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Angel Smith

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Walden University
2014

Abstract

Oral Health Literacy of Parents and Dental Service Use for Children Enrolled in Medicaid

by

Angel Smith

MPH, Walden University, 2007

BS, Tennessee State University, 2005

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

December 2014

Abstract

Many people in the United States have untreated dental disease due to a lack of dental insurance, a lack of oral health knowledge, and a lack of priority placed on dental health. Despite an increase in dental service use by Medicaid recipients as a result of local programs, children enrolled in Medicaid often have low rates of use of dental services. Using the health literacy framework of the Paasche-Orlow and Wolf (POW) model, the purpose of this study was to explore to the relationship between oral health literacy of parents and dental service use for children enrolled in Medicaid and the differences in use rates between preventive and restorative services. A cross-sectional research design was employed within a convenience sample of parents who presented to a nonprofit clinic for a medical appointment. Participants completed a demographic profile, an oral health questionnaire, and REALD-30 survey. Responses were correlated with dental claims retrieved from 1 reference child for each parent. Pearson's correlation revealed no significant relationship between oral health literacy and dental service utilization, r = -.056 (p = .490). An ANOVA revealed no difference in utilization between preventive and restorative services, F (2, 149) = .173, p = .841, η^2 = .002. However, high rates of use for restorative services were observed, suggesting a high prevalence of tooth decay in children. Although this study did not find a significant relationship between oral health literacy and dental utilization, barriers continue to exist that contribute to the high rates of tooth decay in children enrolled in Medicaid. This study impacted social change by highlighting the importance of preventive care in reducing the prevalence of tooth decay.

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Dedication

To my Lord and Savior, for answering my unspoken requests, for being my strength in my times of weakness, for making provisions on my behalf, for being my assurance in my times of doubt. For being my everything.

To my husband, Franklin, for your love, support, and encouragement.

To my boys, Austyn and Ayden, for being my inspiration.

To my parents, for always believing in me, and encouraging me to endure as a good soldier.

To my family, for your many prayers, and understanding my need to see this to the end.

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Chapter 1: Introduction to the Study

Introduction

Tooth decay has been termed the single most chronic disease affecting children (Centers for Disease Control and Prevention [CDC], 2011b). Tooth decay, also referred to as dental caries, is characterized by the weakening of the tooth structure by acid forming bacteria (American Dental Association, 2011). In 2005, approximately 6.5 million children between the ages of 2 years and 18 years had untreated tooth decay (United States Government Accountability Office [GAO], 2008). In a comparison of national survey data from 1988 to 1994 and 1999 to 2004, all age groups experienced a decline in the number of dental caries (Dye et al., 2007). This decline was attributed to public health efforts such as community water fluoridation and dental sealants (CDC, 2011b). However, dental caries in children aged 2 years to 5 years rose 4% between the 1988 to 1994 and 1999 to 2004 study periods (Dye et al., 2007). Despite public health efforts, some populations continue to suffer disproportionately from tooth decay. Two-year-old to 18-year-old children in households below 100% of the Federal Poverty Level (FPL) experienced more tooth decay than those above 100% of the FPL (Dye et al., 2007). Between 1993 and 1996, Newacheck, Hughes, Hung, Wong, and Stoddard (2000) found that 5.3% of children in the United States under age 18 years experienced unmet dental needs. Although tooth decay is preventable, young children have been greatly affected by this chronic disease.

Individuals of all ethnicities experience unmet dental needs, but oral health disparities are most evident in minority communities (Flores & Tomany-Korman, 2008). Flores and Tomany-Korman (2008) found that African American and Hispanic American children had poor oral health when compared to their European American, Asian American, and Native American counterparts. Children from all racial and ethnic groups experience unmet dental needs. However, only 4.8% of European American children had not received preventive dental care in a 12-month period, compared to 11.8% of Hispanic American, 11.3% of African Americans, 6.8% of Asian American, 15% of Native Americans, and 6.7% of multiracial children (Flores & Tomany-Korman, 2008). However, tooth decay is preventable if it is properly addressed (CDC, 2011b).

Defining Tooth Decay

Tooth decay occurs when the enamel on the teeth is weakened by acidic bacteria (American Dental Association [ADA], 2011b). This bacteria is a byproduct of sugar, and it adheres to the sticky surface of plaque on teeth (ADA, 2011b). This demineralization is a result of the overgrowth of normally occurring bacteria that has interacted with dietary sugars left on the teeth and in saliva (Parthasarathy & John, 2008). The effects of tooth decay, especially untreated tooth decay, have the potential to cause unwanted pain and infections in the mouth (CDC, 2011a). Tooth decay can lead to tooth loss in individuals of all ages. Twenty-five percent of U.S. adults over the age of 64 years have lost all of their teeth (CDC, 2011a). When compared to other dental diseases in children, tooth decay in a sample of Brazilian children, aged 11 years to 14 years, was found to be more

prevalent than tooth erosion and dental enamel hypoplasia (Vargas-Ferreira, Praetzel, & Ardenghi, 2011). Prevalence rates were 35.3%, 7.2%, and 19.7% for tooth decay, tooth erosion, and dental enamel hypoplasia (Vargas-Ferreira et al., 2011). These findings help support the idea that children are disproportionately affected by tooth decay, even though it can be easily prevented, as opposed to tooth erosion and dental enamel hypoplasia.

Tooth decay can be prevented with proper oral health habits, proper dieting, and regular visits to the dentist (CDC, 2011b). If not treated, tooth decay in primary teeth can be an indicator of the prevalence of tooth decay in permanent teeth (American Academy of Pediatrics [AAP], 2011). Tooth decay affecting young children is termed early childhood cavities (ECC; ADA, 2011a), and affects approximately 28% of children living in the United States (Beltran-Aguilar et al, 2005). A positive association has been found between ECC and diets high in sugar and is observed in populations of Medicaid recipients (Palmer et al., 2010). Tooth brushing habits are also related to the presence of ECC, a condition that is easily preventable (Begzati, Berisha, & Meqa, 2010). Plutzer and Keirsse (2010) found an association between ECC and family structure, showing that the prevalence of ECC was greater in one-parent homes. Early childhood tooth decay can result in the need for extensive dental treatment, which amounts to increased health care cost (AAP, 2011).

Parents are often asked about the health of their children. The same holds true for the children's oral health status. The 2003 National Survey of Children's Health represented children aged 3 years to 17 years in diverse households across the United

States (as cited in Dietrich, Culler, Garcia, & Henshaw, 2008). Parents were asked to rate their children's teeth as excellent, very good, good, fair, or poor. Differences were observed by ethnicity. The condition of excellent/very good teeth was reported by 74.8% of European American parents, 58.6% of African American parents, and 43.7% of Hispanic American. Fair/poor conditions were reported at a rate of 6.5%, 12%, and 23.4% of European American, African American, and Hispanic Americans, respectively (National Survey of Children's Health as cited in Dietrich et al., 2008). Of those rating their child's teeth condition as fair/poor, cavities were cited as the noted dental problems for 55.5% of European Americans, 52.7% of African Americans, and 54.3% of Hispanic Americans (National Survey of Children's Health as cited in Dietrich et al., 2008). While parents are citing their children's teeth condition as fair or poor, parents seem to understand the causative factor.

While decreases are observed on a national level, oral health disparities continue to exist for minority families (Edelstein & Chinn, 2009). Approximately 39% of European American children experience tooth decay compared to 55% of Mexican American children and 43% of African American children (Edelstein & Chinn, 2009). The rate of untreated tooth decay is 60%, 64%, and 50% for Mexican Americans, African Americans, and European Americans (Edelstein & Chinn, 2009). European Americans tend to have the least amount of decay present and the most amount of treatment received for those areas of decay. The opposite is true for Mexican Americans and African Americans.

Etiology of Tooth Decay

Tooth decay, or dental caries, is caused by many factors (Parthasarathy & John, 2008). These causative factors are categorized into five groups: microbial, genetic, immunological, environmental, and behavioral. Understanding the behavioral and microbial factors that contribute to dental caries is necessary to reduce oral health disparities in minority communities.

Behavioral. Tooth decay is experienced worldwide, and has been associated with many risk factors. Harris, Nicoll, Adair, and Pine (2004) conducted a literature review to understand the causative factors associated with tooth decay in children. The frequency of tooth brushing, dietary habits, sugar consumption, and the use of fluoride products all contributed to the development of tooth decay in children. This study was limited because no studies were included on parental habits and beliefs as risk factors for tooth decay (Harris et al., 2004). Ahmed, Astrom, Skaug, and Petersen (2007) studied 12-year-old children in Iraq and found a relationship between sugar consumption and dental decay, which was prevalent in children of parents with low educational levels and a low socioeconomic status. Trachtenberg, Maserejian, Tavares, Soncini, and Hayes (2008) found that children at a high risk of dental decay were at a greater risk for having fillings replaced due to recurrent decay. It is not enough to have decayed teeth restored. A change in unhealthy behaviors must also accompany that treatment.

Eating practices have been attributed to behavioral practices that have led to tooth decay. Dye et al. (2004) used the 1988 to 1994 National Health and Nutrition

Examination Survey (NHANES) data to identify behavioral factors that contribute to the prevalence of tooth decay. Eating practices for the sample were studied. Results of the covariate analyses revealed caries experience was significantly greater in 2- to 5-year-olds who were not breastfed (26.7% prevalence), when compared to those who were. Twenty five and one half percent of children who had an intake of less than five fruits and vegetables had experienced caries, compared with 17.8% of children who did consume five or more fruits or vegetables. Approximately 34% of children who did not eat breakfast daily experienced dental caries (Dye et al, 2004). Excluding breakfast potentially forfeited an opportunity to include fruits and vegetables in the children's diet.

Microbial. The terms tooth decay and dental caries do not accurately identify the true nature of this dental disease affecting millions of individuals across the world (Assael, 2010). Dental caries are a result of an overgrowth of normally occurring bacteria, which leads to a bacterial infection in the mouth (Parthasarathy & John, 2008). Many microorganisms have been identified in their association with dental diseases, namely dental caries (Assael, 2010). The most prevalent organism in tooth decay is *Streptococcus mutans,* and it is transmitted from mother to child and in school settings (Assael, 2010). According to Kloetzel, Huebner, and Milgrom (2011), poor oral health in women is characterized by an increased amount of *S. mutans* in the mouth. A woman's oral health habits during pregnancy can exasperate the problem of tooth decay in infants shortly after birth. The bacteria are transmitted from mother to child during feeding practices and cleaning of the infant's pacifier. The bacteria colonize in the infant's

mouth, even before teeth begin to erupt. The presence of *S. mutans* makes children susceptible to early childhood caries (Kloetzel et al., 2011).

Dental Service Use

Dental service use is measured by the extent to which dental services are used for any reason. Many factors contribute to the amount of dental service use. These factors include the age of the person needing dental care, the services requested, the availability of dental insurance, and dentists' acceptance of dental insurance (National Institute for Dental and Craniofacial Research [NIDCR], 2005). Many explorations have been made into these factors that affect dental service use for individuals. A more in-depth review will be provided in Chapter 2.

Dental Service Use by Children on Medicaid. Children enrolled in Medicaid have access to dental benefits that cover preventive and restorative services. The NIDCR (NIDCR; 2005) observed that 25% of children do not receive their first dental visit before they enter kindergarten. The underuse of dental services can be attributed to a lack of dental insurance, with children being 2.6 times more likely to have medical insurance than dental insurance (NIDCR, 2005). The implementation of Medicaid has been associated with the reduction of untreated dental decay for children in families living below the FPL (Edelstein, 2010). Between 1997 and 2002, there was a reduction from 9.7% to 8.8% of children with unmet dental needs (Wang, Norton, & Rozier, 2007). Even the implementation of programs such as the State Children's Health Insurance Program (SCHIP) has not appeared to alter the issue of underuse of dental services, which has led

to a high prevalence of untreated dental decay (NIDCR, 2005). Programs like SCHIP extend insurance benefits to children who would otherwise not have access to insurance. Although the children have access to insurance, dental services continue to be underused.

Children on Medicaid have access to dental insurance through the Medicaid program, but many factors contribute the underuse of dental services for this population. Some dentists do not accept Medicaid patients, and some only provide emergency services to these children (Siegal & Marx, 2005; Sweet, Damiano, Rivera, Kuthy, & Heller, 2005). Other barriers noted by families receiving Medicaid are the lack of transportation and a lack of knowledge about Medicaid services (Lee & Horan, 2001). The services received by children on Medicaid also vary, with variations noted between services offered by dentists (Taichman, Sohn, Lim, Eklund, & Ismail, 2009). Dentists' unwillingness to offer comprehensive services to children on Medicaid also have an impact on the rates of underused dental services.

Policy changes to increase Medicaid reimbursements, and interventions such as the Access to Baby and Child Dentistry (ABCD) program, have been implemented to reduce barriers to dental service use for children on Medicaid (GAO, 2009; Lewis, Teeple, Robertson, & Williams, 2009). Provisions to increase the access to dental services through Medicaid include the Healthy People 2020 objectives that seek to prioritize improvements in the monitoring and delivery of oral health services (HealthyPeople.gov, 2011a). Also, the Affordable Care Act ensures that funding is available to train dental providers, as well as monitor the delivery of services to reduce

oral health disparities (Edelstein et al., 2010). These efforts have been taken to increase provider acceptance of children receiving Medicaid benefits by reducing the barriers to submitting claims for payment.

Health Literacy

Health literacy is an emerging concept which has been studied to better understand its contributions to an individual's use of health care services (Kang, Fields, Cornett, & Beck, 2005). This concept is derived from a person's ability to read and understand health-related literature and make sound health decisions based on that literature. While many studies of health literacy exist, few highlight oral health literacy and its effect on making sound dental decisions (Kang et al., 2005).

Various instruments have been developed to measure oral health literacy. The Rapid Estimate of Adult Literacy in Medicine (REALM) measuring instrument has served as the foundation to the development of other instruments used to measure health literacy (Lee, Rozier, Lee, Bender, & Ruiz, 2007). The Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30) was developed using the same concept as REALM to measure oral health literacy (Lee et al., 2007). REALD-30 was used to measure the oral health literacy of parents in this study. This instrument is discussed in greater detail in Chapter 3.

Despite the studies correlating oral health knowledge with dental service use, and the many programs available to inform individuals about oral health, underuse is still prevalent. The NIDCR (2005) suggested that researchers study the effect of health

literacy on the prevalence of these preventable dental diseases. To this end, I sought to merge the gap between what has been discovered, and what is left to discover, to bring awareness to dental service use. Chapter 2 provides an in-depth look at health literacy, as well as the instruments used to study its correlation with dental use.

Statement of the Problem

Medicaid insured children have access to dental insurance but use dental services at low rates. The underuse of dental services has resulted in a high prevalence of untreated tooth decay, which has led to 51 million hours of school lost, as well as the need for more extensive treatment needs and an increase in dental costs (Parthasarathy & John, 2008; Weiss & Palmer, 2004). Despite a 32% increase in dental service use by Medicaid recipients as a result of local programs (Greenberg et al., 2008), policy changes to increase dentist participation in the Medicaid programs, and public health programs to increase the awareness of oral health, the Medicaid community does not take advantage of the available services (Edelstein et al., 2010; HealthyPeople.gov, 2011a; Lewis et al., 2009). This underuse may be due to low health literacy in parents. There was a need to conduct a study to identify the correlation between the oral health literacy of parents and dental service use for their children enrolled in Medicaid, as well as identify the difference in the types of services used.

Research Questions and Hypotheses

The research questions identified below were chosen for their potential in understanding the role that health literacy played in a parent's decision to use dental

services available to their children enrolled in Medicaid. Specific details are provided in Chapter 3.

1. Is there a correlation between the oral health literacy levels of parents and dental service use rates for their children enrolled in Medicaid?

$H_0$1: There is no relationship between the oral health literacy levels of parents and dental service use rates for children enrolled in Medicaid.

$H_1$1: There is a relationship between the oral health literacy levels of parents and dental service use rates for children enrolled in Medicaid.

2. Is there a relationship between oral health literacy levels of parents and the use of preventive verses restorative services received by their children enrolled in Medicaid?

$H_0$2: There is no relationship between the oral health literacy levels of parents and the use of preventive versus restorative services received by their children enrolled in Medicaid.

$H_1$2: There is a relationship between the oral health literacy levels of parents and the use of preventive versus restorative services received by their children enrolled in Medicaid.

Purpose of the Study

The purpose of this study was to examine the emerging concept of oral health literacy and its effect on dental service use. I sought to identify the correlation between the oral health literacy of parents and dental service use practices of their children

enrolled in Medicaid and to determine if oral health literacy levels of parents had an effect on the type of services received by their children enrolled in Medicaid.

Theoretical Framework

Many theories were evaluated for their relevance in studying the correlation between oral health literacy in parents and dental service use for their children enrolled in Medicaid. The Paasche-Orlow and Wolf model was selected based on its concepts of access and use, patient-provider interactions, and self-care (Weld, Padden , Ramsey, & Garmon Bibb, 2008). These concepts were useful in understanding the decision making process of parents when it involved making health-related decisions for their children. The concepts of the Paasche-Orlow and Wolf model, along with a comparison of other models used to study oral health, are discussed in Chapter 2.

Operational Definitions

Caries (tooth decay: Occurs when bacteria attacks the acid in food on the surface of the teeth that causes the tooth surface to weaken (ADA, 2011).

Dental service use: The use of dental services in a specified period of time (Fisher & Mascarenhas, 2007).

Early childhood caries: Tooth decay specific to infants and toddlers (ADA, 2011).

Health literacy: The “ability to read, understand, act on health care information, and perform basic reading and numerical tasks required to function in the health care environment” (Kang et al., 2005, p. 409).

Oral health: "Free of chronic oral-facial pain conditions, oral and pharyngeal (throat) cancers, oral soft tissue lesions, birth defects such as cleft lip and palate, and scores of other diseases and disorders that affect the oral, dental, and craniofacial tissues" (U.S. Department of Health and Human Services, 2000, p. 17).

Oral health knowledge: An understanding of the role that oral health has on systemic conditions and other body functions (Al-Ansari, Honkala, & Honkala, 2003).

Oral health literacy: The ability to make process and understand health information to make informed decisions about a person's oral health (Crozier, 2008).

Assumptions and Limitations

It was assumed that the purpose of the study would be fulfilled through the stated research project, and all participants entered the study with no reservations to participation. While attempting to identify the relationship between oral health literacy of parents and dental service use of their children enrolled in Medicaid, it was assumed that the availability of dental providers in the study population were according to the policies set by Medicaid. It was further assumed that by conducting this study, data would be available to make an impact into the field of dental public health.

This study was limited in that I only sought to study a small population of individuals. Attempting to correlate dental service use of children enrolled in Medicaid with oral health literacy of parents also presented limitations due to confounding factors that may affect dental use such as proximity to available dentists, wait time to schedule appointments, participants' current use habits, or parents' mistrust in the public insurance

system. REALD-30 has been identified as a word recognition instrument. It was limited in that it did not measure an individual's understanding of the dental terms provided, which has the potential to disguise true literacy levels. My employment status in the clinic where data collection was conducted also presented as a limitation to this study.

Significance of the Study

In this study, I sought to find a correlation between parental oral health literacy levels and dental service use for their children enrolled in Medicaid. Results of this study have the potential to improve public health efforts to reduce the prevalence of dental diseases. With the emerging research on oral health disparities and the possible effects of low literacy levels, this study could add insight to the significance of parental literacy and its ability to affect parents' ability to make informed health-related decisions for their children. While other factors leading to low dental use have been identified, and policies implemented to eliminate those factors, disparities among Medicaid enrolled children's use of dental services continue to exist. An exploration of other factors will aid in determining the most effective programs and implementation strategies. Although no correlation was observed, public health efforts could be extended to implementing programs that aid in increasing literacy levels that will arm parents with the necessary skills to make healthier decisions concerning dental service use.

Summary

Although there is a wealth of knowledge available on the causes of tooth decay, services available to prevent and treat tooth decay, and suggestions for behavior

modification, gaps existed in identifying the correlation between oral health literacy of parents and dental service use for their children enrolled in Medicaid. In this study, I attempted to identify a statistical correlation between oral health literacy and dental service use in hopes of identifying steps to reduce the prevalence of tooth decay in children enrolled in Medicaid.

Chapter 2 includes a literature review that provides an introduction to tooth decay and its effects. This introduction is imperative to understanding the need to increase dental service use, especially for children enrolled in Medicaid. Despite the many provisions such as Healthy People 2020 objectives, the Affordable Care Act, and local public health interventions, children on Medicaid continue to suffer from untreated tooth decay. Studies correlating oral health knowledge were reviewed to further highlight the gap that exists because of an emerging theme, health literacy. Chapter 2 concludes with a review of oral health literacy studies and an introduction to the Paasche-Orlow and Wolf model that was used for the research study.

Chapter 3 consists of a review of the research design chosen to study the correlation between the oral health literacy of parents and dental service use rates of their children enrolled in Medicaid. The quantitative methodology chosen is discussed, along with the research questions and hypotheses that were tested. Each research question will be examined. The protocol to conducting the study is provided, along with any ethical concerns, and limitations. Chapter 3 concludes with a discussion on how data were organized, evaluated, and disseminated.

Chapter 4 provides a summary of the demographic characteristics of the study population and a detailed review of the data collection process. An analysis of the data is provided, along with tables to summarize the findings.

Chapter 5 consists of a detailed discussion of the results of the data analysis. An interpretation of the data is provided, as well as a detailed review of the study's limitations. The chapter concludes with recommendations for future research studies.

Chapter 2: Literature Review

Introduction

Chapter 2 encompasses a review of research conducted to understand trends in dental service use and provisions needed to maintain a good oral health status, especially for children. An overview of the oral health disparities affecting individuals in the United States and programs designed to reduce those disparities will follow. A person's level of oral health knowledge, access to, and use of dental services are discussed below to provide an understanding of how those factors contribute to whether or not dental services are used. The barriers affecting dental service use for the Medicaid population are discussed, which leads to a discussion on the possible correlation between oral health literacy and dental service use.

To conduct this literature review, articles published within the last 2 decades were examined to highlight the most up-to-date data published to provide an understanding of dental service use in various populations. The articles were researched using the online libraries from Walden University and the University of Tennessee Health Science Center, and stored using the Endnote X4 software program. Databases searched included CINAHL, PubMed, MEDLINE@ Ovid, PsychINFO, and ProQuest Central. Keywords and phrases such as *oral health, oral health disparities, oral health knowledge, dental health, tooth decay in children, Medicaid, dental utilization,* and *public insurance* were used individually and in various combinations to produce the literature review to follow.

Introduction to Tooth Decay

Tooth decay is the leading chronic illness affecting children in the United States and is more prevalent than asthma and hay fever (CDC, 2011b; Parthasarathy & John, 2008). Tooth decay is caused by the demineralization of the two outermost layers of the teeth; dentin and enamel (Parthasarathy & John, 2008). This demineralization is a result of the overgrowth of normally occurring bacteria that has interacted with dietary sugars left on the teeth and in saliva (Parthasarathy & John, 2008). While the presence of the bacteria is a causative factor in the development of caries, other risk factors such as eating habits and oral hygiene habits can increase the risk of children developing tooth decay at a young age, also known as early childhood caries (Parthasarathy & John, 2008).

Prevalence of Tooth Decay

The prevalence of tooth decay has been a public health concern for decades. This prevalence has seen some increases and declines in recent years. The prevalence of tooth decay also varies from and within countries, as well as between ethnic groups and by poverty status.

By ethnicity. A person's ethnicity has been correlated with the prevalence of tooth decay. Edelstein and Chinn (2009) studied the results of the 1988 to 1994 and 1999 to 2004 NHANES and reported that approximately 39% of European American children experienced tooth decay compared to 55% of Mexican American children and 43% of African American children. The rate of untreated tooth decay was 60%, 64%, and 50% for Mexican Americans, African Americans, and European Americans, respectively

(Edelstein & Chinn, 2009). Using the same national survey, Tomar and Reeves (2009) highlighted the national and state trends in decay for children. Data suggest that, despite the overall decrease in the prevalence of tooth decay, children between the ages of 2 years to 4 years have experienced an increased prevalence of tooth decay. The 1988 to 1994 NHANES reported that 18.49% of children in this age group had tooth decay, which increased to 23.67% in the 1999 to 2004 report. African American and Mexican American children aged 6 years to 8 years also experienced an increase in the prevalence of tooth decay between the two study periods from 49.41% to 56.12% and 63.85% to 68.53% respectively (Tomar & Reeves, 2009). These findings support the need to eliminate barriers that contribute to the high prevalence of tooth decay.

By poverty status. The prevalence of tooth decay in the United States has decreased over the past 2 decades as a result of increased awareness and initiatives that will be discussed below, but early childhood caries has increased by 15.2% in children aged 2 years to 5 years (Dye et al., 2007). A comparison of the National Health and Nutrition Examination Surveys conducted from 1988-1994 and 1999-2004 revealed an increase in the number of decayed and filled surfaces (dfs) of primary teeth in 2-year-olds to 11-year-olds. For three-year-olds living below the FPL, the mean dfs score was two in the 1988 to 1994 report, which increased to a mean dfs score of five in the 1999 to 2004 report (Dye et al., 2007). In contrast, all other age groups experienced a decrease in the prevalence decayed, missing, and filled teeth between the two reports (Dye et al., 2007). Dye and Thornton-Evans (2010) continued the work of Dye et al. (2007) by identifying

trends in tooth decay by poverty status. In their analysis, Dye and Thornton-Evans identified three poverty levels. Poor families were those living at less than or equal to 100% of the FPL. Near poor ranged from100%-199% of the FPL, and the nonpoor were greater than or equal to 200% of the FPL. All three subgroups experienced an increase in tooth decay in children aged 2 years to 4 years. The percent difference was highest for near poor children at 6.6%, followed by the poor at 5.5% and nonpoor at 4.5%. Poor and near poor children aged 6-8 years had a 5.6% and 2.2% increase, respectively, between the two study periods, but nonpoor children had a 0.6% decrease (Dye & Thornton-Evans, 2010). These findings support the idea that a person's poverty status may be considered a barrier to preventing tooth decay.

By gender. Differences in the prevalence of tooth decay have been noted between genders. Dye and Thornton-Evans (2010) also used the NHANES to highlight the difference in the prevalence of tooth decay between boys and girls. Nonpoor children experienced a 10% to 15% increase in the prevalence of tooth decay between the 1988 to 1994 and the 1999 to 2004 NHANES surveys. A comparison between boys and girls revealed no change for girls, but an 8% increase in tooth decay was observed for boys aged 2-years-old to 4- years -old. The rate of untreated tooth decay in nonpoor 2- to 4-year-olds was 5%, with boys in this category having an increase of 7% (Dye & Thornton-Evans, 2010). Boys tend to experience tooth decay at greater rates than girls,

Effects of Tooth Decay

The effects of tooth decay are not specific to any age group. One cannot experience total health in the presence of tooth decay (CDC, 2011a). Tooth decay can lead to tooth loss in individuals of all ages. While tooth decay has adverse effects in adults, with 25% over the age of 64 years having lost teeth, similar effects are noted in children (CDC, 2011c). Tooth decay in children can lead to unwanted pain and affect a child's ability to eat, speak, learn, and socialize (CDC, 2011c). Tooth decay also leads to early tooth loss in children, which can have an effect on a child's ability to speak and diminish a child's self-esteem due to appearance (AAP, 2011). Tooth decay in primary teeth is an indicator of the prevalence of tooth decay in permanent teeth (AAP, 2011). Early childhood tooth decay can result in a need for extensive dental treatment, which amounts to increased health care cost (AAP, 2011). Approximately 51 million hours of school are missed each year by children with tooth decay (Parthasarathy & John, 2008). In a survey conducted between 1997 and 1999 of second grade children in New York state, Kumar, Green, Coluccio, and Davenport (2001) found that, compared to the Healthy People 2000 objectives, all categories of children experienced tooth decay at a higher percentage than the 35% set by Healthy People 2000. Tooth decay was experienced by 51% of the children in the study. Those from nonpoor homes experienced tooth decay at 44.9%, significantly lower than those from poor homes at 60.7% (Kumar et al., 2001). A person's poverty status not only affects their health status, but also their access to care.

Dental Service Use

Dental service use characterizes the extent to which individuals use dental services for any reason. The trends in dental service use vary by and within a country and by many other factors, including behavioral, environmental, and demographic factors. Various factors affecting dental service use and actions taken to reduce those factors will be discussed.

Dental Service Use in the United States

The use of dental services in the United States is determined by many factors. In this section, I highlighted the effect of the dental workforce on dental service use, as well as the role that dental insurance plays in allowing individuals to access needed dental services in the United States. I stopped reviewing here due to time constraints. Please go through the rest of your chapter and look for the patterns I pointed out to you. I will now look at Chapter 3.

Dental Workforce. The availability of dentists determines whether or not individuals access needed dental services. When compared to the medical workforce, the dental workforce has experienced a decline in active providers (Mertz & O'Neil, 2002). While there are 286 physicians to 100,000 individuals, there are only approximately 60 dentists to every 100,000 individuals. In 2020, the dentist to population ratio is expected to decline to 52.7. A similar ratio was observed in 1978 (Mertz & O'Neil, 2002). There were an estimated 49 million people living in the 4,091 areas considered to be dental health professional shortage areas in the United States (Mertz & Mouradian, 2009). In

February of 2012, there were 4,438 dental health professional shortage areas (Health Resources and Services Administration, 2012).

Low access to dental services can also be attributed to the location of available dentists. A dentist's geographic location is also a factor in determining if individuals visit the dentist. Allison and Manski (2007) studied a rural population of adults in Kansas to determine if there were observed differences in use between those residents and residents in nonrural populations. With an odds ratio of 1.34 (P= .01), individuals in rural areas were less likely to utilize dental services when compared to individuals in metropolitan areas. A comparison of the number of available dentists in a county resulted in an odds ratio of 1.01. Residents in counties with a higher concentration of dentists used more dental services. Allison and Manski (2007) suggest that public policies address issues of rural access to dentists.

Availability of Dental Insurance. Access to dental insurance is not as readily available as medial insurance, even for individuals with medical insurance coverage. Approximately 45% of Americans under the age of 65 years were without dental insurance coverage in 2008 (Bloom & Cohen, 2010). The National Health Interview Survey also revealed that only 15.2% of individuals in the United States had access to dental insurance via an employer, and African Americans were more likely to have dental insurance compared to other ethnic groups. A direct correlation was found between income level and access to dental insurance. As the individual's income level increased,

so did their access to dental insurance (Bloom & Cohen, 2010). This finding supports the idea that better insurance opportunities are afforded to individuals with higher incomes.

A study by Cruz, Chen, Salazar, Karloopia, and LaGeros (2010) studied Asian American, Mexican American, and African American Caribbean immigrants residing in New York City, and noted that 71.8% of participants rated their oral health as fair or poor. Likewise, 77.7% of the population stated they did not have dental insurance. When asked if the participants had a regular source of dental care, 80% of the study participants answered "no". Cruz et al. (2010) concluded that dental insurance and having a regular source of dental care were predictors of dental service use. There was no significant association between ethnicity and dental service use (Cruz et al., 2010). While other researchers have correlated dental use with ethnicity, this study confirms that a lack of insurance affected dental service use.

A survey of farm and ranch operators found that out-of-pocket dental expenses led to increased healthcare debt, even for respondents with insurance (Pryor, Prottas, Lottero, Rukavina, & Knudson, 2009). An annual average of $873 in out-of-pocket dental expenses was reported for 73% of individuals with dental insurance and 77% without dental insurance. Respondents reported delaying dental care because of the added financial burden (Pryor et al., 2009).

Manski, Macek, and Moller (2002) also found an association between an individual's dental insurance status and income level. While individuals without dental insurance coverage do not visit the dentist, some individuals with private dental insurance

coverage also reported not visiting the dentist. Manski et al. (2002) conducted a national study and found that 51% of U.S. residents had some form of private dental insurance. Data from the 1996 Medical Expenditure Panel Survey concluded that individuals with private dental insurance were more likely to have at least one dental visit when compared to individuals without private insurance coverage. Data based on income level demonstrated that 43% of the poor with dental coverage reported having a dental visit. Dental visits were also reported at 43%, 55%, and 63% for those in the low, middle, and high income brackets, respectively. Dental visits reported for individuals without private dental coverage were 20% for poor, 22% for low income, 30% for middle income, and 42% for high income populations (Manski et al., 2002). One of the developmental objectives for Healthy People 2020 is to reduce the number of individuals who delay obtaining needed dental care by increasing their access to dental insurance (Healthy People, 2011b).

Dental Service Use Among Children

Because of the continued prevalence of tooth decay, it is imperative to take a look at dental use trends of children. As with adults, many factors affect dental service use for children. Significant factors such as parental habits, parental knowledge, and children's access to dental insurance, will be discussed in the following paragraphs.

Result of Parental Habits. Many factors contribute to a family's use of dental services. Child oral health practices can be linked to that of their parents and caregivers (Sanders, Lim, & Sohn, 2008). Webster, Ware, Ng, Post, and Risko (2011) reported that

62 of 184 parents (33.7%) had not visited the dentist in over two years. Approximately 80% of parents reported brushing their teeth twice a day compared to only 52.5% of children. Sanders et al. (2008) suggested that a lack of priority for primary teeth resulted in the difference between parent and child. They did note, however that children of parents who brushed twice a day were 7.5 times more likely to brush twice a day. Parents reported underuse of dental services due to a lack of insurance and no established dental office where they could receive dental services (Webster et al., 2011). A lack of dental insurance reduces the chances for children to be established with a dental office to receive services.

Farokhi et al. (2011) studied the effect of acculturation of Mexican American mothers on their child's oral health status. Participants were classified as Mexican-oriented, Mexican-oriented to balanced bi-cultural, slightly Anglo-oriented, and strong Anglo-oriented. Significant associations were observed between the mother's level of acculturation and her first dental visit. Mexican American mothers who received assistance through the Women Infants and Children program were more acculturated to American oral health practices (67% of the study population). No significant association was found between acculturation and child oral health status, but the authors observed oral health literacy challenges with the mothers understanding interview questions, even with translators present (Farokhi et al., 2011). Having greater access to public services did not put families in a better position to receive dental services.

Sanders et al. (2008) aimed to discover if a factor schema for capacity for resilience could correlate health resilience with tooth retention in adults, and further correlate health resilience in adults with the oral health status of their children. For this study, adults were considered to have good oral health if they retained 20 or more teeth. Health resilience in children was measured by low prevalence of tooth decay in primary teeth. Sanders et al. (2008) found that 29.2% of the study participants had a capacity for health resilience. No significant difference was noted in the number of retained teeth between the group with a capacity for health resilience and the more vulnerable group with participants retaining approximately 28 and 27 teeth, respectively. Children of health resilient parents had 20% fewer cavities at a follow-up visit when compared to children from vulnerable households (Sanders et al., 2008). This study supports the idea that barriers affect all aspects of an individual's health.

Result of Parental Knowledge. Understanding parental habits, may be easier after identifying a parents knowledge level. Luciano, Overman, Fraiser, and Platin (2008) studied a population of Hispanic adults to determine their level of oral health knowledge, and found that although 66% brushed more than once a day, and 33% flossed at least once a day, frequencies of dental visits were low. Barriers to use were noted relating to beliefs about the use of preventive services, and access to oral health care (Luciano et al., 2008). The level of oral health knowledge shaped by an individual's culture has the potential to affect their dental use trends. Hilton, Stephen, Barker, and Weintraub (2007) conducted a qualitative study involving African American, Chinese, Latino, and Filipino

care givers of children from 1 year to 5 years old. Emerging themes derived from the ethnic groups represented suggested that caregivers perceived primary teeth to be less important than permanent teeth because they would fall out and be replaced by the permanent teeth. Also the group held beliefs that dental checkups were only needed if problems existed. Other factors found to affect the children's oral health included parental fear, familial perceptions, and questionable practices of dental providers such as performing unnecessary services or billing for services that were not provided to the patients. In contrast to African Americans, Mexican American, and Philippine caregivers, Asian American caregivers believed that dental providers brought about healing (Hilton et al., 2007).

Dietrich et al., (2008) used the National Survey of Children's Health to identify differences in parental reports of their child's oral health status by race and ethnicity. This self-report from the 2003 survey allowed parents to rank the condition of their child's teeth as a measure of the child's oral health status. Race was classified as European Americans, African American, and Mexican Americans. For children aged three years to five years, 19.6% of European American parents rated their child's oral health as fair or poor, compared to 18.8% of African American, and 24.7% of Mexican American. For children aged six years to 11 years rates of fair to poor health were 38.3%, 38.8%, and 40.3% for European Americans, African Americans and Mexican Americans, respectively. When adjusting for age, sex, education, poverty level, dental insurance, and preventive care attitude the odds ratio of parents rating their child's oral health status as

fair or poor was 1.0, 1.2, and 2.2 (95% CI) for European Americans, African Americans, and Mexican Americans, respectively (Dietrich et al., 2008).

Wilson-Genderson, Broder, and Phillips (2007) also acknowledged that differences could be observed between a child's rating of his or her own health and the parents rating of the child's health. To identify a correlation between the two ratings, the authors conducted a study using the Child Oral Heath Impact Profile (COHIP). A nonrandom sample of participants were recruited for participation as they presented to three dental schools for pediatric, orthodontic, or craniofacial care appointments. Children presenting to these clinics were generally in the 8- to 15-year age range, and could provide a rating of their oral health-related quality of life. Spearman correlations were obtained on the overall oral health quality of life for the participants. This study found a low to moderate correlation (r = .33 (P< 0.0001)) between parental and child responses with. A comparison of the three test groups, craniofacial group, pediatric group, and orthodontic group, resulted in observed differences between the groups. Approximately 45% of children rated their health higher than the parental scores in the craniofacial group, whereas 46% of children in the orthodontic group rated their oral health lower than their parents' ratings. The difference in concordance suggests the need for multiple strategies of reporting to achieve the most accurate data (Wilson-Genderson et al., 2007).

Focus groups comprised of members of an Orthodox Jewish community residing in the United States found that there was a lack of knowledge about proper brushing

habits, and the influence of diet and nutrition on oral health (Scrambler, Klass, Wright, & Gallager, 2010). There was also the belief that parents had no control over oral health outcomes (Scrambler et al., 2010). Similar to results of other studies (Hilton, Stephen, Barker, and Weintraub, 2007; Mofidi, Zeldin, & Rozier, 2009), the participants did not view the primary teeth as being important. The Jewish community viewed tooth decay as a hereditary disease that is expected if decay was present in parents or grandparents (Scrambler et al., 2010). A significant finding was the parents' lack of time to teach oral health behaviors and the idea that such lessons should be learned in school (Adair et al., 2004; Scrambler et al., 2010).

Southward et al. (2008) conducted a study of day care children in Mississippi to identify predictors of early childhood caries in children. Study participants were all enrolled children less than six years old in 19 licensed centers whose parents completed and returned consents for participation. The parents were also asked to complete a survey consisting of demographic questions, as well as, educational level, and oral health habits for themselves and their children. Based on the bivariate analyses conducted, cavity and abscess history in parents were predictors of the child having urgent dental needs at an odds ratio of 10.23 and 3.32 ($P \leq 0.05$) respectively, but no predictors of early childhood caries. Counter to what the researchers hypothesized, children who had seen a dentist within a year had a greater odds of having early childhood caries (1.18) and urgent treatment needs (0.40). Children who had not visited a dentist in over a year had a 0.54 odds ratio ($P \leq 0.05$) of having early childhood caries, and 0.24 odds ratio ($P \leq 0.05$) of

having urgent dental needs (Southward et al., 2008). This study supports the idea that parents may use dental services more frequently due to an increased prevalence of tooth decay.

A qualitative study by Lopez del Valle, Reidy, and Weinstein (2005) of a Puerto Rican population residing in the United States resulted in the identification of various emerging themes about tooth decay in children. Lopez del Valle et al. (2005) found that mothers and grandmothers considered tooth decay to be a part of childhood, and were unaware of the complications associated with tooth decay in primary, or baby, teeth. The study participants related good oral health to teeth being straight, white, and free of stains. The participants also noted receiving conflicting messages about the appropriate age to begin home care practices, or the age to schedule the child's first dental visit. Mothers were also unaware that primary teeth played an important role in the development of the permanent teeth (Lopez del Valle et al., 2005). Mofidi, Zeldin, and Rozier (2009) also conducted a qualitative study of a population of parents, pregnant women, and head start staff to determine their role in preventing tooth decay. Focus groups were conducted to identify themes relating to determinants of children's oral health. The four head start staff focus groups were comprised of health service workers, teachers, and program coordinators. Researchers found that head start staff were familiar with the importance and need for oral health care, but were unsuccessful in their efforts to convince parents likewise. The focus groups consisting of parents and pregnant women identified a lack of importance and priority in caring for primary teeth as determinants to

children's oral health. The researchers concluded that there was a need to improve the communication between the parents and staff in getting the parents to understand their role in caring for the teeth of their children (Mofidi et al., 2009).

Children's Access to Dental Insurance. A child's access to dental insurance has the potential to affect his or her use of dental services. Pourat (2008) found a correlation between the availability of dental insurance and dental service use in a California population of children under the age of 12 years. For those not covered by insurance, 40% had never been to the dentist, and another 25% had not visited the dentist in over six months. Only 17% of children covered by private insurance had not visited the dentist (Pourat, 2008). Pourat (2008) suggested that services be offered to parents to increase their understanding of dental diseases with hopes of increasing their use of the services available. Pourat and Nicholson (2009) highlighted the significance of having dental insurance for children. They noted that children with dental insurance missed fewer days from school for dental related problems, compared to uninsured children who missed two or more days at a time (Pourat &Nicholson, 2009).

Macek, Wagner, Goodman, Manz, and Marrazzo (2005) found a significant correlation between oral health use for children and parents' educational level. This study involving kindergarten and third grade students in Maryland found that 72% of parents had more than 12 years of education, and 72.2% of children were ineligible for free or reduced lunch. The children of parents with more than 12 years of education visited the dentist at 80.2%, compared with 55% for children of parents with less than 12 years of

education. Approximately 81% of children with private dental insurance had a dental visit during the study period. Patterns of dental visits were observed for children on Medicaid and the uninsured at 63.2% and 63.3%, respectively (Macek et al., 2005). Although families had access to dental insurance thorough Medicaid, they used dental services at the same rate as the uninsured.

Dental Service Use Among Medicaid Recipients

Medicaid recipients are a unique population of people. They have access to dental insurance through the Medicaid program. Even with this access, there are many factors that affect dental service use for this population.

Comparison of dental plans. While Medicaid has been providing insurance coverage for more than 40 years (Brickhouse, Rozier, & Slade, 2008), the State Children's Health Insurance Program (SCHIP) was implemented in 1997 as a supplement to Medicaid in an effort to provide dental coverage for children in families ineligible for Medicaid but with incomes below 200% of the FPL (Wall & Brown, 2008). Wang, Norton, and Rozier (2007) studied the effects of SCHIP on use, and found that children living in states which implemented SCHIP were 4% less likely to suffer from unmet dental needs compared with children living in states that had not implemented the new program. Results of the 1997 to 2002 National Health Interview Survey identified a decrease in the overall percentage of children with unmet dental needs from 9.7% in 1997 to 8.8% in 2002. There was no significant decrease in unmet dental needs six months after implementation but results were evident for children with one year of continuous

enrollment in SCHIP (Wang et al., 2007). Access to dental insurance is beneficial to children by providing them with access to dental care they otherwise, would not have.

Isong and Weintraub (2006) conducted a study of 2- to 11-year old children residing in California. This study identified approximately 19% of this population on Denti-CAL (Medicaid), 52% with private insurance, 5% enrolled in SCHIP, and 23% uninsured. Of the 23% that were uninsured, 57% were eligible for Medicaid or SCHIP. The odds ratio of having a dental visit in the year preceding the study were 1, 0.5, 1.4, and 1.1 for SCHIP, Uninsured, Denti-CAL, and private insurance holders, respectively. Children enrolled in SCHIP were also more likely to have unmet dental needs due to lower rates of dental service use as a result of disruptions in continuous enrollment in an insurance plan, and the lack of a usual source of health care (Isong & Weintraub, 2006). Brickhouse et al. (2008) compared dental service use rates of kindergarten children enrolled in two public insurance programs, Medicaid and SCHIP. A comparison of participants in the two public insurance plans and uninsured children found that 20% of children not enrolled in either plan had untreated tooth decay, while 30% of enrolled children had untreated tooth decay. A comparison of the two public insurance programs found that 24% and 36% of SCHIP and Medicaid children had untreated tooth decay. Brickhouse et al. (2008) identified better use trends for children in the expanded public insurance program. This study also supports the idea that access to dental insurance reduces the prevalence of untreated tooth decay.

Kempe et al. (2005) conducted a study of a population of families recently enrolled in the new SCHIP program. Participants were selected to complete a phone interview two months after enrollment and at a one year follow up. Kempe et al. (2005) found that the rate of unmet dental needs was 46.8% at the time of the new SCHIP enrollment in 1998, and decreased to 37.3% at the one year follow up for a Colorado population (Kempe et al., 2005). The SCHIP program in Colorado was successful in increasing access to dental care, and in turn reducing the unmet dental needs of this population of children (Kempe et al., 2005). A similar retrospective study was conducted using data from 35 states that had implemented SCHIP. Liao, Ganz, Jiang, and Chelmow (2010) found that children on SCHIP were more likely to have received a preventive dental visit (1 year odds ratio= 1.05, 2 years odds ratio= 1.14, 3 years odds ratio= 1.30) after enrollment in SCHIP than before enrollment (odds ratio= 0.31). This study also showed that 29.12% of children between the ages of 6-10 and 23.54% between the ages of 11 years and 16 years reported having more than one dental visit per year. Only 16.56% of children between ages 3 years and 5 years had more than one dental visit (Liao et al., 2010). Federico, Steiner, Beaty, Crane, and Kempe (2007) also found that children continuously enrolled in an insurance program had fewer problems with access and utilization when compared to those uninsured. When there were disruptions in insurance coverage, access was similar to that of those who were uninsured (Federico et al., 2007).

Risk factors. Risk factors such as being from a low socioeconomic status, being a minority, living in an underserved community, and a lack of health insurance all

contribute to an underutilization of dental services, but when multiple risk factors are examined, the rates of use are even more so affected (Stevens, Seid, & Halfon, 2006). A comparison of children that were insured under the public insurance plan in California and uninsured but eligible for public insurance found that those uninsured were less likely to seek dental care with a prevalence ratio of 0.97. However, those with a minimum of risk factors were better able to obtain care by using public health clinics for services. Those children with a number of risk factors were less likely to overcome those risk factors to seek the appropriate care (Stevens et al., 2006).

Special needs children covered by Medicaid experience use barriers of their own (Mitchell & Gaskin, 2008). A comparative study of two Medicaid plans that provide coverage for special needs children found that regardless of the plan, use of preventive services declined over a three year period (Mitchell & Gaskin, 2008). Noted barriers for treating this population are dentists' lack of training with special needs patients, extent of behavioral problems, and lack of office space to accommodate special needs patients (GAO, 2008). Children with chronic health conditions are also less likely to receive dental care. The severity of the conditions reduces the likelihood of dental service use. Young children with chronic conditions are more likely to have received some form of preventive and restorative dental care when compared to older children (Chi, Momany, Neff, Jones, Warren, Slayton, et al., 2011). Better training in needed to support the oral health needs of children with other medical conditions.

Provisions for Dental Service Use

Many provisions have been identified that aid individuals in obtaining needed dental care. Extensive provisions cater to low income individuals, especially children, who are disproportionately affected by dental diseases like tooth decay.

Healthy People 2020. The Healthy People objectives were designed to focus on various public health issues in an effort to bring awareness and foster a nationwide effort to enact change (HealthyPeople.gov, 2011a). Health improvement priorities are identified and further monitored to track improvements (HealthyPeople.gov, 2011a). The oral health objectives outlined by Healthy People seek to reduce dental decay in the United States (HealthyPeople.gov, 2011d). These indicators affect individuals of all ages. Specific objectives address the importance of reducing dental decay in the youngest members of the American society. Programs have also been established to monitor the progress made in reducing oral health disparities (HealthyPeople.gov, 2011d).

The oral health objectives from 2000 to the present address the need to increase the number of individuals using oral health services, and is one of the leading health indicators for the 2020 objectives (HealthyPeople.gov, 1995, 2011a). In 2007, approximately 44.5% of Americans aged 2 years and older had a dental visit in the prior 12 months. The target for 2020 is 49% (HealthyPeople.gov, 2011d). Other healthy people objectives have a direct impact on the use of dental services. The access to health services objectives address the need to reduce the number of individuals who are unable to obtain necessary dental care. The baseline data retrieved in 2007, reported 5.5% of Americans

could not obtain needed dental care. A 0.5% decrease is proposed for 2020 (HealthyPeople.gov, 2011b).

Healthy People 2020 objectives seek to identify factors that affect the health of individuals (HealthyPeople.gov, 2011e). A recently added objective, Social Determinants of Health, highlights the need to address and seek to eliminate barriers which prevent individuals and communities from becoming healthier Americans. This objective addresses key determinants such as the availability of resources, transportation, educational materials, access to mass media, and culturally sensitive health materials (HealthyPeople.gov, 2011e). Lastly, Healthy People 2020 objectives focus on improving the health literacy of Americans, by increasing the number of providers who give their patients easy to understand and follow instructions (HealthyPeople.gov, 2011c). A person's ability to effectively communicate their health needs, as well as, understand health terminology places them in a position to make informed decisions about their health needs (HealthyPeople.gov, 2011c). The provisions set by Healthy People 2020 ensure that progress is made in areas such as increasing the use of dental services, which helps to reduce the prevalence of tooth decay.

Affordable Care Act. The Patient Protection and Affordable Care Act (ACA) was signed into law in March, 2010 after several debates on health insurance reform (Edelstein, Samad, Mullin, & Booth, 2010). Within this act were more than 30 dental care provisions which focused on providing necessary care to children. Key components of this act include increasing funds for training of dental professionals, loan repayment

options for professors and clinicians, innovation strategies for the dental workforce, and providing improved surveillance for dental service use (Edelstein et al., 2010).

The oral health provisions in the ACA were derived from the 2001 U.S Surgeon General's report that acknowledged the increasing prevalence of oral health problems for many segments of the population (Summerfelt, 2011). This report also acknowledged the steady decline in practicing dentists, and an even greater reduction in the availability of practicing dentists in rural areas. Dentists accepting Medicaid patients have also become difficult to locate due to the administrative burden placed on dentists for Medicaid enrollment. To this end, the ACA allocated $60 million to implement projects to assist with increased reimbursement rates for dentists, increase training for mid-level dental practitioners to work in underserviced areas, and expand dental care to individuals at or below 133% of the FPL (Summerfelt, 2011).

Barriers to Dental Service Use for Medicaid Recipients

Children on Medicaid have access to dental insurance through the Medicaid program. Despite their access and the many dental service provisions, barriers continue to exist for this population. Some of the experienced barriers include the limited availability of dentists accepting Medicaid and the limited access to Medicaid services. A discussion on policy changes and programs designed to reduce those barriers will follow.

Availability of Dentists

An individual might assume having dental insurance eliminates the most significant barrier to use, but even with dental coverage, populations still do not receive necessary care. Children on Medicaid are faced with a limited number of dentists accepting Medicaid. Furthermore, for those dentists accepting Medicaid, only a limited number of services are provided to patients.

Dentists accepting Medicaid. Having access to Medicaid does not ensure the availability of a dental provider to deliver services. Sweet, Damiano, Rivera, Kuthy, and Heller (2005) compared the rates of dental use between adults insured by a private plan, Delta Dental, and Iowa Medicaid. Dental claims were used to identify trends in use by these two populations of people. During the study period, 69.3% of the privately insured individuals used dental services, compared to only 27.2% of Medicaid enrollees. Secondary services, such as dental fillings, were provided for 81.3% of privately insured individuals and 65.4% of individuals on Medicaid. More extensive services were rendered to 27.4% of the Medicaid population, and 7.1% of those covered by private insurance. This study did not investigate the reasons for the differences in use, but the authors hypothesized factors such as access to care and perceived need for care contributed to the underuse of dental services by the Medicaid population (Sweet et al., 2005).

Fisher and Mascarenhas (2007) conducted a study using data from the 1999 to 2004 National Health and Nutrition Examination Survey to determine if Medicaid

increased use of dental services. Participants for the study were Medicaid-eligible children ages 2 years to 16 years. Findings reported approximately 40% of Medicaid eligible children were uninsured. Sixty eight percent of uninsured children had not visited the dentist in the past year compared to 61.5% of Medicaid enrolled children. Underuse of dental services was attributed to a lack of participating providers (Fisher & Mascarehas, 2007). Providers must be willing to provide care to individuals on Medicaid in an effort to reduce the prevalence of untreated disease.

Damiano, Momany, Carter, Jones, and Askelson (2008) studied time to first dental visit after enrolling in Medicaid or S-SCHIP for Iowa residents. Differences were observed based on the plan available. While the different plans were similar, differences were noted in the access to participating providers. Participants in the traditional Medicaid program had a 0.23 probability of visiting the dentist within six months of enrollment, as well as a 0.21 probability for children enrolled in the S-SCHIP program with limited participating dentists. Children enrolled in the S-SCHIP plan with access to any willing dentist had the highest probability (0.36, $P< 0.001$) of being seen within the first six months after enrollment. The probability of receiving dental care increased as time since enrollment increased. Damiano et al. (2008) suggested variations in time to first visit may be factors of perceived dental need for children and ease in finding dental providers accepting their dental health plan.

Shortridge and Moore (2009) discovered that even with Medicaid insurance, some recipients had difficulty accessing a dentist; therefore they used emergency departments

as a source of treatment for oral health related problems. Emergency department visits for Medicaid insured persons were similar to persons that were uninsured (Shortridge & Moore, 2009), which is indicative of the shortage in dental providers accepting Medicaid (GAO, 2008). Edelstein (2010) noted the most efficient plan of action to increasing the number of dental providers to treat underserved populations is implementing policy changes that affect dental education and acceptance of Medicaid patients.

Okunseri, Bajorunaite, Abena, Self, Iacopino, and Flores (2008) studied the racial and ethnic composition of Wisconsin dentists accepting Medicaid patients into their practices. Of the 2, 078 dentists completing the survey, 5% reported being minority dentists (Okunseri et al., 2008). Mertz and O'Neil (2002) also noted the lack of minority dentists in the U.S. workforce with 13% representing ethnicities other than European American. Results of the study by Okunseri et al. (2008) found that 35% of minority dentists would accept new Medicaid patients into their practice, compared with only 19% of European Americans accepting these patients. Forty-four percent of dentists working in government clinics and 19% working in nongovernment practices accepted new Medicaid patients (Okunseri et al., 2008). There is a lack of private practice dentist willing to accept Medicaid patients into their practice.

Types of services provided. Variations were also observed in the types of services provided to Medicaid patients. Taichman, Sohn, Lim, Eklund, and Ismail (2009) studied a Michigan population of five- to 12-year old children, and found that an average of eight diagnostic and preventive services were performed by a diagnostic and

preventive provider (DP) per child compared to 6.9 services from a comprehensive provider (CP). Children being treated by DPs were less likely to have received restorative treatment, only 17.1%, compared with children seen by comprehensive providers, 35.6%. This study found a significant association between the type of provider and the type of services rendered to Medicaid enrolled children (Taichman et al., 2009). This study supports the idea of the need for providers willing to provide comprehensive care to patients.

Siegal and Marx (2005) made comparisons between general dentists and pediatric dentists in their treatment of Medicaid insured children up to age 5 years. Fifty seven percent of pediatric dentist and 69% of general dentist placed stipulations on treating such children, with a majority only accepting patients of record (40% of general dentists), or only providing care to referred children (35% of pediatric dentists). Twenty one percent of general dentist and 25% of pediatric dentists would only accept Medicaid patients for emergency services (Siegal & Marx, 2005). Chi and Milgrom (2009) found that children covered by Medicaid receiving restorations were more likely to have a preventive sealant placed and less likely to return for other preventive services such as biannual cleanings and fluoride applications. Children being treated in a pediatric office were more likely to receive preventive services (73.2%) and were considered to have a dental home (14%). General dentists provided preventive services at 64% and provided a dental home for 12.1% of Medicaid enrolled children in this study (Chi & Milgrom, 2009).

A study of Iowa dentists was conducted to understand the dental referral pattern of children (McQuistan, Kuthy, Daminano, & Ward, 2006). Amongst three age groups, children younger than 3 years, 3- to 5-year olds, and 6- to 14-year olds, 17.03% of dentists cited that they would often refer 3- to 5-year old children to a pediatric dentist. Approximately 20% of the study participants stated that if more than 5% of the patients were on public insurance, they almost always referred these patients to another office. No specific reasons were cited for the referral of patients on public insurance (McQuistan et al., 2006).

When Seale and Casamassimo (2003) conducted a study of dental practitioners, they found that only 9% of the dentist did not treat children in their practices. Forty-four percent of those not treating children stated that their practices were not suitable for children, while 13% of the dentist did not feel they had adequate training. For the 91% who did treat children in their practices, the children's ages varied. Twenty-eight percent of the dentists did not treat children under the age of 4 years in their practices. Seale and Casamassimo (2003) concluded that very young children and children on public insurance rarely received dental services. Other barriers noted by dentist are their perceptions that young children are not capable of behaving appropriately to receive dental care, and the dentists feel pressed for time, and treating children caused undo stress for providers (Pine et al., 2004). Lee and Horan (2001) also sited difficultly finding a provider, as well as, transportation issues, distance, and difficultly communicating with health plans and insurance providers as barriers to care. For children enrolled in

Medicaid, preventive services and restorative services were used at 30.5% and 17.8%, respectively. Differences in use were noted based on race, age, sex, geographic location, and Medicaid plan. Also, public health dental centers provided a significant amount of care to this population (Lee & Horan, 2001).

Pourat and Finocchio (2010) also cited data from the 2005 California Health Interview Survey correlating race and ethnicity as barriers to dental service use for Medicaid enrolled children. A study of the time since last dental visit found that 75% of European American children had had an exam within the six months preceding the study compared with 66 % of African American children, 68% of Mexican American children, and 73% of Asian American children. African American and Mexican American dentists make up 1% and 11%, respectively, of the dentist population in California. Pourat and Finocchio (2010) hypothesized a variation in the dentist- patient ethnicities, and difficulty in keeping appointments as barriers to accessing dental care for these ethnic populations.

Access to Medicaid Services

A qualitative study was conducted of caregivers of Medicaid enrolled children to understand their experienced barriers with dental service access (Mofidi, Rozier, & King, 2002). This study, which included African American, European American, Mexican American, and American Indian parents identified several emerging themes which included difficulty in finding Medicaid providers, discrimination by dental office personnel, extended wait times for appointments, and discouraging interactions with the dentists as their perceived barriers to dental service utilization. These emerging themes

were consistent across all ethnic groups represented in this study (Mofidi et al., 2002). Dentists often make decisions to treat patients based on the value that patients put on their oral health, as well as, patterns in retaining dental appointments, and the relationship that a dentist has with the patient (Brennan & Spencer, 2002).

Knowledge of adjunct services. Stuber and Bradley (2005) conducted a study involving 11 geographical locations in the United States to understand perceived barriers to Medicaid enrollment. A survey to identify knowledge about Medicaid found that 56% of participants answered three or more questions incorrectly. Respondents were unfamiliar with eligibility requirements and locations to apply for Medicaid. Forty one percent, 34%, and, 27% stated translator issues, transportation issues, and inconvenient office hours, respectively, as barriers to accessing Medicaid. Reducing barriers for caregivers increases the likelihood of obtaining insurance coverage for their children (Stuber & Bradley, 2005). Kelly, Binkley, Neace, and Gale (2005) also conducted a qualitative study of caregivers to identify perceived barriers to dental use. This study found differences in attitude and behaviors between the groups of parents whose children used dental services, and parents whose children did not use dental services. Caregivers that used dental services cited the importance of instilling healthy habits, preventing dental problems, and correcting problems early as their beliefs for accessing dental care for their children. Non-users, on the other hand, cited the importance of having white teeth, fresh breath, and preventing low self-esteem as their oral health beliefs. This study also found that both users and nonusers were unfamiliar with the services provided to

young children, but the using parents were familiar with adjunct services provided by Medicaid (Kelly et al., 2005). Parents are more apt to use Medicaid services when they are familiar with all services available to them.

Efforts to Reduce Barriers

Efforts have been made to address and reduce barriers that prevent dental service use for children on Medicaid. These efforts address barriers from the environmental and behavioral perspectives. A retrospective study by Nietert, Bradford, and Kaste (2005) was performed to evaluate the effectiveness of a reform that increased Medicaid reimbursement rates. The authors found that before the reform a decline in access to dental providers was noted from 1998 to 1999. The reform was ordered to convince more dentists to accept new patients in their practices, and in turn provide better access for Medicaid recipients. After the reform in 2000, a sharp increase in use was observed. The greatest increase was observed for children between the ages of 2 years and younger with a 61.3% increase in diagnostic services, and a 59.2% increase in preventive services. Children ages 3 years to 21 years observed increases of 24.6% and 28.2% in diagnostic and preventive services, respectively (Nietert et al., 2005).

Policy Changes. Barriers have been noted on all levels that prevent use of dental services for low income households, and especially for children on Medicaid (GAO, 2009). Several policies have been enacted to ensure the availability of resources to reduce tooth decay in these high risk populations. These policies date back to the enactment of the Early Periodic Screening, Diagnosis, and Treatment (EPSDT) in 1967 (Edelstein et

al., 2010). This benefit allowed poor and low income children under the age of 21 to receive comprehensive health care by eliminating financial barriers (Edelstein et al., 2010).

Federal efforts to eliminate barriers to dental service use for Medicaid enrolled children include the Center for Medicaid Services (CMS) posting a policy document outlining a variety of policy issues pertaining to the delivery of Medicaid services (GAO, 2009). The agency also conducted focused dental reviews in 17 states. The reviews assessed the states' compliance with federal Medicaid mandates. Based on their findings, recommendations were made to the individual states to improve the delivery of Medicaid services. The CMS has also improved the monitoring of timely submissions of state data, which included providing technical assistance for states needing it. All states were also required to actively monitor the delivery of dental services to Medicaid recipients such as issuing oral health surveys, monitoring dental claims use trends. According to the report by the GAO, states have enhanced initiatives to recruit more dental providers to accept Medicaid patients, as well as, improved efforts to reach Medicaid-eligible families. Statewide dental use goals have also been set to monitor children's use of dental services. Even with all these advances, access is limited and use rates are still low (GAO, 2009).

Programs and Interventions. Many programs have been implemented to decrease the prevalence of untreated tooth decay in children (Felland, Lauer, & Cunningham, 2008). Although the programs are run according to the needs of the area, many of these programs include providing preventive care such as screenings, cleanings,

and some restorative care in school settings. Other programs include collaborating with dental schools and training facilities to provide care for underserved or low income populations (Felland et al., 2008).

Due to the limited use of dental services by the Medicaid population, Kobayashi, Chi, Coldwell, Domoto, and Milgrom (2005) implemented the Access to Baby and Child Dentistry (ABCD) program as an intervention for Spokane County, with Pierce County, Washington serving as the control county. Eighteen percent of third graders in Spokane County had untreated tooth decay, compared with 22% in Pierce County. Although not statistically significant ($P = 0.26$) the intervention helped to reduce decay in Spokane County. The intervention county also had fewer primary teeth needing crowns, fewer missing teeth, and more sound teeth when compared to children in Pierce County (Kobayashi et al., 2005). The ABCD program also proved successful for a group of Medicaid enrolled children in Washington. Lewis, Teeple, Robertson, and Williams (2009) studied the effect of the ABCD program on increasing the use rates for young children ($\leq$ six years) living in Washington. Medicaid children in this program had better access to a dentist, and therefore had a higher percentage of dental visits than Medicaid children not enrolled in the program. A comparison of Medicaid and privately insured children found rates of dental service use to be 23% and 37%, respectively. Use rates of children in the ABCD program were 45%, rendering the program successful in increasing use rates of those children (Lewis et al., 2009).

A survey by Harrison, Li, Pearce, and Wyman (2003) of low income households identified many barriers to dental care use such as not having a family dentist, inability to schedule appointments due to work constraints, and lack of finances. In an effort to increase use for this population, the Community Dental Facilitator Project was enacted in a Canadian community to assist families in need. This community project assisted families with applying for public insurance as well as schedule dental appointments and follow up treatment. Results of this study showed that of the 128 participants in the study, only 23 (17.2%) had public insurance dental benefits prior to interactions with the community facilitator. By the end of the project, the number of insured children increased to 71 (55.5%). Noted barriers for this intervention were families being dropped due to changes in address and contact information, and parents unwilling to participate due to mistrust in the public insurance system. Overall, the project was successful in increasing the number of children with dental benefits and access to needed treatment (Harrison et al., 2003).

An intervention study (Binkley, Garrett, & Johnson, 2010) for parents of Medicaid enrolled children found that the assistance provided by a dental care coordinator to obtain dental appointments significantly increased dental use rates for children who had not visited the dentist in the 2 years before the study was conducted. After the intervention, 43% of the intervention group received dental care compared to only 26% of the control group. Assistance with finding dental providers and scheduling appointments helped to increase dental service use (Binkley et al., 2010). Similar to

Binkley et al. (2010), Greenberg, Kumar, and Stevenson (2008) found dental case managers to be successful in increasing dental service use for families on Medicaid. An increase in services by 32% was observed after case managers assisted dentists in filling out Medicaid paperwork, and linked patients to participating providers (Greenberg et al., 2008).

An oral health education program for Mexican immigrant parents supported the notion of oral health knowledge being a predictor of behavior (Brown, Canham, and Cureton, 2005). The oral health education intervention was implemented for the study population that consisted of a pretest posttest design. Content of the intervention was designed to increase the oral health knowledge in an effort to make better decisions about their children's oral health. The intervention helped to improve the knowledge level of the 14 participants that took both the pre-and posttest. Half of those participants scored perfectly on the posttest, highlighting the success of the program (Brown et al., 2005).

Despite the many policy changes, programs, and interventions implemented to combat the underuse of dental services by the children enrolled in Medicaid, use rates remain low. Other factors must be explored to understand dental service use trends for this population. An emerging theme, health literacy, will be explored in the following sections.

Health Literacy

Health literacy is considered as the "ability to read, understand, act on health care information, and perform basic reading and numerical tasks required to function in the

health care environment" (Kang, Fields, Cornett & Beck, 2005, p. 409). Health literacy has been connected with a person's ability to make sound medical decisions. While there are various sources of printed materials available to patients, sometimes the materials are considered to be too advanced for the intended audience (Kang et al., 2005). The following sections will highlight studies that researched health literacy and the correlations between health literacy with medical and dental outcomes.

Studies of Health Literacy

In recent years, researchers have been studying the connection between health literacy and various health outcomes for individuals. A report by the National Institute of Dental and Craniofacial Research (NIDCR) (2005) also highlighted the possible correlation between oral health literacy and oral health outcomes. This report suggested that although there have been improvements in the oral health of Americans, preventable dental diseases are still prevalent. The authors of this report suggested literacy skills may affect how individuals perceive the importance of oral health issues, and therefore studies should focus on understanding the impact of literacy in the field of oral health (NIDCR, 2005). Jackson (2006) suggested that although there have been studies correlating high educational attainment in parents with higher prevalence of obtaining preventive dental care for children, these findings do not have any bearing on the relationship between oral health literacy and dental service use. Therefore, high educational levels do not guarantee high literacy levels in individuals. He also noted the correlations made between health literacy and medical outcomes, and suggested that further research be completed to

understand the correlation between health literacy in parents and dental outcomes for their children (Jackson, 2006).

Measuring Instruments. Various health literacy surveys have been constructed to test the literacy levels of individuals. Atchison, Gironda, Messadi, and Der-Martirosian (2010) studied a population of adult patients presenting to California dental clinic for treatment. Atchison et al. (2010) combined the Rapid Estimate of Adult Literacy in Medicine (REALM) with a dental component to create the Rapid Estimate of Adult Literacy in Medicine and Dentistry (REALM-D), an 84 item scale. Fifty seven percent of the study population (N=200) were European American, and 57% were male. Fifty seven percent also had at least four years of college. Overall, non European Americans scored the lowest on the REALM-D with a mean score of 76.2 compared to 80.5 by European Americans. Participants with four years of college scored on average 79.5. Those with a high school education or less scored an average of 75.6. This study found a positive correlation between REALM-D score and race, and educational level (Atchison et al., 2010).

Health Literacy and Medical Outcomes

Health literacy has received increasing attention as an emerging phenomenon because of its relationship with medical outcomes. A discussion of the relationships between health literacy and program participation and increased health care cost is to follow.

Program Participation. A study by Pati, Mohamad, Cnaan, Kavanagh, and Shea (2010) sought to find a correlation between the health literacy of Medicaid eligible mothers and the enrollment rates of their infants into public assistance programs. Eighty percent of the study participants were African American, and 77% were living with annual incomes below $12,000. Health literacy, for these participants, was measured using the short form of the Test of Functional Health Literacy (TOFHL) instrument. Multivariate logistic regression tests were used to make correlations. Pati et al. (2010) found that children whose mothers had marginal health literacy (scores ranging from 17-22) and adequate health literacy (scores higher than 23) were more likely to participate in Temporary Assistance for Needy Families (TANF) and the Food Stamp Program. Fifty nine percent of mothers with marginal health literacy participated in TANF, compared to 34% and 53% of mothers with inadequate and adequate health literacy, respectively. Pati et al. (2010) suggested that simplifying the application process, may increase participation for individuals with low health literacy.

Health Care Cost. Individuals that do not understand the importance of preventive health care tend to spend more money on more extensive treatment options. Weiss and Palmer (2004) found an association between low health literacy and increased health care costs in a Medicaid population residing in Arizona. Study participants were current enrollees in the Medicaid program and had been enrolled for the previous year. The participants' literacy skills were measured using the Instrument for the Diagnosis of Reading (IDR), and were classified as either at or below a third grade reading level or at

or above a fourth grade reading level. Health care charges were measured using health plan billing records for various medical services. Twenty four percent of the study participants were at or below a third grade reading level, and 76% at or above a fourth grade reading level. A multivariate analysis correlated IDR scores and medical costs at P=.037, with mean costs at $10,688 and $2,890 for low literacy and high literacy participants, respectively. The authors concluded that the significantly higher costs for low literacy participants was due to poorer health, which lead to increased medical costs (Weiss & Palmer, 2004).

Contrary to Weiss and Palmer (2004), Sanders, Thompson, and Wilkinson (2007) found no significant association between parental literacy levels and health care visits and costs. The short version of TOFHL was used to measure health literacy and hospital records, and Medicaid claims were used to monitor health care visits and charges. This study found children of parents with low literacy having more health care visits even though the difference was not statistically significant. Mean health care costs were $1657.90 and $1514.74 for children of caregivers with low health literacy and adequate health literacy skills, respectively (Sanders et al., 2007). These findings confirm that low health literacy levels lead to increased health care costs.

Health Literacy and Dental Outcomes

While most studies (Adair et al., 2004; Luciano et al., 2008; and Lopez del Valle et al., 2005) identified oral health knowledge of parents as one of many barriers to oral health care, Rudd and Horowitz (2005) sought to identify the effect that health literacy

had on the oral health status of older adults. Although there was a noted increase in dental care use for the older populations, the use of preventive care may have been neglected due to literacy related issues. Based on scores from the National Adult Literacy Survey 93% of the participants scored between zero to 325 out of 500 possible points. Thirty nine percent of participants scored in the lowest level with scores ranging from zero to 225, suggesting difficulty with understanding information provided in printed material. Rudd and Horowitz (2005) concluded that further research could identify links between health literacy and oral health outcomes.

Jackson, Coan, Hughes, and Eckert (2010) conducted a study involving adult patients receiving care from dental hygiene students in Indiana. As part of the study, participants were asked to complete a survey collecting demographic information and to answer the Short Test of Functional Health Literacy in Adults (S-TOFHLA). Of the 91 participants, 87% scored in the adequate level of health literacy, with 5% and 8% in the marginal and inadequate categories, respectively. Results of this survey correlated health literacy with the age of participants. Younger participants tended to score higher on the surveys. Eighteen to 39-year olds had a mean score of 33.7. The mean score for participants over the age of 70 years was 28.7. Spearman correlations with age were -0.32 (P= 0.0087), and -0.21 (P= 0.0879) with oral hygiene status (Jackson et al., 2010).

Macek, Haynes, Wells, Bauer-Leffler, Cotton, and Parker (2010) tested a new survey, Comprehensive Measure of Oral Health Knowledge (CMOHK), to determine the parents' level of oral health literacy. This study sought to test a new survey that

measured conceptual oral health knowledge. Of the study participants, 42% scored in the highest level of oral health literacy. Those respondents were older, had a higher level of education, and higher income. Those who scored poorly were from low income backgrounds with less than 12 years of schooling. No measures were made among races and ethnicities due to a low representation of ethnicities other than African American (Macek et al., 2010). Macek et al. (2010) suggested that future studies could use the instrument to identify relationships with oral health literacy and dental service use.

Few studies have been conducted to correlate oral health literacy with dental service use, but no studies have been conducted to correlate oral health literacy of parents and dental service use for their children enrolled in Medicaid.

Theoretical Framework

Many theories have been used to understand the dental service use patterns of individuals. With the use of theory, individuals can better understand the factors that influence acceptance and adoption of healthy behaviors. The Paasche-Orlow and Wolf (POW) Model, a health literacy framework, is discussed to highlight the theoretical components used to explain the correlation between oral health literacy of parents and dental service use for their children enrolled in Medicaid. A brief comparison of previously use frameworks is included.

Theories Used in Oral Health

Health Belief Model. The Health Belief Model (HBM) was developed in 1956 by members of the United States Public Health Service (Flaer, Younis, Benjamin, & Hajeri, 2010; Weld, Padden, Ramsey, & Garmon Bibb, 2008). The HBM attempts to predict behavior through an understanding of one's attitude and beliefs. This model suggests that individuals are motivated to change their behavior if they believe they are susceptible to a health threat and if they can perceive the benefits to changing such behaviors (Flaer et al., 2010). The HBM has been used to study health literacy, but the constructs do not focus specifically on concepts of health literacy (Weld et al., 2008). Flaer et al. (2010) studied the HBM to understand how its constructs assisted in increasing dental care use for underserved populations. Based on the participants' perceived susceptibility to dental disease, the authors found that individuals were more motivated to seek dental care based on their level of pain. Fear of losing teeth, and having unhealthy gums were also motivational factors, while fear of dental treatment negatively impacted participants' motivation to seek dental care. The participants' perception of the seriousness of dental diseases was also a factor that motivated them to seek dental care. Based on this concept, the HBM can help predict behaviors needed to actively seek dental care (Flaer et al., 2010).

Theory of Reasoned Action. The Theory of Reasoned Action (TRA)was constructed in 1975 by Martin Fisbein, with the help of Icek Ajen in 1980. This theory was designed to understand the relationship between attitude and behavior. The TRA

suggests that one's attitude is a prediction of their intent to perform a behavior. It also introduces the concept of subjective norm, which implies that a person's behavior is also a reflection of meeting the expectations set by others (Ajzen & Fisbein, 1980).

Theory of Planned Behavior. The Theory of Planned Behavior (TPB) was derived from the TRA, and has also been used to understand dental use patterns. Constructed in 1985, this theoretical framework implies that actions are observed based on an individual's intentions to perform a behavior, and their perceived control over that behavior (Ajzen, 1985). Luzzi and Spencer (2008) conducted a study of adult patients who had not received routine dental care in the previous year. Items on the questionnaire were designed to highlight the constructs of the TPB model. Mean scores for perceived behavioral control were 5.699, and a mean of 5.526 for behavioral intentions to seek dental care. Means scores for self-efficacy beliefs and perceived control beliefs were -2.763 and -6.632, respectively. The authors suggest that efforts be made to identify perceived barriers to dental use and design programs to address those barriers (Luzzi & Spencer, 2008). The HBM, TRA, and TBP have all been essential in understanding the barriers to dental care use, and have laid the foundation for a more extensive search for answers.

Health Literacy Models

While the aforementioned theories have been successful in their efforts to explain oral health behaviors, use of these theories have little success with understanding the role of health literacy in dental service use. The role of health literacy in understanding health

behavior emerged in the past two decades (Weld et al., 2008). The topic of health literacy has been at the center of discussions for both the Institute of Medicine and Healthy People 2020, because improving health literacy is one component in improving the health of this nation (HealthyPeople.gov, 2011e).

Zarcadoolas, Pleasant, and Greer Model. The Zarcadoolas, Pleasant, and Greer Model (ZPG) model is a health literacy model based on four aspects of literacy; fundamental, scientific, civil and cultural (Zarcadoolas, Pleasant, & Greer, 2005). This model proposes to be useful in understanding health communication with an emphasis on using that understanding to effectively access one's health literacy skills. The four concepts include an individual's ability to read, write, use scientific technology, recognize issues of importance, and appropriately use personal beliefs to interpret information (Zarcadoolas et al., 2005). Few studies used this model to understand health literacy (Weld et al., 2008).

Health Literacy Framework . The Health Literacy Framework (HLF) was birthed as a conceptual model of health literacy in 2004 by the Institute of Medicine (Weld et al., 2008). It is constructed of three concepts that include culture and society, education, and health, which suggests that individual health literacy skills are affected by a person's values and beliefs, level of education, and interactions with health care professionals. Limited studies have applied this model in their research efforts, but other researchers used this model as a foundation for the development of other health literacy models (Weld et al., 2008).

Paasche-Orlow and Wolf (POW) Model

The model most fitting for the current research study was the Paasche-Orlow and Wolf Model. The concepts of the POW model were based on the concepts of the HLF (Weld et al, 2008). The POW model identifies a linear pathway from limited health literacy that leads to severe health outcomes and increased health care costs. The constructs of this model suggested that limited health literacy affects a person's access and utilization to health care, provider-patient interactions, and self-care. The authors of this model identified the effects that personal interactions have on health literacy (Weld et al., 2008).

Access and Utilization. The access and utilization concept implied that individuals with low health literacy tend to miss out on preventive health services due to a lack of understanding about the available services and their potential benefits (Paasche-Orlow & Wolf, 2007). Patients may also be ashamed of their low literacy level, and may lead to mistrust in health care providers. Likewise, low literacy levels attribute to individuals not using public insurance available to them (Paasche-Orlow & Wolf, 2007).

Patient-Provider Interactions. Paasche-Orlow and Wolf (2007) suggested that individuals with low health literacy may complicate the patient-provider relationship by failing to acknowledge the need for a greater understanding of diagnoses or the need for better clarification, therefore taking on a passive role in their own health. Providers, likewise, may be unaware of their patients' literacy levels and provide inappropriate feedback to patients (Paasche-Orlow & Wolf, 2007).

Self-Care. Self-care is the third concept of the POW model (Paasche-Orlow &Wolf, 2007). It suggests that low literacy skills contribute to a lack of understanding about managing disease, and contributes to using incorrect medication regimens, a factor of self-management. While pharmacies, for example, provide written instructions, it is not certain that all patients are able to understand those written instructions. A lack of awareness on the part of health professionals also contributes to neglected self-care (Paasche-Orlow & Wolf, 2007).

While the concepts of the POW model have not been studied within the domain of dentistry, this conceptual framework could identify a correlation between oral health literacy and dental service use for families receiving Medicaid benefits.

Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30)

The REALD-30 survey instrument has been used by several researchers interested in understanding the oral health literacy levels of individuals. The development of REALD-30 was initiated after researchers understood the importance of identifying the role oral health literacy contributes in affecting oral health outcomes (Lee, J., Rozier, Lee, S., Bender, & Ruiz, 2007). Previously, health literacy had been measured in medicine using the Rapid Estimate of Adult Literacy in Medicine (REALM), which measured word recognition, and the Test of Functional Health Literacy in Adults (TOFHLA), which measured word recognition and comprehension. Similar to REALM, REALD-30 consists of 30 dental terms derived from the American Dental Association's *Glossary of Common Dental Terminology* and brochures from Dental Clinics in North

Carolina. The terms were ordered from simple to difficult based on the number of syllables and pronunciation (Lee, J et al., 2007).

Studies Using REALD-30

Jones, Lee, and Rozier (2007) conducted a study using the Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30) to identify the oral health literacy levels of patients in two private dental offices. Predictor variables used in this data analysis include knowledge, dental care visits, and oral health status. Of the 101 participants, 28.7% scored below 22 on the REALD-30, suggesting low oral health literacy. The average score for all participants was 23.9. Bivariate analyses were conducted to correlate knowledge scores with dental use, and found that 48.3% of those who scored low on the REALD-30 had not visited the dentist in over a 12-month period. Of those scoring in the low level of oral health literacy, 43.3% rated their oral health as fair or poor. This correlation suggested individuals may have difficulty in understanding the importance of seeking and maintaining oral health care (Jones et al., 2007).

A study of an indigenous population in Australia also used the REALD-30 to test the effect of oral health literacy on oral health outcomes (Parker and Jamieson, 2010). The mean REALD-30 score for this population (N=468) of respondents with ages ranging from 17 years to 72 years was 15. Mean scores of 12.4 and 10.9 were observed for respondents that brushed only once a day or not at all and did not own a toothbrush, respectively. When accessing oral health practices, 83.9% of respondents reported that

their last dental visit was problem related. The mean score on the literacy component for this group of respondents was 15.3 (Parker and Jamieson, 2010).

Miller, Lee, DeWalt, and Vann (2010) studied the relationship between oral health literacy of parents and the oral health status of children. The REALD- 30 measuring instrument was used to find a statistically significant relationship between a parent's oral health literacy and child's oral health status. The results of the bivariate analysis suggested a significant association between a parent's oral health literacy levels and a child's oral health status was significant at the 95% confidence interval. Parents with children having no dental needs had a mean score of 22 on a scale from 0-30, compared to parents of children with severe treatment needs scoring, on average, 18, signifying that parents could only recognize 18 of the 30 dental terms listed. This study was significant because it found no statistical relationship between dental literacy scores of parents and their oral health knowledge (Miller et al., 2010). These findings support the idea optimal oral health knowledge levels are not an indicator of oral health literacy levels.

Horowitz (2009), along with Jackson (2006) recognized the need for more extensive research into oral health literacy, and how it affects the oral health status of adults and their children. Horowitz (2009) suggested that a sound understanding of the impact of oral health literacy is needed to parallel the various efforts to reduce the prevalence of dental disease in Americans. An understanding of oral health literacy not

only affects the community at large, but dental training facilities, dental providers, and policy makers (Horowitz, 2009).

Conclusion

Tooth decay is a major health concern affecting many Americans of all ages. Children, however, suffer disproportionately from oral health diseases. Many factors contribute to the high prevalence of untreated dental diseases. A most evident factor is the underuse of dental services. Barriers to the underuse of dental services are numerous and varied. These barriers include knowledge of dental services, knowledge of oral health, availability of dental insurance, access to dental providers, acceptance of Medicaid patients, and access to transportation and language services. Differences were also observed based on race and ethnicity, educational level, and poverty status. Policies and programs have been implemented to combat these many barriers. Despite the progress, the prevalence of untreated tooth decay in the Medicaid population still exists. The introduction of an emerging theme, health literacy, was researched to identify the correlation between oral health literacy of parents and dental service use for Medicaid enrolled children.

Chapter 3: Methodology

Introduction

In Chapter 3, I outline the methodology used for the research study to identify the correlation between oral health literacy levels of parents and dental service use rates for their children enrolled in Medicaid. The discussion on research design includes the type of study selected, as well as an introduction to the population sampled. A discussion of the validity and reliability of the selected instrument, REALD-30, follows. This chapter concludes with a discussion of the ethical issues taken into consideration to implement this study.

Research Design and Approach

The purpose of this research study was to identify the correlation between oral health literacy of parents and dental service use rates for their children enrolled in Medicaid. In this study, I sought to understand the relationship between a parent's oral health literacy and dental service use rates of their children enrolled in Medicaid. I also examined the relationship between oral health literacy of parents and the types of dental services used for their children enrolled in Medicaid. While various barriers to oral health care have been identified for families enrolled in Medicaid (GAO, 2009), this population is unique in that they are afforded dental insurance through the state Medicaid program. Even with the availability of insurance, use rates remain low.

A cross-sectional study design was used to conduct this study. Because health literacy has been considered an emerging theme related to health outcomes (Kang et al,

2005; NIDCR, 2005), it was imperative to study its role in parents' health-related decisions to seek dental services, especially for children enrolled in Medicaid. The cross-sectional design was appropriate for this study because it allowed for data collection to take place in the participants' natural setting. It also did not require random assignment to groups as would have been required in an experimental study.

The REALD-30, developed by Lee et al (2007), was the measuring instrument of choice. A copy of REALD-30 is placed in Appendix A. Dr. Lee's permission to use REALD-30 can be found in Appendix B. While there are other instruments available to measure adult literacy, the REALD-30 was designed for its use in dentistry as a word recognition survey instrument (Lee et al., 2007). Its design allows for researchers to score a participant's level of oral health literacy based on their ability to recognize various dental terms.

Understanding an individual's oral health literacy levels is vital to understanding their own use of dental services. Jackson (2006) suggested that a study be conducted to understand the correlation between oral health literacy of parents and dental service use. Based on Healthy People 2020 oral health objectives, national efforts will be made to increase use for children enrolled in Medicaid (HealthyPeople.gov, 2011d). These combined efforts are to aid in reducing the high prevalence of tooth decay, a chronic disease that is preventable (CDC, 2011c). Assessing the relationship between oral health literacy of parents and dental service use for their children enrolled in Medicaid has the potential to provide insight into reducing the high prevalence of dental disease.

Setting and Sample

Sample Population

A nonprofit, faith-based clinic was the population of choice in which to draw a sample. This clinic provides medical and dental services in an underserved community of Memphis, Tennessee. This clinic was also chosen as a matter of convenience due to its high population of patients enrolled in Medicaid. I provided a Letter of Cooperation from the clinic (Appendix C). Parameters for drawing the sampling units were a nonprobability convenience sample of parents of children enrolled in Medicaid. The sampling frame included parents of Medicaid enrolled children who visited the clinic within a 7-week time frame. The clinic operated on a "same day appointment" schedule. Therefore, it was impossible to identify the entire sampling population. Because of the difficulty in identifying a complete population, the convenience sample was appropriate for this research study.

The REALD-30 was designed to conduct the Pearson's correlation between the two variables, oral health literacy and dental service use. A one-way analysis of variance (ANOVA) was conducted to examine the difference in literacy levels of parents and the different dental services used by their children. Appropriate statistical tests were employed to determine if the null hypotheses should have been accepted or rejected. Conventional values for α and β, along with Cohen's standard, were used to determine the necessary values to prevent Type I and Type II errors (Cohen, 1992). Based on

G*Power calculations with ρ H1= .30, α= .05, 1-β= .80, and ρ H0= 0, Pearson's correlation required a minimum sample size of 84, and ANOVA required a minimum sample size of 150. The larger sample size of 150 was recruited for this research study.

Study Participants

Parents in this study had at least one child enrolled in Medicaid. The reference child's Medicaid claims history was used to compare use rates with oral health literacy levels measured using REALD-30. The Bureau of TennCare was to be used to retrieve dental claims data, but was not used due to a change in the dental provider for the state of Tennessee. A detailed explanation of the change is provided in Chapter 4. Parents were required to complete a questionnaire (Appendix D) that requested demographic data, as well as a basic oral health questionnaire (Appendix E).

The selected sample shared many characteristics. All participants were the primary caregiver for a reference child between the ages of 6 years and 15 years enrolled in Medicaid. The reference child must have been enrolled in Medicaid for at least 3 months of each of the 3 years preceding the study. The reference child should have been enrolled in Medicaid long enough to have made a dental appointment at least once per year in the preceding 3 years. I received institutional review board (IRB) approval and permission to use employee permissions to access dental claims via the Dentaquest website (Appendix F). There were no specifications for gender or race for this study. Participants meet certain federal requirements that allow them to qualify for Medicaid.

I set up a table in the waiting area of the clinic. Signage was posted on the table to inform potential participants of the research study. Participants were allowed to approach the table to inquire about the study as they waited to be seen for their appointment. I explained the purpose of the study to potential participants and assisted with the completion of the paperwork. Participants were required to sign release forms to search the Medicaid databases to verify active Medicaid coverage. After informed consents (Appendix G) were signed, the participants completed the demographic portion of the survey, which inquired about the age, gender, ethnicity, and persons in the household. Of the children in the household, participants acknowledged the eldest child as the reference child. Basic oral health information was also requested. I then implemented the REALD-30 survey instrument to the participant.

Instrumentation and Materials

REALD-30

The data collecting instrument used for this study was the REALD-30. The REALD-30 is a word recognition instrument that measures oral health literacy levels of adults. Participants were given a list of words arranged by difficulty in pronunciation and syllables. The object of this instrument was to measure the participant's ability to pronounce each word. The participant was instructed not attempt to sound the words out, rather read down the list. One point was awarded for each word pronounced correctly. Scores ranged from 0-30 (Lee et al., 2007).

Test of validity and reliability. The validity and reliability of this instrument was tested by using the eigenvalue plot of the inter item correlation and statistical and data software (STATA 8; Lee et al., 2007). Convergent validity was measured by comparing scores derived from REALM and TOFHLA using Pearson's correlation. Internal reliability was tested using Cronbach's alpha (Lee et al., 2007). Results of the analysis found that, based on the eigenvalue plot for inter item correlation, two significant factors were identified at 8.78 for the first and 2.10 for the second. Positive correlations were found with REALM and TOFHLA at 0.86 and 0.64, respectively. A positive correlation was found between REALD-30 and oral health-related quality of life, but not between REALD-30 and dental health status (Lee et al., 2007). REALD-30 has similar limitations to that of REALM in that it only tests word recognition, and it only accesses recognition of 30 dental terms (Lee et al., 2007). I stopped reviewing here due to time constraints. Please go through the rest of your chapter and look for the patterns I pointed out to you. I will now look at Chapter 4.

Oral Health Questionnaire

The oral health questionnaire consisted of six questions that were answered by the parents concerning their child's oral health. The questions were derived from the 2003 version of the National Survey of Children's Health (CDC, 2003). These questions have been proven to measure a child's oral health quality of life as reported by the parent. Each answer was coded for more efficient data input. The answers provided from these

questions helped identify possible barriers to oral health care along with any confounding factors that had the possibility to alter the results of the research study.

Independent Variable

The independent variable for this research study was oral health literacy scores retrieved from each participant. The scores ranged from 0 to 30. The participants were awarded one point for each word correctly pronounced. No points were awarded for mispronounced words or words that were skipped or stumbled over. These scores were correlated with dental use rates retrieved from dental claims data.

Dependent Variables

For the first research question, dental service use served as the dependent variable and was measured based on the use recommendations set by the state of Tennessee. Medicaid allows each state to set recommendations for use frequencies of each of its provided services. The state of Tennessee allows each child under the age of 20 years to receive two dental exams and cleanings in a one year period (TennDent, 2010). Therefore, use was measured by the number of exams and cleanings completed in a three year period.

The dependent variable for the second research question involved the types of services received. The specific services investigated were exams, cleanings, fillings, extractions, and root canals/pulpotomy, and crowns. Each procedure was identified by an assigned code. The raw data is available in Chapter 4.

Data Collection and Analysis

Demographic information including age, gender, , ethnicity, and persons in the household was collected so as to provide descriptive statistics of the study population. These answers retrieved from the oral health questionnaire were correlated with the oral health literacy levels of the parents. Age and persons in the household were measured at the ratio level. Other demographic indicators were measured at the nominal level.

Research Questions and Hypotheses

1. Is there a correlation between the oral health literacy levels of parents and dental services use rates for their children enrolled in Medicaid?

$H_0$1. There is no relationship between the oral health literacy levels of parents and dental service userates for children enrolled in Medicaid.

$H_1$1. There is a relationship between the oral health literacy levels of parents and dental service use rates for children enrolled in Medicaid.

2. Is there a relationship between oral health literacy levels of parents and the use of preventive verses restorative services received by their children enrolled in Medicaid?

$H_0$2. There is no relationship between the oral health literacy levels of parents and the use of preventive versus restorative services received by their children enrolled in Medicaid.

$H_1$2. There is a relationship between the oral health literacy levels of parents and the use of preventive versus restorative services received by their children enrolled in Medicaid.

Analysis

The Pearson's *r* correlation test was performed between the oral health literacy levels of parents and use rates of their children enrolled in Medicaid to determine a correlation. The Pearson's *r* was preferred over the Spearman's rho because Spearman's rho ranks values, and relies on close ties to identify an association between variables. Spearman's rho correlations also work well when curvilinear relationship is predicted (Maturi & Elsayigh, 2010). The standard hypothesized correlation of $r = .80$ was used to answer the first research question. The second research hypothesis suggested a difference in the types of services used for children enrolled in Medicaid. To answer the second question, a one-way analysis of variance was performed. The Statistical Package for Social Sciences (SPSS) was used in the data analysis process. Descriptive analysis, charts, and are provided to illustrate the findings of this correlational study.

Ethical Considerations

All participants were provided with written information to explain the purpose and nature of the study. The informed consent outlined the requirements for participation as well as addressed any ethical concerns with participation. The informed consent was approved by the IRB, with approval number 11-13-12-0040232. Potential participants

were allowed to ask questions to clarify any misconceptions about participation in the study. Participants were provided with contact information of the researcher for the purposes of withdrawing from the study.

Participants in the study were required to read and sign an informed consent. They displayed understanding of the nature of the study, and their requirements for participation. The participants were informed that they could withdraw from the study at any time without any type of penalty. Because participants were recruited in the clinic where they receive medical and dental care, they were notified that their participation would not alter the nature of the treatment received in the clinic.

Participation in this study required that a reference child be identified. Participants agreed to grant me permission to retrieve dental claims from the Dentaquest website. Parents were informed that their participation would be forfeited if they did not give consent for me to retrieve dental claims on behalf of their child. Information retrieved for the study was use for that sole purpose. Since the collection and analysis phase of the study, the information gathered has been stored in a fire-proof lock box at my private residence, and will be kept for the period of 5 years. Participants and community stakeholders received a two page summary of the study results, via electronic mail, at the conclusion of the dissertation study.

Chapter 4: Results

Introduction

This chapter provides a summary of the demographic characteristics of the study population and a detailed review of the research questions and hypotheses. Tables are provided to support the results of the data analysis. The purpose of this study was to determine the relationship between oral health literacy of parents and dental service use for their children enrolled in Medicaid. There was also an examination of the differences between the types of dental services used by the sample children. The research questions and relevant hypotheses used are as follows:

1. Is there a correlation between the oral health literacy levels of parents and dental service use rates for their children enrolled in Medicaid?

$H_0$1. There is no relationship between the oral health literacy levels of parents and dental service use rates for children enrolled in Medicaid.

$H_1$1. There is a relationship between the oral health literacy levels of parents and dental service use rates for children enrolled in Medicaid.2. Is there a relationship between oral health literacy levels of parents and the use of preventive verses restorative services received by their children enrolled in Medicaid?

$H_0$2. There is no relationship between the oral health literacy levels of parents and the use of preventive versus restorative services received by their children enrolled in Medicaid.

$H_1$2. There is a relationship between the oral health literacy levels of parents and the use of preventive versus restorative services received by their children enrolled in Medicaid.

Data Collection

There were changes made to the data collection methods described in Chapter 3. The original IRB approval was granted in November 2013, but attempts at data collection were not successful. The original data collection site did not have the expected patient population that was needed to qualify for this study. The data collection site was changed to another clinic within the organization, which provided care to a greater volume of patients eligible to participate in the study. The timing of participant recruitment was also changed from after the appointment to while they waited to be seen for their appointment. This change was necessary because potential participants were unwilling to prolong their time in the clinic after having waited a lengthy time for their appointment. Participants were also provided a $5 gift card as a means to thank them for their time and participation in the research study. The incentive was added to increase participation rates. The Bureau of TennCare was to be used to retrieve dental claims of the sample children identified in the study; however, due to changes in the dental carrier for Tennessee Medicaid, the Bureau of TennCare was no longer needed to view the dental claims. I was granted permission by the data collection site to use employee issued permissions to access the dental claims directly from the Dentaquest website. Dentaquest is the largest administrator of government-sponsored dental programs and was selected

by TennCare to manage dental benefits for its recipients. The website is a resource for dentists, as well as individual members. Login credentials allow dental offices to readily access dental eligibility, claim submission, claim history, dental preauthorizations, and other provider resources that enable dentists to deliver high quality care to its members (Dentaquest, 2014).

Data collection was conducted over a span of 7 weeks, between March and May of 2014, until a sample size of *N*=153 were achieved. Dental claims could not be retrieved for one of the sample children. Therefore, the entire participant's package was withheld from the data analysis. The final sample size included in the data analysis was *N*= 152.

Participant Demographics

A sample size of *N*=150 was required for this research study. The research population was comprised of parents and guardians of children between the ages of 6-years and 15-years-old, currently on TennCare. A majority of participants (89.5%) were African American, and approximately 93% were female. The average age of the parents was 34-years-old. The average age of the sample children was 10-years-old, with the highest frequency (*N*= 21, 13.8%) being the age of 7 years. The sample population was representative of the clinic's patient population. Table 1 provides an overview of the demographic characteristics of study participants.

Table 1

Participant Demographics (N=152)

Demographics	Frequency	Percentage
Parent's Age		
20-29	46	30.3
30-39	79	52.0
40-49	25	16.4
50-59	2	1.3
Gender		
Male	11	7.2
Female	141	92.8
Ethnicity		
African American	136	89.5
Caucasian	1	.7
Hispanic/Latino	15	9.9
Sample Child's Age		
6	17	11.2
7	21	13.8
8	20	13.2
9	13	8.6

table continues

10	16	10.5
11	15	9.9
12	10	6.6
13	19	12.5
14	12	7.9
15	9	5.9
Children in Household		
1	27	17.8
2	55	36.2
3	43	28.3
4	13	8.6
5	9	5.9
6	5	3.3

Results

Participants were asked to complete an Oral Health Questionnaire that consisted of six questions pertaining to the sample child's oral health. The results of the questionnaire were used to better understand the parents' perception of their child's oral health and dental use. Table 2 provides a summary of the responses from the Oral Health Questionnaire.

Table 2

Oral Health Questionnaire (N= 152)

Responses	Frequency	Percentage
Oral Health		
Excellent	46	30.3
Good	79	52.0
Fair	26	17.1
Poor	1	.7
Months Since Last Dental Visit		
Never	1	.7
0-6 Months	98	64.5
6-12 Months	38	25.0
12-18 Months	4	2.6
18+ Months	11	7.2
Diagnosed with Cavities		
Yes	101	66.4
No	51	33.6
Received Dental Treatment		
Yes	100	99.0
No	1	1.0
Total	101	
If no treatment, Reason		

table continues

Could not get appointment	1	100.0
Pain in Mouth		
Yes	*29*	19.1
No	*123*	80.9
Pain Interfered with Activities		
Yes	12	41.4
No	17	58.6
Total	29	

Fifty two percent of parents rated their child's oral health as "good," and only one parent (.7%) rated their child's oral health as poor. When asked how many months since their child's last dental visit, 64.5% of parents stated that their child had been seen within the preceding 6 months. Based on the parents' responses, 66% of the children (*N*= 101) had been diagnosed with cavities. Of those, only one parent (1%) stated that their child had not received any dental treatment because they could not get a dental appointment. When asked if the sample child had ever complained of pain in his/her mouth, 19.1% (*N*= 29) of parents stated they had, and 41.4% (*N*=12) stated that pain hindered other activities.

The participants of the research study also completed the REALD-30 word recognition survey. On a scale of 0-30, participant scores ranged from eight to 30. The greatest percentage of participants (14.5%, *N*= 22) had a REALD-30 score of 20, indicating that this group of participants was only able to recognize 20 of the 30 dental

terms. Table 3 provides a summary of the REALD-30 scores. According to Jones et al. (2007), a REALD-30 score below 22 signifies low oral health literacy, which was observed in 69.1% (*N*= 105) of this study's participants. I stopped reviewing here due time constraints. Please go through the rest of your chapter and look for the patterns I pointed out to you. I will now look at Chapter 5.

Table 3

Rapid Estimate of Adult Literacy in Dentistry (N= 152)

REALD-30 Scores	**Frequency**	**Percentage**
8	1	.7
11	1	.7
12	6	3.9
13	2	1.3
14	3	2.0
15	4	2.6
16	8	5.3
17	13	8.6
18	14	9.2
19	17	11.2
20	22	14.5
21	14	9.2

table continues

22	13	8.6
23	15	9.9
24	11	7.2
25	4	2.6
26	2	1.3
29	1	.7
30	1	.7

Hypothesis 1

The first hypothesis predicts that there is a relationship between the oral health literacy of parents and dental service use of their children. Oral health literacy is identified by the parents' score on the REALD-30, the independent variable, while dental service use is identified by the total number of dental exams and cleanings received by the sample child between January 2010 and December 2012, the dependent variable. Pearson's correlation was used to test the relationship between REALD-30 scores and dental service use, characterized by the total number of dental claims submitted, during the study period, for dental exam, cleanings, fillings, extractions, pulpotomys/root canals, and crowns. The standard hypothesized correlation for Pearson is r = .80. Based on that projection, the relationship between oral health literacy of parent and dental service use of their children is not significant. Pearson's r = -.056, with a significance level of p =

.490. Based on these findings, the null hypothesis was accepted. The values for the Person's correlation are presented in Table 4.

Table 4

Pearson's Correlation between REALD-30 scores and Dental Service Utilization (N = 152)

	r	*p*
Total Use	-.056	.490

Pearson's correlation was also conducted among variables to determine relationships between types of dental services. Significant relationships were observed between the following services: exams with cleanings and fillings, cleanings with fillings, fillings with pulpotomys/ root canals, extractions with pulpotomys/ root canals and crowns, and pulpotomys/ root canals with crowns. Table 5 outlines the statistically significant relationships among variables.

Table 5

Pearson's Correlation among Dental Services

		Exams	Cleanings	Fillings	Extractions	Pulpotomy/ Root Canal	Crown
Exams							
	r=	-	.754*	.243*	.006	.114	.078
	p=		.000	.003	.946	.163	.338
Cleanings							
	r=	.754*	-	.286*	.071	.032	.009
	p=	.000		.000	.387	.692	.913
Fillings							
	r=	.243*	.286*	-	.151	.216*	.064
	p=	.003	.000		.064	.007	.435
Extractions							
	r=	.006	.071	.151	-	.250*	.193*
	p=	.946	.387	.064		.002	.017
Pulpotomy/ Root Canal							
	r=	.114	.032	.216*	.250*	-	.822*
	p=	.163	.692	.007	.002		.000
Crown							
	r=	.078	.009	.064	.193*	.822*	-
	p=	.338	.913	.435	.017	.000	

Note.*Correlation is significant at the 0.05 level (2-tailed).

According to the dental claims reviewed for each sample child, on average the sample children had less than one dental claim submitted for extractions, pulpotomys, and crowns, and less than two dental claims for exams and cleanings. Table 6 outlines the descriptive statistics for dental service use as defined by the number of dental claims submitted between January 2010 and December 2012.

Table 6

Descriptive Statistics of Dental Service Use (N=152)

Procedure	**M**	**SD**
Exams	*1.56*	1.166
Cleanings	*1.29*	1.065
Fillings	*1.43*	2.693
Extractions	*.36*	.825
Pulpotomys/Root Canals	*.22*	.799
Crowns	*.26*	.988

Hypothesis 2

The second hypothesis suggests that there is a difference between oral health literacy levels of parents and the use of preventive services versus restorative services. A one-way analysis of variance was performed to test this hypothesis. Scores from the REALD-30 survey were grouped according to recommendations by Jones et al. (2007), and represent the independent variable. Participants with scores below 22 are considered to have low oral health literacy. Scores greater than or equal to 22 represent optimal oral health literacy. The designation of oral literacy status is provided in Table 7.

Table 7

Grouped READLD-30 Scores (N=152)

	Frequency	Percentage
Low Oral Health Literacy (0-21)	105	69.1
Optimal Oral Health Literacy (22-30)	47	30.9

A dependent variable was created that categorized preventive services and restorative services. Dental exams and cleanings were categorized as preventive services, while fillings, extractions, pulpotomys/root canals, and crowns were categorized as restorative services. The total number of dental claims for each category was added to determine, for each participant, which service-preventive or restorative- was used the most. A third category was identified for children that had no dental claims during the study period. Twenty four participants' children (15.8%) used neither preventive nor restorative services during the study period, while 87 (57.2%) and 41 (27%) of participants' children used preventive and restorative services, respectively. The ANOVA was not significant, F (2, 149) = .173, p = .841, suggesting that there is no difference in READLD-30 scores of parents when correlated with the use of preventive and restorative services for their children. READLD-30 scores did not account for any variance in the type of services used. Follow up tests were conducted to evaluate differences among means. Variances ranged from 12.55 to 13.91. The test of homogeneity of variance was not significant, p= .99. The Dunnett's C test also showed no difference in means between

groups. Based on this analysis, the null hypothesis is accepted. Table 8 displays the results of the ANOVA for the types of services used the most, and Table 9 displays the 95% confidence intervals for the pairwise differences, with the means and standard deviations for the three categories of utilization.

Table 8

Tests of Between-Subjects Effects (N= 152)

	F	*p*	η^2
Services Used the Most	*.173*	.841	.002

Table 9

95% Confidence Intervals of Pairwise Differences in Means

Use	*M*	*SD*	No Use	Preventive
No Use	20.00	3.73	-	-
Preventive	19.60	3.60	-1.71 to 2.52	-
Restorative	19.46	3.54	-1.80 to 2.87	-1.50 to 1.77

The participants' averages for use of dental services did not differ greatly based on their oral health literacy designation. The group with low oral health literacy use preventive services, on average, 2.80 times in the study period, and those with optimal oral health literacy used preventive services 2.96 times in the same time frame. Participants used restorative services on average 2.21 and 2.43 times for the low oral

health literacy group and optimal oral health literacy group, respectively. Table 10 provides descriptive statistics of dental service use by oral health literacy groups.

Table 10

Dental Use by REALD-30 Groups (N=152)

	Preventive Services		Restorative Services	
	M	SD	M	SD
Low Oral Health Literacy	2.80	2.049	2.21	3.140
Optimal Oral Health Literacy	2.96	2.196	2.43	4.666

Summary

This research study was designed to understand the relationship between parents' oral health literacy and dental service use rates of their children. Pearson's correlation was used to answer the first research question. It was found that there is not a significant relationship between oral health literacy in parents and dental service use rates for their children enrolled in Medicaid. The same is true when answering the second research question. There is no difference in use of preventive or restorative services in relation to the parent's REALD-30 scores. Significant relationships, however, were found among dental services. Chapter 5 will include recommendations for future study.

Chapter 5: Discussion, Conclusion, and Recommendations

Introduction

The purpose of this study was to investigate the relationship between oral health literacy of parents and dental use rates of their children. The study population chosen was families on Medicaid due to the barrier of not having dental insurance being eliminated. In this study, I examined parents with children between the ages of 6-years-old and 15-years-old, particularly because this age range has generally established a dental home, with history of dental service use. Through the data analysis, I found that there was no relationship between oral health literacy of parents and dental service use for their children. There also was no difference in the use of preventive services versus restorative services, although other significant correlations were observed. This chapter is comprised of the interpretation of the findings, limitations of the study, and implications for future research.

Interpretation

While there have been several studies on the impact of oral health literacy on dental use, no researchers has focused specifically on parents of children enrolled in Medicaid. This study was designed to determine if a parent's level of oral health literacy is a contributing factor to the underuse of dental services, which has resulted in a high prevalence of untreated tooth decay in children. Oral health literacy levels were determined by the parents' REALD-30 score. The average score observed for this study was 19.63 (*SD*= 3.59), with approximately 69% of the participants scoring below 22.

Jones et al. (2007) suggested that a score below 22 characterizes low oral health literacy. The overall low oral health literacy observed in this population may be an indication of the high use rates of restorative services, thus no observed differences in type of services received. The theoretical framework used as a justification of this study was the POW model. One construct of the POW model relates health literacy to dental service use (Paasche-Orlow & Wolf, 2007). According to POW, there is an underuse of preventive services due to a lack of understanding of their benefits. The results of this study support this concept in that 20% of the research population did not have a dental exam during the research period. Jones et al. (2007) identified 31% of its study population as not visiting the dentist in 1 year preceding the study. Pourat (2008) observed that approximately 29% of children between the ages of 1 and 12 years had not visited a dentist in over a 1-year period. I observed similar use patterns with approximately 35% of children having had their last dental visit longer than 6 months preceding the study. In this study, however, no significant relationship between oral health literacy of parents and dental service use, at the 95% confidence interval, was observed. Miller et al. (2010) did observe a statistically significant relationship between a parent's oral health literacy levels and their child's oral health status as identified by a clinical examination of the treatment needs of the child. These findings by Miller et al. (2010) support the idea that clinical examinations are vital to understanding the extent of a person's oral health status.

The frequency of dental services received varied. Taichman et al. (2009) conducted a review over a 3-year period and found that children received, on average,

eight and 6.9 preventive services from diagnostic and preventive providers, and comprehensive providers, respectively. The children identified in the current study had an average of 2.85 (*SD* = 2.09) exam and cleaning visits in the 3-year study period.

Sixty six percent of parents stated that their child had been diagnosed with dental cavities, and 99% of those parents stated that their child received dental treatment. Although use rates of restorative services are high, these results may confirm findings by Hilton et al. (2007) who suggested that parents were not knowledgeable of the roles of primary teeth and were not aware of the importance of maintaining the health of primary teeth, thereby only seeking dental care if there was a problem. A high occurrence of dental claim submissions for restorative procedures suggests a high prevalence of tooth decay in children, which for the current study, may be an indication of the lack of importance placed on preventive care and a lack of knowledge about maintaining the health of primary teeth. One-half of the study population had at least one restorative claim submitted between January 2010 and December 2012. Of those, 38% (*N*= 29) had five or more claims submitted. Although no statistically significant correlation was observed between oral health literacy and dental service use, or the type of services use, the children have history of using preventive and restorative dental services.

Limitations of the Study

Several limitations to this study were observed. The sample size of *N*=152 was small compared to the number of children currently enrolled in Tennessee Medicaid. Likewise, a convenience sampling method was used, based on the patients who were

visiting the clinic for a scheduled appointment. Dental use habits may have already been established for some participants. While only one participant encountered difficulty with scheduling an appointment for their child, availability of scheduling appointments, transportation issues, and parents' mistrust in the public insurance system may have been other barriers to using dental services.

The REALD-30 survey is a word recognition instrument. It did not measure the parents' comprehension of the terminology. In fact, a few of the participants admitted that they could pronounce some of the words, but did not understand their meaning. Based on this admission, it can be assumed that actual oral health literacy rates may be lower than what was observed in this study. Lee et al. (2007) also identified similar limitations when developing the REALD-30 survey. The researchers admitted that this method of measuring oral health literacy has been criticized due to its limited ability to measure comprehension of dental terms. Another limitation identified was the use of a convenience sample of participants in a health clinic, because this sampling method consists of participants who are already frequent users of health care services (Lee et al., 2007). Also, while dental claims are the most accurate depiction of services used, some services may have been completed, but omitted from the Dentaquest website due to being denied by TennCare; therefore, it is possible that use may be underreported in this study.

Recommendations for Further Study

The purpose of this study was to understand the effect of parental oral health literacy on dental service use for their children. Families on Medicaid were the target

population because Medicaid covers dental procedures for its members, therefore eliminating at least one barrier. Previous scholars have found correlations between oral health knowledge and dental use and oral health literacy with oral health status, with most studies conducted in private practice offices. In this study, I did not find a significant relationship between the oral health literacy of parents and dental service use for their children enrolled in Medicaid. While taking into consideration the limitations of this study, future researchers could build on the current study and seek to identify motivational factors to use for the Medicaid population. Researchers could attempt to correlate dental service use with cultural beliefs, relationship with dental providers, referral practices from other health care providers, and incentive programs. Scholars could also include an oral health literacy survey that also measures the participants' comprehension of the dental terminology.

I did not collect data on the parents' use of dental services. It may prove beneficial to conduct a study correlating an individual's oral health literacy levels with their own dental use practices. Research efforts could then work to identify trends in parent and child dental service use as it relates to oral health literacy. I stopped reviewing here. Please go through the rest of your chapter and look for the patterns I pointed out to you. I will now look at your references.

I also aimed to determine if there was a difference in the use of preventive and restorative services, but restricted the study data to a three-year period. In the current study there was no way to properly consider lapses in dental service use. Further scholars

should include the participants' complete dental claim history in order to gain a more complete measure of dental service use. It is worth noting that because dental claims were retrieved from the Dentaquest website, it is possible that dental claims were submitted from various dental providers for an individual patient. Further study could conduct an analysis of patients with dental history provided by one dentist or group practice over a designated period of time. A study of this magnitude would allow for a more accurate history of dental use.

Implications for Social Change

Tooth decay is an easily preventable disease affecting young children, especially those living in poverty. Fortunately, the State Medicaid program provides dental coverage for eligible families. Unfortunately access to dental insurance does not automatically solve the problem of untreated tooth decay in children. Although I did not identify a relationship between oral health literacy of parents and dental service use for their children enrolled in Medicaid, there is still an opportunity to improve dental service use and, as a result, decrease the prevalence of tooth decay. I found that there was no difference in use rates based on oral health literacy levels of parents. I also identified that even in this small population of participants, there was a high rate of tooth decay, evident in the need for restorative care. Results of this study indicate the need to better promote the use of preventive services, namely for this unique population of participants with access to dental insurance. With the passing of the Affordable Care Act, more children are now eligible for coverage under the state Medicaid plan (Summerfelt, 2011). Efforts

can be extended to educate parents of the services available to their children through the Medicaid program, and the importance of using those services to ensure the health of their children.

Conclusion

Many factors have affected dental service use for individuals from all backgrounds. Individuals from underserved communities have suffered the greatest from dental issues, namely children. Eliminating barriers to use is one step in improving outcomes. This study contributes to the literature by focusing on the oral health literacy of families enrolled in Medicaid. Although my findings suggested that there was no relationship between oral health literacy and dental service use, these findings do further highlight the high prevalence of tooth decay and the underuse of preventive dental services for children enrolled in Medicaid.

Use rates for preventive services are low compared to similar studies examining a similar time frame. Based on these findings, further research is needed to identify the correlation between motivational factors such as cultural beliefs and relationship with dental providers and dental use for families on Medicaid, as well as, the effect that comprehension of dental terminology plays on dental use. For this study, rates of use for restorative services were high, suggesting a high prevalence of tooth decay. Although treatment had been initiated for most of those with decay, it can only be assumed that all needed treatment was completed.

Likewise, the expansion of Medicaid benefits to families demands more education for recipients on the services available to them. It is not enough to assume that the provision of dental insurance, alone, will reduce the prevalence of tooth decay. While understanding that other barriers continue to exist, efforts must be made to systematically reduce those barriers that prevent the use of dental services. Understanding those barriers, allows for efforts to be made to greatly reduce the levels of untreated tooth decay.

References

Adair, P.M, Pine, C.M., Burnside, G., Nicoll, A.D., Gillett, A., Anwar, S. … Young, D.W. (2004). Familial and cultural perceptions and beliefs of oral hygiene and dietary practices among ethnically and socio-economically diverse groups. *Community Dental Health, 21,* 102-111.Retrieved from http://www.cdhjournal.org/

Ahmed, N.A., Astrom, A.N., Skaug, N., & Petersen, P.E. (2007). Dental caries prevalence and risk factors among 12-year old schoolchildren from Baghdad, Iraq: a post-war survey. *International Dental Journal, 57,* 36-44. doi: 10.1111/j.1875-595X.2007.tb00116.x

Al-Ansari, J., Honkala, E., & Honkala, S. (2003). Oral health knowledge and behavior among male health science students in Kuwait. *BMC Oral Health, 3*(1), 2-7.doi: 10.1186/1472-6831-3-2

Allison, R.A., & Manski, R.J. (2007). The supply of dentist and access to care in rural Kansas. *The Journal of Rural Health, 23*(3), 198-206. doi: 10.1111/2Fj.1748-0361.2007.00091.x

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Heidelberg, Germany: Springer.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

American Academy of Pediatrics. (2011). Early childhood caries in indigenous communities. *Pediatrics*, 127(6), 1190-1198. doi: 10.1542/peds.2011-0847

American Dental Association. (2011a). Early childhood tooth decay. Retrieved December 28, 2011, from http://www.ada.org/5165.aspx?currentTab=1

American Dental Association. (2011b). Tooth decay. Retrieved June 8, 2011, from http://www.ada.org/3031.aspx?currentTab=1

Assael, L.A. (2010). Tooth decay. *Journal of Oral & Maxillofacial Surgery*, 68(2), 237-238. doi: 10.1016/j.joms.2009.12.001

Atchinson, K.A., Gironda, M.W., Messadi, D., & Der-Martirosian, C. (2010). Screening for oral health literacy in an urban dental clinic. *Journal of Public Health Dentistry, 70,* 269-275. doi: 10.1111/j.1752-7325.2010.00181.x

Begzati, A., Berisha, M., & Meqa, K. (2010). Early childhood caries in preschool children of Kosovo- a serious public health problem. *BMC Public Health, 10*, 788-795. doi: 10.1186/1471-2458-10-788

Beltran-Aguilar E.D., Barker, L.K., Canto, M.T., Dye, B.A., Gooch, B.F., Griffin, S.O. … Wu, T. (2005). Surveillance for dental caries, dental sealants, tooth retention edentulism, and enamel fluorosis—United States, 1988–1994 and 1999–2002. In: Surveillance Summaries, August 26, 2005. *MMWR* 54 (3), 1-43.

Binkley, C.J., Garrett, B.G., & Johnson, K.W. (2010). Increasing dental care utilization by Medicaid-eligible children: A dental care coordinator intervention. *Journal of Public Health Dentistry, 70,* 76-84. doi: 10.1111/j.1752-7325.2009.00146.x

Bloom, B., & Cohen, R.A. (2010). Dental insurance for persons under 65 years with private health insurance: United States, 2008. *NCHS Data Brief, 40*. Retrieved from http://www.cdc.gov/nchs/data/databriefs/db40.pdf I stopped reviewing here. Please go through the rest of your references and look for the patterns I pointed out to you.

Brennan, D. & Spencer, A.J. (2002). Influence of patient, visit, and oral health factors on dental service provision. *Journal of Public Health Dentistry*, 62(3), 148-157. doi: 10.1111/j.1440-1584.2007.00883.x

Brickhouse, T.H., Rozier, R.G.., & Slade, G.D. (2008). Effects of enrollment in Medicaid verses the State Children's Health Insurance Program on kindergarten children's untreated dental caries. *American Journal of Public Health, 98*, 876-881. doi:10.2105/AJPH.2007.111468

Brown, R.M. Canham, D., & Cureton, V.Y. (2005). An oral health education program for Latino immigrant parents. *Journal of School Nursing*, 21(5), 266-271. doi: 10.1177/10598405050210050401

California Healthcare Foundation. (2008). Snapshot. *haves and have-nots: A look at children's use of dental care in California.* Oakland, CA: Pourat, N.

Centers for Disease Control and Prevention (CDC). (2011a). Children's oral health. Retrieved from http://www.cdc.gov/oralhealth/topics/child.htm

Centers for Disease Control and Prevention. (2011b). Hygiene-related diseases. Retrieved June 8, 2011 from http://www.cdc.gov/healthywater/hygiene/disease/dental_caries.html

Centers for Disease Control and Prevention. (2003). National survey of children's health, 2003). Retrieved from http://www.cdc.gov/nchs/data/slaits/NSCH_Questionnaire.pdf

Centers for Disease Control and Prevention (CDC). (2011c). Oral health. Retrieved from http://www.cdc.gov/chronicdisease/resources/publications/AAG/doh.htm

Chi, D.L. & Milgrom, P. (2009). Preventive dental service utilization for Medicaid-enrolled children in New Hampshire: A comparison of care provided by pediatric dentists and general dentists. *Journal of Health Care for the Poor and Underserved, 20*, 458-472. doi: 10.1353/hpu.0.0139

Chi, D.L., Momany, E.T., Neff, J., Jones, M.P., Warren, J.J., Slayton, R.L. … Damiano, P.C. (2011). Impact of chronic condition status and severity on dental utilization for Iowa Medicaid-enrolled Children. *Medical Care*, 49(2), 180-192. doi: 10.1111/j.1475-6773.2010.01172.x

Cohen, J. (1992). Quantitative methods in Psychology: A power primer. *Psychological Bulletin*, 112(1), 155-159. doi: 10.1037/0033-2909.112.1.155

Crozier, S. (2008). Oral health literacy continues to be HOD priority. Retrieved from http://www.ada.org/news/1780.aspx

Cruz, G.D., Chen, Y., Salazar, C.R., Karloopia, R., & LeGeros, R.Z. (2010). Determinants of oral health care utilization among diverse groups of immigrants in New York City. *Journal of the American Dental Association, 141,* 871-878. doi: 10.14219/jada.archive.2010.0286

Damiano, P.C., Momany, E.T., Carter, K.D., Jones, M.P., & Askelson, N.M. (2008). Time to first dental visit after initially enrolling in Medicaid and S-SCHIP. *Medical Care,* 46, 1234-1239. doi: 10.1097/MLR.0b013e31817d92cd

DentaQuest. (2014). Serving TennCare members. Retrieved from http://dentaquest.com/state-plans/regions/tennessee/our-story/serving-tenncare-members/

Dietrich, T., Culler, C., Garcia, R.I., & Henshaw, M.M. (2008). Racial and ethnic disparities in children's oral health. *Journal of the American Dental Association,* 139(11), 1507-1517.

Dye, B.A., Tan, S., Smith, V., Lewis, B.G., Barker, L.K., Thornton-Evans, G. … Li, C.(2007). Trends in oral health status: United States, 1988-1994 and 1999-2004. National Center for Health Statistics. *Vital Health Statistics,* 11(248). Retrieved from http://www.cdc.gov/nchs/data/series/sr_11/sr11_248.pdf

Dye, B.A. and Thornton-Evans, G. (2010). Trends in oral health by poverty status as measured by Healthy People 2010 objectives. *Public Health Reports, 125,* 817-830. Retrieved from http://www-ncbi-nlm-nih-gov.ezproxy.uthsc.edu/pmc/articles/PMC2966663/#__ffn_sectitle

Edelstein, B. (2010). The dental safety net, its workforce, and policy recommendations for its enhancements. *Journal of Public Health Dentistry,* 70, S32-S39. doi: 10.1111/j.1752-7325.2010.00176.x

Edelstein, B.L., & Chinn, C.H. (2009). Update on disparities in oral health and access to dental care for America's children. *Academic Pediatrics,* 9(6), 415-419. doi: 10.1016/j.acap.2009.09.010

Edelstein, B.L., Samad, F., Mullin, L., & Booth, M. (2010). Oral health provisions in U.S. Health Care Reform. *Journal of the American Dental Association,* 141, 1471-1479. doi: 10.14219/jada.archive.2010.0110

Farokhi, M.R., Cano, S.M., Bober-Moken, I.G., Bartoloni, J.A., Cunningham, S.E., & Baez, M.X. (2011). Maternal acculturation: Could it impact oral health practices of Mexican American mothers and their children? *Journal of Primary Care & Community Health,* 2(2), 87-95. doi: 10.1177/2150131910388942

Federico, S.G., Steiner, J.F., Beaty, B., Crane, L., & Kempe, A. (2007). Disruptions in insurance coverage: Patterns and relationship to health care access, unmet need, and utilization before enrollment in the State Children's Health Insurance Program. *Pediatrics,* 120(4), e1009-e1016. doi: 10.1542/peds.2006-3094

Felland, L.E., Lauer, J.R., & Cunningham, P.J. (2008). Community efforts to expand dental services for low-income people. *Health System Change, 122*, 1-4. Retrieved from http://www.hschange.com/CONTENT/1000/

Fisher, M.A., & Mascarehas, A.K. (2007). A comparison of medical and dental outcomes for Medicaid-insured and uninsured Medicaid-eligible children: A U.S. population based study. *Journal of the American Dental Association,* 140, 1403-1412. doi: 10.14219/jada.archive.2009.0078

Flaer, P.J., Younis, M.Z., Benjamin, P.L., & Hajeri, M.A. (2010). A psychosocial approach to dentistry for the underserved: Incorporating theory into practice. *Journal of Healthcare & Finance,* 37(1), 101-108. Retrieved from http://auth.waldenulibrary.org/ezpws.exe?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=53300442&site=eds-live&scope=site

Flores, G. & Tomany-Korman, S.C. (2008). Racial and ethnic disparities in medical and dental health, access to care, and use of services in U.S. children. *Pediatrics,* 121(2), e286-e298. doi: 10.1542/peds.2007-1243

Greenberg, B.J., Kumar, J.V., & Stevenson, H. (2008). Dental case management: Increasing access to oral health care for families and children with low incomes. *Journal of the American Dental Association,* 139, 1114-1121. doi: 10.14219/jada.archive.2008.0314

Harrison, R.L., Li, J., Pearce, K., & Wyman, T. (2003). The community dental facilitator project: Reducing barriers to dental care. *Journal of Public Health Dentistry,* 63(3), 126-128. Retrieved from http://ovidsp.tx.ovid.com/sp-3.13.1a/ovidweb.cgi?QS2=434f4e1a73d37e8cac529f721181381a59ccfd2dfda3cd

Health Resources and Services Administration. (2012). Shortage designation: health professional shortage areas & medically underserved areas/populations. Retrieved from http://bhpr.hrsa.gov/shortage/

HealthyPeople.gov. (1995). Oral health. Retrieved from http://odphp.osophs.dhhs.gov/pubs/hp2000/pdf/res_list/13oral.pdf

HealthyPeople.gov. (2011a). About healthy people. Retrieved from http://www.healthypeople.gov/2020/about/default.aspx

HealthyPeople.gov. (2011b). Access to health services. Retrieved from http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=1

HealthyPeople.gov. (2011c). Health communication and health information technology. Retrieved from http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=18

HealthyPeople.gov. (2011d). Oral health. Retrieved from http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=32

HealthyPeople.gov. (2011e). Social determinants of health. Retrieved from http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=39

Hilton, I.V., Stephen, S., Barker, J.C., & Weintraub, J.A. (2007). Cultural factors and children's oral health care: A qualitative study of carers of young children. *Community Dentistry & Oral Epidemiology, 3*5, 429-428. doi: 10.1111/j.1600-0528.2006.00356.x

Horowitz, A.M. (2009). The role of health literacy in reducing disparities. *The Journal of Dental Hygiene*, 83(4), 182-183. Retrieved from http://opac.uthsc.edu:4550/resserv?sid=OVID:medline&id=pmid:19909638&id=

Isong, U. & Weintraub, J.A. (2006). Dental check-up of California's State Children's Health Insurance Program. *Pediatric Dentistry,* 28(4), 316-324. Retrieved from http://www.ingentaconnect.com.ezproxy.uthsc.edu/content/aapd/pd/2006/00000028/00000004/art00003?token=003d1475212839412f415d76783425452a7b2f427a513825303329482fe29

Jackson, R. (2006). parental health literacy and children's dental health: Implications for the future. *Pediatric Dentistry,* 28(1), 72-75. Retrieved from http://www.ingentaconnect.com.ezproxy.uthsc.edu/content/aapd/pd/2006/00000028/00000001/art00012?token=00421737d36dba8275c277b42572b465d7d3f2525446e4a45592f3f3b2ce8d2a3e

Jackson, R.D., Coan, L.S., Hughes, E., & Eckert, G.J. (2010). Introduction of health literacy into the allied dental curriculum: First steps and plans for the future. *Journal of Dental Education,* 74(3), 318-324. Retrieved from http://www.jdentaled.org.ezproxy.uthsc.edu/content/74/3/318.abstract

Jones, M., Lee, J.Y., & Rozier, G. (2007). Oral health literacy among adult patients seeking dental care. *Journal of the American Dental Association,* 138(9), 1199-1208. doi: 10.14219/jada.archive.2007.0344

Kang, E., Fields, H.W., Cornett, S., & Beck, F.M. (2005). An evaluation of pediatric dental patient education materials using contemporary health literacy measures. *Pediatric Dentistry,* 27(5), 409-413. Retrieved from http://www.ingentaconnect.com.ezproxy.uthsc.edu/content/aapd/pd/2005/00000027/00000005/art00012?token=004d1b3edaf3f486382275c277b42572b465d7d3f25707b742b6c592f3f3b2c132586f16632c2

Kelly, S.E., Binkley, C.J., Neace, W.P., & Gale, B.S. (2005). Barriers to care-seeking for children's oral health among low-income caregivers. *American Journal of Public Health, 95,* 1345-1351. doi:10.2105/AJPH.2004.045286

Kempe, A., Beaty, B.L., Crane, L.A., Stokstad, J., Barrow, J., Belman, S. … Steiner, J.F. (2005). Changes in access, utilization, and quality of care after enrollment into a state child health insurance plan. *Pediatrics, 115*, 364-371. doi: 10.1542/peds.2004-0475

Kloetzel, M.K., Huebner, C.E., & Milgrom, P. (2011). Referrals for dental care during pregnancy. *Journal of Midwifery & Women's Health,* 56(2), 110-117. doi: 10.1111/j.1542-2011.2010.00022.x

Kobayashi, M., Chi, D., Coldwell, S.E., Domoto, P., & Milgrom, P. (2005). The effectiveness and estimated costs of the Access to Baby and Child Dentistry

program in Washington state. *The Journal of the American Dental Association, 136*, 1257-1263. doi: 10.14219/jada.archive.2005.0341

Kumar, J.V., Green, E.L., Coluccio, C., & Davenport, R. (2001). Oral health status of second grade school children in upstate New York. *New York State Dental Journal,* 67(2), 26-31.

Lee, M.A. & Horan, S.A. (2001). Children's access to dental care in Connecticut's Medicaid managed care program. *Maternal and Child Health Journal,* 5(1), 43-51. Retrieved from http://ovidsp.tx.ovid.com/sp-3.13.1a/ovidweb.cgi?QS2=434f4e1a73d37e8c27e134f44f8715f141805971163a08

Lee, J.Y., Rozier, R.G., Lee, S.D., Bender, D., Ruiz, R.E. (2007). Development of a word recognition instrument to test health literacy in dentistry: The REALD-30- a brief communication. *Journal of Public Health Dentistry*, 67(2), 94-98. doi: 10.1111/j.0022-4006.2007.00021.x

Lewis, C., Teeple, E., Robertson, A., & Williams, A. (2009). Preventive dental care for young, Medicaid-insured children in Washington state. *Pediatrics, 124,* e120-e127. doi: 10.1542/peds.2008-3089

Liao, C.C., Ganz, M.L., Jiang, H., & Chelmow, T. (2010). The impact of the public insurance expansions on children's use of preventive dental care. *Maternal and Child Health Journal, 14,* 58-66. doi: 10.1007/s10995-008-0432-3

Lopez del Valle, L.M., Riedy, C.A., & Weinstein, P. (2005). Rural Puerto Rican women's views on children's oral health: A qualitative community-based study.

Journal of Dentistry for Children, 72(2), 61-66. Retrieved from http://www.ingentaconnect.com.ezproxy.uthsc.edu/content/aapd/jodc/2005/00000072/00000002/art00005?token=004b1a6d5ec9c9d3267e442f206721236625442c232b5f243142687630505d53ea18906067e

Luciano, M., Overman, V.P., Fraiser, P.Y. & Platin, E. (2008). Survey of oral health practices among adults in a North Carolina Hispanic population. *Journal of Dental Hygiene,* 82(2), 1-14. Retrieved from http://jdh.adha.org/content/82/2/20.full.pdf

Luzzi, L. & Spencer, A.J. (2008). Factors influencing the use of public dental services: An application of the Theory of Planned Behavior. *BMC Health Services Research,* 8(93). doi: 10.1186/1472-6963-8-93

Macek, M.D., Haynes, D.H., Wells, W., Bauer-Leffler, S., Cotton, P.A., & Parker, R.M. (2010). Measuring conceptual health knowledge in the context of oral health literacy: Preliminary results. *Journal of Public Health Dentistry, 70,* 197-204. doi: 10.1111/j.1752-7325.2010.00165.x

Macek, M.D., Wagner, M.L., Goodman, H.S., Manz, M.C., & Marrazzo, I.D. (2005). Dental visits and access to dental care among Maryland schoolchildren. *Journal of the American Dental Association, 136,* 524-533. doi: 10.14219/jada.archive.2005.0210

Manski, R.J., Macek, M.D., & Moeller, J.F. (2002). Private dental coverage: Who has it and how does it influence dental visits and expenditures? *Journal of the*

American Dental Association, 133, 1551-1559. doi: 10.14219/jada.archive.2002.0087

Maturi, T.A. & Elsayigh, A. (2010). A Comparison of Correlation Coefficients via a Three-Step Bootstrap Approach. *Journal of Mathematics Research,* 2(2), 3-10. Retrieved from http://www.doaj.org/doaj?func=openurl&genre=article&issn=19169795&date=2010&volume=2&issue=2&spage=

McQuistan, M.R., Kuthy, R.A., Damiano, P.C., & Ward, M.M. (2006). General dentists' referrals of 3- to 5-year-old children to pediatric dentist. *Journal of the American Dental Association, 137,* 653-660. doi: 10.14219/jada.archive.2006.0262

Mertz, E. & Mouradian, W. (2009). Addressing children's oral health in the new millennium: Trends in the dental workforce. *Academy of Pediatrics,* 9(6), 433-444. doi: 10.1016/j.acap.2009.09.003

Mertz, E. & O'Neil, E. (2002). The growing challenge of providing oral health care services to all Americans. *Health Affairs,* 21(5), 65-77. doi:10.1016/j.acap.2009.09.003

Miller, E., Lee, J.Y., DeWalt, D.A., and Vann, F.B. (2010). Impact of caregiver literacy on children's oral health outcomes. *Pediatrics,* 126, 107-114. doi: 10.1542/peds.2009-2887

Mitchell, J.M. & Gaskin, D.G. (2008). Receipt of preventive dental care among special-needs children enrolled in Medicaid: A crisis in need of attention. *Journal of*

Health Politics, Policy and Law, 33(5), 883-905. doi: 10.1215/03616878-2008-023

Mofidi, M., Rozier, R.G., & King, R.S. (2002). Problems with access to dental care for Medicaid-insured children: What caregivers think. *American Journal of Public Health, 95,* 53-58. doi: 10.2105/AJPH/.92.1.53

Mofidi, M., Zeldin, L.P., & Rozier, R.G. (2009). Oral health of early head start children: A qualitative study of staff, parents, and pregnant women. *American Journal of Public Health, 99,* 245-251. doi:10.2105/AJPH.2008.133827

NIDCR. (2005). The invisible barrier: Literacy and its relationship with oral health. *Journal of Public Health Dentistry,* 65(3), 174-182. Retrieved from http://ejournals.ebsco.com.ezproxy.uthsc.edu/Direct.asp?AccessToken=54WJ94RTR6JPYS94SQPWYFZWW9F4T6WW6&Show=Object

Nietert, P.J., Bradford, W.D., & Kaste, L.M. (2005). The impact of an innovative reform to South Carolina dental Medicaid system. *Health Services Research,* 40(4), 1078-1091. doi: 10.1111/j.1475-6773.2005.00405.x

Okunseri, C., Bajorunaite, R., Abena, A., Self, K., Iacopino, A.M., & Flores, G. (2008). Racial/ethnic disparities in the acceptance of Medicaid patients in dental practices. *Journal of Public Health Dentistry,* 68(3), 149-153. doi: 10.1111/j.1752-7325.2007.00079.x

Paasche-Orlow, M.K. & Wolf, M.S. (2007). The casual pathways linking health literacy to health outcomes. *American Journal of Health Behaviors,* 31(Suppl1), S19-S26. doi: 10.5993/AJHB.31.s1.4

Palmer, C.A. et al. (2010). Diet and caries-associated bacteria in early childhood caries. *Journal of Dental Research,* 89(11), 1224-1229. doi: 10.1177/0022034510376543

Parthasarathy, P. & John, R. (2008). Early prevention and identification of childhood caries. *Nurse Practitioner,* 33(9), 40-48. doi: 10.1097/01.NPR.0000335570.31347.e1

Parker, E.J. & Jamieson, L.M. (2010). Associations between Indigenous Australian oral health literacy and self-reported oral health outcomes. *BMC Oral Health,* 10(3). doi: 10.1186/1472-6831-10-3

Pati, S., Mohamad, Z., Cnaan, A., Kavanagh, J., & Shea, J.A. (2010). Influence of maternal health literacy on child participation in social welfare programs: The Philadelphia experience. *American Journal of Public Health,* 100(9), 1662-1665. doi: 10.2105/AJPH/.2009.172742

Pine, C.M., Adair, P.M., Burnside, G., Nicoll, A.D., Gillett, A., Borges-Yanez, S.A. ... Whelton, H. (2004). Barriers to the treatment of childhood caries perceived by dentists working in different countries. *Community Dental Health, 21,* 112-120.

Plutzer, K. & Keirse, M.J. (2010). Incidence and prevention of early childhood caries in one- and two-parent families. *Child: Care, Health, & Development,* 37(1), 5-10. doi: doi:10.1111/j.1365-2214.2010.01114.x

Pourat. N. (2008). Snapshot. Have and have-nots: A look at children's use of dental care in California. California Healthcare Foundation: Oakland, CA.

Pourat, N. & Finocchio, L. (2010). Racial and ethnic disparities in dental care for publicly insured children. *Health Affairs,* 29(7), 1356-1363. doi: 10.1377/hlthaff.2009.0089

Pourat, N. &Nicholson, G. (2009). *Unaffordable dental care is linked to frequent school absences.* Los Angeles, CA: UCLA Center for Health Policy Research.

Rudd, R., & Horowitz, A.M. (2005). The role of health literacy in achieving oral health for elders. *Journal of Dental Education,* 69(9), 1018-1021. Retrieved from http://www.jdentaled.org.ezproxy.uthsc.edu/content/69/9/957.full

Sanders, A.E., Lim, S., & Sohn, W. (2008). Resilience to urban poverty: Theoretical and empirical considerations for population health. *American Journal of Public Health, 98*, 1101-1106. doi:10.2105/AJPH.2007.119495

Sanders, L.M., Thompson, V.T., & Wilkinson, J.D. (2007). Caregiver health literacy and the use of child health services. *Pediatrics,* 119(1), e86-e92. doi: 10.1542/peds.2005-1738

Scrambler, S., Klass, C., Wright, D., & Gallager, J.E. (2010). Insights into the oral health beliefs and practices of mothers from a north London Orthodox Jewish community. *BMC Oral Health,* 10(14), doi 10.1186/1472-6831-10-14.

Seale, N.S. & Casamassimo, P.S. (2003). Access to dental care for children in the United States: A survey of general practitioners. *Journal of the American Dental Association, 134*, 1630-1640. doi: 10.14219/jada.archive.2003.0110

Shortridge, E.F. & Moore, J.R. (2009). Use of emergency departments for conditions related to poor oral healthcare: Implications for rural and low-resource urban areas for three states. *Journal of Public Health Management and Practice,* 15(3), 238-245. doi: 10.1097/PHH.0b013e3181a1179f

Siegal, M.D, and Marx, M.L. (2005). Ohio dental care providers' treatment of young children, 2002. *Journal of the American Dental Association, 136*, 1583-1591. doi: 10.14219/jada.archive.2005.0093

Southward, L.H., Robertson, P., Edelstein, B.L., Hanna, H., Wells-Parker, E., Baggett, D.H., et al. (2008). Oral health of young children in Mississippi Delta child care centers: A second look at early childhood caries risk assessment. *Journal of Public Health Dentistry,* 68(4), 188-195. doi: 10.1111/j.1752-7325.2007.00061.x

Stevens, G.D., Seid, M.S., & Halfon, N. (2006). Enrolling vulnerable, uninsured but eligible children in public health insurance: Association with health status and primary care access. *Pediatrics, 117*, e751-e759. doi: 10.1542/peds.2005-1558

Stuber, J. & Bradley, E. (2005). Barriers to Medicaid enrollment: Who is at risk? *American Journal of Public Health,* 95(2), 292-298. doi: 10.2105/AJPH.2002.006254

Summerfelt, F.F. (2011). Teledentistry-assisted, affiliated practice for dental hygienists: An innovative oral health workforce model. *Journal of Dental Education,* 75(6), 733-742. Retrieved from http://www.jdentaled.org.ezproxy.uthsc.edu/content/75/6/733.abstract

Sweet, M., Damiano, P., Rivera, E., Kuthy, R., & Heller, K. (2005). A comparison of dental services received by Medicaid and privately insured adult populations. *Journal of the American Dental Association, 136*, 93-100. doi: 10.14219/jada.archive.2005.0034

Taichman, L.S., Sohn, W., Lim, S., Eklund, S., & Ismail, A. (2009). Assessing patterns of restorative and preventive care among children enrolled in Medicaid, by type of dental care provider. *Journal of the American Dental Association, 140*, 886-894. doi: 10.14219/jada.archive.2009.0282

TennDent. (2010). Member handbook. Information about your TennCare dental program. Retrieved from http://www.tenndent.com/Docs/TennDent-Handbook-web.pdf

The Access Project. (2009). *The costs of dental care and the impact of dental insurance coverage* (Issue Brief No. 4). Boston, MA: Pryor, C., Prottas, J., Lottero, B., Rukavina, M., & Knudson, A.

Tomar, S.L. & Reeves, A.F. (2009). Changes in the oral health of US children and adolescents and dental public health infrastructure since the release of the Healthy

People 2010 Objectives. *Academic Pediatrics*, 9(6), 388-395. doi: 10.1016/j.acap.2009.09.018

United States Government Accountability Office. (2008). *Medicaid: Extent of dental disease in children has not decreased* (GAO-08-1176T). Retrieved from www.gao.gov.

United Sates Government Accountability Office. (2009). *Medicaid: State and federal actions have been taken to improve children's access to dental services, but gaps remain* (GAO-09-723). Retrieved from www.gao.gov.

Wall, T.P. & Brown, L.J. (2008). Public dental expenditures and dental visits among children in the U.S., 1996-2004. *Public Health Reports,* 123(5), 636-645. Retrieved from http://www.jstor.org.ezproxy.uthsc.edu/stable/25682106

Wang, H., Norton, E.C., & Rozier, R.G. (2007). Effects of the State Children's Health Insurance Program on access to dental care and use of dental services. *Health Services Research,* 42(4), 1544-1563. doi: 10.1111/j.1475-6773.2007.00699.x

Webster, R.A., Ware, J., Ng, M.W., Post, J.N., & Risko, W. (2011). Family perspectives on home oral health practices and interactions with pediatric providers. *Clinical Pediatrics*, 50(2), 162-165. doi: 10.1177/0009922810379909

Weiss, B.D. & Palmer, R. (2004). Relationship between health care costs and very low literacy skills in a medically needy and indigent Medicaid population. *Journal of the American Board of Family Practice,* 17(1), 44-47. doi: 10.3122/jabfm.17.1.44

Weld, K.K., Padden, D., Ramsey, G., & Garmon Bibb, S.C. (2008). A framework for guiding health literacy research in populations with universal access to healthcare. *Advances in Nursing Science*, 31(4), 308-318. doi: 10.1097/01.ANS.0000341411.25048.91

Wilson-Genderson, M., Broder, H.L., & Phillips, C. (2007). Concordance between caregiver and child reports of children's oral health-related quality of life. *Community Dentistry and Oral Epidemiology, 35,* 32-40. doi: 10.1111/j.1600-0528.2007.00403.x

Zarcadoolas, C., Pleasant, A., & Greer, D.S. (2005). Understanding health literacy: An expanded model. *Health Promotion International*, 20(2), 195-203. doi: 10.1093/heapro/dah609

Appendix A:

READ-30

Rapid Estimation of Adult Literacy in Dentistry

30 word version

School of Dentistry

School of Public Health

University of North Carolina at Chapel Hill

Chapel Hill, NC 27599-7450 USA

Jessica Y. Lee DDS, MPH, PhD

Jessica_lee@dentistry.unc.edu

919-966-2739

Interview/ READ-30 Start Time: _____ Study ID Number __ __-__ __ __

REALD-30

YOU WILL NOW ADMINISTER THE DENTAL LITERACY TEST

READ THE FOLLOWING TO THE PARTICIPANT:

Now, I am going to show you cards with one word on every card. I would like you to read

the word out loud. If you do not know the answer, please say, “don’t know.” Do not guess.

Dental REALM end time: _____

Score: _____

1. Sugar _____	11. Abscess _____	21. Periodontal _____
2. Smoking _____	12. Extraction _____	22. Sealant _____
3. Floss _____	13. Denture _____	23. Hypoplasia _____
4. Brush _____	14. Enamel _____	24. Halitosis _____
5. Pulp _____	15. Dentition _____	25. Analgesia _____
6. Fluoride _____	16. Plaque _____	26. Cellulitis _____
7. Braces _____	17. Gingiva _____	27. Fistula _____
8. Genetics _____	18. Malocclusion _____	28. Temporomandibular _____
9. Restoration _____	19. Incipient _____	29. Hyperemia _____
10. Bruxism _____	20. Caries _____	30. Apicoectomy _____

Appendix B

Request to Use REALD-30

Subject : RE: Request to use REALD-30

Date : Mon, Jan 09, 2012 01:26 PM CST

From : **"Lee, Jessica" <leej@dentistry.unc.edu>**

To : Angel Gates <angel.gates@waldenu.edu>

CC : regina.galer-unti@waldenu.edu <regina.galer-unti@waldenu.edu>

Attachment : READ_30.pdf

READ30_Publication.pdf

The instrument is attached. Please just cite the original work when making reference to it. I hope it helps.

Jessica Y. Lee DDS, MPH, PhD
Associate Professor
Department of Pediatric Dentistry
University of North Carolina
228 Brauer Hall, CB 7450
Chapel Hill, NC 27599-7450
Phone: 919-966-2739
Fax: 919-966-7992
Email: leej@dentistry.unc.edu

From: Angel Gates [mailto:angel.gates@waldenu.edu]
Sent: Monday, January 09, 2012 12:38 PM
To: Lee, Jessica
Cc: regina.galer-unti@waldenu.edu
Subject: Request to use READ-30

Dear Dr. Lee,

I am a doctoral student at Walden University. My dissertation research interests include oral health literacy and dental service utilization. During my research I have found interest in the READ-30 measuring instrument. Would you please

grant me access to the REALD-30 and allow me one-time use of your instrument for the purpose of completing my dissertation research? If publishable data results from my dissertation study, I will credit your instrument in the body of the manuscript and dissertation.

My dissertation work is being conducted under the supervision of my committee chair, Dr. Regina Galer-Unti. She can be contacted at regina.galer-unti@waldenu.edu.

I look forward to hearing from you soon.

Best regards,

Angel Gates
Doctoral Student
Walden University

Appendix C

[redacted] *is a Christian non-profit organization focused on fulfilling the physical, spiritual, and emotional needs of the underserved through health centers and outreach programs*

June 19, 2012

Dear Mrs. Gates,

Based on my review of your research proposal, I give permission for you to conduct the study entitled The Relationship Between Oral Health Literacy in Parents and Dental Service Utilization for Their Children Enrolled in Medicaid within the [redacted]

As part of this study, I authorize you to recruit participants for the study as they enter the medical clinic for their appointment. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: providing space in the lobby for participant recruitment, and providing space to administer the survey to participants. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,

[redacted]

Executive Director

[redacted]

Appendix D

Demographic Questionnaire

Please answer all of the following questions. The information you provide will assist in completing this study to better understand issues relating to you access of dental care. The information you provide will be kept confidential and no identifying information will be published.

Age _____

Gender Male Female

Ethnicity AA/Black Caucasian/White Asian/Asian American

Hispanic/Latino Native American Other

Number of children in the household _____

Please identify the oldest child in the household to serve as the sample child. The following questions pertain to the sample child. The following information will be used to retrieve dental claims from their Medicaid provider. This information will not be used for any other purpose.

Sample Child's Age _____

Sample Child's DOB _____

Sample Child's First and Last Name_____

Sample Child's SSN _____

Appendix E

Oral Health Questionnaire

1. Has the sample child been continuously enrolled in Medicaid for the past three years? Yes No

   If no, has the child been enrolled in Medicaid for at least three months of each of the previous three years? Yes No

2. How do you rate your child's oral health? Excellent Good Fair Poor

3. How many months since your child's last dental visit?

   Never 0-6 months 6-12 months 12-18 months 18+ months

4. Has your child ever been diagnosed with having dental cavities? Yes No

   If yes, did the child receive any dental treatment? Yes No

   If your child did not receive treatment, what was the reason for not receiving treatment?

   Did not agree with proposed treatment Could not get appointment

   Could not miss work/school Other_____

5. Has child complained of pain in his/her mouth? Yes No

6. Has pain hindered any other activities (school, social time, eating, speaking)?

   Yes No

Appendix F

[redacted] *is a Christian non-profit organization focused on fulfilling the physical, spiritual, and emotional needs of the underserved through health centers and outreach programs.*

February 18, 2014

Dear Angel Smith,

Based on my review of your research proposal, I give permission for you to conduct the study entitled The Relationship Between Oral Health Literacy in Parents and Dental Service Utilization for Their Children Enrolled in Medicaid within the [redacted]. As part of this study, I authorize you to recruit participants for the study as they enter the medical clinic for their appointment. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: providing space in the lobby for participant recruitment, providing a private room to administer the survey to participants, and granting permission to access Dentaquest to view dental claims of the patients identified for the research study. We reserve the right to withdraw from the study at any time if circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,

[redacted]

Clinical Medical Director

[redacted]

Appendix G

Research Study Consent Form

You are invited to participate in a research study to understand the relationship between your oral health literacy and dental service utilization of your children. This study focuses on parents of children enrolled in the state Medicaid program. This study is being conducted by Angel Smith, a doctoral candidate at Walden University. Please read this form carefully before agreeing to participate in this study.

The purpose of this study is to identify and understand the relationship between oral health literacy of parents and dental service utilization rates of their children enrolled in Medicaid. If you choose to participate in this study, you must have at least one child between the ages of six years and 15 years enrolled in Medicaid. The child must have active enrollment for a minimum of at least three months in the three years preceding the research study. You will be asked to complete a questionnaire about yourself and your oldest child. [redacted] has granted Angel Smith permission to access Dentaquest to view dental claims submitted on behalf of your child. By signing this form, you give Angel Smith permission to access those dental claims submitted from January 2010 to December 2012 for the following procedure codes: Exams (D0120, D0145, and D0150), dental cleanings (D1110, D1120), sealants (D1351), restorative treatment (D2140-D2954), pulpotomys or root canals (D3220-D3330), and extractions

(D7140-D7250). You will also be asked to complete a word recognition survey. You will be able to complete the questionnaire and survey in 30 minutes.

The researcher will provide participants with all the privacy rights granted by HIPAA and by federal and state laws and regulations. All information retrieved as a result of your participation in this study will be used for that sole purpose. Any information that has the potential to identify a participant will be kept confidential, and will not be published in any reports. At the conclusion of this study, all records will be securely stored and archived. The researcher will be the only person to have access to research records.

Please bear in mind that although you have been invited to participate in this study, your participation is strictly voluntary. In appreciation of your time, you will be presented with a $5.00 gift card for participating in this study. You may withdraw from the study at any time. Your status as a patient at [redacted] will not be affected if you choose to withdraw. If you choose to withdraw from the study, contact the researcher, Angel Smith, at [redacted]

There are no physical or mental risks to participation in this study. There are no personal benefits to participation. Community benefits include gaining a better understanding of the dental issues faced by parents of children enrolled in Medicaid.

If there are any questions or concerns regarding any portion of this form or your participation in this study, contact the researcher by email at [redacted]. This study is being conducted under the supervision of Dr. JaMuir Robinson. She can

be reached by email at [redacted]. If you have any questions about your rights as a participant in this study, you may contact Dr. Leilani Endicott at 1-800-925-3368, ext. 1210. Walden University's approval number for this study is **11-13-12-0040232** and it expires on **October 22, 2014**.

You may receive a copy of this form, as well as a two page summary of the research results, via electronic mail, once the dissertation has been approved.

By signing your name below, you acknowledge that you have read this entire form, and you agree to participate in this study by completing all related forms.

Child's Name_____

Parent's Name_____

Signature_____ Date_____

E-mail Address_____

Curriculum Vitae

Angel A. Smith

EDUCATION

Ph.D. Public Health, November 2014
Walden University, Baltimore, MD

M.P.H., November 2007
Walden University, Baltimore, MD

B.S. Dental Hygiene, May 2005
Tennessee State University, Nashville, TN

A.S. Dental Hygiene, May 2004
Tennessee State University, Nashville, TN

LICENSURE

Registered Dental Hygienist, Tennessee Board of Dentistry

CERTIFICATIONS

Certified Health Education Specialist, National Commission for Health Education Credentialing, Inc.

EXPERIENCE

University of Tennessee Health Science Center-Department of Dental Hygiene, Adjunct Faculty, Memphis, TN, January 2011-Present.

- Provide clinical instruction to dental hygiene students in the public health setting.
- Assist with dental instrumentation
- Oversee the care provided to dental patients.

[redacted], Dental Hygienist, Dental Outreach & Quality Improvement Manager, [redacted], September 2008- Present.

- Provide dental hygiene services to patients.
- Manage dental outreach activities.

- Coordinate dental care with local organizations.
- Oversee the dental operations of the dental services provided to children attending local head start programs.
- Coordinate employee attendance at community health fairs.
- Create age appropriate fact sheets used during oral hygiene presentations.
- Conduct oral health presentations in schools, parent meetings, and local organizations.
- Perform monthly chart audits.
- Monitor quality improvement measures.
- Develop clinical protocols.
- Represent the organization on community Health Advisory Committees.

Arkansas Department of Health, Public Health Educator, Forrest City, AR, December 2007-April 2008.

- Created brochures, fact sheets, and informational packets for community organizations.
- Served as community educator for 14 regions in the state.
- Administered the Youth Behavioral Health Surveys in schools.

Dr. Vincent Price & Associates, Dental Hygienist, Memphis, TN June 2005-September 2007.

- Provided dental hygiene services to patients.

Internship- Memphis and Shelby County Health Department, Memphis, TN, June 2007-August 2007.

- Developed presentations for the Vector Program.
- Developed a smoking cessation program to be used on college campuses.
- Attended health fairs sponsored by the health department.

Affiliated Dentist, Dental Hygienist, Clarksville, TN, November 2004- April 2005.

- Provided dental hygiene services to patients.