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Capstone Approval Document

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Oral Health Care Accessibility in the Older Adult Population: A Cobb County Study

has been read by the undersigned. It is hereby recommended for acceptance by the faculty with credit to the amount of 3 semester hours.

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ORAL HEALTH CARE ACCESSIBILITY IN THE OLDER ADULT POPULATION: A COBB COUNTY STUDY

A Master Thesis

Submitted to the Faculty

of

American Public University

by

Cynthia Herlihy

In Partial Fulfillment of the Requirements for the Degree of

Master of Public Health

January 21, 2018

American Public University

Charles Town, WV
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DEDICATION

I dedicate this thesis work to my late mother, Margaret. To my children to whom I remind that any dream is achievable. To my friends Carole, Gale, Sara, Cindy, John, and many others. Lastly, to my former boss who inspired this journey.
ACKNOWLEDGEMENTS

I would like to thank professor, Dr. Carol Hoban, for her helpful suggestions in general, and engagement throughout this thesis. To the program chair, Dr. Koutoubi, who provided guidance in the early preparation of my research; a special thank you. Finally, I extend my sincere gratitude to everyone who offered their time, support and expertise in this project. This thesis paper would not be possible without them.
The older adult population presents significant challenges to public health and dental professionals where good oral health is essential to maintaining overall health and general wellness. Access to oral care and oral hygiene in older adults residing in Georgia, the United States and world-wide is recognized as inadequate. The purpose of this study is to examine the oral health status of adults 65 years of age and older residing in assisted and independent (LTC) living facilities in Cobb County, Georgia, investigate factors that act as facilitators or barriers to
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access to oral health care, and analyze archival findings to outcomes from this research. Using a
quasi-experimental and correlational design, an 8-item multiple choice questionnaire with a
pre/post evaluation was administered to 89 older adults (75 women, 14 men). The survey data
and archival data were analyzed as separate components. The findings indicated that there was
not a significant relationship between visiting a dentist within the past 12 months and having
dental insurance ($\chi^2(1) = 0.28, p = .598$). In addition, the results revealed oral health education
significantly increased the likelihood of individuals to seek oral healthcare ($Z = -4.20, p < .001$).
Oral health education appears a primary driver of perceived oral health need and significantly
increases the likelihood of older adults in LTC facilities to seek oral health care. While no
significant difference was noted between having dental insurance and visiting a dentist, this may
be due to older adults in LTC facilities having a disproportionately greater need to visit a dentist
and do so regardless of cost. Tackling obstacles to oral care in this older adult population will
require a multi-interventional approach to increase oral health awareness, improve access to
affordable services, and promote good oral care outcomes.

Keywords: oral health, oral hygiene, older adults, long-term care, barriers
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ORAL HEALTH CARE ACCESSIBILITY IN OLDER ADULT POPULATION: A COBB COUNTY STUDY

I. Introduction

Today, it is unquestioned that good oral health is a fundamental component to overall physical health and psychological wellness. Sound oral care is achievable by routine self-care, periodic preventive screenings, and regular dental visits to detect, treat, and manage oral conditions, though many individuals are burdened with poor oral health which negatively affects their general health and quality of life. Access to care is particularly critical to older adults, especially those residing in long-term care facilities due to increased risk for oral conditions and diseases associated with chronic conditions, age-related physiological changes, and use of over-the-counter and prescription medications. To this end, the FDI World Dental Federation [FDI] (2016) penned a new, universally relevant definition to oral health with the intent to provide direction to key stakeholders and policymakers by emphasizing that oral health does not occur in a vacuum. Early in 2017, bill H.R. 2442 was introduced which calls upon legislators to amend the Public Health Act to improve essential oral health services for low-income and underserved populations by breaking down barriers to care. Achieving access to oral health services today, however, remains a daunting challenge, especially for older adults and particularly those residing in long-term care settings.

Researchers have strived to validate barriers that impede access to oral care with a wealth of literature reviewed and synthesized, and a host of oral hygiene strategies and program structural changes, recommended. However, minimal research has produced long-term improvements or permanent solutions for older adults on a community level. The conceptual frameworks adopted in this study were the health belief model and social cognitive theory within a media study framework. The purpose of this research is to examine some of the determinants to
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dental care utilization in Cobb County, GA., particularly those that promote or impede access to
care, to gain a better understanding of why some residents eliminate or fail to initiate oral care in
residential long-term care (assisted and independent) settings.

Problem Statement

Data from the 2011-2012 National Health Interview Survey (NHIS) speaks loudly of our
nation’s older adult oral health status in that almost all adults aged 65 and older with any natural
teeth have dental caries. A report by Dye, Thornton-Evans, Li, & Iafolla (2015) shows the
national prevalence of dental caries was higher in non-Hispanic white adults (98%) than in non-
Hispanic black (91%) and Hispanic (86%) adults, and this prevalence was consistently similar
for adults’ age 65-74 and those aged 74 and older. However, the researchers indicated almost all
U.S. adults (96%) age 65 and older with permanent teeth had some form of tooth decay. In
addition, non-Hispanic black adults age 65 years and older had greater complete tooth loss
(24%), compared to Hispanic (15%) or non-Hispanic white adults. The results from this survey
illuminate oral health disparities in the older adult population and emphasize the need for further
review and viable solutions.

During 2012, in the state of Georgia, dental health problems among older adults appeared
comparatively similar to those throughout the nation according to reports by the Centers for
Disease Control and Prevention (CDC) while dental care was listed among the top health issues
identified in a Cobb County health needs assessment report (WellStar Cobb Hospital, 2013).
Among several statistics, there are two types often used to measure the oral health of a
population are; the percentage of people who have visited the dentist in the past 12 months and
the percentage of individuals that have no remaining natural teeth. In 2016, Herlihy conducted a
preliminary oral health assessment using 2012 data collected from the CDC’s Division of Oral
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Health along with the Territorial Dental Directors (ASTDD), reported through the Behavioral Risk Factor Surveillance System (BRFSS) and the National Oral Health Surveillance System (NOHSS) for the entire nation and each state, and found that “32.8 % of adults had not visited a dental professional in the past 12 months, nationally, compared to 35.9% of adults in Georgia” (p. 7). For the same year, Herlihy (2016) found that the CDC reported “16.2% percentage of older adults, 65 years of age and older reported having lost all of their natural teeth due to tooth decay or gum disease, nationally, compared to 18.4% of older adults, 65 years of age and older in Georgia” (p. 7). Many adults, especially seniors, lack adequate access to oral care despite the fact that research has equipped the public and dental community with an overwhelming wealth of literature and evidence. Factors that contribute to problems with access to oral health care are numerous and complex. These include cultural, socioeconomic, geographic, and literacy factors, among others. A thorough review of these factors is provided in the literature review section that follows.

Purpose of the Study

For this study, I examined dental insurance and dental visits within 12 months in residents of assisted and independent living facilities in Cobb County, Georgia. In addition, I investigated if an association exists between oral health and hygiene education and the likelihood of dental visits from pre-and post-survey scores. Information was obtained using an 8-question survey from long-term care facility residents to determine residents’ oral health and insurance status. The questions consisted of perceived facilitators and barriers to oral care, knowledge of available oral health services, edentulism and dental insurance status, dental service utilization, and two questions to determine if oral health education has an influence on dental service utilization. Based on the current focus of this study, demographic background was not included
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in the questionnaire though may be of interest in future research. It is the purpose of this study, then, to address the factors stated above in the following;

Research Questions

The following research questions were developed with the corresponding hypothesis, as applicable, which are located in the methods section and include:

Q1: Are older adults residing in assisted and independent living centers aware of oral health services that may be available to them in the county?

Q2: Do older adults residing in assisted and independent living centers make use of available oral health care and education?

Q3: What percentage of older adults has lost any teeth due to natural aging or dental problems?

Q4: What percentage of older adults residing in assisted and independent living facilities has some type of dental insurance?

Q5: Are those with dental insurance more likely to have seen a dentist in the past 12 months?

Q6: What do they perceive as the biggest hindrance to oral care?

Q7: What factors would make them more likely to seek oral health care?

Q8: Does oral healthcare education increase the likelihood of individuals to seek oral health care when needed?
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This study involved several analyses in that different methods were used to address these research questions. The analysis of Q8 included pre-and-post question survey responses.

II. Theoretical Framework

The FDI (2016) defines oral health as multifaceted, encompassing “the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and free from pain, discomfort, and disease of the craniofacial complex” (para. 3). One of the underlying principles maintains that oral health is a core component of health, where physical and psychosocial wellness exists in uninterrupted sequence, influenced by the attitudes and values of individuals and communities. Consistent with this principle, the health belief model (HBM) aims to explain and anticipate individual health behaviors by focusing on beliefs and attitudes, while its fundamental principle asserts that if individuals are provided with better information, they will make better health choices.

Health Belief Model

The HBM theory, developed by Hochbaum in 1958, explains differing reactions to symptoms and variations to treatment adherence (Rosenstock, 1974). Several decades later, the HBM has been combined with social cognitive models resulting in expansion of the underlying components, which establishes that health behaviors are influenced by an individual’s desire to ward off illness, and by having confidence that the recommended action results in a favorable outcome. At the center of the HBM theory lays six concepts that influence health behaviors which are based on non-operational health decision stages, as such; the likelihood that an individual follows a preventive behavior will be influenced by their perception of the costs and benefits associated with the action. These perception concepts include the following;
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Perceived susceptibility: the individual’s assessment of their risk of acquiring the condition or disease. Some older adults may believe that with age, bones naturally become softer. Bone loss, however, can be the result of periodontal disease or decay. Educating older adults provides them with factual information, dispelling myths and shifting denial.

Perceived seriousness of the condition or disease: the extent of severity associated with a condition or disease (e.g., pain, disability, health consequences) and the impact it will have on one’s lifestyle (social or family relationships). Symptoms associated with certain oral diseases are pain, bleeding, inflammation, which can last for extended durations, and are qualified as stabbing, sharp, throbbing and can be disabling.

When combined, the above variables share a cognitive component referred to as perceived threat, and these are influenced by information. While this instills a call to action, it cannot predict how an individual will respond, rather, it is influenced by a balance between efficacy and the cost of alternate courses of action.

Perceived barriers to action: Individuals ask about any barriers or obstacles that prevent an action. They seek to know if there’s cost, time, pain or embarrassment associated with the action, such as finding dental services. As Maguen, Armistead, & Kalichman (2000) have noted, scoring the results may be difficult, and (some) barriers may be rather independent of one another.

Perceived benefits of action: The individual asks questions if the proposed action will be effective in avoiding the health risk. The perception is a characteristic of the individual’s beliefs, more so than facts. Information provided to older adults includes the effectiveness of medications and benefits of preventive dental visits in limiting risk susceptibility and severity.
Cues to action: Individuals become motivated to take actions that move them from their current psychological or physical state toward more positive behaviors and health outcomes. As mentioned previously, education and information provide a conduit through which individuals learn about positive oral health behaviors and those that increase susceptibility.

Self-efficacy: This represents the individual’s confidence of, and belief in their own abilities to achieve a given action. If individuals believe they cannot be successful initiating an action or consider the action difficult, they will be less likely to engage in that action regardless of positive or essential health benefit outcomes. Self-efficacy or beliefs can be promoted through messages such as posters, and calendars, community support, as well as education and training.

Parallel to these concepts, Cummings, Becker, & Maile, (1980) assessed 14 models of behaviors and derived a form of empirical scaling that yielded six types of variables; knowledge regarding disease; perception of symptoms and threat of illness; attitudes toward health care; accessibility of health services; socioeconomic status (SES); demographic factors which could be used to explain health actions. The HBM concepts, outlined in Figure 1 below, are used widely in health behavior models today.

The strength of this model exists within the concept that an individual’s belief of health risk has an ability to reach an anticipated outcome. Brewer et al. (2007) contend that perceived risk is the most beneficial prognosticator of health behavior. The interaction between perceived risk and benefits can be used to explain older adult oral health behaviors and identify causes of change between stages. A weakness of HBM lies in its inability to address underlying personal, social and environmental associated factors. Age, for instance, may contribute to this factor in that edentulous older adults tend to perceive themselves to be less susceptible to oral illnesses and diseases, and may not perceive a need for behavior change. These adults, however, often lack vital oral health information which places them at increased risk (perceived threat) of oral conditions such as xerostomia, oral and pharyngeal cancers, halitosis, and inflammatory papillary hyperplasia. To this end, the social cognitive theory complements and strengthens HBM, and serves as a reasonable and necessary approach.

Social Cognitive Theory

Bandura’s (1977) definition of social cognitive theory (SCT) maintains that behavior is driven by one’s expectancies and incentives. These expectancies are divided and categorized into three classes; environmental stimulus (an understanding of what-leads-to-what), consequences assigned to the behavior (expectancy outcome), and one’s ability to perform the behavior (self-efficacy) which is required to influence outcomes. Incentives (motivation-reinforcement) define how a person’s behavior will be adjusted, providing the person interprets that there are consequences (e.g., oral disease, illness). Older adults will aim to modify their behavior if they
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perceive that their current routines may cause harm to their health, that by engaging in change will decrease health risks, and if they are able to espouse this new behavior themselves (Bandura, 1977). While several concepts of HBM intersect with SCT (perceived threat vs. expectancies about the environment), one specific concept inherent to SCT complements and strengthens the model; self-efficacy. This model, however, has not been applied to many oral health studies. The significance of this model to older adults in LTC facilities means that the individual must feel competent to initiate change. Providing necessary oral health information and reducing (social, environmental, etc.) barriers to access to oral care will promote the belief that one can engage in healthy behaviors.

Researchers have used HBM for decades to investigate specific health-related concerns (e.g., physical activity in pregnancy, mammograms, HIV). As a result, numerous studies have been performed with researchers (Kelly, 1979; King, 1982; Rundall & Wheeler, 1979) having analyzed the HBM concepts, (e.g., susceptibility, severity, benefits, and barriers), validating each dimension, and noting its significance with each health-related behaviors under study. Of the HBM concepts studied, researchers (Abdolaliyan, Shahnazi, Kzemi, & Hasanzadeh, 2017; Fulton, et al., 1991; Rundall & Wheeler, 1979) have consistently found perceived benefits and perceived barriers to be robust predictors of a health outcome, despite some views (Armitage & Conner, 2000; Stroebe & de Wit, 1996) to the contrary.

Chen and Land (1986) studied HBM concepts by analyzing causal relationships among American women’s health beliefs and preventive dental behavior using the LISREL system, a causal modeling method. Foremost, perceived susceptibility was found to have reciprocal causal ties between oral health beliefs and preventive visits. In other words, the greater the causal impact of perceived susceptibility (threat) on dental visits coupled with negative feedback effect
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suggests that each have causal processes that are interdependent. Chen and Land (1986) also contend that the greater the perception of susceptibility resulted in an increased likelihood of dental care utilization. Yet, the perception of susceptibility (threat) diminished following the action of visiting the dentist – which can be rationalized. Specifically, after the impending threat of decay or illness has been clinically assessed and treated, it may decrease one’s perceived threat (risk) of disease, resulting in increased confidence. However, if regular dental visits are not maintained, one becomes uncertain of their oral health status, resulting in the perception of susceptibility (threat).

Secondly, the researchers found perceived barriers to have a unilateral, direct causal path to dental visits. More important, the findings suggest that commonly held HBM assumptions about beliefs as one-way determinants of health action was not always true. Rather, dental health beliefs were viewed as both determinants and consequences to dental health behavior. The results from this study can be viewed as a need to address HBM limitations, align and evaluate concepts among researchers, and emphasizes the need to improve oral health outcomes.

To overcome the limitations previously outlined, it is necessary to extend this model beyond HBM’s intrapersonal behaviors into a framework that considers external factors (policies, structures, and norms in the community) which influence behavior. To this end, an HBM which incorporates SCT concepts (self-efficacy) integrated within an ecological framework can overcome limitations, and produce viable outcomes. This integrated conceptual model will allow program planners and key stakeholders to understand the norms that support oral health within the community. Where individual beliefs and lifestyle are important factors, a combined conceptual model provides planners a means to identify and assess factors that impede or facilitate access to oral health in the setting where older adults work, live and socialize.
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In addition, this framework has the ability to create unique opportunities to address community public oral health concerns as well as address structural-environmental barriers and improve socio-economical health disparities [Figure 2]. For instance, media presented in the social environment can shape public health campaigns by enhancing community mobilization, stimulate motivational factors, and channel influence and content domains (Finnegan & Viswanath, 2008). This approach allows communication to reach people of differing socioeconomic status (SES) and rural locations who would otherwise be excluded from ordinary media communications.

Figure 2. Diagram of a Conceptual Health Belief Model in an ecological framework. Adapted from Keyes PH. International Dental Journal. 1962;12: 443-464.

Moreover, using a Comprehensive Measure of Oral Health Knowledge (CMOHK) measurement tool and data obtained from a large cross-sectional survey, Macek et al. (2017)
investigated oral health conceptual knowledge and its relationships with oral outcomes in patients attending university-based dental clinics. Using this tool, the researchers found that one-fifth (20%) of 909 adults had a low conceptual knowledge, and a strong correlation with oral health attitudes, beliefs, and self-efficacy toward dental caries and periodontal disease prevention. While scores were not associated with dental cleaning or visits within the previous 12 months, Macek et al. (2017) urged researchers to combine oral health concepts, similar to those found in the HBM, in their conceptual frameworks. This study illustrates that oral health literacy assessment tools can be useful toward identifying low-literacy populations; populations that would benefit from targeted media-rich oral health literacy campaigns to reduce dental care knowledge gaps and improve oral care outcomes. For this purpose, a corresponding hypothesis was developed to examine if an association exists between oral health education and the likelihood to seek oral care, which follows in the methods section.

Long-term care

Over the years the need for long-term care has increased, and the definition has been widely redefined. Long-term care refers to a broad spectrum of services intended to provide health, personal care and/or supportive services to older adults and other individuals who require assistance with activities for an extended period of time to compensate for loss of functional abilities often associated with an injury, physical, mental, or cognitive disability, chronic illnesses, or other health-related ailments. Services vary greatly in intensity and frequency depending on the individual needs of the resident, contend Schmitter-Edgecombe & Parsey (2014), and may include general supervision or direct care, as well as activities of daily living (ADLs) (e.g., bathing, toileting, dressing) or instrumental activities of daily living (IADLs) (e.g., meal preparation, housekeeping, medication oversight). ADL and IADL services are intended to
improve quality of life, enhance physical functionality, and may include special services, assistive and mechanical devices, as well as help from family members or community resources.

Older adults can receive long-term care in a variety of settings such as residential care homes, private homes, through the community in adult day care centers, residential settings such as assisted and independent living communities, or nursing home institutions. Commonly, when an older adult requires assistance above what can be provided at home, an assisted or independent living facility is a consideration. When an older adult’s health needs exceed the level of care provided in an assisted living facility, a home health agency can be hired to provide extra services in-house, or the next, highest level of residential care (e.g., nursing home or skilled nursing home) is required.

Roughly 6.5 percent of older adults reside in long-term care facilities, of which, about 1.45 million reside in nursing home institutions while close to 750,000 reside in some type of residential-care environment that renders long-term care services, according to Spillman & Black (2006). Nursing home residents typically require close monitoring and medical attention more so than adults in residential care centers. This is primarily due to increased limited mobility, and functionality, and medical conditions such as depression, sleep and behavioral disorders, arthritis and osteoporosis, lung and heart disease, diabetes, vision or hearing impairments, among others. To this end, a report prepared for the US Department of Health and Human Services, Office of Disability, Aging, Long-Term Care Policy, and the Urban Institute (2002) indicated a significantly high percentage of cognitive impairment in residents of nursing home institutions compared to residents of assisted living facilities. For the purpose of this research, assisted and independent living settings were included in the study whereas nursing home settings, memory care and special care units, etcetera, were excluded.
Older adults residing in long-term care facilities require additional attention as their oral health is generally poor due to a combination of factors, (e.g., functional limitations, multiple medications). Adding to this, they are not able to frequent a dentist as these facilities typically lack on-site dental professionals or trained non-dental professionals to meet oral health needs (Kiyak, 2005). Slade, Locker, Leake, Price, & Chao (1990) compared the oral health status of institutionalized and non-institutionalized older adults and found that institutionalized adults were more than twice as likely to be edentulous although researchers suggested that pre-existing sociodemographic factors prior to admission were likely attributable to an increased likelihood of oral disease. Nonetheless, as adults age and have a need for long-term residential care, the need for continued oral health services is expected to grow. In a study that used a large multi-ethnic sample, Berg, Berkey, Tang, Baine, & Altman (2000) found significant unmet oral treatment needs in residents of long-term settings, when compared to independent older adults residing in the same community.

**Definition of Terms**

Older adults, long-term care administrators, policymakers, community agencies and key stakeholders interfacing with healthcare practitioners are exposed to terms that are often specific to a provider’s field of specialty. Several oral health-related terms are used throughout this paper. The following definitions are to contribute unity and understanding of the terms.

*Dental caries*: also referred to as tooth decay, is a term used to describe a bacterial disease process due to acids from bacterial metabolism disseminating into dentine and enamel which is highly preventable (Featherstone, 2008).

*Edentulism*: a condition of tooth loss, partial (one to many) or total (32 teeth), that increases with age although edentulism does not have to be part of the natural aging process. It
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serves as the “final marker of disease burden in oral health” (Cunha-Cruz, Hujoel, & Nadanovsky, 2007).

*Inflammatory papillary hyperplasia:* also referred to as denture stomatitis, is tissue overgrowth in the palate (roof of the mouth) with nodular appearance typically associated with poorly fitting dentures or partials (Gual-Vaqués et al., 2017).

*Oral health:* motor and sensory activities such as “speaking, smelling, smiling, chewing, swallowing….and to convey a myriad of feelings and emotions through facial expressions with confidence, free from pain, discomfort and disease of the craniofacial complex which is essential to overall physical and mental well-being” and quality of life (FDI, 2016, para. 2).

*Oral hygiene:* the practice of keeping a clean mouth and maintaining proper dental care to prevent tooth decay and gum diseases such as gingivitis and periodontitis.

*Oral prophylaxis:* a scaling and polishing method to remove stains, plaque and calculus from exposed and unexposed areas on tooth surfaces as a preventive measure to control local irritation factors (American Academy of Periodontology, 2017).

*Periodontal disease:* a chronic inflammatory disease affecting the gum tissues and supportive bone structures of the teeth; in its earliest stages it is referred to as gingivitis (Eke, Dye, Wei, Thornton-Evans, & Genco, 2012).

*Risk factors:* factors that contribute to poor oral health including unhealthy diet, poor oral hygiene, harmful alcohol use, tobacco use, and social determinants of health (World Health Organization [WHO], 2017a, para. 1).

*Social determinants:* the circumstances in which “people live, work, age…that are shaped by the distribution of resources, money, power at local, national, and global levels that are responsible for health inequities” (WHO, 2017b, para. 1).
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III. Review of the Literature

An oral health crisis is emerging given that our world’s population is exploding. As Ortman, Velkoff, & Hogan, (2014), have projected, the aging population in the U.S. is expected to reach 83.7 million, nearly double in size from 4.1 million in 2012, with Petersen, Kandelman, Arpin, & Ogawa (2010) adding that adults 60 years of age and older will comprise over half the world’s population by the year 2050. Along with life expectancy increasing, additional challenges will be placed on our existing health care system, particularly, dental care. Complicating this, oral and dental diseases are unreasonably more common among older adults. These conditions are associated with many factors, claims Lamster (2004), including financial concerns, lack of insurance, the age of teeth, chronic disorders, medications, as well as limited mobility, and increases with age. Adding to this, many of these adults will require long-term care (LTC). Current projections estimate that roughly two-thirds of aging adults 65 years or older will require long-term care services (Kemper, Komisar, & Alecxih, 2005). While oral health is universally recognized by public health officials and in literature as crucial to general health, many Americans go without sufficient oral healthcare, particularly older adults.

Consequences of inadequate access to oral health services

The consequences of inadequate access to oral health services and subsequently poor oral health are far-reaching. A study by Griffin, Jones, Brunson, Griffin, & Bailey, (2012) found that poor oral health negatively affects quality of life (ability to eat, articulation of speech, esthetics and subsequently a decline in social interaction and intimacy) that, in turn, increases the risk for other diseases, morbidity, and mortality. There is strong evidence, for instance, that demonstrates a correlation between oral health and cardiovascular disease (Leishman, Do, & Ford, 2010;
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Meurman, Sanz, & Janket, 2004; Mustafa et al., 2015), diabetes (Leite, Marlow, & Fernandes, 2014; Taylor & Borgnakke, 2008), and respiratory disease (Azarpazhooh & Leake, 2006; Scannapieco, Bush, & Paju, 2003). In addition, adults with chronic conditions are routinely prescribed medications (antihistamines, Beta-blockers, lung inhalers, ACE inhibitors, antidepressants) that alters the production of saliva as a side effect which can lead to significant problems of the teeth and supporting structures and adversely affects proper chewing, resulting in poor digestion (Lamster, 2004). Consequently, many older adults may limit or substitute food options for softer, easier-to-consume products that have poor nutritional value or high-fat content lending to malnutrition or obesity.

Dentures, an alternative to natural teeth, provide facial structure integrity as well as improve food mastication which is particularly crucial to edentulous, older adults. However, some studies have shown (van Kampen, van der Bilt, Cune, Fontijn-Tekamp, & Bosman, 2004; Woda, Mishellany, & Peyron, 2006) that a greater amount of muscular energy is required to masticate food in full denture wearers compared to adults with 20 or more teeth and dentures impede one’s ability to create a bolus or chew food to half its original size which may explain why older adult denture wearers avoid certain foods.

Lack of insurance

Many aging American baby boomers will soon retire, and as a result, their primary health benefits such as employer-sponsored insurance will be replaced with Medicare, which under some Advantage plans, offer a limited number of dental plans at affordable rates. Cuts in state budgets, Medicaid program reductions, and the looming Affordable Care Act (ACA) dismantlement fuels the increased use of public and private safety nets in the absence of access
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to dental care. Understandably, several studies have shown (Davis & Reisine, 2015; Dolan, Atchison, & Huynh, 2005; Manski, Moeller, & Maas, 2001) that overall dental utilization has been insufficient in adults ages 60 years and older over the past several decades, despite marginal increases across the nation.

Types of major barriers to oral health care, reports the Institutes of Medicine (2001), are low rates of dental insurance, high out of pocket costs including insurance co-payments and deductibles, untrained general health workforce in oral health, and an unawareness regarding the importance of good oral health in the general public and health professionals. One of the most important barriers to care, particularly for low-income populations, is the continued lack of dental insurance and affordable dental care. Patients that feel dental care is expensive often delay or forgo dental care.

Consistent with its obligations under the Centers for Medicare and Medicaid rules, in 2016 the Georgia Department of Community Health (GDCH) produced the Access Monitoring Review Plan (AMRP), wherein Medicaid beneficiary access to providers (primary care, podiatry, home health, behavioral, dental, etc.) was analyzed. The findings showed dental care to be one of the top three access issues. The GDCH emphasized concern in that Georgia’s Fee-For-Service (FFS) beneficiary population is comprised mostly of older adults who have significant health care needs; needs that are critical for this population to have access to care when necessary, and on a when-needed basis.

Medicaid programs are required to cover dental services to children and youths 21 years of age and under, but there are no minimum coverage requirements established for adults. The ACA, adopted in 2010 by Congress, allowed an expansion of Medicaid coverage to extend services to people eligible for Medicaid, though Buettgens, Kenney, and the Urban Institute
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(2016) point out, that Georgia was, and currently remains one of 19 states that chose not to increase the insurance coverage limitations that were extended to low-income adults as part of the ACA. Generally, Georgia Medicaid benefits will cover emergency services for adults suffering from oral pain due to compromised teeth though not preventive or restorative services. Yet, states change Medicaid coverage of adult dental benefits periodically, increasing them as funds become available and cutting benefits when budgets are tight.

Consequently, adults without access to care often forgo preventive care and rely on emergency department (ED) physicians for palliative treatment which Lee, Lewis, Saltzman, and Starks (2012) contend accounts for sharp increases in ED visits for untreated dental conditions. Palliative treatment, however, is intended as an immediate, interim solution only. Typically, ED physicians provide management of dental symptoms through antibiotics and analgesics, report Sun et al., (2015) though most are unequipped to provide definitive treatment of the underlying cause.

Georgia’s dental health disparities, Moore et al. (2017) point out, stem from a lack of community health needs assessments, availability of services offered in federally qualified health centers, transportation to dental offices, innovative solutions, unanswered health literacy concerns, and unwillingness of dentists to participate in, or accept low Medicaid reimbursement rates. Complicating matters, trained professionals such as dental hygienists are skilled in providing routine oral prophylaxis, oral cancer screenings, periodontal assessments, as well as nutritional counseling and oral hygiene instructions yet there are only 38 states [Figure 3] that allow hygienists direct access to patients:
Dental hygienists are at the front-line of oral health defense, from Baumgartner, Schimmel, & Müller’s (2015) perspective, as they routinely interact with patients, screen for conditions that warrant dental treatment, and can serve as immediate links to dentists.

**Financial factors**

Previous studies have suggested myriad barriers to having good oral health, and among those, the most commonly mentioned is financial status. To this end, “wealth and income have a strong and independent effect on dental care utilization” claim Manski et al., therein can be reliable predictors of oral health status (2012, p. 179). Comparably, having dental insurance may increase the likelihood of dental office visits, which in turn, leads to improved overall health. For that matter, Manski and Moeller (2017) observed that a majority (70%) of older adults in the United States go without any type of dental benefits, while a fourth (24%) had only private coverage, although, age was not specifically defined. Given that financial status appears to be a main predictor of oral health status is especially concerning, since the incomes of older adults are
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usually lower than the working population and affect the availability of insurance. Most notably, Adegbembo, Leake, Main, Lawrence, and Chipman (2002) highlighted the importance of being insured and dental health outcomes by indicating older adults with dental insurance were more than twice as likely to make regular dental visits, and consequently have more natural teeth remaining compared to the uninsured population. These findings are evidence that if older adults are provided with some type of dental insurance, it enables and fosters the use of dental services and increases overall health. Apart from financial reasons, where one resides plays a role in accessing dental services which is discussed further below.

Geographical location

Geographical and environmental factors may play a role in access to oral care. Place of residence, for instance, is a factor that has been reported to influence dental health in older adults. Vargas et al. (2003) have reported that residing in rural areas increases the risk factor for having poor dental health and infrequent use of dental services which results in overall unmet dental needs. This was true for all age groups but especially marked in older adults, where nearly half (47%) of seniors in rural areas reported a dental office visit, compared to nearly two-thirds (58%) of those residing in urban communities. The findings from this study align with those of Mitchell, Bennett, and Brock-Martin (2013) where, using the BRFSS and Area Resource File (ARF) data, notable associations between high-poverty rural and other rural counties, and increased edentulism rates were observed. Specifically, people residing in rural counties had higher rates of total edentulism (high-poverty 51.9%, other rural 8.2%) and partial edentulism (high-poverty 51.3%, other rural 45%) compared to urban areas (total edentulism 4.3%, partial 38.4%) respectively. Overall, socioeconomic along with health status indicators were found to be robust predictors of edentulism in this study.
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In terms of dental visits, de Oliveira Ferreira, Leopoldo Ferreira Antunes, and Bof de Andrade (2013) investigated Brazilian adults 65-74 years of age having had dental visit appointments within the last two years, based on socioeconomic factors (region, education, and income). The researchers found that roughly half (46.5%) of adults had an appointment although each factor was independently associated with the outcome. These studies and others (Guo et al., 2014) are further indication that place of residence (rural versus urban) and location appear to play a role in use of dental services and oral status.

Regular dental care, however, is vital to maintaining good oral health. For this reason, the American Dental Association (ADA) has stated that regular dental visits should occur at a frequency determined by a dentist. This recommendation is based on research conducted by Giannobile et al. (2013) that shown individual risk factors influence the frequency of cleanings per year to prevent periodontal disease; those at high-risk will likely benefit from more frequent visits while low-risk patients may require a single cleaning annually. While the factors mentioned above influence dental service utilization, other factors that have not been widely investigated serve as significant barriers to oral care. These are discussed in more detail below.

Oral health attitudes

Besides obvious financial and demographic factors, other variables may exist which influence the overall dental health status in older adults. For instance, one noted barrier to adequate dental care is personal attitudes towards oral health and dental professionals. In the Florida Dental Care study, report Gilbert, Duncan, Heft, & Coward (1997), African Americans and Caucasian adults 45 years of age and older were interviewed to discern dental attitudes on dental service utilization, and knowledge of dental service. From six attitudinal constructs used in the study (e.g., perceptions of importance in dental care, cynicism toward dentists and dental
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care), researchers were able to significantly distinguish between regular users, users, and non-user of dental care. Consistently, the worse dental outcomes and more negative attitudes toward oral health were recorded among African Americans with low incomes, living in rural areas. This study and others (Guo et al., 2014) further point to the fact that race and lower income (on average, compared to Caucasians) coupled with one’s attitude toward oral health have an impact on dentition status and service use.

**Perceived importance and cultural beliefs**

Although reports have suggested that poor oral health is associated with specific ethnic minorities (US DHHS, 2000), education, beliefs, and perceived self-importance of oral health are *stronger* predictors of dental service utilization. In one such study, Kiyak & Reichmuth (2005) compared low income older adults enrolled in free, or reduced-cost community dental services, to those who routinely used the service as preventive treatment, or for emergency purposes, or no utilization. As no- and low-cost clinics were initially developed, the number of visits increased, yet as soon as acute conditions (e.g., pain) were resolved, return visits became infrequent. Subsequently, individuals’ attitudes towards oral care were analyzed, and researchers had noted that perceived personal importance associated with oral health is the best predictor of the type of services used. Additionally, the older adult immigrants involved in the study (mainly Hispanic and Asians) conveyed less concern for saving their natural teeth or the benefit of a healthy mouth.

Comparatively, Kelesidis (2014) looked at sociocultural factors in oral care use, and its relationship to oral health perceptions among African Americans and Asians, and found no significant distinctions in oral health awareness or poor financial status between the two groups, however, over three-fourths (78.4%) held adverse oral health perceptions while each group held
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relatively low perceptions (29.7%, 28.3%) of adverse periodontal disease. To this point, some cultures do not have an understanding of gum disease and oral health, nor are they familiar with preventive practices. Having white teeth may be important esthetically in some cultures, though, a healthy mouth is not correlated with one’s appearance.

In addition, Kiyak’s (2005) research also found that transportation or physical barriers to accessing dental care were not able to discriminate between preventive treatments versus, emergency service versus non-utilization, although, personal attitudes towards oral care were able to classify patients into three groups further suggesting that personal beliefs (stemming from education) are among the strongest factors that influence overall oral health in older adults.

Education

Education invariably plays a vital role in perceived need of oral health and dental service utilization. For instance, Manski et al. (2015) modeled the effect of dental service utilization and costs of expanding dental coverage for uninsured adults ages 55 and older. An interesting finding was that when dental insurance was provided to a cohort of uninsured, and compared to a previous insured population group, dental care utilization and expenditures were less in the uninsured population despite having been provided coverage and the possibility to receive care. The results between the groups showed that education has an independent impact on dental care utilization by isolating the effect of having dental insurance. Specifically, the previously uninsured without dental-use group had lower incomes and were less educated than the previously insured group, yet when provided with access to dental care to overcome the gap between two populations, the dental use rates of the previously uninsured fell far below what was expected. While this study illustrates that providing insurance to uninsured older adults alone is not enough to increase dental service use, it suggests the need for an educational approach to
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help increase oral health knowledge and dental service utilization.

The incidence of poor health and disparities affects many older adults, especially those of low socioeconomic and poor educational attainment, while the cost of caring for people with poor health affects both our healthcare system and our government. As a point, in 2016, the Organisation for Economic Co-operation and Development (OCED) surveyed 250,000 adults in 33 countries to examine the relationship between education, literacy and self-reported health. The findings indicate that better-educated adults are more apt to report better health than less educated adults even after controlling for individual background characteristics, with differences in self-reported health associated with education greatest in Norway and the U.S., whereas the association between self-reported health and literacy was highest in the U.S. and Austria.

Alternatively, Schillinger, Barton, Karter, Wang, & Adler (2006) questioned if literacy mediates the relationship between education and health outcomes in low-income adults with diabetes. Their results parallel OCED’s findings in that adults with educational attainment were associated with improved glycemic control and was notably remarkable when comparing people with lower levels of education (i.e., below high school graduate versus high school graduate). More important, the use of literacy as a mediator thinned the direct effects of education on glycemic control to insignificant levels, which shown to be both statistically and clinically significant. However, limited literacy has been associated with deficient reading skills and a lack of these skills linked to a limited education.

Literacy

Health literacy is tied to literacy, as Sørensen et al. (2012) point out, it “entails people’s knowledge, motivation, and competencies to access, understand…and apply health information in order to make judgements and decisions in everyday life regarding healthcare, disease
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prevention and health promotion to maintain or improve quality of life during life course” (p. 3).

Likewise, oral health literacy extends to the degree to which people have an ability to read, understand, and process basic oral health information in order to make sound decisions and act upon them, however, poor health literacy is common-place among older adults. For instance, one-third (33%) of adults ages 65 and older, report Williams, Davis, Parker, & Weiss (2002) have adequate to less-than-adequate health literacy. The reasons for health illiteracy itself is far-reaching in that adults might lack access to health information resources due to financial and time constraints, difficulty comprehending written words or performing internet searches, as well as cultural biases, which may promote dependence on family members or health care professionals, indicate Holtzman, Atchison, Gironda, Radbod, & Gornbein (2014), and this may contribute to missed or rescheduled dental visit appointments. Establishing effective provider-patient communications is central to oral health outcomes, however, this can be impeded by health literacy deficiencies.

Similarly, Guo et al. (2014) examined the association between health literacy and self-reported oral health, and to determine if it is influenced by patient-dentist communication and dental care use patterns. The researchers found that higher health literacy levels resulted in higher quality provider-patient communications, and higher quality provider communication correlated with higher self-rated oral health. All the available research demonstrates that the public’s health literacy overall, and oral health literacy, distinctly, is deficient. Yet, health literacy is paramount as it can affect patient outcomes, as well as overall health care use and costs. Moreover, Jones, Lee, & Rozier (2007) examined the association of knowledge, oral health status with oral health literacy among patients in a dental setting and found a considerable number of patients with low oral health literacy levels which was strongly affiliated with lower
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dental knowledge, decreased dental visits, and self-reported poor oral health. Taken together, this
underscores that social systems and healthcare providers are significant stakeholders in framing
the association between education, literacy, and health.

Studies of oral health status and barriers to care of older adults in the U.S.

In the United States, there are relatively few recent studies regarding oral health among
adults 65 years of age and older residing in LTC community dwellings, although this area is
gaining greater attention and research momentum. Population-based studies have largely focused
on data collected from adults visiting dental clinics (Lukes, Janssen, Thacker, & Wadhawan,
2014; McQuistan, Qasim, Shao, Straub-Morarend, & Macek, 2015) for purposes such as
improving oral health surveillance techniques. Dental clinics serve as prime locations for
implementing dental services, convenience sampling, and produce useful information to provide
feedback on effective and ineffective components. However, this approach may have limitations
in that many older adults have limited mobility rendering them unable to attend dental centers,
lack transportation, or other limiting factors.

In contrast, Berg et al. (2000), compared the oral health status of independent
community-dwelling older adults, those receiving long-term home care services, or residing in
nursing facilities in Arizona. While the research refrained from focusing on specific residential
settings which would prove useful in recognizing setting-specific barriers, the findings
demonstrated users of long-term care services had significant unmet oral treatments needs
compared to independent older adults living in the same communities. Residing in a nursing
home, or receiving long-term care services were also strong predictors of root and coronal caries
occurrence. This study, however, was conducted nearly two decades ago and included nursing
homes which have populations known to suffer from increased chronic conditions warranting
In 2015, Davis and Reisine examined barriers to oral care in English-speaking, low-income housing residents in Connecticut ages 65 years or older with the purpose of developing theory through investigation. Three major themes evolved from the study; lack of dental insurance, fear and anxiety, and transportation, amongst others. Davis and Reisine used a relatively small sample size (seventeen) and focused specifically on older adults in low-income independent housing settings. As Patton (2002) points out, sample size is not dictated by rules; qualitative research that focuses on similar settings, as inhomogeneous samples, lends to describing a particular subgroup in more depth. However, individuals with physical limitations which precluded them from attending interviews were excluded which represents a significant characteristic of the older adult population, particularly residents in long-term care settings. No recent studies have been identified that relate to oral health knowledge and beliefs in older adults residing in assisted and independent care settings to perceived barriers to oral health care in the U.S. Researchers abroad have examined the reasons why residents in long-term residential care settings suffer from poor oral health and barriers to oral care more extensively, compared to the U.S.

**Studies abroad**

Studies pertaining to oral health in the older adult population have been conducted in several diverse areas abroad such as India, Australia, Canada, China, and Poland. The main focus of several of these studies were older adults, most of whom reside in LTC community dwellings, their oral health knowledge, beliefs, and attitudes, dental examinations, and barriers to care. Some, extended investigation to seek the relationship between dental insurance status on the use
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of dental service needs (Adegbembo et al., 2002; MacEntee, Weiss, Waxler-Morrison, & Morrison, 1987); analyze oral health behavior of age groups according to residential location (rural and urban) and the role of social behavior risk factors on dental carries (Zhu, Petersen, Wang, Bian, & Zhang, 2005), or survey the opinions and experience of dentists (MacEntee, et al., 1987). Population sample size in these studies varied from 226 older adults, upward to 4,399 adults who range in age from 55 years and older.

Various methods were used in these studies, such as Chi-squared and Fisher’s tests to examine the associations between two categorical variables (Gaszynska, Szatko, Godala, & Gaszynski, 2014), the Krushal-Willis test to analyze differences of continuous variables distributions on categorical variable categories, or ANOVA and Chi-squared tests to determine differences between groups on dependent variables (Mariño, Khan, Tham, Khew, & Stevenson, 2014). Adegbembo et al. (2002) performed analysis using the Krushal-Willis test as a means of assessing *The Effect of Dental Insurance* (and other factors) on the *Ranking of Dental Treatment Needs*, and Kendall’s W statistic to determine the degree of correlation between levels of oral health need to independent factors.

As a whole, several of the studies used logistic regression models, models which can be useful in describing the relationship between a categorical response variable and a set of predictor variables. To this end, Mariño et al. (2002) used thirteen predictors, including dependent variables (e.g., education, age, gender, income), and enabling and needs variables (e.g. attitude toward, and knowledge of oral health, perceived needs, self-perceived barriers to dental care, and importance of oral health), along with three clinical variables (self-reported mobility issues, tooth decay, and number of natural teeth) to analyze the likelihood of oral care utilization. From this model, researchers noted that adults living alone were less
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apt to visit the dentist, and those who perceived less oral health needs were less apt to frequent a
dentist compared to adults who perceived more oral health needs. Differing from other studies,
Mariño et al. (2002) sampled 226 younger adults 55 years of age and older who were largely
dentate, yet of these younger adults, roughly half (51.2%) had visited a dentist within the past 12
months.

Moreover, Gaszynska et al. (2014) sampled 259 participants 65 years of age and older, and
observed that three-fourths (75%) of the population had not visited a dentist within the past
year. Comparatively, Adegbembo et al. (2002) sampled 252 older adults residing in senior care
homes and found half those with insurance had visited (47.2%), compared to those without
insurance had visited a dentist (28.4%) within the past 12 months. Albeit having insurance
appears to influence dental care service use, underutilization of services identified by high
percentages across regions underscores the need to identify and address barriers to care.

Among the barriers to oral care identified by Gaszynska et al. (2014) were problems with
accessibility to oral care services (26.4%), misjudgment of existing oral conditions (26%), lacked
awareness of dental need (23.3%), held a belief that a dentist could not help (19.2%), anticipated
high cost of dental treatment (2.6%) or were afraid of pain (2.6%) of 193 senior home care
residents. Likewise, Mariño et al., (2014) reported that over half (51.2%) of older adults had attended
a dentist in the past 12 months, and of the entire population, only eighty-nine (38.1%) participants
had only 21 or more teeth, while another eighty-two (34.2%) were completely edentulous.
Overall, participants perceived the cost of dental service (32.7%), fear of dentists (25.8%), length
of appointment waiting lists (18.1%), and accessibility to oral care services (11.1%) as the top
barriers to care.

Comparatively, in a study that compared rural and urban dwelling adults ages 35-44
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(\(n = 4076\)) and \(65-74 (n = 3790)\), Zhu et al. (2005) found that over one-fourth (26\%) of younger adults and nearly one-fourth (23\%) of older adults had visited a dentist within the past year. While the findings were relatively consistent across both groups regardless of urban versus rural locations, the most significant decline in oral care service utilization (16\%) was noticed in 65-74-year-old rural-dwelling adults.

In terms of oral health behaviors, when Zhu et al. (2005) asked the 64-74-year-old rural-dwelling age group what steps they would take if their gums were to bleed, almost one-tenth (9\%) of the participants indicated they would stop brushing, nearly one-tenth (9\%) said they would pay more attention, less (7\%) would seek a dentist, roughly one-fourth (22\%) would ignore the bleeding, and nearly one-third (27\%) were without knowledge of what actions to take. Compared to the urban-dwelling adults, over one-tenth (13\%) would stop brushing if their gums were to bleed, nearly one-fifth (18\%) would ignore the bleeding and one-fifth (16\%) were without knowledge of what actions to take, yet of this group, one-fifth (15\%) consume sweets twice a day and about one-fourth (23\%) do so daily.

More important, among all age groups and regions, Zhu et al. (2002) noticed over a half (56\%) of the surveyed adult population believed that tooth loss was a natural part of the aging process and therefore inevitable with nearly all (92\%) rural and urban dwelling adults 65-74 years of age having no knowledge of dental plaque therein are unaware that it is the leading cause of periodontal disease. While cultural and regional differences can shape oral health behaviors, and in review of these studies, there is a seemingly similar issue; where knowledge, attitudes, and oral health beliefs are strong predictors of dental care utilization, a lack of knowledge about the significance of good oral health impedes oral health outcomes.
Facilitators of access to oral health knowledge and care

Dentists and other oral practitioners are among those trained to screen, diagnose and prevent oral diseases, and render treatment to the public. It is these dental providers that are the main sources of public oral health information (Melbye & Armfield, 2013). Oral health information, in turn, influences patient preventive activities, treatment compliance, and overall oral health outcomes (Fox, 2010). In a study that used a large sample size, Zhu et al. (2005) found that nearly one-fourth (21%) of the population indicated that they rely on dentists for oral health information. It is this provider-patient interaction which fosters trusting relationships, supports patient-centered care, and improves oral health outcomes.

Primary care physicians and other qualified healthcare providers obtain information from patients routinely to assess presenting symptoms, determine diagnoses, provide counseling, render therapeutic directives, and consequently, can establish caring relationships. These relationships, claim Fong Ha and Longnecker (2010), offer shared perceptions into the nature of the problem, treatment goals and psychosocial promotion. For this reason, Fong Ha and Longnecker (2010) maintain that effective patient-provider communications have the ability to promote understanding of health-related information and allows better distinction of patient expectations, perceptions and needs. The collaborative interaction between various providers and provider-to-patient communication cultivates quality of care and healthy outcomes.

Care management teams and LTC facility directors are central to managing the care of older adults who can no longer reside independently in the community. Administrators and care managers often serve as health coordination gatekeepers as they maintain oversight of ADL’s and medications, facilitate oral health hygiene, provide nutritional services, assist with transportation services and promote physical, social and mental wellness in older adults. These
ORAL HEALTH CARE ACCESSIBILITY IN THE OLDER ADULT

professionals can integrate processes that foster effective interactions between residents and
dental providers, promote oral health education, information and services, and facilitate
collaboration with community agencies.

Media distributed through mailings, brochures, posters or magazines, in the form of
stories, news, or images can shape health outcomes (knowledge, attitudes, opinions, and
behaviors) among individuals, groups, organizations, and communities. For instance, Zhu et al.
(2005) indicated that one-third (30%) of adults gained oral health information directly from
magazine and newspapers, and nearly one-sixth (15%) acquired information from hospital
signage. Electronic media (radio, television and the internet) provide a means for advancing oral
health information which is particularly useful for reaching vulnerable (i.e., low socioeconomic
status), and at-risk groups such as older adults with chronic health conditions, limited mobility,
isolated by living environment or geographic location.

Contrary to stereotypical belief, many older adults are technology-savvy. These adults
routinely use smartphones, tablets, and smartwatches and rely on the internet as a source of
health information. Recent statistics from the Pew Research Center show that more than half
(58%) of adults ages 65 years and older use the internet. Moreover, Perrin and Duggan (2015)
report that over three-fourths (78%) of rural-dwelling adults use the internet compared to a larger
number (85%) of urban-dwelling adults, and one-third of adults having below a high school
education use the internet. Media-rich oral health messages sent via channels commonly
available to older adults residing in assisted living and independent care facilities are
considerations in community public health approaches.

Technology and recent communication advancements serve as useful mechanisms for
older adults to access oral health information and care. Teledentistry, contend Irving, Stewart,
Spallek, & Blinkhorn (2017), allows patients to receive dental consultation, oral screenings, diagnosis management and treatment plans, remotely. This technology is an important component in access to care, as it permits older adults with physical, financial, or geographic limitations who would otherwise forgo oral care, a means to receive dental services. Consequently, it may help older adults establish and maintain routine dental appointments, improve quality of life, and reduce overall health care costs.

Social networks such as family members, close friends, and acquaintances, as well as social activities, serve as significant channels to oral health information and oral wellness. Older adults frequently attend social and recreational clubs, community functions and local organizations. These social networks are important to older adults on many levels and have a great impact on oral health outcomes. According to Tsakos et al. (2013), older adults with four to six close friends decreases the likelihood of tooth decay and lowers the risk of root decay than older adults having fewer friends. Equally important, older adults with high social networks such as family, friends, and neighbors have a higher level of stress-coping abilities which encourages motivation to seek dental care (Boyapati & Wang, 2007) which may have a positive effect on oral health outcomes and quality of life (Tsakos et al., 2013).

Community agencies, such as Senior Services and Wellness centers are instrumental in oral health promotion activities by focusing on delivery of health information and prevention intervention (Nihtilä et al., 2017). Collaborative efforts through interagency partnerships have worked to deliver interventions and monitor outcomes by using available oral health resources with support from public and private organizations and key stakeholders (U.S. Department of Health and Human Services Oral Health Coordinating Committee, 2016). Moreover, community
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oral health campaigns facilitated through community centers can leverage technology, channel data for future research, and monitor oral health outcomes.

Collaboration between dental practitioners, primary care physicians, community agencies, facility administrators are of utmost importance and have boundless potential in helping to close oral health-related knowledge gaps and improve oral health outcomes in LTC older adults. However, Wakefield, Loken, & Hornik (2014) stress that access to, and availability of services are crucial to influence individuals stimulated by media messages to take action, change behavior, and realize optimal health.

IV. Methodology

I used a quasi-experimental and correlational design and a structured 8-question survey in this quantitative study. The purpose of the study was to examine some of the determinants to dental care utilization, those that promote or impede access to oral care in the older adult Cobb County population who reside in residential long-term care facilities. Cobb County is one of nine metro Atlanta counties and home to roughly sixty-one assisted and independent living facilities. In 2016, a preliminary background research was conducted using Cobb County’s Community Health Needs Assessment report, county sociodemographics, as well as national and state statistics acquired from the CDC’s Division of Oral Health via the reported data through the BRFSS and the National Oral Health Surveillance System (NOHSS). The findings, mentioned below, served as the springboard for this research.

Participants

Between April 2017 and July 2017, 89 participants (85.2% women, 14.8% men) residing in long-term facilities in Cobb County, Georgia completed an oral health survey. The eligible
ORAL HEALTH CARE ACCESSIBILITY IN THE OLDER ADULT population consisted of all persons, ages 65 years or older, residing in long-term (assisted and independent) living facilities in Cobb County, Georgia. Facilities were randomly selected among 43 assisted, and 18 independent living facilities within Cobb County. Each facility was initially contacted by phone or email inviting participation in a free oral health education seminar and survey. Letters of approval were obtained from each facility, and schedule confirmations were initiated by phone, email or text one-to-two weeks in advance of each visit. As the result of one facility cancellation due to a low level of interest, two additional facilities were randomly selected. All residents attending the free oral hygiene educational seminar received a complementary oral hygiene gift package. Survey participants received a $3.00 gift card in addition to the oral gift package as compensation for their time.

During each visit, a free 30-minute oral health education seminar was provided by a licensed, local dentist, including 15-minutes of open questions and answers. All residents attending the event were fully informed of the purpose and extent of the study, in writing and verbally. All participant questions regarding the research were addressed in a way to refrain from research bias. Documented informed consent was obtained from survey participants or the legally appointed guardian. Nine residents chose not to participate in the survey. One survey was removed as a result of not having met the minimum required criteria. As a result, 88 long-term care facility residents (75 women, 13 men) participated in the survey. The oral health practices of older adults were explored by asking eight questions with one question (question 8) asked of survey participants both pre-and post-education. The main goal of this study was to seek answers to the following research questions;

Research Q1: Are older adults residing in assisted and independent living centers aware of oral health services that may be available to them in the county?
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Research Q2: Do older adults residing in assisted and independent living centers make use of available oral health care and education?

Research Q3: What percentage of older adults has lost any teeth due to natural aging or dental problems?

Research Q4: What percentage of older adults residing in assisted and independent living facilities has some type of dental insurance?

Research Q5: Are those with dental insurance more likely to have seen a dentist in the past 12 months?

Research Q6: What do they perceive as the biggest hindrance to oral care?

Research Q7: What factors would make them more likely to seek oral healthcare?

Research Q8: Does oral healthcare education increase the likelihood of individuals to seek oral healthcare when needed?

The responses from these questions, which are analyzed and discussed in the results section, offer greater insight in to dental service use, and oral health attitudes, beliefs, and perceptions toward oral health barriers that exist in the older adult population residing in assisted and independent living facilities; what they perceive as facilitators or barriers to oral care.

Research Design

Data were collected to answer these questions, in part, from the U.S. Census Bureau, the CDC as well as other publicly available resources for the purpose of analysis. Long-term care (assisted and independent living) facility information was obtained from the Cobb County Chamber of Commerce, local telephone directory, and online resources. I used a quasi-experimental and correlational design in this quantitative study. A quantitative methodology is appropriate when assessing the strength of associations between numerically measureable
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constructs (Howell, 2013). Applying a correlational research design, allows for the investigation of the nature of relationships between and among variables of a small sample of a population at single point in time (Stangor, 2011). These correlations are useful in analyzing the magnitude, extent, direction and strength of the associations.

The research variables correspond to the individual survey items answered on the eight-item self-report oral healthcare survey. A majority of the survey measures items on a nominal level, with either a “Yes” or “No” response while two other nominal level survey items requested participants to indicate hindrances or factors that led them to seek healthcare. These two items had several potential responses as they were open-ended items. The final question on the survey regarding the likelihood to seek oral healthcare was measured on an ordinal level, ranging from 1: “Definitely would not” to 5: “Definitely would”. The final question, question eight, was the only survey item that was administered both prior to and after the oral healthcare education. Archival data were also utilized to make comparisons to the local Cobb County data which was available on a public domain.

Materials and Procedure

During each facility visit, each resident in attendance was debriefed, provided a copy of the study consent form, and the contents were read verbally aloud. The consent form contained information on the purpose and nature of the study, participant compensation, and risks to the participants. The consent instrument was used to gain informed consent from participants (see Appendix A). Participants were informed of the voluntary nature of the survey and that the process could be stopped at any point without gift forfeiture or any implication. Participants were then asked to complete the first part of a structured two-part, eight-item survey (see Appendix B). The questionnaire involved both multiple choice and open ended responses. The open ended
questions were used to describe the most common limitations to oral care and factors that may help promote seeking oral care. Educational materials were provided by the dentist administering the oral health education prior to the start of the seminar and contained information on the importance of oral hygiene and dental care as well as oral health resources available to older adults. The exact curriculum and media through which the oral education was presented were the same for all participants.

At the beginning of the session, participants were asked to complete the first part of the questionnaire regarding access to, and hindrances to, receiving oral healthcare, including their oral health and dental insurance status. After all questionnaires were completed, the educational session began. The material covered in the educational presentation, as well as the media through which it was presented was determined by the presenting dentist and were uniform across all selected facilities. At the conclusion of the education session, participants asked to answer question eight of the survey again: “How likely are you to seek oral healthcare if needed?” The format of the questionnaire consisted of open and closed-ended questions, as well as a 5-point Likert scale which ranged from “Definitely would not” to “Definitely would” for question eight. The questionnaire did not consist of correct or incorrect answers. Once completed, the surveys were collected, and the oral gift packages and gift cards were distributed to participants. The dentist then addressed open questions from participants. Prior to the study, IRB approval was sought and received.

**Data Analysis Plan**

To analyze the above research questions and hypotheses more rigorously, based on the numerous reasons addressed earlier, the following statistical procedures were developed. For the analysis, Excel and SPSS version 24.0 were used to enter the survey data. The research questions
were then analyzed as follows:

Research Q1: Are older adults residing in assisted and independent living centers aware of oral health services that may be available to them in the county?

To address research question one, exploratory data analysis was proposed to examine whether older adults residing in assisted and independent living centers were aware of oral health services that may be available to them in the country. This exploratory analysis involves the use of descriptive statistics to analyze trends (Howell, 2013). Survey question number five was used to analyze the trends (5. Do you feel that you have access to adequate oral healthcare if needed?). Frequencies, percentages, and bar charts were used to summarize the sample findings for this survey item, and are listed in the results section.

Research Q2: Do older adults residing in assisted and independent living centers make use of available oral health care and education?

To address research question two, exploratory data analysis was proposed to examine whether older adults residing in assisted and independent living centers make use of available oral health care and education. Survey question number one was used to explore the trends (1. Have you visited a dentist for any reason within the past 12 months?). Frequencies, percentages, and bar charts used to summarize the sample findings for this survey item.

Research Q3: What percentage of older adults has lost any teeth due to natural aging or dental problems?

To address research question three, exploratory data analysis was proposed to examine the distribution of older adults who have lost teeth due to natural aging or dental problems. Survey question number two was used to explore the trends (2. Have you lost any natural teeth to
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natural aging or dental problems?). The results section provides for frequencies, percentages, and bar charts to summarize the sample findings for this survey item.

Research Q4: What percentage of older adults residing in assisted and independent living facilities has some type of dental insurance?

To address research question four, exploratory data analysis was proposed to examine the distribution of older adults residing in assisted and independent living facilities who have some type of dental insurance. Survey question number four was used to explore the trends (4. Do you have dental insurance?). Frequencies, percentages, and bar charts were used to explore the trends in the number of participants who had some form of dental insurance. These are outlined in the results section.

Research Q5: Are those with dental insurance more likely to have seen a dentist in the past 12 months?

H0: Those with dental insurance are no more likely to have seen a dentist in the past year compared to those who do not have dental insurance.

H1: Those with dental insurance are significantly more likely to have seen a dentist in the past year compared to those who do not have dental insurance.

To address research question five, a chi-square test of independence was conducted to examine the relationship between having dental insurance and visiting a dentist in the past 12 months. According to Howell (2013), a chi-square test of independence is an appropriate statistical analysis when assessing the strength of the relationship between two nominal level variables. A cross-tabulation was conducted between survey question number one (1) Have you visited a dentist for any reason within the past 12 months? and survey question number four (4)
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Do you have dental insurance? Statistical significance was denoted and the null hypothesis was rejected if the p-value was lower than .05.

Research Q6: What do they perceive as the biggest hindrance to oral care?

To address research question six, exploratory data analysis was proposed to examine what older adults perceive as their biggest hindrance to oral care. Survey question number six was used to analyze the trends (6. What would you say is the biggest hindrance to receiving adequate oral healthcare?). Likewise, frequencies and percentages were used to summarize the sample findings for this survey item.

Research Q7: What factors would make them more likely to seek oral healthcare?

To address research question seven, exploratory data analysis was used to examine the factors that make participants more likely to seek oral healthcare. Survey question number seven was used to analyze the trends (7. What, if anything, would make you more likely to seek oral healthcare?). Frequencies and percentages were used to summarize the sample findings for this survey item located in the results section.

Research Q8: Does oral healthcare education increase the likelihood of individuals to seek oral healthcare when needed?

H0: Oral healthcare education does not increase the likelihood of individuals to seek oral healthcare when needed.

H1: Oral healthcare education significantly increases the likelihood of individuals to seek oral healthcare when needed.
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To address research question eight, a Wilcoxon-Signed rank test was used to examine whether oral healthcare education increased the likelihood of individuals seeking oral healthcare. From Pallant’s (2013) perspective the Wilcoxon-Signed rank test, a non-parametric version of the paired sample t-test, is appropriate when assessing for differences in an ordinal dependent variable between two time periods. Survey question number eight (8. How likely are you to seek oral healthcare if needed?) was administered prior to and after the oral healthcare education. The self-response item was measured on an ordinal scale ranging from 1: “Definitely would not” to 5: “Definitely would”. Statistical significance was denoted and the null hypothesis was rejected if the p-value was lower than .05. Along with the above research questions, additional research questions were analyzed using national and statewide archival data to the data obtained from this research, which is outlined in the following section.

Archival Research Questions

Part of this study seeks to compare the proportion of LTC participants who have visited the dentist within the past year, and, those having lost all of their natural teeth to the same statistics in the general American population of older adults, and in the state of Georgia. To address this, a series of two-proportion z-tests were conducted to examine for differences in the pairs of proportions. The first part of this comparison is based on adults who have: Not visited a dental professional in the past 12 months (Measure 1). The need for investigation stems from the preliminary assessment where the data shown that 32.8% of adults, nationally, had not visited a dental professional in the past 12 months, compared to 35.9% of adults in Georgia, in 2012 (Herlihy, 2016).

To compare the percentage of participants who have not visited the dentist within the past
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year in this study to the same percentage in the general American population of older adults, a two-proportion z-test was conducted to examine the following research question and hypothesis:

Archival Research Q1: Are there significant differences in the proportions of older adults who have not visited the dentist within the past year between residents in LTC facilities in Cobb County and the general American population?

H₀: The proportion of older adults residing in LTC facilities in Cobb County who have not visited the dentist within the past year is equal to the same proportion in the general American population of older adults.

H₁: The proportion of older adults residing in LTC facilities in Cobb County who have not visited the dentist within the past year is not equal to the same proportion in the general American population of older adults.

Likewise, the survey results were compared with the proportion of adults who have not visited the dentist within the past year in Georgia. For this, two-proportion z-test was used to test the following research question and hypothesis:

Archival Research Q2: Are there significant differences in the proportions of older adults who have not visited the dentist within the past year between residents in LTC facilities in Cobb County and the Georgia population?

H₀: The proportion of older adults residing in LTC facilities in Cobb County who have not visited the dentist within the past year is equal to the same proportion in the Georgia population of older adults.

H₁: The proportion of older adults residing in LTC facilities in Cobb County who have not visited the dentist within the past year is not equal to the same proportion in the Georgia population of older adults.
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As mentioned earlier in the problem statement, in 2012 the CDC reported that nationally, 16.2% percentage of older adults, 65 years of age and older reported having lost all of their natural teeth due to tooth decay or gum disease, compared to 18.4% of older adults, 65 years of age and older in Georgia (Herlihy, 2016). The second comparison was based on U.S. and Georgia comparisons of adults who have: Lost all of their natural teeth (Measure 2).

To compare the proportion of the LTC participants who lost all of their natural teeth to the same proportion in the general American population of older adults, a two-proportion z-test was conducted, and the following research question and hypothesis were examined:

Archival Research Q3: Are there significant differences in the proportions of older adults who have lost all their natural teeth between residents in LTC facilities in Cobb County and the general American population?

H₀: The proportion of older adults residing in LTC facilities in Cobb County who have lost all their natural teeth is equal to the same proportion in the American population of older adults.

H₁: The proportion of older adults residing in LTC facilities in Cobb County who have lost all their natural teeth is not equal to the same proportion in the American population of older adults.

Similar to the hypotheses above, another set of H₀, and H₁ hypotheses were tested to see if the proportion of participants who lost all of their natural teeth in the study is the same to this proportion in the older adults, 65 years of age and older in Georgia.

Archival Research Q4: Are there significant differences in the proportions of older adults who have lost all their natural teeth between residents in LTC facilities in Cobb County and the Georgia population?
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H₀: The proportion of older adults residing in LTC facilities in Cobb County who have lost all their natural teeth is equal to the same proportion in the Georgia population of adults.

H₁: The proportion of older adults residing in LTC facilities in Cobb County who have lost all their natural teeth is not equal to the same proportion in the Georgia population of adults.

The results from these research questions and corresponding hypotheses are presented in the following results section.

V. Results

Introduction

The purpose of this study was to examine the oral health status of adults 65 years of age and older residing in assisted and independent (LTC) living facilities in Cobb County, Georgia and investigate factors that act as facilitators or barriers to access to oral health care. This section presents the findings for the statistical examination of the data. Statistical significance for all inferential analyses is evaluated at the conventional alpha level, α = .05. The demographic characteristics of the population showed the gender of the sample was distributed between 13 males (14.8%) and 75 females (85.2%).

Research Questions for Oral Healthcare Self-Report Survey

Research Q1: Are older adults residing in assisted and independent living centers aware of oral health services that may be available to them in the county?

To address research question one, exploratory data analysis was used to examine whether older adults residing in assisted and independent living centers were aware of oral health services that may be available to them in the county. The trends in survey question number five were
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explored (5. Do you feel that you have access to adequate oral healthcare if needed?). The frequencies and bar chart indicated that most of the sample \((n = 42, 47.7\%)\) had adequate oral healthcare. However, several participants \((n = 25, 28.4\%)\) indicated that they were unsure of what (oral health services) are available to them. Frequencies and percentages for having access to adequate oral healthcare are presented in Table 1.

Table 1

*Frequency Table for Having Access to Adequate Oral Healthcare*

<table>
<thead>
<tr>
<th>Variable</th>
<th>(n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you feel that you have access to adequate oral healthcare if needed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42</td>
<td>47.7</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>23.9</td>
</tr>
<tr>
<td>Unsere of what is available</td>
<td>25</td>
<td>28.4</td>
</tr>
</tbody>
</table>

*Note.* Due to rounding error, all percentages may not sum to 100%.

Research Q2: Do older adults residing in assisted and independent living centers make use of available oral health care and education?

To address research question two, exploratory data analysis was used to examine whether older adults residing in assisted and independent living centers make use of available oral health
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care and education. The trends in survey question number one were explored (1. Have you visited a dentist for any reason within the past 12 months?). A majority of the sample \((n = 55, 62.5\%)\) had visited the dentist within the past 12 months. Frequencies and percentages for having visiting a dentist within the past 12 months are presented in Table 2.

Table 2

*Frequency Table for Visiting a Dentist within the Past 12 Months*

<table>
<thead>
<tr>
<th>Variable</th>
<th>(N)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you visited a dentist for any reason within the past 12 months?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>55</td>
<td>62.5</td>
</tr>
<tr>
<td>No</td>
<td>33</td>
<td>37.5</td>
</tr>
</tbody>
</table>

*Note.* Due to rounding error, all percentages may not sum to 100%.

![Figure 5. Bar chart for having visited a dentist for any reason within the past 12 months.](image)

Research Q3: What percentage of older adults has lost any teeth due to natural aging or dental problems?

To address research question three, exploratory data analysis was used to examine the distribution of older adults who have lost teeth due to natural aging or dental problems. The trends in survey question number two were explored (2. Have you lost any natural teeth to
natural aging or dental problems?). A majority of the sample had lost natural teeth due to aging or dental problems \((n = 69, 78.4\%)\). Among the participants who had lost natural teeth due to aging or dental problems, most had lost 8 or fewer teeth \((n = 36, 52.2\%)\). In addition, several participants had also lost 25-32 teeth \((n = 17, 24.6\%)\). Frequencies and percentages for losing teeth due to natural aging or dental problems are presented in Table 3a.

Table 3a

*Frequency Table for Losing Teeth Due to Natural Aging or Dental Problems*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you lost any natural teeth to natural aging or dental problems?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>69</td>
<td>78.4</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>20.5</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Among those who lost teeth due to natural aging or dental problems, how many lost:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 or fewer teeth</td>
<td>36</td>
<td>52.2</td>
</tr>
<tr>
<td>9-16 teeth</td>
<td>10</td>
<td>14.5</td>
</tr>
<tr>
<td>17-24 teeth</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>25-32 teeth</td>
<td>17</td>
<td>24.6</td>
</tr>
<tr>
<td>No response</td>
<td>5</td>
<td>7.2</td>
</tr>
</tbody>
</table>

*Note.* Due to rounding error, all percentages may not sum to 100%.

*Figure 6.* Bar chart for losing natural teeth due to natural aging or dental problems.
Among the male participants, a majority had lost natural teeth due to aging or dental problems \( (n = 10, 76.9\%) \). Among the female participants, a majority had lost natural teeth due to aging or dental problems \( (n = 59, 78.7\%) \). A gender comparison for teeth loss due to natural aging or dental problems is presented in Table 3b.

Table 3b

*Frequency Table for Losing Teeth Due to Natural Aging or Dental Problems by Gender*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males: Have you lost any natural teeth to natural aging or dental problems?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>76.9</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>15.4</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td>7.7</td>
</tr>
<tr>
<td>Females: Have you lost any natural teeth to natural aging or dental problems?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>59</td>
<td>78.7</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>21.3</td>
</tr>
</tbody>
</table>

*Note.* Due to rounding error, all percentages may not sum to 100%.

Among the participants who did not have adequate oral healthcare or were unsure of what is available to them in survey item 5, a majority indicated they had lost natural teeth due to aging or dental problems \( (n = 38, 82.6\%) \). These participants are presented in Table 3c.

Table 3c

*Frequency Table for Losing Teeth Due to Natural Aging or Dental Problems Among Participants Not Having Access to Adequate Care, or Unsure of What was Available*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Among participants that did not have access to adequate healthcare, or were unsure what was available to them. Have you lost any natural teeth to natural aging or dental problems?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>38</td>
<td>82.6</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>17.4</td>
</tr>
</tbody>
</table>

*Note.* Due to rounding error, all percentages may not sum to 100%.
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Among those who indicated that they had lost teeth due to natural aging or dental problems, the number of teeth lost ranged from 1 to 32, with $M = 12.80$ and $SD = 11.93$. Among the females who had lost teeth, the number of teeth lost ranged from 1 to 32, with $M = 12.88$ and $SD = 12.61$. Among the males who had lost teeth, the number of teeth lost ranged from 1 to 32, with $M = 12.79$ and $SD = 11.95$. This data is presented in Table 3d.

Table 3d

| Number of Teeth Lost Due to Natural Aging or Dental Problems |
|-----------------|-------------|-----|-----|
| Variable        | Min | Max | $M$ | $SD$  |
| Number of teeth lost | 1   | 32  | 12.80 | 11.93 |
| Males: Number of teeth lost | 1   | 32  | 12.88 | 12.61 |
| Females: Number of teeth lost | 1   | 32  | 12.79 | 11.95 |

Edentulism, partial or total, was found in over half (52.2%) who indicated a loss of 8 or fewer teeth, nearly one-sixth (14.5%) reported a loss of 9 to 16 teeth, a marginal proportion (1.4%) indicated losing between 17-24 teeth, and over one-fourth (24.6%) reported a loss of 25 to 32 teeth.

Research Q4: What percentage of older adults residing in assisted and independent living facilities has some type of dental insurance?

To address research question four, exploratory data analysis was used to examine the distribution of older adults residing in assisted and independent living facilities who have some type of dental insurance. The trends in survey question number four were explored (4. Do you have dental insurance?). A majority of the sample involved ($n = 59, 67.0\%$) did not have dental insurance. Frequencies and percentages for having dental insurance are presented in Table 4.
ORAL HEALTH CARE ACCESSIBILITY IN THE OLDER ADULT

Table 4

*Frequency Table for Having Dental Insurance*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have dental insurance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>29</td>
<td>33.0</td>
</tr>
<tr>
<td>No</td>
<td>59</td>
<td>67.0</td>
</tr>
</tbody>
</table>

*Note.* Due to rounding error, all percentages may not sum to 100%.

Figure 7. Bar chart for having dental insurance.

Research Q5: Are those with dental insurance more likely to have seen a dentist in the past 12 months?

H₀: Those with dental insurance are no more likely to have seen a dentist in the past year compared to those who do not have dental insurance.

H₁: Those with dental insurance are significantly more likely to have seen a dentist in the past year compared to those who do not have dental insurance.

To address research question five, a chi-square test of independence was conducted to examine the relationship between having dental insurance and visiting a dentist in the past 12 months. A cross-tabulation was run between survey question number one (1.) Have you visited a dentist for any reason within the past 12 months?, and survey question number four (4.) Do you
have dental insurance? The highest frequency combination corresponded to those who did not have dental insurance and visited a dentist within the past 12 months. However, there was not a significant relationship between visiting a dentist within the past 12 months and having dental insurance ($\chi^2(1) = 0.28, p = .598$). Due to non-significance, the null hypothesis for this research question cannot be rejected. Frequencies and percentages for having access to adequate oral healthcare are presented in Table 5.

Table 5

<table>
<thead>
<tr>
<th>Variable</th>
<th>Have dental insurance?</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>$\chi^2$</td>
<td>$p$</td>
<td></td>
</tr>
<tr>
<td>Visited dentist within past 12 months?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td>38</td>
<td>0.28</td>
<td>.598</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Research Q6: What do they perceive as the biggest hindrance to oral care?

To address research question six, exploratory data analysis was used to examine what older adults perceive as their biggest hindrance to oral care. The trends in survey question number six were explored (6. What would you say is the biggest hindrance to receiving adequate oral healthcare?). The most prevalent responses for hindrances to oral care corresponded to “cost of dental care” and “lack of financial resources”. Frequencies and percentages for hindrances are presented in Table 6.
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Table 6

*Frequency Table for Biggest Hindrance to Oral Care*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>What would you say is the biggest hindrance to receiving adequate oral healthcare?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of dental care</td>
<td>22</td>
<td>25.0</td>
</tr>
<tr>
<td>Inadequate insurance coverage</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Transportation</td>
<td>8</td>
<td>9.1</td>
</tr>
<tr>
<td>Lack of dental insurance</td>
<td>9</td>
<td>10.2</td>
</tr>
<tr>
<td>Finding the right dentist</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Lack of financial resources</td>
<td>14</td>
<td>15.9</td>
</tr>
<tr>
<td>Lack of timely dental appointment availability</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Lack of physical ability</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Lack of dental hygiene information</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Fear of dental procedures</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Lack of perceived need</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Other personal obligations</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Nothing</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>NA</td>
<td>19</td>
<td>21.6</td>
</tr>
</tbody>
</table>

*Note.* Due to rounding error, all percentages may not sum to 100%.

The top four responses to the biggest hindrance to receiving adequate oral healthcare correspond to “Cost of dental care”, “Lack of financial resources”, “Lack of dental insurance” and “Transportation”.

Research Q7: What factors would make them more likely to seek oral healthcare?

To address research question seven, exploratory data analysis was used to examine the factors that make participants more likely to seek oral healthcare. The trends in survey question number seven were explored (7. What, if anything, would make you more likely to seek oral healthcare?). The most prevalent responses for factors that would make individuals more likely seek oral health care corresponded to “finding affordable dental care”, “oral problems”, followed next by “Perceived dental need”, and “Increased financial resources”. Frequencies and percentages for hindrances are presented in Table 7.
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Table 7

*Frequency Table for Factors that Would Make Individuals More Likely to Seek Oral Healthcare*

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>What, if anything, would make you more likely to seek oral healthcare?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finding affordable dental care</td>
<td>20</td>
<td>22.7</td>
</tr>
<tr>
<td>Better dental insurance coverage</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Better availability of dental hygiene information</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Transportation</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Finding the right dentist</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>Loss of teeth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased financial resources</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Increased financial resources/Comfortable dental care</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Perceived dental need</td>
<td>6</td>
<td>6.8</td>
</tr>
<tr>
<td>Finding a dentist that accepts my dental insurance</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Having a care taker</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Having dental insurance</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Better physical ability</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Improved ease of access to dental care</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Oral problems</td>
<td>15</td>
<td>17.0</td>
</tr>
<tr>
<td>No Answer</td>
<td>22</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Note. Due to rounding error, all percentages may not sum to 100%.

Research Q8: Does oral healthcare education increase the likelihood of individuals to seek oral healthcare when needed?

$H_0$: Oral healthcare education does not increase the likelihood of individuals to seek oral healthcare when needed.

$H_1$: Oral healthcare education significantly increases the likelihood of individuals to seek oral healthcare when needed.

To address research question eight, a Wilcoxon-Signed rank test was conducted to examine whether oral healthcare education increased the likelihood of individuals seeking oral healthcare. Survey question number eight (8. How likely are you to seek oral healthcare if
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needed?) was administered prior to and after the oral healthcare education. The self-response item was measured on an ordinal scale ranging from 1: “Definitely would not” to 5: “Definitely would”. The findings of the Wilcoxon-Signed rank test indicated that there were significant differences in pretest and posttest responses ($Z = -4.20$, $p < .001$). The null hypothesis for the research question can be rejected. The findings for the Wilcoxon-Signed rank test are presented in Table 8.

Table 8

*Wilcoxon-Signed Rank Test after Oral Healthcare Education*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean rank</td>
<td>Mean rank</td>
</tr>
<tr>
<td>How likely to seek oral healthcare if needed?</td>
<td>11.00</td>
<td>11.52</td>
</tr>
</tbody>
</table>

*Figure 8. Pretest response*
Research Questions for Archival Data

**Archival Q1:** Are there significant differences in the proportions of older adults who have not visited the dentist within the past year between residents in LTC facilities in Cobb County and the general American population?

- **H\textsubscript{0}:** The proportion of older adults residing in LTC facilities in Cobb County who have not visited the dentist within the past year is equal to the same proportion in the general American population of older adults.
- **H\textsubscript{1}:** The proportion of older adults residing in LTC facilities in Cobb County who have not visited the dentist within the past year is not equal to the same proportion in the general American population of older adults.

A two-proportion z-test was conducted to examine for differences in the proportions of older adults who visited the dentist within the past year between LTC facilities and the general American population. Findings of the two-proportion z-test indicated that there were not statistically significant differences between the two proportions ($z = 0.88, p = .348$). Due to non-
significant findings, the null hypothesis ($H_0$) was not rejected. Table 10 presents the findings of the two-proportion $z$-tests.

Table 9

*Two-Proportion Z-Tests for Not Visiting Dentist within the Past Year between Cobb County LTC Sample and the American Population*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cobb County LTC Sample</th>
<th>American Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>Total</td>
</tr>
<tr>
<td>Did not visit dentist within the past year</td>
<td>33</td>
<td>88</td>
</tr>
</tbody>
</table>

Archival Q2: Are there significant differences in the proportions of older adults who have not visited the dentist within the past year between residents in LTC facilities in Cobb County and the Georgia population?

$H_0$: The proportion of older adults residing in LTC facilities in Cobb County who have not visited the dentist within the past year is equal to the same proportion in the Georgia population of older adults

$H_1$: The proportion of older adults in Cobb County who have not visited the dentist within the past year is not equal to the same proportion in the Georgia population of older adults

A two-proportion $z$-test was conducted to examine for differences in the proportions of older adults who visited the dentist within the past year between LTC facilities and the Georgia population. Findings of the two-proportion $z$-test indicated that there were not statistically significant differences between the two proportions ($z = 0.10, p = .754$). Due to non-significant findings, the null hypothesis ($H_0$) was not rejected. Table 11 presents the findings of the two-proportion $z$-tests.
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Table 10

Two-Proportion Z-Tests for Not Visiting Dentist within the Past Year between Cobb County LTC Sample and the Georgia Population

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cobb County LTC Sample</th>
<th>Georgia Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Total</td>
</tr>
<tr>
<td>Did not visit dentist within the past year</td>
<td>33</td>
<td>88</td>
</tr>
</tbody>
</table>

Archival Q3: Are there significant differences in the proportions of older adults who have lost all their natural teeth between residents in LTC facilities in Cobb County and the general American population?

H₀: The proportion of older adults residing in LTC facilities in Cobb County who have lost all their natural teeth is equal to the same proportion in the American population of older adults

H₁: The proportion of older adults residing in LTC facilities in Cobb County who have lost all their natural teeth is not equal to the same proportion in the American population of older adults

A two-proportion z-test was conducted to examine for differences in the proportions of older adults who lost all their natural teeth between LTC facilities and the general American population. Findings of the two-proportion z-test indicated that there were not statistically significant differences between the two proportions ($z = 1.54, p = .215$). Due to non-significant findings, the null hypothesis ($H₀$) was not rejected. Table 12 presents the findings of the two-proportion z-tests.
Archival Q4: Are there significant differences in the proportions of older adults who have lost all their natural teeth between residents in LTC facilities in Cobb County and the Georgia population?

H₀: The proportion of older adults residing in LTC facilities in Cobb County who have lost all their natural teeth is equal to the same proportion in the Georgia population of adults

H₁: The proportion of older adults residing in LTC facilities in Cobb County who have lost all their natural teeth is not equal to the same proportion in the Georgia population of adults

A two-proportion z-test was conducted to examine for differences in the proportions of older adults who lost all their natural teeth between LTC facilities and the Georgia population. Findings of the two-proportion z-test indicated that there were not statistically significant differences between the two proportions ($z = 0.50, p = .479$). Due to non-significant findings, the null hypothesis ($H₀$) was not rejected. Table 12 presents the findings of the two-proportion z-tests.
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Table 12

Two-Proportion Z-Tests for Losing Natural Teeth between Cobb County LTC Sample and the Georgia Population

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cobb County LTC Sample</th>
<th>Georgia Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Total</td>
</tr>
<tr>
<td>Lost natural teeth</td>
<td>15</td>
<td>69</td>
</tr>
</tbody>
</table>

Summary

The intent of this study was to examine the oral health status of adults 65 years of age and older residing in assisted and independent (LTC) living facilities in Cobb County, Georgia and investigate factors that act as facilitators or barriers to access to oral health care. In this section, the findings of the statistical analyses were presented. These findings indicated that there was not a significant relationship between visiting the dentist within the past 12 months and having dental insurance ($\chi^2(1) = 0.28, p = .598$). Additionally, the statistical findings indicated that oral healthcare education significantly increased the likelihood of older adults to seek oral healthcare ($Z = -4.20, p < .001$). These findings along with the archival findings are discussed further in the discussion section, including the study limitations and recommendations for future research.

VI. Discussion

Introduction

Access to care is particularly critical to older adults, especially those residing in long-term care facilities due to increased risk for oral conditions and diseases associated with chronic conditions, age-related physiological changes, and use of over-the-counter and prescription medications. The oral health and hygiene of older adults, across the nation and in Georgia, is
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known to be poorer than the rest of the general population. The purpose of this study was to assess the oral health status of adults 65 years of age and older residing in randomly selected assisted and independent (LTC) living facilities in Cobb County, Georgia and examine factors that act as facilitators or barriers to access to oral health care. I used an eight-item open and closed-ended oral healthcare survey to obtain data from the population of interest. A majority of the questionnaire measured items on a nominal level with either a “Yes” or “No” response, while other nominal level survey items were designed explicitly to evaluate factors that act as facilitators or barriers to care. This section includes key findings from the results, interpretation of results, study implications, including limitations.

Interpretation of the Findings

The demographic characteristics of the population showed the gender of the sample was distributed between 13 males (14.8%) and 75 females (85.2%). The findings from this study revealed that of the older adult population (n = 88), over one-third (37.5 %) had not visited a dentist in the past year.

The older adults in this study had relatively comparable incidence of edentulism in the older adult population in the United States, and in Georgia (Dye, Thornton-Evans, Li, & Iafolla, 2015). The findings showed that a majority of the sample (n = 69) had lost natural teeth (78.4%) due to aging or dental problems. Among those who reported losing teeth (1 to 32), the mean number of teeth lost for older adults in this study was 12.80 (SD 11.93). Among the females, the mean number of lost teeth was 12.88 (SD 12.61), whereas for males, the mean number of teeth lost was 12.79 (SD 11.95). More than half of the older adults in this study (52.2%) indicated a loss of 8 or fewer teeth, with nearly one-sixth (14.5%) reporting a loss of 9 to 16 teeth, a marginal proportion (1.4%) indicated losing between 17 to 24 teeth, and over one-fourth (24.6%)
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reported a loss of 25 to 32 teeth.

The findings showed that participants who indicated they did not have access to adequate healthcare or were unsure what was available to them (n = 38), most (82.6%) reported they had lost natural teeth due to aging or dental problems. These findings together demonstrate the poor oral health status in older adults in LTC facilities and appear in line with Cobb County’s health needs assessment report which identified dental care among the top health issues within the adult population (WellStar Cobb Hospital, 2013). Taken together, incidence of edentulism and dental service utilization in this study are similar to the findings of other researchers in the United States (Davis & Reisine, 2015; Dolan, Atchison, & Huynh, 2005; Manski, Moeller, & Maas, 2001), and abroad (Adegbembo et al., 2002; Mariño et al., 2014).

This study examined the distribution of older adults residing in assisted and independent living facilities who have some type of dental insurance, and the findings showed that a majority of the sample involved (n = 59, 67.0%) did not have dental insurance. This finding is consistent with a report issued by the Institutes of Medicine (2001), including research by Lamster (2004), which identified a lack of dental insurance as a top barrier to oral care. Other researchers (Manski and Moeller, 2017) have found that a majority (70%) of older adults in the United States go without any type of dental benefits.

A lack of dental insurance corresponds with the SCT concept of self-efficacy, in that self-efficacy represents the individual’s confidence of, and belief in their own abilities to achieve a given action (Bandura, 1977). However, if individuals believe they cannot be successful initiating an action or consider the action difficult, they will be less likely to engage in that action regardless of positive or essential health benefit outcomes. As a result of not having dental insurance, Lee, Lewis, Saltzman, & Starks, (2012) find that adults without a means to care
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frequently forgo preventive care and rely on emergency department (ED) physicians for palliative treatment.

This study showed that of the total sample population, almost half (47%) reported they had adequate access to oral care. However, several participants (28.4%) indicated that they were unsure of what (oral health services) were available to them and nearly one-fourth (23.9%) of residents reported they did not have adequate access to oral health services.

An unawareness of available dental services may contribute to poor dental utilization and a higher incidence of edentulism. Poor dental utilization in general, and more notably older adults has been observed by other researchers (Mitchell, Bennett, & Brock-Martin, 2013; Vargas et al., 2003) particularly with residents residing in rural areas as it increases the risk factor for poor dental health, and infrequent use of dental services results in overall unmet dental needs. From a large sample population, Zhu et al. (2005) compared urban and rural community-dwelling residents oral care utilization and found that nearly one-fourth (23%) of older adults had visited a dentist within the past year, with the most significant decline in oral care utilization (16%) observed in rural-dwelling older adults, ages 64-74 years of age. While the Cobb County study involved random selection of facilities that included urban and rural locations, it did not seek to compare urban versus rural-dwelling adult demographics.

This study examined if a relationship exists between having dental insurance and visiting a dentist, and found that there was a disproportionately large number of adults (n = 38) who indicated they had visited the dentist in the last year, although they did not have dental insurance. While the findings indicated there was no significant difference, an explanation for this finding is likely due to adults lacking dental insurance have a disproportionately greater need to visit a dentist and do so regardless of cost.
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Many Medicare and other insurance plans do not offer dental benefits. Retired, older adults who live off of fixed incomes must pay dental costs out-of-pocket (Dolan, Atchison, & Huynh, 2005), and as a result they will frequently forgo preventive or routine oral care, seeking treatment to alleviate symptoms (e.g., extraction) associated with more serious conditions (e.g., decay, disease) where cost is not a weighed consideration. This observation corresponds with the HBM concept of “perceived threat” (Rosenstock, 1974). Individuals may fail to take action (preventive dental visit) unless they perceive they are susceptible to a threat (oral disease or illness). And, although they perceive they are susceptible, if barriers prohibit access to preventive or routine oral care, the seriousness of the threat (toothache) or impact (social relationships) encourages cues to take action (e.g., dental or emergency room visit).

Chen and Land (1986) examined HBM concepts by analyzing causal relationships among American women’s health beliefs and preventive dental behavior using a causal modeling method and found that perceived susceptibility had reciprocal causal ties between oral health beliefs and preventive visits. A study conducted by Brewer et al. (2007) found that perceived risk is the most beneficial prognosticator of health behavior. However, when individuals perceive that one or several barriers stand in their way of achieving an action, they are less apt to engage in behaviors that result in positive oral health outcomes. These cues to action have dual forms; they can be fostered by internal stimuli (e.g., toothache), or external stimuli (media, information). According to Solhi, Shojai Zadeh, Seraj, and Faghih Zadeh (2010), internal and external cues lend to an individual’s decision-making.

This study revealed what participants perceived to be the biggest hindrance to receiving adequate oral care in the county. The top four responses were cost of dental care (25%), and lack of financial resources (15.9%) as the biggest obstacles to oral care followed by lack of dental
insurance (10.2%), and transportation needs (9.1%). This finding is similar to other U.S.
researchers (Davis & Reisine, 2015) who identified lack of dental insurance, and transportation
as the top barriers to care of senior adults residing in low-income community dwellings. Unlike
this study, Davis & Reisine (2015) also found fear and anxiety among the top barriers to care. A
reasonable explanation for variations in perceived barriers lies with structural, environmental and
other characteristics specific to each community.

The findings from this study align with research by Moore et al. (2017) who report
common barriers to oral health in metro Atlanta, as well as the state of Georgia, are unresolved
health literacy concerns, a lack of transportation to and from dental offices, a lack of community
health needs assessments, a lack of services in federally qualified health centers, among others.

Outside the United States, Gaszynska et al. (2014) noted problems with accessibility to
oral care services (26.4%), misjudgment of existing oral conditions (26%), and a lack of
awareness of dental need (23.3%) in their findings, while Mariño et al. (2014) identified the cost
of dental service (32.7%) as the top barriers to oral care. While variations in perceived barriers
exist across studies, despite region or country, consistent themes appear such as lack of perceived
need and access to care.

Several researchers have noted (Dolan, Atchison, & Huynh, 2005; Griffin, Jones,
Brunson, Griffin, & Bailey, 2012) that access to care is influenced by many factors, including
facilitators and barriers to care. While barriers can be financial, cultural, structural and physical
including the provider’s attitude from an older adult’s perspective, it is the lack of dental
insurance and ability to pay out-of-pocket that hinders an older adults’ efforts to obtain oral care.
Self-efficacy, according to Bandura (1977), motivates cues to take action. If an individual does
not have self-efficacy, a belief in their own competence to carry out an action, they will be less
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likely to engage in that action regardless of positive or essential health benefit outcomes and is especially true in the absence of oral health information and affordable services.

Exploratory data analysis was used to examine the factors that would make participants more likely to seek oral healthcare. The most prevalent responses corresponded to finding affordable dental care (22.7%), encountering oral problems (17.0%), followed by perceived dental need (6.8%), and increased financial resources (6.8%). Some participants in this study voiced a lack of perceived need for oral care due to edentulism, indicating they wear dentures. Several of the same participants, however, reported ill-fitting dentures, oral lesions, or xerostoma. A few participants voiced concern about the lack of oral health information through media such as magazines, flyers or television. All participants were receptive to education presented by the dentist.

This is the only study known to investigate the relationship between oral health education and the likelihood of older adults residing in LTC facilities to seek oral healthcare. The findings revealed that oral health education significantly increased the likelihood of these older adults to seek oral health care. Similar studies on the effects education in other settings or areas of oral care have been researched by Chong, (2016), and Frenkel, Harvey, & Needs (2002).

Chong researched the effects of diabetes education in Hawaiian adult patients with type 2 diabetes mellitus, multiple chronic conditions or taking multiple medications, or diagnosed with diabetes in a select community, helped optimize drug therapy. The findings showed that education improved diabetic outcomes by reducing HbA1c, FBG, and TG levels within the initial six month program period. An important second component to the findings showed the educational program to be instrumental in delaying the progression of long-term complications associated with uncontrolled hypertension in the Marshallese population.
The oral health care knowledge and attitudes among nursing home caregivers in Denmark were examined in a 6-month oral health care education program by Frenkel, Harvey, & Needs (2002). In a randomized control study, the researchers determined that the intervention group significantly improved knowledge (P<0.003) and attitude (P<0.001) outcomes following oral health education, over the control group. Qualitative responses supported acceptance of caregiver roles in oral health and the caregivers’ subjective assessment of current service provisions in the nursing homes. An important outcome to this study was the comparison of separately reported trial results of residents’ oral health status, knowledge, and attitude score improvements which aligned with overall improved delivery of oral health care.

Lack of access to adequate oral healthcare is a national problem among older adults. In the state of Georgia, dental healthcare issues among older adults appear to be relatively similar to those of the nation according to reports by the CDC. Data obtained from the CDC’s Division of Oral Health along with the Territorial Dental Directors (ASTDD), reported through the Behavioral Risk Factor Surveillance System (BRFSS) and the National Oral Health Surveillance System (NOHSS) for the entire nation and statewide from 2012 to 2013, revealed that 32.8% of adults had not visited a dental professional in the past 12 months, nationally, compared to 35.9% of adults in Georgia. During the same period, data from the CDC showed 16.2% percentage of older adults, 65 years of age and older, reported having lost all of their natural teeth due to tooth decay or gum disease, nationally, compared to 18.4% of older adults, 65 years of age and older in Georgia (2012a, 2012b; Herlihy, 2016). Four archival research questions compared the survey data to the national and statewide databases.

While the findings did not show statistical significance at an alpha .05, the results suggest a marginal significance and important trend in the predicted direction where: the
proportion of older adults in LTC facilities who had not visited a dentist in the last year (37.5%) appeared higher than the corresponding proportion of older adults nationally (32.8%), as well as higher than the corresponding proportion of older adults in Georgia (35.9%), and a broader study is warranted. In addition, the proportion of older adults in LTC facilities who had lost all their teeth (21.7%) appeared higher than the corresponding proportion of older adults nationally (16.2%) and higher than the corresponding proportion of Georgia older adults (18.4%). While the results revealed a non-significant yet important trend in the predicted direction, given the study sample size these outcomes lie within the margin of error of the test at the alpha .05. A broad census of the elderly in Cobb County adults living in LTC facilities may reveal significant differences between these populations and warrants further study.

Findings of poor dental visit utilization and incidence of edentulism have been reported by many other researchers in the U.S. (Griffin, Jones, Brunson, Griffin, & Bailey, 2012; Simon, Nalliah, & Seymour, 2015), and abroad (Adegbembo, et al., 2002; Gaszynska, Szatko, Godala, & Gaszynski, 2014) over the past two decades. While many studies in the U.S. and abroad identified various barriers, consistent themes arose such as lack of access to oral services, financial factors, lack of dental insurance, including a lack of transportation (to and from the dentist office).

Findings from this study, along with those of other researchers (Davis & Reisine, 2015; Griffin, Jones, Brunson, Griffin, & Bailey, 2012), point to important factors that represent barriers in older adult LTC population and suggest methods to promote good oral health outcomes. Increasing oral health awareness and access to affordable dental services is fundamentally important to reducing barriers and improving oral health outcomes in older adults residing in assisted and independent LTC facilities.
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As a result of this study, older adult participants were provided an opportunity to receive free oral hygiene education delivered face-to-face by a licensed dentist. From the oral question and answer session facilitated by the dentist, participants inquired further and learned more about gum recession, proper denture cleaning, ill-fitting dentures and oral bone architecture changes, differences in mouthwashes, xerostomia and medications, proper steps to achieving and maintaining good oral health and its relationship to good overall health and a confident appearance. An important finding from this research shows that oral health information when presented to older adults 65 years of age and older residing in LTC facilities increases the likelihood of to seek oral health services.

In the U.S., Western medicine has traditionally viewed oral health as a distinct and separate component from general physical health and overall wellness. Based on this dichotomy and the oral health status of older adults in Georgia and the U.S., oral health needs to be integrated into biomedical practice using an ecological framework that focuses on improving individual oral health behaviors, increasing access to health information, and reducing barriers to care. Such an approach promotes positive health outcomes in older adults who are at increased risk for oral conditions and diseases associated with chronic conditions, age-related physiological changes, and frequent use of medications. In order to improve the oral health outcomes in older adults in LTC facilities in the county, individuals must be provided with essential health information to increase oral hygiene and risk awareness, including improved access to services specific to the community in which they reside. These actions are consistent with the findings of other studies (Griffin, Jones, Brunson, Griffin, & Bailey, 2012; Moore, et al., 2017), and align with the FDI’s underlying principles. The findings from this research can be used by facility leaders, dental and medical health providers, and public health officials to improve access to oral
Implications for Sociomedical Change

This study underscores the significance of perceived need for oral care as an important driver of an older adult’s intention to visit a dentist regardless of dental insurance status. Based on participant’s awareness of oral health following the education provided by a dentist, education appears to be a primary factor in perceived oral need due to perceived risk, and consequently increases the likelihood of an individual to seek oral care. This finding aligns with a recommendation by Manski et al. (2015) that an educational approach would increase oral health knowledge and dental service utilization. The findings from this research contributes to the body of literature by advancing information on dental insurance, service utilization, the oral health status, attitudes, and beliefs of LTC older adults in a populous U.S. county. While several oral health studies have been conducted in dental settings involving older adults in the U.S. (Jones, Lee, & Rozier 2007; Lukes, Janssen, Thacker, & Wadhawan, 2014; McQuistan, Qasim, Shao, Straub-Morarend, & Macek, 2015), relatively few have focused on individuals residing in LTC settings. Aside from Davis & Reisine, (2015) who studied adults age 65 years or older in low-income community dwellings where themes emerged as barriers to care, other research has largely focused on dental and periodontal screening assessments.

Limitations

This study was limited to the time constraints under which it was conducted, which limited the number of facility visits and affected the anticipated population size of 150 participants. Based on the requirements associated with nature of the study (e.g., approval letters,
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The study included the use of a questionnaire that had not been previously tested, to validate or deem it reliable. Based on the fact that there are relatively few instruments that focus on delivery of oral education in long-term care settings and an aging populations’ perception of barriers to care, the use of previously constructed instruments was limited. Phillips (2017) claims that if a new survey is properly developed, its use, “regardless of topic and whether exploring an emotion or opinion, has the equivalent rigor of a psychometric instrument” (p. 8).

The national and statewide data that were obtained prior to the survey followed the enactment of the ACA which raised the poverty ceiling limits allowing more low-income individuals to become eligible for health care benefits and increased access to care. However, with the advent of ACA dismantlement, the results from this study may be limited to the time frame in which it was conducted and is subject to any new policies that are enacted that may influence financial incomes and consequently out-of-pocket payment of dental care which affects access to care.

A delimitation of this study was the choice to limit demographic data collection. This was due to reasons of practicality and the scope of the study.

VII. Conclusion

Oral health is a core component to overall physical and psychosocial wellness; consequently, access to oral care is essential. When older adults are able to access oral health care, they are presented opportunities to have oral diseases diagnosed and treated in the early stages through basic preventive and routine dental services, including educational awareness and personal behavior guidance (IOM & National Research Council [NRC], 2011). Meeting the oral health needs in older adults in LTC facilities means confronting the unique needs and disparities
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of this population. Tackling obstacles to oral care will require a multi-interventional approach to increase oral health awareness, and developing collaborative networks to improve access to affordable services and good oral care outcomes. It is also necessary to incorporate plans that will ensure the demand-side meets with the supply-side of oral services. Mobile oral health screening units, LTC facility staff training with a licensed dentist or hygienist, and oral health community outreach programs are among ways to promote oral health awareness and help prevent oral diseases in the LTC older adult population.

This research underscores the importance of oral care for adults 65 years of age and older residing in LTC facilities. The findings revealed factors that serve as facilitators and barriers to care that can be used to educate decision-makers about oral health needs for older adults in the community, plan future interventions, develop policies, a means to leverage resources and implement effective actions. The participants in this study were receptive to the oral health education, eager to share their opinions and expressed positive views about future oral health opportunities.

VIII. Recommendations for Future Research

Based on the results from the pre- and post-education which showed significant results, the impact of oral health education should be reexamined by future researchers to determine if the effect warrants further investigation, including any effect on oral health service utilization in follow up. Oral health knowledge, attitudes, and beliefs of study participants should be assessed at baseline using a validated tool in a randomized control study. Future research should include a broader census of older adults in LTC facilities at a county level to compare national and statewide population data, and sociodemographics.
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The researcher had no financial arrangement or incentive with the dentist who presented the education or any other entity. The researcher agreed to share or discuss the study results only after its conclusion and analysis of the findings.
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Appendix A: Consent to Participate in a Research Study

Title of Study: Oral Health Care Accessibility in the Older Adult Population, of Cobb County

Introduction
You are being asked to be in a research study regarding oral health in older adults residing in Cobb County. You were selected as a possible participant because you reside in an assisted living center and are 65 years of age or older. Only those age 65 years or older may participate in the survey questionnaire. We ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of Study
The purpose of the study is gain an understanding of oral health accessibility in the older adult Cobb County population who reside in assisted and independent living facilities. This information will be used to help increase access to oral health care. Ultimately, this research will be presented to a dentist, and may be shared with the Georgia Dental Association.

Description of the Study Procedures
If you agree to be in this study, you will be asked to do the following things: First, eligible participants will be given an eight-question written survey to complete. The survey contains both open-ended and multiple choice questions, and should take about 10 minutes to complete. Participants will then attend a 30 minute educational presentation on personal oral health care. At the conclusion, a single survey question, “How likely are you to seek oral healthcare if needed?” will be asked of participants. The survey should take approximately 5 minutes to complete.

Risks/Discomforts of Being in this Study
There are no reasonable foreseeable (or expected) risks.

Benefits of Being in the Study
The benefits of participation include receiving first-hand oral health education from a licensed dentist which may enhance one’s oral health awareness.

Confidentiality
All responses are treated as anonymous and in no case will responses from individual participants be identified.

Payments
You may receive the following: oral health goody-bags or items (e.g. tooth brush, tooth paste, floss, and/or mouth wash) at the conclusion of the presentation; and a small gift card at the end of the survey.

Right to Refuse or Withdraw
The decision to participate in this study is entirely up to you. You may refuse to take part in the study at any time without affecting your relationship with the investigator of this study or American Public University. Your decision will not result in any loss or benefits to which you are otherwise entitled. You have the right not to answer any single question, as well as to withdraw completely from the survey at any point during the process; additionally, you have the right to request that the researcher not use any of your questionnaire material.

Right to Ask Questions and Report Concerns
You have the right to ask questions about this research study and to have those questions answered by me before, during or after the study. If you have further questions or concerns about your rights as a participant in this study, contact the American Public University System, IRB Chair at: apus-IRB@apus.edu

Consent
By signing below I verify that I am 18 years of age or older, understand the statements above, and freely consent to participate in the study.

Subject's Signature: ______________________________   Date: __________________________
Appendix B: Oral Healthcare Self-Report Survey

1. Have you visited a dentist for any reason within the past 12 months?  Yes  No

2. Have you lost any natural teeth to natural aging or dental problems?  Yes  No
   If yes, how many? __________

3. Do you feel that oral health is important to your overall health?  Yes  No

4. Do you have dental insurance?  Yes  No

5. Do you feel that you have access to adequate oral healthcare if needed?
   Please circle one:  Yes  No  Unsure of what is available to me

6. What would you say is the biggest hindrance to receiving adequate oral healthcare?

7. What, if anything, would make you more likely to seek oral healthcare?

8. How likely are you to seek oral healthcare if needed?  Please circle one:
   Definitely would not  Not likely  Neutral  Somewhat likely  Definitely would

Please check your gender: Male _______ Female _______
How likely are you to seek oral healthcare if needed? Please circle one:

Definitely would not  Not likely  Neutral  Somewhat likely  Definitely would

Please check your gender: Male _______ Female ________