth. Pre data collection revealed that one resident had no oral debris, two had slight oral debris, and one had moderate oral debris. Post data suggest there was no change in the amount of oral debris found in the resident's mouths. Calculus present at the pre data collection were as follows: three residents with slight calculus and one with moderate calculus. The amount of calculus noted in the post data collection suggests two residents had no visible calculus, one exhibited slight amount of calculus and one with moderate amount of calculus. The two residents with no visible calculus suggest that their teeth were professionally cleaned within one month after the pre data collection. It should be noted that it is not known whether or not a professional cleaning was actually performed. Table 2 displays both pre and post data collection that four residents had no visual abscesses and three of the four had untreated decay.

Table 3 is representative of three residents that were edentulous and wore maxillary and mandibular removable dentures. Data on removable maxillary and mandibular dentures



were scored together, not separately. Pre data revealed two residents had slight oral debris and one resident had moderate oral debris on dentures. Post data collection revealed one resident had no oral debris and two had moderate oral debris present on dentures.

Evaluations of soft tissues of the mouths of all participating residents are compared in Table 4. Oral lesion category was separated into two subcategories-oral lesion and candidiasis. Both pre and post data revealed six residents had no oral lesions present. One resident exhibited with suspected candidiasis. Post data collection revealed one resident had an oral lesion and one had suspected candidiasis. Both pre and post data collection revealed four residents had no obvious problems with the gingiva and three had red and swollen gingiva. Examination of the resident's lips at pre data collection revealed four residents had pink/smooth lips and three had cracked/dry lips. More importantly, post data collection revealed all seven residents presented with dry/cracked lips. Pre data revealed four residents did not exhibit a dry mouth while three did exhibit a dry mouth. Of importance, post data collections reveal all seven residents exhibiting a dry mouth.

An examination of the resident's charts was conducted by the researcher. Items of interest were whether or not the residents had had an oral health evaluation, the presence of systemic disease to include diabetes, cardiovascular disease, and number of medications. Table 5 displays the following: all participating residents had had an oral health evaluation within the last year, 2 were assessed as non-coherent, all had either Type II diabetes, cardiovascular disease or both and all took at least five or more medications that can cause dry mouth. What is interesting to note is that the medical doctor in charge completed the oral health evaluation and evaluated all residents as "margins intact and mucous membranes as moist" despite numerous other clinical parameters to aid in evaluation.

TABLE 1  
CAREGIVERS PRE/POST TEST SCORES

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Employment Credentials	Pre-Test (n=15)	Post-Test (n=15)
Certified Nursing Assistant	9	9 (60%)
Licensed Practical Nurse	4	4 (27%)
Registered Nurse	2	2 (13%)
Mean Score	14.53 (sd=1.356)	16.00 (sd=1.309)

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TABLE 2

## DENTATE RESIDENTS PRE/POST SCREENING RESULTS (n=4)

	<b>Pre</b>	<b>Post</b>
<b>Oral Debris/Plaque</b>		
None	1	1
Slight/Covering Less Than $\frac{1}{3}$ of Dentition	2	2
Moderate/Covering at Least $\frac{1}{2}$ of Dentition	1	1
Severe/Covering More Than $\frac{1}{2}$ of Dentition	0	0
<b>Calculus</b>		
None	0	2
Slight/Covering Less Than $\frac{1}{3}$ of Dentition	3	1
Moderate/Covering at Least $\frac{1}{2}$ of Dentition	1	1
Severe/Covering More Than $\frac{1}{2}$ of Dentition	0	0
<b>Visual Abscess</b>		
No	4	4
Yes	0	0
<b>Untreated Decay</b>		
No	1	1
Yes	3	3

Four Residents with natural dentition had a total of 43 maxillary and 43 mandibular teeth, including 10 root tips. Root tips are included in the untreated decay category.

One dentate resident did not cooperate with the post screening and was not included in the comparison.

TABLE 3

RESIDENTS WITH FULL REMOVABLE DENTURES PRE/POST SCREENING  
RESULTS (n=3)

<b>Removable Maxillary (Upper) Denture</b>	<b>Pre</b>	<b>Post</b>
<b>Oral Debris/Calculus</b>		
None	0	1
Slight/Covering Less Than $\frac{1}{3}$ of Dentition	2	0
Moderate/Covering at Least $\frac{1}{2}$ of Dentition	1	2
Severe/Covering More Than $\frac{1}{2}$ of Dentition	0	0
<b>Removable Mandibular (Lower) Denture</b>		
<b>Oral Debris/Calculus</b>		
None	0	1
Slight/Covering Less Than $\frac{1}{3}$ of Dentition	2	0
Moderate/Covering at Least $\frac{1}{2}$ of Dentition	1	2
Severe/Covering More Than $\frac{1}{2}$ of Dentition	0	0

\*One edentulous resident did not cooperate with the post screening and was not included in the comparison.

TABLE 4  
SOFT TISSUE SCREENING RESULTS (n=7)

	<b>Pre</b>	<b>Post</b>
<b>Dry Mouth</b>		
No	4	0
Yes	3	7
<hr/>		
<b>Oral Lesions and or Candidiasis</b>		
No	6	6
Yes		
Oral Lesion	0	1
Candidiasis	1	1
<hr/>		
<b>Gingiva</b>		
No Obvious Problems	4	4
Red/Swollen	3	3
Bleeding	0	0
Both	0	0
<hr/>		
<b>Lips</b>		
Pink/Smooth	4	0
Dry/Cracked	3	7
Dry/Cracked/Sores	0	0

\*Includes all residents that participated in both the pre/post oral screening.

TABLE 5

LONG-TERM CARE FACILITY ORAL HEALTH ASSESSMENT OF RESIDENTS (n=7)

Resident	Date of Last Oral Evaluation^#	Patient Interactions with Others and Surroundings 1=Coherent 2=Non-Coherent	Systemic Disease 1=No 2=Yes	Number of Medications 1=No Meds 2=1-4 Meds 3=5-9 Meds 4=10 or More Meds
1	Jan. 2012	2	1	4
3	Dec. 2011	1	2	3
5	Nov. 2011	2	2	3
6	Jan. 2012	1	2	4
7	Feb. 2012	1	2	3
8	Oct. 2011	1	2	3
9	Dec. 2011	1	2	4

^Completed by Medical Doctor-All evaluated as “margins intact” and “mucous membranes moist”

#Care Facility Oral Assessment Form

Broken/Carious Teeth	Edentulous	Dentate	Oral Lesion
Gums-Margins Intact	Bleed Easily	Inflamed Gums	Oral Pain
Mucous Membranes	Referral		

## CHAPTER 4

### DISCUSSION

The purpose of this study was to determine the effects of an oral health education program presented to caregivers in a long term care facility. Specifically: (1) How would the oral health knowledge level of the LTCF caregivers regarding oral health issues be affected following an oral health education program? (2) Would the amount of oral debris in residents' mouths be affected by an oral health education program? (3) Would the effects, if any, be sustained over a one month time period?

It has been suggested in the literature that an oral health education program could make a difference in oral health knowledge of caregivers (Blank et al. 1996; Nicol et al. 2005; Samson et al. 2009; Sjögren et al. 2009; Wårdh et al. 2003). Previous studies also suggest that while oral health knowledge improves with education, it does not necessarily support that improved oral health education predicts better clinical performance in performing oral care with the resident's in LTCF's (Blank et al. 1996). The results of this study which include, increased caregivers knowledge in oral care and less than adequate oral health of the residents help support those findings.

The researcher presented an open-ended response question at the end of the pre and post-test seeking the perceptions of caregivers as to what was the biggest barrier in performing oral care with the residents. The consensus was that insufficient time to provide oral care was the greatest barrier to performing oral health care. This consensus is consistent with previous literature which also suggested lack of time as a barrier to providing the necessary oral care (McKelvey et al. 1999; Paulsson et al. 1999; Rak and Warren 1990).

A finding of interest to the author was the fact that even though there was a statistically significant improvement in the oral health care knowledge of caregivers, this did not relate to an improvement in oral health of residents over a one month time period. This is evident in the oral health assessment of resident's mouths and lips. Obtaining the pre and post oral health assessment took place in the middle of February and end of March, respectively. It is possible the dry lips and mouths of the residents were a result of the heating and cooling properties of the LTCF. It is possible the humidity level of the LTCF contributed to this problem. Another possibility in the contribution of dry lips and mouths of the residents might be the timing in which their medications were given. It was not known to the researcher what time of day the residents received their medications. The physiologic metabolism of the medications taken by the residents is not known to the researcher. The one individual that presented with possible candidiasis at the pre oral health assessment also presented with possible candidiasis and an oral lesion at the post oral health assessment. It is possible the resident had eaten something to cause the oral lesion. However, this was doubted by the researcher because in conversation with the Director of Nursing it was said this had been an ongoing problem with the resident. Research in oral health care knowledge education programs supports these findings as well (Blank et al. 1996). What previous research does reveal is that delegating oral health care responsibilities to a particular caregiver may lead to an improvement in oral health of residents in LTCFs. Allocating oral health care responsibilities to a particular caregiver could improve time constraints that are reported in previous literature and from this particular study (Paulsson et al. 1999; Samson et al. 2009; Wårdh et al. 2003).



Collecting pre and post oral health assessment on the residents required the researcher to be present at the LTCF at different times of day and days of the week. It should be noted that the researcher did not observe the caregivers assisting the residents with oral care despite the care facility's guidelines requiring that oral care be provided.

This study presented with several limitations. The first relates to the small sample size of both the number of caregivers and the number of residents who participated. Results from the small sample size cannot be generalized to all caregivers that perform oral care to residents in LTCFs. Finding a LTCF with many more caregivers and residents or utilizing more than one LTCF would help generate a larger study population. Increasing the sample size of caregivers might help to establish a correlation closer to 1.0 as the analyzed correlation of the paired sample on the pre and post-test was .604. Increasing the study population of residents would allow a matched paired t-test or z-test to analyze the oral health of residents. Also, the research did not incorporate a control group for either the caregivers or residents to fully analyze how effective the education program was to the caregivers of the LTCF.

Obtaining informed consent from the legal guardians was an obstacle to overcome. Thirty-four residents lived in the LTCF and only seven residents were able to participate in the oral health screening. Increasing the sample size of the residents would have allowed for descriptive analysis to be performed.

Environmental factors also presented another obstacle to the researcher. The presentation was to be part of an hour-long staff meeting and the researcher was asked to keep the oral health presentation to thirty minutes. Unfortunately, the staff meeting took forty minutes, leaving only twenty minutes for the presentation on oral health. Due to the

time constraints and environmental factors, the oral health care presentation was amended. The oral health care video was eliminated and the researcher chose to demonstrate oral health techniques and briefly discuss what the video was intended to present. The environmental factors presented to the researcher might have extended into the pre and post testing and could account for the 9 missing caregivers pre and post test scores.

The testing instrument and the oral health assessment form presented limitations. The reliability and validity of the pre and post-test questions had not been established. Therefore, it is not known whether or not the questions were dependable and measured what they were intended to measure. With respect to the oral health assessment form, it is possible the researcher might have incorrectly assessed the oral health conditions of the resident due to the lighting, the positioning of the residents at the time of assessment and not having a complete view of the entire mouth. All but one of the residents were assessed while sitting in a non-reclining chair. Conducting a trial oral health assessment on the residents by using the researcher and another qualified dental hygienist would allow for calibration to take place. This would help to establish the rater-reliability of the oral health assessment form. Transferring the oral health data of the residents to create the comparison tables was confusing and not time efficient. One collection instrument was used for all residents (Appendix). To help increase efficiency of the collection form, constructing three different oral health surveys to evaluate the oral health of the residents might be less cumbersome. Evaluation of hard tissue, edentulous conditions, and soft tissue of the mouth using three separate forms would provide greater efficiency.

Lastly, comparing the caregivers' pre and post oral health knowledge was analyzed using a paired sample dependent t-test yet, the data of 9 caregivers was not analyzed at all.

All data is important to a study and should not be discarded. Analyzing the data using an independent sample t-test might have revealed important information that could have been compared or contrasted to the paired sample t-test. This information might have been relevant to the findings of this study or to future studies.

## CHAPTER 5

### CONCLUSIONS

Based on the results from this study, the following conclusions can be drawn:

1. An oral health education program presented to caregivers in a LTCF produced a statistically significant increase in post-test scores for caregiver's knowledge of oral health care issues.
2. An oral health education program presented to caregivers in a LTCF did not decrease the amount of oral debris in resident's mouths.
3. An oral health education program presented to caregivers did not result in better oral health of residents in the LTCF over a one month time period post education of caregivers.

Suggestions for future research include obtaining a larger sample size of caregivers and residents, incorporating numerous LTCFs, and establishing a control group to help analyze how effective an oral health educational program presented to caregivers and the resultant effects on oral care for residents in LTCFs.

It is also suggested to conduct a longitudinal study over a period of months to years to evaluate the long-term results of an oral health educational program presented to caregivers in LTCFs.

In assessing the oral health of residents in the LTCF, the researcher chose to exclude tube fed residents. It would be of interest to research the oral health of these residents to examine the possible relationship of tube feeding to overall oral health.

Lastly, incorporating dental hygiene education into nursing programs to research the effects of how and if, oral health knowledge and education is integrated into nursing care.

APPENDIX

Oral Health Assessment Form

**Long-Term Care Facility Oral Health Screening Form**

Facility Location-State	Screening Date	Day of Screening	1=Coherent 1=Coop	2=Non-Coherent 2=Un-Coop
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**Demographic Information**

Resident's Age 1=40 & Under    2=41-50    3=51-60    4=61-70 5=71-80        6=81 and over	Gender    1=Male 2=Female	Race/Ethnicity if Known 1=White    2=African American    3=Hispanic    4=Asian 5=AI/AN    6=Pacific Islander    7=Multi-Racial 8=Unknown
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**Information from Chart**

Nursing Assessment Oral Health/Comments:  Date of Last Oral Evaluation	Patient Interactions with Others and Surroundings 1=Coherent 2=Non-Coherent
Systemic Disease (s)    1=No    2=Yes	Number of Medication(s)    1=No Medications    2=1-4 meds 3=5-9 meds                    4=10 or more meds

**Oral Screening Information    Please Ask if Individual has Removable Dentures. If so, have the individual Remove Dentures and Conduct Intraoral Evaluation**

Removable Maxillary (Upper) Denture <b>If Yes → Patient's Name on Denture</b>	1=No    2=Yes 1=No    2=Yes	Debris/Tarter Present on Upper Denture	1=No    2=Yes
Removable Mandibular (Lower) Denture <b>If Yes → Patient's Name on Denture</b>	1=No    2=Yes 1=No    2=Yes	Debris/Tarter Present on Lower Denture	1=No    2=Yes
Calculus/Tarter Present <b>If Yes →</b>	1=No    2=Yes	1=Slight/Covering Less Than 1/2 of Dentition 2=Moderate/Covering at Least 1/2 of Dentition 3=Severe/Covering More Than 1/2 of Dentition	
Oral Debris /Plaque <b>If Yes →</b>	1=No    2=Yes	1=Slight/Covering Less Than 1/2 of Dentition 2=Moderate/Covering at Least 1/2 of Dentition 3=Severe/Covering More Than 1/2 of Dentition	
Dry Mouth	1=No    2=Yes	Oral Lesions/Candidiasis (yeast) 1=No    2=Yes <b>If Yes, Please Circle Which Applies</b> Oral Lesion    Candidiasis    Both    Other	
Visual Abscesses (infection)	1=No    2=Yes	Red and Swollen Gingiva/ Visual Bleeding of Gingival (gum) Tissues 1=No    2=Red/ Swollen    3=Bleeding                    4=Red/Swollen and Bleeding	
Untreated Decay(cavity)	1=No    2=Yes	Lips                    1=Pink/Smooth    2=Dry/Cracked                    3=Dry/ Cracked/Sores	
# of Natural Maxillary Teeth (including root fragments))		# of Natural Mandibular Teeth (including root fragments)	
Treatment Needs: 1=No Obvious Problems-Next Regular Visit 2=Early Care-Schedule within next 1-2 months 3=Urgent Care-Schedule within next week due to pain/infection		Additional Comments:	

Resident's Initials:

Resident's Room Number:

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### EDUCATION:

5/1980	Diploma	Winnetonka High School Kansas City, Missouri
2001	Bachelor of Arts Psychology	Rockhurst University Kansas City, Missouri
2003	Bachelor of Science Dental Hygiene	University of Missouri-Kansas City Kansas City, Missouri
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### POSITIONS HELD:

2007-Current	Private Practice	Gladstone, Missouri
2003-2007	Public Health	Kansas City, Missouri Kansas City, Kansas
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### PROFESSIONAL AFFILIATIONS:

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### PROFESSIONAL PRESENTATIONS:

2011	Table Clinic-Oral Health and Education for Caregivers in Long-Term Care Facilities, Midwest Dental Conference
2006-2007	Associated Youth Services, Health fairs at Local Middle and High Schools
2006-2007	Indian Springs Dental Clinic, Classroom Presentations K-5
2003-2006	Samuel U. Rodgers Community Health, Classroom Presentations K-5
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