Improving the Oral Health Status of Functionally Independent and Dependent Seniors Residing in Long-Term Care Facilities Through Dental Hygiene Education

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Submitted in partial fulfillment of the requirements for the degree of Master of Education

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Abstract

The purpose of this study was to evaluate the oral health status of residents residing in 2 long-term care facilities and determine if dental hygiene education was required in order to improve their current oral health. The oral health status of 6 independent and 4 dependent individuals residing in 2 long-term care facilities was evaluated. In addition, the current oral health and disease prevention practices employed by 4 caregivers who were responsible for providing oral care to dependent residents in the long-term care facilities were evaluated. Furthermore, an evaluation of the oral care practices of independent residents who were responsible for providing their own care was conducted. Finally, the challenges that caregivers and independent residents faced when performing oral care were determined, and methodological changes were proposed.

Using a generic qualitative research methodology, data collection was comprised of semistructured interviews, field observations, and documentation. The oral health status of the residents was reevaluated 3 months later. The findings of this study demonstrated an increase in plaque accumulation, gingival inflammation, and unhealthy gingival tissue colour changes among the residents over the 3-month period. The study revealed that poor oral health among the residents was a result of inadequate oral hygiene care techniques, difficulties accessing oral health care, financial limitations, insufficient care staff, insufficient time for personal care duties, lack of professional development, minimal interprofessional collaboration of health disciplines, and lack of perseverance on the part of the caregivers and residents.

Overall, oral health is essential, and maintaining optimal oral health requires increased collaboration and communication between health care providers.
Acknowledgements

I would like to thank the participants in my study for their honesty and cooperation. This study would not have been a success without them.

I would like to thank Johnson & Johnson, GlaxoSmithKline, Bolton Dental Manufacturer, and Sunstar Butler for their generous contributions of dental resources.

A special thank you goes to my research assistant Patricia Rowan, for all of her help and assistance.

My sincere gratitude goes to my advisor, Joe Engemann, for all of his support, guidance, patience, and positive encouragement.

Thank you to my parents, Angela and Nick, for their continuous love and support throughout these stressful years.

Finally, I would like to thank my fiancé, Rob, for his ongoing love, support, advice, and continuous motivation. His encouragement allowed me to complete this thesis in the midst of work, house hunting, and planning a wedding.
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CHAPTER ONE: INTRODUCTION TO THE STUDY

Oral health has a substantial impact on an individual’s overall general health and well-being (McNally & Lyons, 2004). A lack of awareness regarding the importance of oral health can contribute to oral and systemic disease (McNally & Lyons). Oral disease and dysfunction can be extremely painful and can affect an individual’s chewing, eating, and speaking abilities (McNally, 2005). High levels of oral disease have been shown to exist in the elderly population, more specifically, elderly individuals residing in long-term care facilities (McNally; McNally & Lyons; Simons, Baker, Jones, Kidd, & Beighton, 2000; Thompson, 2005).

The purpose of this study was to evaluate the oral health status of independent and dependent elderly individuals residing in long-term care facilities. This study evaluated the current oral health and disease prevention practices implemented by personal support workers in long-term care facilities, and it evaluated the oral care practices of independent residents responsible for providing their own oral care. Additionally, the study addressed the challenges that personal support workers and independent residents faced in meeting optimal oral health.

A personal support worker is a caregiver who assists individuals with daily personal care needs as they deal with the effects of aging, injury, or illness (Ontario Association of Community Care Access Centres [OACCAC], Ontario Community Support Association [OCSA], & Ontario Home Health Care Providers’ Association [OHHCPA], 2000). Personal support workers are qualified to provide personal support, homemaking, attendant, and respite services to individuals in their own homes or long-term care facilities (OACCAC, OCSA, & OHHCPA). Depending on the site of
employment (e.g., long-term care facility or residential home), a personal support worker’s duties may include basic homemaking tasks such as cleaning, shopping, and meal preparation as well as providing personal care services such as grooming, toileting, and bathing (OACCAC, OCSA, & OHHCPA).

Long-term care (LTC) facilities are homes where individuals requiring 24-hour supervision, nursing care, and assistance with daily living activities (e.g., personal and oral hygiene, dressing, bathing, eating, and grooming) reside. For the purpose of this research study, long-term care facilities included nursing homes, retirement homes, and assisted living facilities for the aged. Residents of long-term care facilities are offered medical, nursing, rehabilitative, and social support services.

The need for long-term care usually arises from old age, chronic illness, injury, or disability. The proper management of oral care delivered to medically compromised elderly populations in long-term care facilities has presented challenges for nursing home administrators, daily caregivers, and dental professionals who provide services in these institutions (Coleman, 2004). Current research literature has identified that some of the challenges encountered by health care workers include unco-operative residents, inadequate personnel tending to the residents, insufficient time and resources, heavy workload, vaguely defined work roles, and poor patient prognosis (Coleman; OACCAC, OCSA, & OHHCPA, 2000). Consequently, these challenges create stressful working environments.

Work overload and job stress are serious problems among health care workers that can thereby jeopardize the quality of care provided to their patients (OACCAC, OCSA, & OHHCPA, 2000). When job pressure is extreme and prolonged, it has the
potential to result in burnout: a stage of stress in which workers no longer function
normally (T. White, 2003). Workers become emotionally exhausted and detached from
patients and colleagues (White). Moreover, they become disinterested in their work and
are more susceptible to health problems (White).

The suboptimal conditions and standards of oral health and dental treatment
within these health care settings have been identified as areas for additional study and
focus (Coleman, 2004). In addition to the evaluation of oral health practices, this study
proposes time-efficient strategies that may help reduce personal support workers’ stress
and minimize the challenges experienced when providing oral care. Overall, the
restructured oral health practices aim to improve the quality of care and the general health
of the residents.

**Background of the Problem**

According to the World Health Organization (WHO), the elderly population is the
fastest growing age group. It has been estimated that there are approximately 600 million
people aged 60 years and over and that this number will increase dramatically by 2050
(Peterson & Yamamoto, 2005). By 2050, the WHO proposes that the global elderly
population will comprise 2 billion people (Peterson & Yamamoto). In Ontario, the
population of individuals aged 65 and over will rise significantly from 1.6 million, or
12.8% of the total Canadian population, in 2004 to 3.6 million, or 22.2% of the total
Canadian population, in 2031 (Ontario Ministry of Finance, 2005). Moreover, the
population of individuals aged 75 and over will more than double and increase from
731,000, or 5.9% of the total Canadian population, in 2004 to 1.7 million, or 10.1% of the
total Canadian population, in 2031 (Ontario Ministry of Finance).
As individuals get older, most experience normal, age-related changes that may affect their lifestyle. Examples of common age-related changes may include hearing impairment, memory loss, weakening vision, and the increased probability of arthritis, hypertension, heart disease, diabetes, and osteoarthritis (The American Psychological Association, 1998; Lamster, 2004; McNally, 2005; University of Alberta, 2001). Some elderly individuals may develop chronic illnesses or become disabled, forcing them into long-term care facilities and causing them to be dependent on caregivers for their daily activities. These age-related changes and major systemic disorders can have a tremendous impact on the overall oral health and quality of life of such individuals (Locker & Matear, 2000). For example, studies have demonstrated a connection between periodontal disease (gum disease) and diabetes (Grossi & Genco, 1998; Lamster; Locker & Matear; University of Alberta). An association between periodontal disease and cardiovascular disease has also been identified (De Stefano, Anda, Kahn, Williamson, & Russell, 1993; Joshipura, Hung, Rimm, Willett, & Ascherio, 2003; Joshipura, et. al., 1996; Lamster; Morrison, Ellison, & Taylor, 1999; Ritchie, Joshipura, Hung, & Douglass, 2002; Scannapieco & Genco, 1999; University of Alberta). In addition to the potential for systemic health conditions, McNally (2005) noted that chronic conditions such as arthritis and memory loss can diminish an individual's ability to perform effective oral hygiene practices.

“Successful aging not only adds years to life, but also adds life to years by improving its quality” (Fiske, 2000, p. 321). An individual's overall quality of life can have an impact on one's general health and lifestyle choices. Optimal oral health
contributes to successful aging by adding to self-esteem, self-image, appearance, sociability, dietary selection, and nutrition (Fiske).

Optimal oral health is an important factor for the general health and well-being of the elderly population. Oral and dental diseases, though not conventionally considered serious, can undermine an individual’s well-being and quality of life to a surprising degree (Locker & Matear, 2000). Oral diseases and dysfunction can be extremely painful and have a tremendous impact on an individual’s quality of life, affecting their chewing, eating, speaking, and socializing abilities (McNally, 2005). McNally noted that “in no segment of society are these domains more critical than in the elderly, for it is in this population that deficits in quality of life are the most devastating” (p. 465).

Pain and disability associated with poor oral health affect an individual’s ability to eat properly, which can result in weight loss, inadequate nutrition, and can negatively affect the ability to resist systemic diseases (McNally, 2005). McNally estimated that between 5% and 10% of community dwelling elderly individuals and between 30% and 60% of homebound and institutionalized elderly are malnourished.

Oral disease has been identified as a significant problem for elderly residents of long-term care facilities in developed countries, yet little research is available regarding the Canadian population (Wyatt, 2002). Wyatt conducted a study to describe the medical, dietary, oral microbial, oral hygiene, and dental status of elderly individuals living in long-term care facilities in Vancouver, Canada. Wyatt reported that high levels of edentulism (complete tooth loss), caries (tooth decay), poor oral hygiene, gum disease, and soft tissue lesions were discovered among the elderly in the long-term care facilities. The level of dexterity required for adequate brushing and flossing may also decrease with
These physical limitations, which are common among elderly individuals, may often lead to the suboptimal oral hygiene conditions (Bailey et al.). Bailey et al. noted that as a result of these physical limitations, many elderly individuals living in long-term care facilities rely on caregivers for their daily oral care. Unfortunately, oral health activities are commonly overlooked within these facilities (Wardh, Hallberg, Berggren, Anderson, & Sorensen, 2000).

Paulsson, Soderfeldt, Nederfors, and Fridlund (2002) found that oral health problems are frequently overshadowed by other medical needs which are thought to be more urgent by the caregivers. For example, Paulsson et al. stated that the caregivers “appear to perceive oral health as the most difficult part of their work” (p. 42). Moreover, Wardh et al. (2000) interviewed nurses and caregivers in long-term care facilities and found that nearly all nurses and caregivers believed that oral health care is important, yet almost none of them actually provided it. Several of the interviewed nurses and caregivers in Wardh et al.’s study stated that they assumed someone else was providing the oral care to the dependent elderly residents. Furthermore, almost all of the nurses and caregivers considered providing oral care burdensome and even described it as disgusting (Wardh et al.). Unfortunately, by simply overlooking daily oral care, the general health and well-being of these LTC facility residents has the potential to decline (Coleman, 2004).

Wardh et al. (2000) proposed that oral health can be improved through oral health education and oral health promotion activities. Bailey et al. (2005) had suggested that in order to correct the current oral health deficits, long-term care facilities should consider hiring part-time or full-time dental hygienists to assess and oversee the oral care provided
to the residents. "Oral health promotion is not directed simply at reducing disease and injury to the teeth and their supporting structures but may instead have as its aim, the promotion of feelings of well-being, social acceptability or articulate speech" (Kay & Locker, 1998, p. 132). Oral health promotion is important because poor oral health can have serious psychological ramifications (Bailey et al., 2005). Poor oral health limits an individual’s personal choices, social opportunities, and overall quality of life (Kay & Locker). Practical hands-on training and continuing education courses for caregivers have been recommended as means of improving oral health care for functionally dependent elderly residents (Coleman, 2004; Kay & Locker). Thus, oral health education needs to be targeted to the individual caring for oneself in addition to those who are caring for the elderly, whether at home or in a long-term care facility (Canadian Dental Association [CDA], 2005).

In the Ottawa Charter of Health Promotion, Green and Kreuter (1999) stated that “health promotion encompasses health education… and is aimed at the complementary social and political actions that will facilitate the necessary organizational, economic, and other environmental supports for the conversion of individual actions into health enhancements and quality-of-life gains” (p. 19). Therefore, health education serves the individual by encouraging organizations to become actively involved in the efforts of health promotion.

Dental professionals in Canada are concerned about the oral health status of Canada’s population, focusing particularly on the elderly (Matear, 2006). Unfortunately, strategies and funding have not been sufficient in order to support initiatives aimed at addressing the growing needs of the elderly population (Matear). Matear stated that
the oral health needs of older adults, and the potentially serious consequences of oral disease in the elderly, present a major challenge not only to members of the dental profession, but to all health care professionals and the general community.

(p. 1)

He suggested that in an attempt to improve the oral hygiene of the elderly, co-operation between caregivers and dental professionals (i.e., dentists and dental hygienists) is essential. Coleman (2005) also recommended that interprofessional collaboration between nursing and dental professionals can be effective in providing quality oral health care to this population.

According to MacEntee (2000), dental professionals have the ability to reduce the risk of morbidity and mortality in long-term care facilities and contribute to successful aging of the residents by improving their quality of life. MacEntee stated that the quality of life of residents can be improved by “offering an accessible monitoring, diagnostic, and treatment service directly to frail elders, and by assisting the nursing staff through educational initiatives to offer daily mouth care as an integral component of their personal hygiene care for all the residents” (p. 328).

Long-term care facilities’ dental policies and procedures require revision to effect the required changes that will improve the dental health of its residents. There is a demonstrated need for more active dental programs within these facilities as well as further collaboration among the health care professions. Most important, the caregivers responsible for providing daily health care to the residents need the appropriate educational instruction and necessary time to provide vital oral health maintenance services to this population.
Statement of the Problem

As we age, changes in health and mobility occur (The American Psychological Association, 1998; Lamster, 2004; McNally, 2005; University of Alberta, 2001). In addition, finances may become limited. These challenges can present problems in accessing appropriate dental health services that are necessary in order to prevent oral diseases.

Within Canada’s predominantly private dental care system, access to dental services is largely determined by the individual’s ability to pay. Consequently, household income and insurance coverage are powerful determinants of dental care services (Locker & Matear, 2000). Due to financial constraints, Little, Falace, Miller, and Rhodus (2002) have found that elderly adults underutilize dental services. This is of particular concern given that the elderly are at a greater risk of oral diseases and systemic conditions than any other age group (Wyatt, 2002).

The issue of accessing dental services is critical to achieving the goal of overall health for elderly individuals. Dental services should not be limited to individuals who have the luxury of accessing these services within the traditional dental office environment or who have significant insurance coverage. The dental profession must begin to address the issue of inequalities that exist among individuals and their access to dental care and ensure that the elderly living in long-term care facilities are not neglected.

In general, oral health has been reported to be an important component of overall health, well-being, and quality of life among institutionalized elderly (Coleman, 2002; McNally & Lyons, 2004). Though its importance has been stressed, it appears that the elderly residing in long-term care facilities suffer from the worst oral health and hygiene
Healthy teeth and oral tissues as well as the need for dental health care are as important for elderly individuals as for any other age group in society. Challenges to accessing dental care must therefore be removed, and prevention and intervention strategies must be formulated to reduce the increased prevalence of oral diseases in institutionalized elderly.

Common challenges that the residents and caregivers encounter in maintaining acceptable levels of oral hygiene include knowledge deficits in oral health, lack of time, a shortage of caregivers, and insufficient oral hygiene resources (Coleman, 2004).

It is very important that caregivers who are taking care of institutionalized elderly have extensive knowledge of the dental care needs of their residents. Dental health education is considered to be an important component of dental health services. Although oral care is included in introductory nursing degree programs, it is infrequently taught by dental experts (Mynors-Wallis & Davis, 2004). The dental profession has an important role to play in providing education to the caregivers who provide assistance to the institutionalized residents.

**Purpose of the Study**

Oral care is considered one of the most essential services performed by caregivers and is regarded as an integral part of the daily hygiene routine provided to institutionalized elderly individuals (Xavier, 2000). Assessing a patient’s mouth and delivering appropriate oral care can prevent potential infections, distress, and discomfort and reduce the incidence of dental and systemic disease (Xavier). Though providing oral
care is a key component of nursing, poor oral health is commonplace among frail, debilitated, and dependent long-term care facility residents (Coleman, 2004).

The purpose of this study was to improve the oral health status of elderly individuals residing in long-term care facilities through the delivery of oral hygiene education by a registered dental hygienist. This study evaluated the oral health status of independent and dependent elderly residents living in long-term care facilities. This study also evaluated the current oral health and disease prevention practices implemented by the caregivers and independent residents within these facilities. In addition, this study identified the challenges encountered by personal support workers and independent residents when performing daily oral care and prompted the proposal of strategies and solutions to help improve the oral health status of the residents and minimize the obstacles encountered by both parties.

The oral health status of the participating residents was evaluated and documented. Personal support workers were individually shadowed by a dental hygienist while they provided oral care for their dependent patients. The dental hygienist determined whether the quality of oral care provided by the personal support worker was sufficient in improving the oral health status of the resident. The dental hygienist also observed independent residents who provided their own oral care. The dental hygienist observed the independent residents’ level of skill and ability when performing oral care. Based on the findings, modifications were recommended by the dental hygienist for the personal support workers and the independent residents to implement during their daily routine in order to help the residents achieve optimal oral health.
Three months after the initial evaluation, the dental hygienist returned to the long-term care facilities and evaluated the oral health of the residents to determine if the strategies implemented by the personal support workers and the independent residents had a positive impact on the overall oral health of the residents. Evaluation of the residents' oral health status after the dental hygiene intervention provided information regarding the effectiveness of the strategies recommended and implemented.

**Research Questions**

The problem of inadequate oral hygiene among elderly residents of long-term care facilities has been widely documented in the literature (Coleman, 2004; Isaksson, Paulsson, Fridlund, & Nederfors, 2000; Mynors-Wallis & Davis, 2004; Nicol, Sweeney, McHugh, & Bagg, 2005; Vanobbergen & De Visschere, 2005; Wyatt, 2002). Comprehensive oral health care is an essential part of quality of life. “Orofacial infections, pain, discomfort, xerostomia, dysphagia, dysgeusia, tooth loss, edentulousness, and mucosal diseases can have a dramatic effect on an older adult’s quality of life” (Coleman, p. 1).

Oral diseases and disorders can compromise the individual’s chewing, eating, and speaking abilities and can affect their social interactions (Locker & Matear, 2000; McNally, 2005). For example, Locker and Matear found that elderly individuals living in long-term care facilities who experience psychosocial problems related to oral disorders have scores on measures of quality of life that indicate significantly lower morale and significantly lower levels of life satisfaction than community dwelling older adults. Therefore, these oral diseases and disorders must be recognized and managed.
appropriately by health care professionals in order to eradicate disease, restore function, and improve the quality of an individual’s life (University of Alberta, 2001).

Traditionally, many dental hygienists viewed themselves only in functional terms, describing their career responsibilities in terms of the clinical activities that they performed. When asked what a dental hygienist does, most dental hygienists would invariably respond with *cleans teeth*, understating the importance of the role of the dental hygienist as an oral health educator (Darby & Walsh, 2003). Today, societal trends towards consumerism, self-care, disease prevention, and healthy lifestyles have patients requesting extensive information from the dental hygienist regarding oral health promotion and oral disease prevention (Darby & Walsh).

In 1985, the American Dental Hygienists’ Association recognized the practice of dental hygiene as complex and multifaceted. It was acknowledged that dental hygienists function in many roles: clinician, health educator, researcher, consumer advocate, change agent, and administrator (Darby & Walsh, 2003). The role of the dental hygienist as educator involves effectively communicating not only with patients but also with dentists and other health care professionals. This role is critical in meeting the oral health needs of individuals, families, and communities.

The initial goal of the oral health educator is “to employ techniques and agents to forestall the onset of disease, to reverse the progress of the initial stages of disease, or to arrest the disease process before treatment becomes necessary” (Harris & Christen, 1995, p. 2). Current literature demonstrates the need for dental professionals to provide in-service practical training and education sessions to caregivers of long-term care facilities.
(Coleman, 2005; McNally, 2005; Nicol et al., 2005; Paulsson et al., 2002; Simons et al., 2000; R. White, 2000; Yates, 2003).

Oral health should be a central part of nursing care. The deficiencies in both oral health education and the provision of oral care require urgent attention (R. White, 2000). Coleman (2004) has recommended that nursing degree curricula be continuously updated and that continuing education courses should include more content and practical hands-on instruction on oral health care.

Further investigation into the effectiveness of oral health programs currently administered in long-term care facilities is needed. This issue is crucial considering that McNally (2005) reported there is inadequate information regarding the oral health status and treatment needs of older Canadians.

As a dental hygienist and oral health educator, the main focus of this research study was to assess the oral health status of independent and dependent residents residing in long-term care facilities. This research study evaluated the current oral health practices performed by personal support workers and independent residents in long-term care facilities and determined if modifications to treatment were required in order to improve the oral health status of the residents. The general research question that was addressed determined if there was a need to improve the oral health and disease prevention practices utilized by caregivers and independent residents within long-term care facilities. The following specific questions were addressed in the research study to help answer the overall research question:

1. What is the current health status of the independent and dependent residents residing in the specified long-term care facilities?
2. What are the current oral health and disease prevention practices being performed by residents and caregivers in the specified long-term care facilities?

3. What continuing oral health education courses are available to the caregivers and/or residents by the Directors of Care at both facilities?

4. What are the specific challenges that caregivers encounter when providing oral care for dependent residents?

5. What are the specific challenges that independent residents encounter when performing personal oral care?

**Rationale**

"Collaboration occurs when individuals of differing strengths work together as equal partners to achieve better results than each could achieve working alone" (Darby & Walsh, 2003, p. 9). The dental hygienist and the caregivers in long-term care facilities can work together to improve the oral health status of the residents. The dental hygienist who sees the scope of practice moving beyond the traditional dental office setting will be able to help provide equal opportunities for dental care to everyone.

Many dental hygiene schools in Ontario are committed to fostering the concept of lifelong learning in their students. It is important for dental hygiene students to work in collaboration with other health care providers to co-ordinate delivery of optimal client care. In doing so, students are exposed to various occupational settings within which dental hygienists can be employed, including public health, long-term care facilities, and educational settings.

Many dental professionals have not been sensitized to the dental needs of the functionally dependent elderly population and to the impact that poor oral health can
have on their general well-being. A component of the dental hygiene course curriculum at many dental hygiene schools requires that students visit a long-term care facility and provide oral hygiene instruction to the residents and caregivers in an effort to improve their current oral care regimen. These educational sessions have the potential to positively influence the quality of life and comfort for the residents by ensuring that caregivers are knowledgeable about oral health and its important relationship to general well-being. Additionally, it promotes interprofessional collaboration between health care disciplines.

**Theoretical Framework**

Traditionally, health care has been focused on illness and disease (Canadian Dental Hygienists Association [CDHA], 2001). Often, health professionals intervene only after individuals develop acute or chronic illnesses and experience compromised lives (Pender, 2002). Today, the health care system is focused on maintaining conditions of healthy interactions between the self and the environment (Pender). Unfortunately, maintaining health has been difficult for some individuals, and they have encountered challenges in accessing care during illness (CDHA).

Achieving optimal health for all is a challenge for health professionals, one that can be met by strategies of health promotion such as marketing, health education, and collaboration with other health care professionals (Darby & Walsh, 2003). Health promotion is based on numerous theories regarding what influences people's health and what constitutes an effective intervention or strategy to improve health. The theoretical frameworks upon which this study is based are Pender's Health Promotion Model (HPM) and Penner's Health Belief Model (HBM).
According to Pender’s HPM (2002), health promotion consists of activities directed towards increasing the level of well-being and actualizing the health potential of individuals, families, communities, and society. It is directed towards increasing states of positive tension in order to promote change, growth, and maturation in individuals (Galloway, 2003). The importance of health is within the individual’s value system; if health is not a priority or highly valued, the individual may be less likely to act on recommended health promoting behaviours (Galloway).

Penner’s HBM was developed in the early 1950s and was directed solely at examining health behaviours (Galloway, 2003). It theorizes that individuals will take preventive health action if they believe that they are susceptible to disease, the disease has serious consequences, preventive action will be beneficial in reducing either the severity of the disease or the susceptibility of the condition, and that the benefits of taking preventive action will outweigh the perceived challenges (Darby & Walsh, 2003). One of the most accepted variables in Penner’s HBM is that educational attainment has a direct effect on preventive health behaviour, thus increasing the likelihood of utilizing preventive health services and/or taking preventive actions (Darby & Walsh). The higher one’s level of education, the more likely one will abide by recommendations (Darby & Walsh). The Health Belief Model is a health protective model, whereas the Health Promotion Model focuses more on the achievement of higher levels of well-being and self-actualization (Galloway).

Caregivers and residents will receive strategic instruction from the dental hygienist that can be implemented in order to improve oral health. If the recommended strategies are seen as beneficial by the caregivers and the residents, and they believe that
the recommended behaviours will lead to the desired outcome of optimal oral health, then they may be more receptive to incorporating the strategies into their daily routine.

According to the HPM, Pender notes that cognitive-perceptual factors such as perceived challenges determine an individual’s participation in health promotion (Galloway, 2003). The more challenges a person encounters in health promotion activities, the less likely that person will participate in health promoting activities (Galloway). Pender notes that family, peers, and health care providers are important sources of interpersonal influence that can increase or decrease commitment to and engagement of health promoting behaviour (Galloway).

Caregivers of elderly residents in long-term care facilities have expressed the need and desire to increase their current knowledge in oral care in order to improve the quality of life of their patients (Paulsson et al., 2002). If caregivers are committed to providing daily oral care, then the individual may be more encouraged to receive it, which could possibly result in improved overall health.

**Importance of the Study**

This study attempted to increase dental health professionals’ awareness of the dire oral health needs of institutionalized elderly. This study was intended to encourage dental professionals to become actively involved and collaborate with other health care professionals for the benefit of the community. In addition, this study was valuable because it could help increase the oral health knowledge of caregivers and independent residents in long-term care facilities and subsequently improve the oral care performed.

This study may have an impact on a large number of individuals. The Directors of Care of long-term care facilities, the caregivers of long-term care facilities, the residents
of long-term care facilities, the legal guardians of residents in long-term care facilities, dental hygienists, dental hygiene students, and dental hygiene school administrators may be interested in the findings from this study. This study may provide insight into the challenges encountered by residents in long-term care facilities and caregivers in maintaining oral care. This study also offers suggestions that can be implemented in long-term care facilities working to improve their oral health programs.

Regardless of the outcome of the study, there will be an increase in public awareness and within the health care profession. There will also be an increased awareness of the special needs of elderly individuals in order to maintain their oral health and quality of life.

Caregivers were presented with the theoretical information necessary to augment their oral health knowledge base and oral health care regimen. With each participating dependent resident, the caregivers demonstrated their current daily oral hygiene routine. The oral hygiene routine was evaluated by a dental hygienist and recommendations to the current practices were made. Each caregiver was given a practical demonstration of the recommended oral hygiene procedures and requested that they be implemented for 3 months in order to evaluate whether improvements in residents’ oral health occurred.

Theoretical teaching alone is insufficient when providing oral health education, and there is no substitute for practical experience. Therefore, the results of the study were aimed to influence both theoretical and practical aspects of oral care.

**Limitations of the Study**

This research study evaluated the current oral care practices that caregivers and independent residents in specific long-term care facilities performed. The ultimate goal of
the study was to positively effect behavioural change among the caregivers and
independent residents, encourage healthy lifestyles for the residents, and fundamentally
promote optimal oral health.

The scope of this problem is international, given the population demographics of
the aging (Penner, 2002). However, the focus of this study was limited to two long-term
care facilities in Ontario, Canada. For the purpose of this study, the long-term care
facilities are referred to as *LTC-A* and *LTC-B*. This study should further contribute to the
existing body of knowledge for seniors and dental professionals in Ontario by providing
additional information on the institutionalized elderly and their oral health demands.
Unfortunately, this study has inherent limitations that restrict the ability to extrapolate the
findings to represent all long-term care facilities in Ontario. The study was unable to
represent a larger region due to a number of variable factors. First, the number of
residents per long-term care facility is not fixed, nor is the ratio of dependent to
independent residents. The number of residents and the residents’ level of dependency
cannot be considered the same at all of the long-term care facilities across Ontario. The
various facilities will differ with regards to the number of staff employed based on the
numbers of dependent and independent residents present. The duties and the
responsibilities of the care staff may vary among the long-term care facilities. In *LTC-B*,
the caregivers employed were predominantly personal support workers, whereas in other
facilities there may be a greater number of nurse practitioners, health care aides, or
registered nurses employed. Depending on the care staff and their level of education,
their roles within an LTC facility and interaction with the residents may vary.
In addition, at LTC-B, the resources used for oral care consisted of toothbrushes, mouthwash, dental floss, and denture cleaners. Other long-term care facilities may utilize a broader range of oral care aids that could include power toothbrushes and/or proxabrushes. The time allotted in providing care may be related to the number of staff present and the number of residents for whom they are responsible. Therefore, fewer residents may allow for an increased amount of time devoted to performing proper oral care. The caregivers in LTC-B felt as though they were rushed when providing oral care due to the number of residents to whom they were accountable.

The caregivers in the LTC facilities were not all graduates of the same career college. The level of skill, knowledge base pertaining to oral care, and practice time may vary from one educational institution to another, thereby affecting the oral health status of the residents. Finally, LTC-B employs a resident dentist who visits the facility on an annual basis. In other facilities the residents may have more or less access to a resident dentist, further affecting the oral health of their mouths. These variables limit the findings of the study from being used as an accurate representation of the situation at other facilities outside of the specific region in question.

Additionally, limitations that may have had an impact on the results of the study are here summarized. Some caregivers in the study may not have provided complete and accurate assessments of their daily oral health practices due to a fear that such disclosure could jeopardize their current employment status. Educational backgrounds and years of clinical experience of each participating caregiver may affect their oral health practices and oral interview responses. Participants, both residents and caregivers, may not have understood the oral health strategies being implemented, which could also have had an
adverse effect on the final results of the study, since such confusion could undermine the effect of the intended strategies. Last, when the caregivers and residents did not match up, caregivers in the study were randomly assigned to other participating residents. A subsequent decline in the oral health of the resident may have resulted since the caregiver responsible for their care did not participate. These limitations may in turn have an effect on the overall results of the study.

Outline of the Remainder of the Document

Chapter Two provides a critical review of the existing research on the oral health status of aged individuals residing in long-term care facilities. Health is an integral component of quality of life. Therefore, the concept of oral health and its association with quality of life is discussed in Chapter Two. In addition, Chapter Two explains gingival disease, periodontal disease, edentulism, and the impact of these factors on the overall systemic health of an individual. The final section of Chapter Two addresses the current gaps found in oral health education, oral health education programs, and the insufficiencies of oral care provided to institutionalized residents.

Chapter Three includes a description of the present research study. It discusses the materials and methods utilized for the research study. This chapter includes an analysis of the research design, selection of participants, instrumentation tools, methodological assumptions and limitations, and the ethical considerations of the study.

Chapter Four presents the results of the research study. The results address the current oral health conditions of the independent and dependent residents residing in the long-term care facilities under investigation. The challenges encountered by the caregivers and the independent residents are identified. In addition, as part of the data
collection process, oral health recommendations are provided for each participant, which are outlined in this chapter.

Chapter Five highlights the relevance and importance of the research findings. An overview of the research study is integrated. The findings of the study including the content deficiencies of the personal support worker textbook, inadequate support staff, insufficient time, lack of program regulation, and the necessity for continuing education for personal support workers are all discussed in this chapter. Interwoven throughout the discussion are suggestions for improvements in these areas. Last, the necessity for interprofessional collaboration among health care disciplines is stressed in order to help improve the current status of long-term care facility residents. In addition, a glossary of terms has been included (see Appendix A).
CHAPTER TWO: REVIEW OF RELATED LITERATURE

This chapter provides a critical review of the existing research that is significant to the oral health status of elderly individuals residing in long-term care facilities. In addition, the concept of oral health and how it relates to an individual’s quality of life is discussed. This chapter explains periodontal disease and its influence on an individual’s overall systemic health. Finally, the deficiencies present in oral health care education, oral health educational programs for caregivers and residents of long-term care facilities, and the quality of oral care provided to elderly residents of long-term care facilities are discussed.

Health and Quality of Life

A term that has gained wide usage in the past few years is health-related quality of life (Penner, 2002). The term health-related quality of life is used to identify and describe the strong relationship between the broad concepts of health and quality of life (Penner).

Health-related quality of life is a specialized and multifaceted concept drawn from quality of life literature (Penner, 2002). How long and how well people live is directly related to their health and their lifestyle choices. “The value of our health related to our quality of life is determined by our ability to function, limitations to that function, impairments and perceptions, and social opportunities” (Penner, p. 9). Health and quality of life are intrinsically linked; neither can exist without the other.

The most standardized definition of health is taken from the World Health Organization (WHO), which conceptualizes health as “a complete state of physical, mental, and social well-being and not merely the absence of illness and infirmity”
(Locker & Matear, 2000, p. 23). Health is no longer determined by the absence of disease. Health has come to include the concept of well-being (Penner, 2002). The lifestyle choices that are made throughout our lifetime have an impact on our physical, mental, and social well-being. Taking responsibility for our health, preventing accidents and illnesses, and working with health care providers when necessary are strategies geared towards living healthier lifestyles.

Wellness encourages consumer awareness and promotes the establishment of social systems and environments conducive to health-promoting behaviour (Penner, 2002). Health and wellness encourage individuals to maximize their personal potential for optimal well-being and to construct meaningful and rewarding lives.

Wass (cited in Penner, 2002) stated that “optimal health includes minimizing health risks, raising individual’s quality of life, and effecting enduring social change to support optimal health environments” (p. 22). To achieve optimal health, primary disease prevention strategies must be implemented (Wass, cited in Penner, 2002). The most effective prevention strategy for the achievement of optimal health is through education (Wilkins, 2005).

The health promotion movement has emerged due in large part to the efforts of the WHO (Watt & Marinho, 2000). Health promotion encompasses a range of complementary educational actions to encourage health and well-being. Oral health promotion has developed as the contemporary approach to tackling oral diseases. In 1995, the WHO developed an Oral Health Program that encourages national oral health planners to implement oral health programs oriented towards improved oral health and quality of life for elderly individuals (Peterson & Yamamoto, 2005). In an effort to
improve the oral health and quality of life of elderly individuals, the national oral health authorities have been urged to formulate oral health goals, targets, and standards of oral health for elderly people (Peterson & Yamamoto).

In clinical dentistry, considerable interest has been focused on the evidence base for oral health promotion (Watt & Marinho, 2000). Watt and Marinho conducted a systematic assessment of the research that had been published to assess the effectiveness of oral health promotion interventions. Their assessments have stimulated much debate regarding the value of oral health promotion and the ways in which preventive action should be developed for the future.

A major difficulty that Watt and Marinho (2000) encountered when determining the effectiveness of oral health interventions was that numerous measures were used in the studies reviewed. They stated that due to the lack of standardized and validated measures utilized among the studies, direct comparisons among the studies were difficult. They have recommended that randomized controlled trial study designs would help eliminate any potential threats to validity and avoid biases in terms of formulating overall conclusions. According to Watt and Marinho “unbiased analysis of the evidence using systematic reviews of the randomized controlled trials remains the gold standard methodology for assessing evidence of effectiveness” (p. 45).

**Oral Health and Overall Health**

In May 2000, the Surgeon General of the United States released a revolutionary report on oral health, *Oral Health in America: A Report of the Surgeon General.* The main focus of the report was to “alert Americans to the full meaning of oral health and its importance in relation to general health and well-being” (U.S. Department of Health and
Human Services, 2000, p. iii). This report is relevant to Canadians and their government as well.

While oral health care is not taken completely for granted, its significance to our general health is underestimated. The reality that the mouth is connected to the rest of the body is often overlooked. This point is expressed forcefully in the Surgeon General’s report (U.S. Department of Health and Human Services, 2000). The Surgeon General stated that oral health is integral to general health and reminded Americans that oral health includes more than merely healthy teeth. The Surgeon General continued to state that individuals cannot be healthy without oral health. In his words:

The word oral, both in its Latin root and in common usage refers to the “mouth.” The mouth includes not only the teeth and the gums and their supporting connective tissues, ligaments and bone, but also the hard and soft palate, the soft mucosal tissue lining the mouth and throat, the tongue, the lips, the salivary glands, the chewing muscles….Equally important are the branches of the nervous, immune, and vascular systems that animate, protect, and nourish the oral tissues, as well as provide connections to the brain and the rest of the body. The genetic patterning of development in utero to the developing brain and to the tissues of the face and head that surround the mouth, structures whose location is captured in the word craniofacial.

These are tissues whose function we often take for granted, yet they represent the very essence of our humanity. The craniofacial complex allows us to speak and smile, sigh and kiss, smell, taste, touch, chew and
swallow, cry out in pain, and convey a world of feelings and emotions through facial expressions. They also provide protection against microbial infections and environmental insults. (p. 1)

A sore mouth has the potential to have an impact on our well-being (Penner, 2002). Oral health problems such as mouth ulcers, gum diseases, and yeast infections can be very uncomfortable and painful (Canadian Dental Association [CDA], 2005). The mouth harbours a wide variety of microbes that have a direct route to the rest of our body. Poor oral health is often the source of significant illnesses and fatalities. In addition, the condition of the mouth and how oral health influences and affects general health has been demonstrated (The American Academy of Periodontology, 2005). The American Academy of Periodontology launched an effort to educate the public regarding new findings that support what dental professionals had long suspected: infections in the mouth have the potential to create health problems elsewhere in the body. Since then, evidence has continued to mount to support these links (CDA, 2005; Canadian Dental Hygienists Association [CDHA] & Lavigne, 2004a, 2004b; Matear, 2006).

Periodontal diseases are linked to major health problems including heart disease, stroke, osteoporosis, diabetes, and respiratory diseases such as aspiration pneumonia (The American Academy of Periodontology, 2005). An American Heart Association study revealed that the risk of having a stroke can double as a result of a minor chronic oral infection such as an impacted tooth (The American Academy of Periodontology). Numerous other studies have been conducted and revealed that individuals with periodontal disease had a higher risk of cardiovascular disease than individuals without
Healthy Mouth, Healthy Body

Gingivitis is an acute inflammation of the gums. Gingivitis is caused by an accumulation of dental plaque on the teeth. In the absence of adequate oral hygiene, plaque will accumulate along the gumline and cause an inflammatory reaction within 3-4 days (Darby & Walsh, 2003). Gingivitis is reversible; that is, it may disappear and the gingival tissues may return to health, provided the teeth are cleaned and subsequently kept free from plaque (Darby & Walsh). Untreated gingivitis and continuous penetration of dental plaque below the gumline may lead to injury of the supporting structures of the teeth. Gingivitis can be a precursor to periodontitis, also referred to as periodontal disease.

Periodontitis is a form of gum disease. It is a chronic infection of the gums that is characterized by a loss of gingival attachment between the tooth and the jawbone (Darby & Walsh, 2003). Periodontitis is the leading cause of tooth loss among adults (Darby & Walsh). Unfortunately, periodontitis is not reversible. Generally, periodontal disease progresses slowly, and its progression can be stopped with proper oral hygiene care and maintenance. Most often, severe periodontal breakdown is not observed until the ages of 50-60 years, which is the result of 30-40 years of inflammatory involvement (Darby & Walsh).

The pathogenic organisms that cause periodontal disease adhere to and proliferate on the tooth surface. Plaque bacteria tend to grow and adhere more quickly in mouths that have partial or full xerostomia (dry mouth), compounding the severity of periodontal
breakdown. Where chronic periodontal infection is present, it can result in tooth loss and can have a profound influence on systemic health (Darby & Walsh, 2003). Gram-negative bacteria that are characterized by periodontal disease can directly injure periodontal tissues and elicit an inflammatory and immune response (Matear, 2000). The periodontal tissues are a gateway to the human body’s systemic circulation. These gram-negative bacteria gain access into the bloodstream through dental procedures, chewing, and oral hygiene procedures. The circulation of the microbial toxins can exacerbate the patient’s current medical condition (CDHA & Lavigne, 2004a, 2004b; Matear, 2000; R. White, 2000).

Recent studies in periodontal medicine have suggested an association between periodontal disease and certain systemic disorders such as diabetes mellitus, pneumonia, stroke, and heart disease in compromised elderly individuals (CDHA, 2001; CDHA & Lavigne, 2004a, 2004b). Evidence presented at a symposium entitled *Periodontal Health and Systemic Disorders*, sponsored by the University of Western Ontario’s School of Dentistry, also supported this association (Teng et al., 2002).

The presence of oral bacteria in the bloodstream of an individual with a healthy immune system will not cause any systemic problems (Mayo Clinic, 2005). The immune system quickly disposes of the oral bacteria, thus preventing infection. However, if the immune system is weakened, for example, due to a disease or systemic disorder, the oral bacteria from gingivitis or periodontitis can enter into the bloodstream and become troublesome. The bacteria associated with periodontitis and gingivitis can spread from the gums through the bloodstream to the lungs or heart, causing new infections (CDHA & Lavigne, 2004a, 2004b; Darby & Walsh, 2003).
Locker and Matear (2000) found that a key component in respiratory distress, particularly in elderly and immunocompromised individuals in long-term care facilities, is the aspiration of bacteria into the lungs from the oral cavity. Based on Locker and Matear's findings, Coleman (2005) revealed that daily oral hygiene care provided by caregivers to nursing home residents reduced the risk of pneumonia. Evidence suggests that a straightforward and familiar nursing intervention, such as brushing teeth, can yield important health benefits and improve quality of life for nursing home residents (Coleman).

**The Elderly**

The proportion of elderly individuals is growing faster than any other age group (Peterson & Yamamoto, 2005). Approximately 600 million people are aged 60 years and over, and this figure is estimated to double by the year 2025. According to the WHO, by the year 2050 there will be 2 billion elderly individuals, of which 80% will be living in developing countries (Peterson & Yamamoto). This may pose tremendous challenges to health care professionals.

Aging not only brings about changes in health but often also reduces mobility and access to services required by these new health conditions, which can include oral health concerns. Many individuals lose their dental insurance upon retiring. If the lack of dental insurance is coupled with increased mobility problems, seniors can face significant deterrents to securing proper oral health care. In addition, during the aging process the immune system begins to deteriorate, making seniors more vulnerable to systemic diseases and to various side effects from prescription medications. If necessary, a senior
can secure care in a long-term care facility. Unfortunately, even these facilities have a limited capacity to deliver oral health services.

Schnelle, Alessi, and Simmons (2002) have provided evidence indicating that nursing homes do not have sufficient caregivers to provide optimal oral care to elderly residents, despite the caregivers being well-educated. Insufficient time and staff are consistently reported as challenges to providing optimal oral care (Coleman, 2005).

Baker, Simons, Jones, Kidd, and Beighton (2000) have noted that high levels of oral disease have been shown to exist in individuals aged 65 years and older. Baker et al. also noted that similar findings were discovered when comparisons were made between the oral health status of institutionalized elderly and the oral health status of individuals living at home.

Holmes (cited in Vanobbergen & De Visschere, 2005) stated that in the medical, dental, and nursing literature there is a general consensus that effective oral hygiene is one of the determining factors in the control of oral disease. With an increase in age and dependency, elderly people become more vulnerable to oral disease. Therefore, it has been recommended that in order to help control oral disease, daily oral hygiene procedures become an integral part of total care (Holmes cited in Vanobbergen & De Visschere).

Baker et al. (2000) noted that many challenges exist to appropriate oral health care among the elderly occupants of residential homes. Challenges that have been encountered by caregivers and residents include financial insecurity, the residents' restricted mobility, low levels of perceived need for oral care by residents and care staff, and the caregivers' lack of dental knowledge and time (Coleman, 2005).
Elderly residents are often dependent on caregivers to perform all of their daily care activities. Caregivers play a primary role in dental disease prevention. With the population aging, the need and demand for oral care for institutionalized seniors continue to increase. Solutions to these problems have included oral health education for the elderly residents and continuing education for the caregivers of these long-term care facilities (Coleman, 2005). The CDA (2005) has stressed the importance of optimal oral health and the methods necessary to maintain such health. In order to maintain health, the CDA has recommended that oral hygiene instruction be targeted to the individual caring for himself/herself as well as to those who are caring for the dependent, whether at home or in a long-term care facility.

**Tooth Loss**

A senior’s ability to ingest food is directly related to the number of teeth present in the mouth and to the mouth’s ability to perform the primary function of preliminary digestion: the mastication of food. Tooth loss, which has an impact on one’s ability to masticate food, is usually a result of periodontal disease (Matear, 1999). Hutton, Feine, and Morais (2002) conducted a study comparing the incidence of periodontal disease and tooth loss among Canadian and American populations. The study reported that 50% of Canadian adults aged 55 years or older had periodontal disease. The study also revealed that 15% of American adults aged 50-64 years and 33.1% of those aged 65 years or older had lost all of their natural dentition, a condition known as edentulism. The prevalence of edentulism in this age group in the United States has been noted as being comparable to similarly aged individuals in various regions of Canada (Hutton et al.).
The ability to chew a variety of foods with different textures and nutritional values is the principal benefit provided by teeth. As tooth loss occurs, masticatory efficiency has been shown to decline (Hutton et al., 2002). With the progression of tooth loss, it is then natural for individuals to alter their dietary intake in order to compensate for the greater difficulty in eating certain foods. Research studies have provided strong evidence for an association between diminished masticatory function and the amount of fruits, vegetables, meats, and breads that individuals consume (Ritchie, Joshipura, Silliman, Miller, & Douglass, 2000; Walls, Steele, Sheiham, Marcenes, & Moynihan, 2000).

Ritchie et al. (2000) examined a sample of 563 adults aged 70 years or older living at home in rural and urban areas in the United States. Baseline data included information regarding the subjects’ health status, measurements of height and weight, functional status, physical activity, disease diagnosis, lifestyle behaviours, and cognitive and affective status (Ritchie et al.). A gerodontist (dentist specializing in the care of the elderly) conducted an oral exam on each participant and assessed the number and location of teeth present in the oral cavity, number of missing teeth, periodontal status, presence of oral lesions, periodontal attachment loss, recession, and gingival bleeding (Ritchie et al.). One year later, the subjects were reassessed using the same criteria. Over the 1-year period, one third of the women lost 4% or more of their previous total body weight, while the men lost 6% or more of their total body weight (Ritchie et al.). Thirty-six percent of the subjects were edentulous, and three quarters of the subjects wore complete dentures. Those who wore complete dentures or who were edentulous were
more likely to complain of difficulties chewing and oral pain than those with natural dentition (Ritchie et al.).

Many older adults who wear dentures do not replace poorly fitting dentures. Lack of adequately fitting dentures may further contribute to difficulty chewing and diminished intake of foods, which results in significant weight loss (Ritchie et al., 2000). Among the individuals who maintained most of their natural dentition, who had increased numbers of posterior teeth, who had increased numbers of functional units, and larger chewing surfaces, it appeared that they were at a slightly lower risk for significant weight loss (Ritchie et al.). The presence of opposing teeth (functional units), the number of posterior teeth, and larger chewing surface all appeared to decrease the risk of significant weight loss (Ritchie et al.).

Masticatory efficiency declines as the loss of teeth progresses. As a result, dietary intake is modified in order to compensate for the difficulties encountered when eating various foods (Hutton et al., 2002). Furthermore, edentulous individuals may lack the adequate nutrient intake necessary to maintain general overall health. The research findings have suggested that poor dentate status may be an important risk factor for significant weight loss among community dwelling elderly (Hutton et al.; Ritchie et al., 2000; Walls et al., 2000).

Walls et al. (2000) reported that older adults with missing teeth had difficulty eating meat, fresh fruit, vegetables, and nuts. Impaired mastication and oral health problems have also been associated with lower fiber intake (Sheiham et al., 2001; Walls et al., 2000). Likewise, Sheiham et al. found that fiber intake among older adults was directly associated to the number of teeth present in the oral cavity. High fiber diets have
been associated with a decreased risk of cardiovascular disease and certain types of cancer; as well they are important for intestinal health.

Bailey, Ledikwe, Smiciklas-Wright, Mitchell, and Jenson. (2004) reported that lower intakes of vitamins A, E, and C have been associated with tooth loss and poor oral health. Sheiham et al. (2001) also reported that elderly dentate individuals demonstrated better nutrient profiles of calcium, non-heme iron, pantothenic acid, and vitamins C and E than individuals with fewer teeth. Among the individuals with fewer teeth, the nutrient intake of folacin, carotenes, and ascorbic acid were found to be significantly lower (Sheiham et al.).

It has been recognized that physical function impairment is associated with poor oral health in older individuals. One medical study showed that 70% of patients in long-term care facilities had unacceptable levels of oral health (CDHA, 2001). Mojan, Budtz-Jorgensen, and Rapin (1999) found that in elderly institutionalized patients with severe functional impairment, compromised oral function was associated with a lower body mass index and serum albumin concentration, two recognized markers of malnutrition. Similarly, Krall, Hayes, and Garcia (1998) observed that, as impairment of natural dentition increased, intake of food sources such as protein, fiber, vitamins, and minerals declined.

Inadequate nutrition can lead to additional systemic health problems (Hutton et al., 2002). It is possible that edentulous patients with poor nutrition may be at greater risk for a variety of systemic diseases. For example, Reavley and Holt (cited in Hutton et al.) revealed that individuals with low consumption of vitamin A were known to be at greater risk for various forms of cancer, heart disease, and rheumatoid arthritis. As well, they
revealed that a low intake of vitamin E was also associated with various cancers, heart
disease, and Parkinson's disease. Furthermore, vitamin C consumption below
recommended levels could lead to reduced immune system function and greater risks of
cardiovascular disease, myocardial infarction, and hypertension. Aside from these effects,
Trembly (cited in Hutton et al., 2002) found that increases in fat and cholesterol have
been associated with obesity and diabetes mellitus, which predispose the individual to a
series of cardiac conditions. Hutton et al. noted that elderly individuals with a significant
loss of muscle mass and strength had a lower intake of protein, which could further
increase their frailty.

Hamasha, Hand, and Levy (1998) found significant differences between
edentulous and dentate individuals with respect to rates of vascular disease, heart failure,
heart disease, and joint disease. Hamasha et al. found that edentulous subjects
demonstrated a greater prevalence of each of these illnesses. On the basis of these and
previous studies mentioned, there is definite reason to be concerned that tooth loss and
subsequent changes in diet could increase the incidence of disease among elderly
individuals.

In most cases, early detection of disease is crucial to saving lives. A thorough oral
examination can detect signs of nutritional deficiencies as well as a number of maladies
including microbial infections, immune disorders, injuries, and oral cancer.

In summary, edentulous individuals reported significantly more chewing
difficulties than dentate individuals (Hutton et al., 2002). As a result, the edentulous
individuals altered their diet. A lower intake of fruits, vegetables, and meats which are
regarded as major sources of vitamins, minerals, and protein became difficult to chew
Consequently, a tendency to favour softer, more processed foods developed. Nutritional deficiencies in turn could ultimately result in an increased incidence of various health disorders.

**Xerostomia**

One of the most uncomfortable oral health disorders that elderly individuals experience is salivary gland dysfunction, or xerostomia. Xerostomia, or dry mouth, is a condition reported in approximately 30% of the population (Peterson & Yamamoto, 2005). Xerostomia can result in partial or complete loss of salivary production. The dysfunction of the salivary glands can be attributable to age, medication, or a combination of both (Spence, 1995).

Drug-induced xerostomia is most common in elderly individuals because of the high prevalence of multimedication therapies. “The drugs most commonly responsible for dry mouth are tricyclic antidepressants, antipsychotics, atropinics, beta blockers and antihistamines, thus the complaint of dry mouth is particularly frequent in patients treated for hypertension, psychiatric or urinary problems” (Peterson & Yamamoto, 2005, p. 85).

The reduction in saliva production has an impact on the oral cavity. One of the primary functions of saliva is the introduction of enzymes into food in order to begin the digestion process. Enzymes present in saliva begin the breakdown of complex carbohydrates and proteins. Without the preliminary breakdown of food by saliva, the stomach and digestive tract are left to complete the digestion process on their own. This reduction of preliminary digestion can result in masticatory difficulties, with consequent digestive ailments and weight loss. Less saliva results in less preliminary digestion and causes difficulties with the breakdown of food in the oral cavity (Shepherd, 2002).
Decreased saliva also results in an increased rate of dental decay (Darby & Walsh, 2003). Without the moisture and therapeutic benefits of saliva, the structures surrounding and supporting the teeth are readily susceptible to bacterial invasion and dental decay (Darby & Walsh). Saliva serves as a buffer to neutralize acid on the teeth and remineralize dental enamel. Without this effect, dental enamel tends to demineralize at an accelerated rate, which then results in dental decay (Daniel & Harfst, 2004).

Furthermore, changes in the degree of lubrication in the mouth can affect the ease of speaking, efficiency in chewing, swallowing, and taste perception. Individuals with xerostomia may also experience mucosal yeast infections, such as candidiasis, and considerable oral discomfort (Coleman, 2005). Regardless of the apparent cause of xerostomia, a comprehensive oral hygiene program should be developed for each patient who experiences dry mouth. The type of program should be dependent upon the severity of oral dryness, the number and condition of natural teeth present, the type and location of artificial removable teeth, and the patient's physical and mental ability to care for his/her own oral hygiene. A preventive program for elderly individuals with xerostomia often includes more frequent dental examinations and professional dental cleanings, daily use of prescriptive fluorides, modifications in dietary intake, and the use of artificial lubricating agents (Coleman). Comprehensive oral hygiene should be considered as a part of the caregiver's responsibilities when caring for these dependent individuals.

**Gaps in Health Care Education**

As members of the health care profession, caregivers are educated and aware of the responsibilities required to help improve the oral health of elderly individuals. McNally (2005) found that elderly Canadians visit the dentist less frequently than any
other adult segment of the population. This is of particular concern given that as people age, they become more susceptible to oral and dental diseases (Lamster, 2004). Elderly individuals in long-term care facilities are at considerable risk of dental and oral diseases, yet they experience greater challenges to receiving appropriate oral care than their independent counterparts (Wyatt, 2002). It is recommended by McNally and Lyons (2004) that upon admittance into a long-term care facility, elderly individuals have initial oral examinations conducted to evaluate their current oral health status and their ability to perform personal oral hygiene. Unfortunately, the education that most caregivers in long-term care facilities receive in the area of oral health assessment is inconsistent and not standardized (Coleman, 2004; McNally & Lyons; Reynolds, 1997; Smith, 2004).

In Ontario there is a shortage of qualified health care providers able to care for elderly residents of long-term care facilities (Ontario Nurses’ Association, 2006). The Ontario Nurses’ Association estimated that between 15,000 and 30,000 registered nurses will retire by 2008, leaving a large gap in the health care system. As nurses’ workloads increase, so too will patients’ suffering. Ontario nurses are working harder, caring for more individuals, and spending less time daily with each patient due to limited staff and insufficient government funding (Smith, 2004). In turn, funding and staff shortages affect the standards of care provided to the patients. The Canadian Union of Public Employees (CUPE) have recommended that nursing staff spend approximately 3.5 hours daily with each patient in a long-term care facility. Instead, it has been noted by the Ministry of Health that most care staff in long-term care facilities spend between 2.27 and 2.3 hours of care with each patient (Smith).
Today, the seniors in long-term care facilities are more fragile and have increasingly more complex health issues than in the past (Smith, 2004). Understanding and being able to provide the greatest care for these individuals requires additional educational instruction in gerontology (Smith). Smith has noted that the educational standards for health care aides and personal support workers in long-term care facilities in Ontario are insufficient. Smith has recommended that the Ministry of Colleges and Universities in Ontario expand their geriatric health care curriculum.

In the United States, Coleman (2005) has also reported there is insufficient geriatric health care education among nurses. She has reported that less than 1% of nurses in the United States are certified in geriatric nursing, and only 3% of advanced practice nurses specialize in the care of elderly patients. In 1999, according to the American Nurses Credentialing Center, approximately 1800 nurses in the United States were certified as geriatric nurse practitioners, and only about 500 were certified as gerontology clinical nurse specialists (Coleman). When compared to the number of certified nurses in the United States, this represents a very small sample.

In another American study, Coleman (2004) found that only 23% of baccalaureate nursing programs had a required course in geriatric nursing. Lack of sufficient geriatric health care education in colleges and universities poses a great challenge to the future care of elderly residents in North America.

A study conducted by the University of British Columbia evaluated the oral health programs of four long-term care facilities in the province of British Columbia in order to identify the features essential for the implementation of a successful oral health program. The researchers found that the health care providers experienced difficulty implementing
oral hygiene into their daily routine due to time constraints (Thomson, 1998). In addition, the researchers found that lack of adequate oral health education for health care aides and resistance to oral care by some residents contributed to the minimal attention given to oral hygiene (Thomson, 1998). Furthermore, among the four locations studied, Thomson noted that the facilities failed to provide on-site dental treatment, which is a provincial requirement. The researchers concluded that oral hygiene, diagnostic assessment, and dental treatment are fundamental requirements for the implementation of a successful oral health program (H. Thomson, 1998).

At Dalhousie University, Faculty of Dentistry, McNally and Lyons (2004) conducted a Health Service Evaluation that examined the present state of the oral health care delivery system for seniors living in the province of Nova Scotia. They addressed many important oral health care issues and provided recommendations for the care staff and residents for improving oral health care. Overall, McNally and Lyons stressed that in order to improve the oral health of seniors, oral health must be explicitly recognized as an essential component of overall health and quality of life. They also stressed that the individuals responsible for providing oral care to seniors must have relevant geriatric education in order to meet the demands and needs of the aging population.

Upon investigation, McNally and Lyons (2004) found that students in North American oral health professional programs received marginal geriatric dental education due to a lack of comprehensive teaching standards and procedures. Accreditation and licensing requirements provided little guidance in establishing meaningful standards of competency for educators (McNally & Lyons). They have recommended that in order to ensure the competency of students in health professional programs, extensive clinical
experience working with seniors who have a broad range of health issues should be provided. The fact that the aging population presents itself with complex health histories requiring unique and specific oral health interventions reinforces the need for geriatric oral health education to be recognized as a formal area of specialization within health care educational programs (McNally & Lyons).

Furthermore, McNally and Lyons (2004) discovered a lack of oral health promotion programs within long-term care facilities. Dentists, dental hygienists, dental and dental hygiene students, and dental and dental hygiene associations provide information on seniors’ oral health issues and oral health education seminars predominantly upon request (McNally & Lyons). As oral health advocates, these health care professionals should assume a more active role in encouraging health promotional activities, especially to those populations known to experience challenges accessing appropriate oral health care.

McNally and Lyons (2004) conducted a Canadian review of the oral health programs directed at caregivers providing personal care and discovered that inadequate levels of oral health care education and a lack of oral health promotion initiatives existed. Frequent oral health promotion programs provided within continuing care settings have proven to be the most favourable method to develop positive oral health attitudes and behaviours in both caregivers and seniors receiving care (McNally & Lyons). In an effort to improve the level of care and oral health of individuals residing in long-term care facilities, they have recommended that
• Accreditation standards for dental, dental hygiene and other health related programs must include explicit requirements to ensure education experiences to meet the oral health needs associated with the aging population
• Non-traditional models for delivering oral health care, such as the use of mobile dental clinics to accommodate care needs outside of the traditional office setting, must be included as regular education components for oral health care
• Geriatric dentistry must be recognized as a discreet area of specialization. Because the complexities of seniors’ oral health care often exceed the core competencies of undergraduate dental students, programs for geriatric dentistry must be developed to provide the appropriate leadership and expertise to care for this sector of the population
• Geriatric training, both didactic and clinical, must be integrated into programs for health care workers outside traditional dentistry. Relevant education programs include gerontology, nursing, continuing care assistance, medicine, pharmacy, population health, and health education and promotion
• Caregivers providing personal care must have access to adequate training opportunities to meet the special needs associated with geriatric oral health care. (p. 5)

Upon further investigation, they evaluated the availability and accessibility of dental care in long-term care facilities, identifying many challenges for appropriate oral health care. They included:
• There is no infrastructure to facilitate the continuity of dental care for seniors living in long-term care facilities
• Standardized oral health care policies and procedures do not exist in many long-term care facilities
• Geriatric dental training for nursing staff and personal caregivers is unavailable or inadequate

• Adequate clinic space and dental equipment is not available within long-term care facilities to facilitate onsite visits by dental professionals. (p. 8)

McNally and Lyons (2004) have noted that the lack of appropriate dental and oral health care received by the seniors in long-term care facilities is a result of overlooking and underestimating the specific needs of these individuals. Seniors themselves lack the awareness of the importance of regular oral health care and the impact it has on their general health and quality of life. There is a general belief among seniors that the mouth is separate from the rest of the body (McNally & Lyons). The supportive efforts of family, friends, community members, and health professionals have been recommended as a means to encourage seniors to access appropriate oral health care (McNally & Lyons). In addition, McNally and Lyons further recommended that educational resources and oral health promotion programs in long-term care facilities offered by dental hygienists be employed as a valuable source of raising awareness and developing oral health care skills for nursing staff, family members, and seniors.

In 2005, representatives from the Canadian Dental Association, provincial dental associations, and dental regulatory bodies gathered together to discuss the importance of the oral health of seniors in Canada. Participants were asked to reflect and respond to the question What will seniors' oral health care in Canada look like in 2020? (Thompson, 2005, p. 3). The responses provided an optimistic view that positive changes and improvements with respect to the oral health of seniors can and will be made by 2020. As a collective group, the researchers envisioned that dentists, dental hygienists, and dental
assistants will receive more education in the area of geriatric dentistry. In addition, they believed oral health care will be a primary component in nursing education, long-term care facilities will provide residents with initial entry dental examinations and periodic follow-up exams, a mandate will be made within long-term care facilities for daily oral hygiene care maintenance, and health care providers will work collaboratively with other health care professionals in order to monitor the health of seniors nationally (Thompson).

The responses given were based on the current situation evident within dental/dental hygiene education programs and long-term care facilities. For example, Thompson noted that the current issues related to the oral health care of seniors in Canada were as follows:

- There are no uniform requirements for geriatric oral health care education at Canadian universities that are mandated by accreditation.
- There are no Chairs of Geriatric Dentistry in university dental schools.
- There is a need for centres of expertise in seniors’ oral health care dentistry.
- Much of current money for dentistry goes to pediatric and orthodontics.
- Continuing education courses in oral health care for seniors tend to be more general, focus on needs and don’t tend to provide “hands-on” education regarding working with seniors in long-term care facilities.
- There is a need to increase the education and awareness of other health professionals regarding the importance of seniors’ oral health care. (p. 14)

Frenkel, Harvey, and Newcombe (2001) also found that in Denmark, few nursing curricula include instruction in oral health care. Frenkel et al. indicated that nurses were commonly unaware of the importance of oral health care within holistic care and are unable to either carry out oral health care or educate auxiliary staff to do so. Practical
hands-on oral health educational sessions for nurses and auxiliary care staff have frequently been recommended as a means of improving oral health care for functionally dependent clients (Frenkel et al.).

As health care professionals, caregivers need to work toward an integrated health care environment that can effectively provide for the oral health needs of seniors. Many studies (Coleman, 2005; Frenkel et al., 2001; McNally & Lyons, 2004; Reynolds, 1997; Thompson, 2005; H. Thomson, 1998) have concluded that increased educational efforts can begin in the schools of the respective health care professions. Increased collaboration among these disciplines may lead to a more effective approach that can positively affect the oral health of the elderly.

**Oral Health Education Programs**

Optimal oral hygiene has been reported to be an important component of overall health, well-being, and quality of life for institutionalized elderly (MacEntee, 2000). MacEntee reported that poor oral hygiene has been detected in institutionalized elderly individuals. The level of knowledge of oral hygiene procedures among caregivers is insufficient to properly service this growing portion of the population (Vanobbergen & De Visschere, 2005). A lack of oral health knowledge is a significant challenge to improving standards in the practice of optimal oral care (McNally & Lyons, 2004). Although a lack of oral health knowledge has been indicated as a significant challenge to improving oral health standards, MacEntee found that caregivers in British Columbia were willing to obtain professional education in order to improve the practice of oral care for their patients.
In 1980, Sandburg (cited in Paulsson, Fridlund, Holmen, Hyg, & Nederfors, 1998) conducted a study and reported that despite a heavy workload, caregivers expressed a need to help solve the oral health problems of residents in hospitals and long-term care facilities. It was presumed that caregivers had an understanding of which oral health care procedures were optimal for individual patients and that it would be possible, by means of a continuing education program, to maintain and even improve the oral health of these patients by including simple procedures in their regular daily routines. This, coupled with good personal oral hygiene habits, was regarded as a promising basis for future improvements in oral health care procedures in nursing institutions. Interestingly, more than 25 years later, we continue to battle with similar oral health care concerns regarding the elderly.

Health professionals in Canada have been concerned with the oral health care of Canada’s population as a whole (Locker & Matear, 2000; McNally & Lyons, 2004; Thompson, 2005; H. Thomson, 1998; Wyatt, 2002). Unfortunately, strategies and funding have not yet supported the initiatives addressing the growing needs of the elderly population (McNally & Lyons). The oral health needs of older adults and the potentially serious consequences of oral disease in the elderly present major challenges, not only to members of the dental profession but to all health care professionals and the general community (Matear, 2000). Researchers have emphasized the importance of oral hygiene instruction in order to improve the oral health and quality of life among the elderly (Locker & Matear; McNally & Lyons; Thompson; H. Thomson; Wyatt). These researchers have stressed that the single greatest need among the institutionalized elderly is routine oral hygiene care. They have suggested that students in health care professions,
the caregivers of residents in long-term care facilities, and the residents themselves would benefit from specialized oral health education (Locker & Matear; McNally & Lyons; Thompson; Thomson; Wyatt).

Paulsson et al. (1998) conducted a study in Sweden that evaluated the clinical oral health outcomes of elderly residents after the caregivers had undergone an oral health education program taught by dental hygienists. The dental hygienists delivered a theoretical instruction session to the caregivers, followed by a practical demonstration of oral care procedures. The caregivers had an opportunity to apply the information learned in the practical session. Effective educational presentations should include active audience participation (Reynolds, 1997). Demonstrations followed by practical application are successful ways of maintaining the attention of the audience and ensuring that the learning objectives of the educational session are understood (Reynolds). The study by Paulsson et al. demonstrated that the education program had a positive impact on the oral health status of the elderly residents. This study constituted a promising platform for future collaboration between caregivers and dental professionals when establishing oral health programs for elderly persons in long-term care facilities.

Three years later, Paulsson, Soderfeldt, Nederfors, and Fridlund (2003) revisited the same long-term care facilities and reassessed the effect of the oral health education program. Paulsson et al. wanted to determine if the oral health education program introduced 3 years prior was still providing similar positive outcomes on the oral health status of the elderly residents. No additional education or health promotion activities had been provided to the caregivers in these long-term care facilities. The results of the study concluded that, although the positive effect of the oral health education program was
initially small, it gained in significance, and 3 years after the initial educational intervention positive results were again obtained. Based on these results, Paulsson et al. provided evidence that supported the fact that there is value in the effort to improve knowledge through education. This study has provided further evidence to support the claim that an effective education program can improve the knowledge of oral health of caregivers and can improve the oral health status of elderly residents worldwide.

Frenkel et al. (2001) selected a sample of nursing homes in Denmark to participate in a study that evaluated whether oral health care education for caregivers in long-term care facilities would achieve improvements in the oral health status of residents. The aim of the health education program was to reduce the plaque levels of residents by raising the awareness, knowledge, and skills in oral health care of the caregivers (Frenkel et al.). The oral health care education session was conducted by a health promoter who had a diploma in Dental Health Education, an Adult Education Teaching Certificate, and a certificate in Health Education. The education program lasted approximately 1 hour and covered the role of plaque in oral disease, demonstrations of cleaning techniques for dentures and natural teeth, and practice of these techniques by caregivers using a mannequin head, models, and other teaching aids. Toothbrushes were distributed to all residents in an effort to encourage oral hygiene activity (Frenkel et al.). Residents were examined at baseline and again at 1 month and 6 months after completion of the oral health care education program. The baseline oral health assessments concluded that the residents had poor oral hygiene (Frenkel et al.).

Following the staff’s education program, a significant improvement in the oral health of the residents was clearly apparent (Frenkel et al., 2001). The improvements
achieved suggested that the oral health care program and the distribution of toothbrushes to all residents enabled caregivers to clean dentures and teeth where previously they lacked the resources to do so. Frenkel et al. noted that after the oral health care education program, caregivers indicated that “they thought more about the importance of oral care, felt more confident in performing it, and believed they were helping prevent oral problems for clients” (p. 295). For a relatively modest cost to the oral health care education provider, clients in long-term care facilities would benefit from significant reductions in plaque and associated mucosal and gingival inflammation. Since the effects of the intervention have been largely sustained for 6 months, an annual education program in order to maintain the awareness and skills of caregivers is strongly recommended. In facilities that experience a higher turnover of staff, more frequent education programs will be necessary. Overall, this study clearly demonstrated that oral health care education can improve caregivers’ knowledge and performance of oral health care for elderly residents.

Nicol et al. (2005) conducted a study to evaluate the effectiveness of a comprehensive oral health education program for caregivers of institutionalized elderly residents. Seventy-eight residents of five long-term care facilities in Britain were enrolled and underwent baseline oral health evaluations. Staff caring for residents in three of the five facilities received a specialized education program in oral care. The remaining two facilities did not receive the oral health education program until the study was completed and the results were analyzed.

A dentist conducted the education program with the assistance of a dental hygienist. An introductory 30-minute lecture describing the mouth in health and disease
was followed by a discussion on basic oral care procedures. The education program concluded with a practical demonstration in toothbrushing and denture care. In order to provide clinical demonstrations of the relevance of oral care, local patients with common oral conditions were encouraged to attend the education program to discuss their oral problems with the caregivers. The oral health status of the residents at all five facilities was reevaluated after periods of 3 and 9 months.

Nicol et al. (2005) noted that the results obtained after the education program were encouraging, demonstrating some statistically significant positive changes in oral care procedures and health gains. The oral health education program provided as part of this study was very well received. Management and senior care staff were enthusiastic about participating in the study, recognizing the possibilities for combining professional development together with the potential for improving patient care (Nicol et al.).

According to Vanobbergen and De Visschere (2005), long-term care facility directors who are interactive and supportive of their staff have a positive impact on the oral hygiene procedures performed in the facility, suggesting that it is important to include management from the initiation of any oral hygiene strategy. This is in agreement with the study conducted by Nitsche and Hopfenmuller (cited in Vanobbergen & De Visschere), who interviewed the management teams of 85 institutions in West Berlin and concluded that the informing and motivation of the management and nursing staff were the first step towards improving the oral and dental care of elderly residents.

Canadian studies conducted by McNally and Lyons (2004) and Thompson (2005) also concluded that ongoing continuing education is necessary for professional health care providers in the area of geriatric dentistry and that long-term care facility
administrators need to ensure that residents are receiving daily oral care procedures in addition to initial and follow-up dental examinations. With continuous efforts by all health care professions, the overall health of the elderly population can improve.

It is important to note that Johnson and Lange (1999) also indicated positive results in the provision of oral care procedures by caregivers when the managerial team of long-term care facilities played an active role in the introduction of an educational oral health program. The studies conducted by Johnson and Lange indicated that the caregivers preferred that the oral health education programs be conducted by dental professionals rather than other educational and/or program administrators.

Although many positive outcomes have been documented in the literature, there are some contradicting conclusions regarding the achievements of these oral health education programs in improving patient oral health. Schou, Wight, Clemson, Douglas, and Clark (1989) tested an oral health promotion program engaging both caregivers and residents in four different elderly institutions in Scotland. The four institutions were randomly allocated to one of the four programs. The four programs included: (a) active involvement of residents only, (b) active involvement of caregivers only, (c) active involvement of both caregivers and residents, and (d) control group with no educational program.

Three dental hygienists together with the caregivers of the institutions conducted the education program. The program consisted of three 1-hour sessions directed at the caregivers and the residents. A semistructured interview and a clinical examination were conducted immediately before and 2 months after the termination of the program. The overall aim of the study was to improve the oral hygiene habits of the residents through
instruction in denture care. An educational session in denture care would theoretically lead to a reduction in bacterial plaque levels. This program, however, failed to improve the oral health condition of residents. Even after instructions in denture brushing techniques were provided, the elderly residents were not able to brush their dentures to an extent where it significantly reduced the amount of bacterial plaque accumulation (Schou et al., 1989).

The dental hygienists conducting the study felt that less than half of the participants in each study were capable of understanding the dental health education messages. According to the dental hygienists, a large proportion of the participants were not mentally or physically stable, which had an overall negative impact on the results of the study (Schou et al., 1989).

Several oral health education programs have been presented to health care professionals with the intention that such oral health education would lead to better instruction of patients regarding personal oral hygiene. There are contradicting conclusions as to the success of these programs in improving patient oral health or the professionals’ level of knowledge. However, after a systematic review of the effectiveness of dental health education by Paulsson et al. (2003), an overall positive effect on knowledge levels and oral health of elderly residents has been demonstrated.

Long-term care facilities need to examine their current oral health care programs to ensure that the oral health needs of their residents are being met. These facilities must investigate which health care providers are primarily responsible for the maintenance of oral health care needs of the residents, what services they are currently performing, what level of expertise they have for these duties, and what continuing education would enable
these health care providers to perform their duties more effectively in order to improve
the health status of their residents.

**Health Belief Model**

The dental hygienist is a licensed primary health care professional, oral health
educator, and clinician who provides preventive, educational, and therapeutic services
supporting total health for the control of oral diseases and the promotion of oral health
(Wilkins, 2005). Health promotion can be defined as “the process of enabling people to
increase control of and improve their health through self-care, mutual aid, and the
creation of healthy environments” (Wilkins, p. 4).

The span of dental hygiene practice is vast. Dental hygiene services are available
for general and specialty dental practices, research programs, professional education,
community health, hospital and institutional resident care, federal programs, the armed
forces, and dental product promotion (Wilkins, 2005). The dental hygienist is the primary
care provider of preventive services. Preventive services are the methods employed by
the clinician and/or the patient to promote and maintain oral health. As a specialist in oral
health care, the dental hygienist is involved in all levels of prevention: primary,
secondary, and tertiary.

Primary prevention is aimed at achieving optimal health and increasing resistance
to disease (Galloway, 2003). Primary preventive oral health measures are carried out so
that oral disease does not occur. An example of primary prevention would include oral
health promotion programs in elementary schools and long-term care facilities.

Secondary prevention is aimed toward early treatment and disability limitation
(Galloway, 2003). Secondary prevention involves the treatment of early oral disease to
prevent further progress of potentially irreversible conditions that, if not arrested, can lead to rehabilitative treatment or eventual loss of teeth (Wilkins, 2005). An example of secondary prevention is the removal of bacterial plaque in order to prevent the progression of early periodontal disease.

Tertiary prevention is the management of patients when disease and illness are present (Galloway, 2003). Tertiary prevention uses methods to replace lost oral tissue and to rehabilitate the oral cavity to a level where function is as near normal as possible (Wilkins, 2005). An example of tertiary prevention is the replacement of a missing tooth as a result of advanced periodontal disease.

The Health Belief Model (HBM) was developed in the 1950s by a group of social psychologists in order to examine why an individual would or would not participate in health promoting behaviours (Darby & Walsh, 2003). The HBM theorizes that individuals will take preventive health action if they believe that:

- They are susceptible to contracting a disease or illness.
- The disease or illness has serious medical consequences if left untreated.
- They can take preventive actions that will be beneficial in reducing either the severity or susceptibility of the disease or illness.
- The perceived benefits of the interventions outweigh the perceived challenges of the interventions (e.g., time, cost to the individual, pain, etc.) (Darby & Walsh, 2003; Galloway, 2003).

One of the most accepted variables of this model is that educational attainment has a direct influence on preventive health behaviour, thus increasing the likelihood of utilizing preventive health services and/or taking other preventive health actions. The
more educated an individual is in the area of oral health care, the more likely that the individual will follow recommended oral health care instructions/recommendations (Darby & Walsh, 2003). For the purpose of this research, the caregivers participating in the study were provided with oral health strategies that were designed to enhance their knowledge of oral health care for their residents and become more efficient when providing these daily services. With the HBM, participation in positive health behaviours may be a major contributor for decreasing illness and disease and enhancing the health of individuals. In this study, the education intervention took place in the LTC-A.

According to the HBM, understanding an individual's beliefs regarding health is an essential component for identifying the underlying determinants for participation in health promoting behaviours (Darby & Walsh, 2003). Creating opportunities for the caregivers to be exposed to the specialized oral health subject matter instructed by dental professionals provides the caregivers with greater opportunities to acquire the necessary knowledge and skills.

Knowledge is inseparable from practice (Stein, 1998). In this study, the educational intervention provided the caregivers with the opportunity to acquire knowledge through one-on-one oral health discussions and apply practical skills through practice sessions in order to become proficient in providing oral care for their residents. For the caregivers, the learning process was transferred from the traditional classroom setting to the realm of practice. A simple and direct approach will help satisfy learning objectives and enhance the retention of subject matter. The more practical, realistic, and patient specific the components of oral health instruction are, the more effective the
outcomes will be in terms of treatment and prevention of illness or disease (Wilkins, 2005).

In this study, a dental hygienist accompanied the caregivers during their daily duties and evaluated their delivery of oral health to each resident. Each participating resident had an initial oral health examination performed at the commencement of the study. The dental hygienist proposed strategies that were to be implemented in order to help minimize the caregivers' daily workload and manage obstacles encountered when providing oral care. Three months after the initial oral health examinations, the dental hygienist followed-up with the caregivers in an interview process in order to determine if oral health care improvements were achieved in both the areas of oral disease prevention and time management.

In the LTC-B, the dental hygienist reviewed the oral hygiene procedures with the participating elderly residents and educated them with respect to the maintenance of personal oral hygiene. The dental hygienist initially evaluated the oral health of the participating residents and their current oral hygiene practices. The dental hygienist implemented new oral health practices when necessary. A final review of the oral health status and practices of the residents was conducted 3 months after the commencement of the study in order to determine if improved oral health was evident.

Social interaction is a critical component of learning (Kearsley, 2005). During the education intervention, the caregivers and the residents were given an additional opportunity to discuss the problems they encountered on a daily basis when providing oral care or performing oral care respectively. Learners were involved in an interactive setting, allowing them to acquire various skills and behaviours necessary to be proficient
in oral hygiene. Thus, the HBM is the learning theory that was best suited to this research study.

**Summary**

Oral health is an important aspect of general health. There are links between oral disorders and systemic health conditions (CDHA & Lavigne, 2004a, 2004b). Optimal oral health is important for many aspects of daily living, such as eating, talking, and socializing, and for increased self-esteem.

As change agents and client advocates, caregivers must identify barriers to change, realign priorities, and become pathfinders for elders whose oral health needs have become a great concern in the long-term care system. Caregivers, health care administrators, dental professionals, and governments must openly communicate the importance of oral health care as an institutional value. Caregivers must ensure that oral health care has equal importance with other personal care activities and that they become knowledgeable about the institutional challenges that give rise to its inadequacy. Lack of specialized geriatric oral health education has been noted as the main adversary to maintaining optimal oral health and oral hygiene for residents in long-term care facilities (McNally & Lyons, 2004). By inadequately providing oral health practices to those institutionalized individuals whose health and well-being could be improved through improved health standards, we are contributing to a host of other potentially life-threatening problems that could be prevented.

Dental diseases for the most part are preventable through safe, effective, and simple means. Through additional education and health promotion activities, and collaboration among health care professionals, dental disease could be prevented.
CHAPTER THREE: METHODOLOGY AND RESEARCH DESIGN

This chapter discusses the materials and methods that were utilized for the purpose of the research study. The research design, selection of participants, instrumentation, field procedures, data collection and recording, data analysis and processing, methodological assumptions and limitations, and ethical considerations are discussed.

Research Design and Method

This study was based on a generic qualitative research methodology. Qualitative research is intended to gain an in-depth understanding of human behaviour and study the motives that drive it. Qualitative research focuses on exploring and understanding a central phenomenon (Creswell, 2002). To learn about this central phenomenon, the researcher interviewed and observed participants in their natural setting in order to understand their experiences. Ethics approval was received from the Brock University Research Ethics Board (see Appendix B). Once the data were collected, the researcher interpreted the information and developed themes and meanings, drawing on personal reflections and past research. Using a generic qualitative research methodology, data collection was comprised of semistructured interviews, field observations, and documentation. Data was collected through caregiver interviews, field observations, and documentation. The data was transcribed and analyzed by hand. The data was coded and then the codes were collapsed in order to develop themes. Resident themes included oral hygiene practices, health status of residents, resources utilized, accessibility of dental care, and financial constraints. Caregiver themes included time, resources, oral hygiene practices, staff, oral hygiene knowledge, oral hygiene education, and inconsistencies in
oral hygiene practices. The themes helped to identify the central phenomenon. In order to validate the data, member checking was conducted.

This research study examined the oral health status of seniors living in the two long-term care facilities located in Ontario. For the purpose of this research study, the long-term care facilities were referred to as LTC-A and LTC-B. The seniors that participated in the research study were between 65 and 93 years of age.

At LTC-A, the principal investigator evaluated the oral health of seniors who are dependent on caregivers to provide them with daily oral care. The oral health evaluations were carried out by a principal investigator who is a registered dental hygienist. The principal investigator accompanied each caregiver while she provided oral care for each participating resident. Each caregiver was asked specific semistructured interview questions, and her behaviour was observed. The principal investigator observed the caregiver's brushing technique, the resources used, the challenges encountered, the resident's co-operation, and the resident's response to oral care.

The principal investigator examined and interpreted the data collected in order to identify challenges experienced by the caregivers when providing oral care. Based on the findings, the implementation of certain oral health practices that may help minimize challenges regularly experienced by the caregivers were recommended. The implementation of new oral hygiene practices is also intended to help improve the oral health of the resident and minimize the amount of inflammation and dental plaque present. Three months after the initial assessment, the principal investigator returned to the LTC-A and repeated the interview process and the evaluations in an effort to
determine if improvements were made in the oral health status of seniors and the delivery of quality care provided by the caregivers.

At LTC-B, the principal investigator evaluated the oral health status of the residents who were capable of providing their own personal oral care. The principal investigator interviewed each resident and observed his or her oral hygiene behaviour. The principal investigator collected and interpreted the data gathered. The principal investigator recommended new oral hygiene practices in order to help minimize the challenges experienced by the residents when performing daily oral care. The implementation of new oral hygiene practices is also intended to help improve the oral health of the resident, minimizing the amount of inflammation and dental plaque present. Three months after the initial oral health assessment, the principal investigator returned and reevaluated the oral health of the participating residents. The principal investigator determined if improvements in oral health had been achieved through the implementation of new oral health practices recommended by the principal investigator 3 months prior. Last, the principal investigator reviewed the oral care section in the textbook used by the personal support workers during their education and discussed the oral care practices and curriculum with personal support worker instructors from a private career college.

Selection of Participants

Presently, the average population of Ontario is 12,393,000 (Ontario Ministry of Finance, 2005). According to the Ontario Ministry of Finance, persons aged 65 years or older comprise 12.8% of the population of Ontario. The participants in this study were a sample of convenience. This study focused on members of the population that reside in long-term care facilities and that were over the age of 65 years.
Individuals aged 65 years or older residing in long-term care facilities are more likely to become ill, experience weight loss, or die as a result of bacterial infections caused from various microorganisms located in the oral cavity (Nicol et al., 2005). Pathogenic microorganisms accumulate because of poor oral hygiene coupled with changes in an individual's defense mechanism (Nicol et al.). An increased exposure to such microorganisms could result in an increased incidence of systemic infections. Nicol et al. have stressed that preventive programs designed to limit oral infections have the ability to decrease hospital admissions of elderly occupants of long-term care facilities and lower mortality rates related to systemic bacterial infections.

The Directors of Care at LTC-A and LTC-B were contacted and offered assessments of the current oral health status of their residents and their oral health practices. The current oral hygiene and disease prevention practices conducted by the caregivers at LTC-A on functionally dependent residents were examined. The current oral care practices of independent residents of LTC-B were examined. The residents in both facilities were given initial oral health examinations in order to identify their current oral health status. A sample of 4 caregivers and 10 elderly residents served as the participants of the study. A cohort of participants was divided into two groups. Four caregivers and 4 elderly residents from LTC-A served as the dependent group. Six elderly residents from the LTC-A and LTC-B served as the participants in the independent group. The number of independent residents from both residences was less than anticipated; therefore, the data collected when assessing the oral health of the independent residents were collapsed from the two long-term care facilities.
The challenges that are experienced by both parties when performing oral care were examined, and new oral health strategies were established and implemented in order to help reduce future obstacles and improve the overall oral health of the residents.

Inclusion criteria for the caregivers at LTC-A dictated that the caregivers must consent to be available for oral care practice assessments at the onset of the study and 3 months after the implementation of new oral health practices. Inclusion criteria for the elderly residents at LTC-A and LTC-B dictated that the residents must be available for oral examinations at the onset of the study and 3 months after the implementation of new oral health practices. Those receiving oral examinations must be residents of the long-term care facilities under investigation. The participants must be co-operative and able to provide informed consent. Some residents were not able to provide informed consent due to mental or physical impairments. In such cases a legal guardian was required to provide informed consent on their behalf. Individuals who were unwilling to participate or who lacked co-operation and understanding were excluded.

The oral examinations were carried out by a principal investigator along with assistance from a dental hygiene instructor. Both individuals are registered dental hygienists and dental hygiene instructors at a dental hygiene college in Ontario. The Maintenance of Oral Health assessment form was used when examining the oral cavities of the residents (see Appendix C). The principal investigator conducted the oral assessments. In order to maintain infection control, the research assistant documented the findings reported by the principal investigator. The principal investigator is a registered dental hygienist who has over 7 years of clinical experience. The research assistant is also a registered dental hygienist who has over 25 years of clinical experience.
Long-Term Care Facilities: LTC-A

LTC-A is a long-term care facility that offers admittance to independent and dependent residents. LTC-A is part of the Retirement Real Estate Investment Trust (REIT) co-operation. The Retirement REIT is a publicly traded income trust that specializes in the provision of accommodation and health services to Canada’s growing population of senior citizens (Retirement Residences REIT, 2007).

LTC-A offers a wide range of services and amenities. These include 24-hour nursing supervision, private and semiprivate rooms, assisted living areas, lounges, housekeeping and linen services, recreational facilities, and a library. Residents who complain of oral pain and discomfort are seen by a dentist who visits the facility on an annual basis. LTC-A is able to accommodate over 100 residents. Currently, LTC-A accommodates both dependent and independent residents requiring routine nursing care. There are just under 100 staff members at LTC-A, with approximately half of these staff members in the nursing department. Typically, during an 8-hour day shift, a personal support worker is designated to each of the care floors where dependent residents reside. In addition, there are additional caregivers that work on all care floors to assist with overflow duties. During the evening shift, there are personal support workers that attend to the needs of the dependent residents. Throughout the day and evening shifts there are also designated personal support workers to care for the independent residents. LTC-A is a large facility that requires a large care staff in order to readily assists each resident.

LTC-A underwent staff changes when the initial commencement of the research study was to occur. The Director of Care who initially accepted the invitation to participate in the research study was no longer employed at the long-term care facility. A
new Director of Care was appointed approximately 1 month before the onset of the research study. At this time, the new Director of Care was contacted and the research study was newly presented to this individual, who was optimistic and eager to proceed with the research study. The new Director of Care is a registered nurse who expressed a great interest in the study and demonstrated a great passion regarding the improvement of and attention to the oral health concerns of the residents. This Director of Care clearly valued optimal oral health and vocalized its importance with respect to the general health and well-being of the seniors. She believed that a large group of residents and caregivers would be interested in participating in the research study. She requested the responsibility to introduce the program to the independent residents and caregivers at a weekly in-house meeting. As well, she contacted the guardians of the dependent residents, requesting their permission to allow their family members to participate. Approximately 2 weeks after the introduction of the study, the letters of participation and consent forms were collected. Unfortunately, there was a great disappointment regarding the number of individuals willing to participate in the study. Four independent residents, 4 dependent residents, and 4 caregivers agreed to partake in the study.

*Long-Term Care Facilities: LTC-B*

*LTC-B* is a seniors' residence offering a wide variety of services and facilities to their residents. In addition to basic assistance with bathing, grooming, toileting, and meal preparation, the residence is situated on a large property suitable for tranquil relaxation. The residence provides 12-hour registered nursing care during the day and personal support worker care 24 hours a day, 7 days a week. The residence is located within one
kilometer of a family dental practice. *LTC-B* has a group of volunteers that provide the seniors with transportation for their dental, medical, and daily appointments.

*LTC-B* is able to accommodate approximately 50 residents. The Director of Care was very positive and enthusiastic about the introduction of the oral care program. The Director of Care recommended that an information session be provided to the residents in order to determine if there was interest for the program at the facility. An initial interactive information session was provided to the residents describing the oral care study program. An oral care instructional video was presented to the residents, followed by an information session and question-and-answer period in order to inform them of the purpose of the study. Letters of consent and participation were delivered to the Director of Care to distribute as requested. The Director of Care distributed the letters to the interested residents. The residents were very receptive and initially demonstrated an interest in the study. Unfortunately, upon returning to collect the letters of consent and participation, many residents refused to commit to the 3-month study. Two independent residents enrolled in the study. These residents were 74 and 86 years of age and were under the care of a physician for a variety of medical conditions. Their medical histories included high blood pressure, elevated cholesterol levels, anemia, arthritis, and total joint replacements.

*Independent Residents, Dependent Residents, and Caregivers*

Diabetes, high blood pressure, kidney disorders, multiple sclerosis, psoriasis, arthritis, Alzheimer’s, vision problems, cognitive impairments, asthma, depression, and heart conditions were among the medical conditions that the independent residents possessed. The independent residents were between 65 and 80 years of age.
The dependent residents suffered from anxiety, high/low blood pressure, diabetes, dementia, heart problems, thyroid conditions, vision problems, Alzheimer's, depression, asthma, and epileptic seizures. The dependent residents were between 78 and 93 years of age.

In Ontario, personal support worker (PSW) training is offered by community colleges, registered private career colleges, adult education centres, and nonprofit organizations. The PSW training is based on the curriculum approved by the Ontario government, the division that incorporates the Ministry of Health and Ministry of Education and Training (Ontario Community Support Association, 2007). The caregivers that participated attained a personal support worker diploma from a registered private career college. The personal support worker training program was developed by the Ontario provincial government to reform and improve the standards for individuals requiring long-term care facilities, chronic care, and in-home private care. In 1997, the personal support worker program consolidated the health care aide training, home support worker training, attendant care training, and respite worker training into a single comprehensive training program (OCSA). At the college where the PSWs attended, the personal support worker program is a 26-week program. The personal support worker training program has been established at the private career college since 2001.

Didactic and practical skills are developed throughout the program. During the 26 weeks, students are taught ways to develop interpersonal communication skills, employ safety standards, assist individuals with mobility problems, recognize abuse and perform required actions, assist individuals with cognitive impairment and mental health issues, assist individuals who are dying, administer medication, and use specific support devices
(National Academy of Health and Business [NAHB], n.d.). In addition, students are taught the skills of household management, meal preparation, care planning, personal hygiene assessment, and family coping mechanisms (NAHB). Individuals admitted to the program must have received an Ontario Secondary School graduation diploma or its equivalent. If individuals are 19 years or older, they may qualify as a mature student if they have a minimum of 1-year work experience (NAHB).

The caregiver participants varied with respect to years of experience as personal support workers. Experience ranged from 8 months to 6 years. The caregivers had diverse educational backgrounds. Two of the 4 caregivers completed their elementary and secondary school education abroad and applied to the program as mature students. Another caregiver completed her Health Care Aide diploma in Montreal in 1992 and returned to school in 2003 to receive her personal support worker diploma. The fourth caregiver was a landed immigrant and did not disclose where her initial education was obtained, but she verified that she had received her personal support worker diploma in 2001. Each caregiver reported working approximately 37.5 hours per week, with the hours accumulated on both evening and day shifts. All of the caregivers that participated in the study graduated from the same personal support worker program.

**Instrumentation**

In this study, the qualitative data collection methods involved field observations, semistructured interviews, and documentation. The data allowed the researcher to observe, as clearly as possible, the social interactions and behaviours that were to be studied.
At LTC-A, the principal investigator accompanied each caregiver during her daily rounds and observed the oral hygiene practices performed on the participating dependent residents. The principal investigator evaluated the oral health status of each participating resident. The principal investigator interviewed each caregiver regarding her current daily oral hygiene practices. In addition to demonstrating the current daily oral hygiene practices used, the caregiver was asked a specific set of questions during an interview process. Each caregiver was asked to answer the following questions, and during the interview the dialogue between the caregiver and the principal investigator was audiorecorded. The following questions were asked:

1. What level of education have you completed?
2. How many years have you been working as a caregiver?
3. What level/type of oral care education have you received?
4. What challenges do you encounter when performing oral hygiene on your residents?
5. What resources are available to you for performing oral hygiene?
6. Are the patients responsible for providing each caregiver with their own oral hygiene resources (i.e., power toothbrush, floss, interdental aids)?
7. Regardless of the resources that you are utilizing to provide oral care at this time, are there any additional resources that would be ideal in order to help provide optimal oral care for the residents?
8. Is there enough time to provide quality oral care to your patients?
9. Are there additional oral health concerns that you would like to have addressed?

The data were analyzed. Based on this analysis, recommendations were made by the principal investigator in order to help the caregiver improve the quality of care.
provided daily to her residents. The oral hygiene recommendations were recorded. The recommendations were to be implemented by each caregiver in an effort to determine if the quality of care provided to the residents would improve and, as a result, upgrade the oral health status of the residents.

The residents at LTC-B demonstrated their current oral hygiene practices to the principal investigator. The oral hygiene practices were recorded. The principal investigator evaluated the participants’ current oral hygiene practices and assessed their manual dexterity. The level of manual dexterity allowed the principal investigator to gain further insight into their physical abilities for the removal of dental plaque. The participants were encouraged to discuss the challenges that they encountered when performing personal oral care. After careful observation of each resident’s current oral hygiene practices, each resident was given a practical demonstration in oral hygiene and denture care that was to be implemented.

Baseline data information was collected and analyzed for each participant at LTC-A and LTC-B. Baseline data included demographic information and dental and medical histories (see Appendix D). In addition, measures of oral health were completed. The primary outcome variables for the residents’ oral health were:

1. dental status, identifying the number of remaining natural teeth and the presence of fixed/removable dentures;
2. gingival status/mucosal index, measured on a 4-point Likert scale corresponding to no inflammation, mild inflammation, moderate inflammation, and severe inflammation;
3. oral mucosal status, recording the presence or absence of colour changes, wounds, blisters, and suspected malignancies;
4. oral hygiene status, measured by means of a modified plaque index. The plaque index provides a numeric assessment of the plaque accumulation on the surfaces of the teeth on a scale from 0 to 3.

In addition, the presence and distribution of plaque were determined. The plaque index of Silness and Loe (Perry, Beemsterboer, & Taggart, 1996) was used to measure the amount of plaque present at the gingival margin (gumline) of natural dentition. The following criteria were used for scoring:

0: gingival area is free of plaque (no debris present)
1: small amount of plaque visible with the naked eye
2: moderate amounts of plaque visible with the naked eye
3: abundance of plaque visible with the naked eye

The plaque index for the individual patient was calculated by adding the scores for each examined tooth surface (four surfaces in total per tooth: facial, lingual, mesial, and distal) and dividing it by the number of examined surfaces (see Appendix E).

The gingival index according to Silness and Loe (Perry et al., 1996) was used to assess the degree of gingival inflammation. The gingival index for the individual patient was calculated by adding the scores for each examined surface (four surfaces in total per tooth: facial, lingual, mesial, and distal) and dividing this sum by the number of examined surfaces (see Appendix E).

The following criteria were used for scoring:

0: clinically healthy gingiva, no inflammation visible with the naked eye
1: mild inflammation, slight gingival colour change visible with the naked eye
2: moderate inflammation, redness, and edema visible with the naked eye
3: severe inflammation, redness, edema, spontaneous bleeding, and ulcerations visible with the naked eye.

The plaque and gingival findings were documented on the designated assessment forms (see Appendixes F & G). Referral to or consultation with other health care providers was made and documented in the individual resident’s chart when warranted. The Director of Care was made of aware of any relevant clinical findings or necessary referrals.

Duplicate examinations were repeated in each long-term care facility 3 months after the implementation of new oral hygiene practices. The instruments that were utilized for the study were pilot tested and validated for their content and relevance to oral health. The instruments utilized (i.e., interview questions, assessment forms, and medical history forms) were pilot tested by three examiners: a program director from a dental hygiene college, a principal instructor from a personal support worker program, and a dentist and lead professor from a dental school.

Data Collection

Epidemiology is the study of illness and associated factors in human populations (Perry et al., 1996). Epidemiology deals with the prevalence and extent of disease in groups. The prevalence and extent of disease provides clues about its severity in the population. Clinical assessment is an essential part of epidemiological research. This study utilized a number of epidemiological indices pertaining to the oral examinations/assessments of the elderly residents.

At baseline, demographic information and medical and dental histories were collected from the participating residents of LTC-A and LTC-B (see Appendix D). A
medical history was taken and evaluated to identify predisposing conditions that may affect treatment, patient management, and periodontal outcomes. Such conditions include but are not limited to hypertension, diabetes, smoking, and medications. A dental history, including the chief complaint of the resident, was taken and evaluated. Extraoral head and neck structures were recorded and evaluated. Intraoral structures and tissues including the oral mucosa, floor of the mouth, lips, tongue, salivary glands, muscles of mastication, and palate were inspected, evaluated, and recorded.

A dental examination recorded the number of natural teeth currently present in the oral cavity. The denture status and denture wearing habits were recorded. Denture cleanliness was assessed as good, fair, poor, or very poor. The frequency of oral/denture hygiene and by whom provided was recorded. A clinical assessment of saliva was recorded as abundant, medium, scanty, dry mouth, or burning sensation. The lips were assessed for health and recorded as normal, dry, cracked, or lesions. The tongue was assessed for cleanliness and health. The appearance of the tongue was marked as either red, fissured, dry, healthy, or other. The floor of the mouth was assessed and recorded as normal, torus, or lesions. The palate was assessed and recorded as normal, high, shallow, torus, or lesions. The residents' compliance to oral health care was evaluated and recorded. The residents' behaviour was observed and recorded as being compliant always, sometimes, usually, or rarely. For functionally dependent residents, the information pertaining to oral hygiene compliance was gathered from the caregiver responsible for providing oral care to the resident. The current oral care procedures performed by the independent residents of LTC-B and the caregivers of LTC-A were evaluated and recorded.
Plaque and gingival indices were used to measure the status of oral health of an individual (Darby & Walsh, 2003). These indices provided baseline data on the level of oral health of the resident and allowed for the monitoring of the resident’s/caregiver’s oral self-care progress over the selected period of time. The plaque and gingival indices were used in order to evaluate the effectiveness of current oral health and disease prevention practices performed by the residents and caregivers in the specified long-term care facilities while at the same time serving as an indicator of their oral health status. Dental literature reports that the presence and amount of plaque along the gumline will have a direct effect on the severity of gingival inflammation (Daniel & Harfst, 2004; Darby & Walsh; Wilkins, 2005).

For individuals with a history of periodontal disease, clinical studies have suggested that periodontal maintenance should be performed at intervals of less than 6 months (The American Academy of Periodontology, 2000, 2001, 2003). The inflammatory components of plaque induced gingivitis and periodontal disease can be managed effectively for the majority of individuals through plaque control programs coupled with periodic periodontal debridement performed by a dental hygienist (The American Academy of Periodontology, 2001). Since the 1970s, periodontal maintenance intervals of 2 weeks, 2-3 months, 3 months, 3-4 months, 3-6 months, 4-6 months, and 18 months have been evaluated (The American Academy of Periodontology, 2003; Haffajee, Socransky, Smith, & Dibart, 1991; Pihlstrom, McHugh, Oliphant, & Ortiz-Campos, 1983; Ramfjord, Knowles, Nissles, Burquett, & Shick, 1975). Data have suggested that the return of periodontal pathogens generally occurs in approximately 9-11 weeks but can vary dramatically between individuals (The American Academy of Periodontology,
Therefore, although experimental studies have demonstrated successful treatment outcomes when individuals are professionally maintained at 2-week intervals, such a program is impractical for most individuals (Nyman, Rosling, & Lindhe, 1975; Nyman, Rosling, Lindhe, & Jern, 1976). In general, more recent data suggest that the majority of individuals with a previous history of periodontal conditions should obtain periodontal maintenance at intervals of at least every 3 months in order to decrease the likelihood of progressive disease (The American Academy of Periodontology, 2001, 2003).

For the purpose of this research study, oral health reevaluations 3 months after the implementation of the oral health practices were recorded using the same assessment form (see Appendix C). The reevaluations were carried out blind, without reference to the initial baseline assessment.

**Data Analysis**

Improvement in the oral health status of the elderly residents was determined by comparing the denture wearing habits, denture cleanliness, oral hygiene habits, amount of saliva present, condition of the lips, tongue, and oral cavity, and by measuring the amount of gingival inflammation and plaque present at baseline and 3 months after the implementation of new oral health practices. In order to assess whether an improvement in quality of care provided by the caregivers was achieved, the researcher interviewed each caregiver again at the end of the study, and comparisons were made from the results obtained from the baseline oral health interview with the results obtained 3 months later.

**Ethical Considerations**

Prior to the commencement of research, the Brock University Research Ethics Board reviewed the research proposal and gave clearance for the research study (File #
06-133-IERACI) to proceed (see Appendix B). Upon clearance from the Research Ethics Board, the program directors of two long-term care facilities were contacted and agreed to participate in the study. All of the participants in the study were presented with letters of participation and an informed consent form. The informed consent form was signed by each participant before the research study began. The participants were aware that their participation in the study was voluntary and that they were able to withdraw from the study at any time without penalty. The participants were aware that there was no payment for their participation in the study. The participants understood that their identity would remain confidential, all personal information would be kept confidential, and that all information provided would be coded. In order to ensure participant confidentiality, the names of the participants and the long-term care facilities in the study were given pseudonyms. The collected data were kept locked in a filing cabinet at the principal investigator's home, and all electronic data were stored in a password-protected folder on the principal investigator’s computer. All of the data will be destroyed 2 years after all the data were collected. A written summary discussing the result of the study will be distributed by the directors of care of the long-term care facilities to the participants upon completion of the study. The participants were made aware that the results of the study may appear in an academic journal and conference presentations and that a copy of the journal article will be made available to all participants. If the participants in the study had any questions or concerns about their participation in the study, they were able to contact the principal investigator, graduate project advisor, or the Research Ethics Officer at Brock University through electronic mail or telephone.
Summary

A generic qualitative research design was utilized to assess the oral health status of elderly individuals residing in long-term care facilities. Furthermore, the research study evaluated the current oral health and disease prevention practices implemented by caregivers and addressed the challenges that they faced in meeting the oral health demands of the residents. After careful observation and discussion with each participating resident and caregiver, the employment of new oral health practices was implemented. The implementation of new oral health practices was planned with the achievable aim of reducing residents' plaque levels and gingival inflammation by raising caregivers' awareness, knowledge, and skills for the maintenance of optimal oral health care.
CHAPTER FOUR: PRESENTATION OF RESULTS

The focus of the study was to examine the oral health status of independent and dependent elderly residents living in long-term care facilities and to determine if there was an improvement in this status after the delivery of oral health care training by a registered dental hygienist. The study also evaluated the current oral hygiene and disease prevention practices utilized by personal support workers who were responsible for providing oral care to functionally dependent residents in long-term care facilities. Additionally, the study examined the oral health status of independent residents who provided their own oral care. Moreover, the study identified the challenges encountered by the personal support workers and the independent residents when performing daily oral care. Last, the study reviewed the textbook, Mosby's Canadian Textbook for the Support Worker (Sorrentino, 2003), used by the caregivers during their formal education as well as discussed with the instructors at the private career college regarding the curriculum and oral care practices taught during the personal support worker course. Thus, in total, the goal of this study was to generate strategies intended to improve the oral health status of the residents and to minimize the obstacles encountered by the personal support workers and the independent residents. Specifically, the following questions were investigated:

1. What is the current health status of the independent and dependent residents residing in the specified long-term care facilities?
2. What are the current oral health and disease prevention practices being performed by residents and caregivers in the specified long-term care facilities?
3. Are continuing oral health education courses available to the caregivers and/or residents by the Directors of Care at both facilities?

4. What are the specific challenges that caregivers encounter when providing oral care to dependent residents?

5. What are the specific challenges that independent residents encounter when performing personal oral care?

**Independent and Dependent Residents’ Intraoral Health Assessments**

In order to answer these questions, two long-term care facilities were selected to participate in the study, LTC-A and LTC-B. The participants in the study included 4 caregivers, 6 independent residents, and 4 dependent residents. The 4 caregivers and the 4 dependent residents who participated were from LTC-A. The independent residents who partook in the study were from LTC-A and LTC-B. Two independent residents from LTC-B and 4 independent residents from LTC-A were interested in participating in the study.

The oral health status of the independent and dependent residents was measured by means of an intraoral assessment form (see Appendixes F & G), health history questionnaire (see Appendix D), and plaque and gingival indices (see Appendix E). Through visual inspection, a plaque index was used to measure the presence of plaque along the gingival margin (gumline), and a gingival index was used to assess the severity of gingival inflammation. The plaque and gingival indices permitted evaluation of the four surfaces of a natural tooth: the facial, lingual, mesial, and distal. Plaque and gingival indices are used to measure the level of oral health of an individual (Darby & Walsh, 2003).
Audio-recorded interviews and practical demonstrations were the methods used to document the current oral health and disease prevention practices employed by the residents and caregivers in the long-term care facilities. Additionally, these methods uncovered the specific challenges and obstacles that the independent residents and caregivers encountered when performing daily oral care. These qualitative and quantitative data were coded to note common themes.

**Current Oral Health Status and Oral Care Recommendations**

Baseline intraoral assessments were recorded at the beginning of the research study. Three months later, follow-up intraoral assessments were repeated and recorded for each participating resident. In order for the participants of this research study to remain anonymous, each resident and caregiver was assigned a pseudonym. Included is a table comparing the initial and final intraoral assessments for the independent and dependent residents (refer to Tables 1 & 2).

At *LTC-B*, the intraoral assessments took place in the residents’ private rooms. The private rooms of the participating residents were clean and orderly. The participating independent residents, named Anne and Jill, each had her own dentist and scheduled regular dental visits every 6-9 months. Both residents had visited their dentists approximately 3-4 months prior to the commencement of the study. The residents were very motivated and enthusiastic about the oral care program. The initial oral health status of the residents at *LTC-B* was recorded as satisfactory. Jill reported brushing her teeth an average of three times a day for a minimum of 1.5 minutes. She reported using, on a daily basis, a manual toothbrush, mouthwash, and a sulcabrush to remove dental plaque from
Table 1

*Initial and Final Oral Health Assessments for Independent Residents*

<table>
<thead>
<tr>
<th>Independent Resident</th>
<th>Age</th>
<th>Initial Oral Health Assessment</th>
<th>Final Oral Health Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jill</td>
<td>74</td>
<td>Lightly plaque-coated tongue, mild gingival inflammation, generalized light plaque, dry mouth, dry tongue</td>
<td>Scanty saliva, lightly plaque-coated tongue, mild-moderate gingival inflammation, increase in plaque accumulation</td>
</tr>
<tr>
<td>Anne</td>
<td>86</td>
<td>Food debris in between teeth, mild gingival inflammation, lightly plaque-coated tongue, dry lips, generalized light plaque accumulation, medium saliva, generalized toothbrush abrasion, recession</td>
<td>Lightly plaque-coated tongue, medium saliva, mild to moderate gingival inflammation, and moderate dental plaque accumulation</td>
</tr>
<tr>
<td>Leslie</td>
<td>65</td>
<td>Edentulous, reported dry mouth, loss of taste sensation and ill-fitting dentures, reported eating soft diet due to denture problems, evidence of oral ulcerations, a deficient amount of saliva, and a lightly plaque-coated tongue</td>
<td>dry mouth, a heavily plaque-coated, dry tongue, and an oral ulcer, reported visiting dentist for denture repair, eating a variety of foods</td>
</tr>
<tr>
<td>Margaret</td>
<td>75</td>
<td>lightly plaque-coated tongue, medium amount of saliva, mild gingival inflammation, and mild to moderate amounts of plaque accumulation</td>
<td>lightly plaque-coated tongue, moderate gingival inflammation, and moderate to heavy amounts of plaque accumulation</td>
</tr>
<tr>
<td>David</td>
<td>79</td>
<td>medium amounts of saliva, moderate gingival inflammation, and generalized heavy plaque accumulation. All surfaces of his teeth were covered with an abundance of dental plaque. Poor oral hygiene was evident; improved oral care was necessary</td>
<td>extremely poor oral hygiene, displayed generalized severe gingival inflammation, generalized heavy plaque accumulation, numerous broken teeth, bad breath, and potential carious lesions</td>
</tr>
<tr>
<td>Arnold</td>
<td>75</td>
<td>lightly plaque-coated tongue, generalized mild to moderate plaque accumulation, and mild to moderate gingival inflammation, ill-fitting denture</td>
<td>Moderate amount of plaque, moderate gingival inflammation, and a heavily plaque-coated tongue, reported visiting dentist for denture repair</td>
</tr>
</tbody>
</table>
### Table 2

**Initial and Final Oral Health Assessments for Dependent Residents**

<table>
<thead>
<tr>
<th>Dependent Resident</th>
<th>Age</th>
<th>Initial Oral Health Assessment</th>
<th>Final Oral Health Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amanda</td>
<td>93</td>
<td>Edentulous, cracked lips, a heavily plaque-coated tongue, blood blister on tongue, medium saliva, denture irritation, fair denture hygiene dentures exhibited a fair amount of calculus</td>
<td>normal lips, lightly plaque-coated tongue, medium saliva, healthy roof of the mouth, fair-poor denture hygiene status, denture status did not improve</td>
</tr>
<tr>
<td>Mary</td>
<td>78</td>
<td>dry mouth and tongue, scanty saliva, clean tongue, generalized gingival recession, moderate-heavy amounts of dental plaque, moderate gingival inflammation, poor oral hygiene</td>
<td>lightly plaque-coated tongue, scanty saliva, fair oral hygiene, moderate gingival inflammation, moderate-heavy plaque accumulation, during 3-month period resident was hospitalized</td>
</tr>
<tr>
<td>Lori</td>
<td>86</td>
<td>generalized mild gingival inflammation, localized moderate amounts of calculus</td>
<td>normal lips, lightly plaque-coated tongue, medium saliva, fair oral hygiene, generalized mild gingival inflammation, generalized moderate dental plaque</td>
</tr>
<tr>
<td>Joanne</td>
<td>86</td>
<td>dry, cracked lips, canker sore on upper lip, lightly plaque-coated tongue, scanty saliva, hematoma present on cheek, denture stomatitis, fair denture hygiene status, fair oral hygiene status, moderate amounts of plaque and calculus on natural teeth</td>
<td>cheek biting, normal lips, medium saliva, lightly plaque-coated tongue, denture-induced ulceration, dentures lightly coated with calculus, poor oral hygiene, moderate-heavy dental plaque and calculus present</td>
</tr>
</tbody>
</table>
the gumline. Jill had previously visited her dentist approximately 3 months ago and was scheduled to visit the dentist again in 3 months time. Her initial intraoral assessment displayed a lightly plaque-coated tongue, mild gingival inflammation, and generalized light plaque accumulation. Her chief complaint was a dry mouth and tongue. Jill was informed that a common side effect of certain types of medication may result in a dry mouth. Overall her oral health status was good. The oral care recommendations were made based upon the results of the initial intraoral assessment. A recommendation made was to replace the sulcabrush every 3 months because the bristles were worn and frayed. Other recommendations included the use of an oral moisturizing toothpaste, alcohol-free mouthwash, and saliva substitutes in order to help alleviate the dry mouth and tongue. Practical demonstrations, verbal instructions, written instructions, and practice time were provided. At the final intraoral assessment, Jill displayed scanty saliva, a lightly plaque-coated tongue, mild to moderate gingival inflammation, and a generalized increase in dental plaque accumulation. Jill reported purchasing the specified oral moisturizing toothpaste and alcohol-free mouthwash to help improve the dry mouth and tongue. A new sulcabrush was given to her at the initial intraoral assessment. Jill informed the principal investigator that the oral care products were very expensive, and she did not believe that she would continue purchasing these products due to limited finances. Jill reported that her physician had modified her medications for her arthritis and cholesterol, which resulted in an increase in saliva production. She reported that her next dental appointment was in 1 week’s time.

The second resident from LTC-B, Anne, reported brushing her teeth on average twice daily for less than 1 minute each time. Anne’s chief complaints were that food
frequently would catch between her teeth and that her teeth were sensitive to touch. Anne did not floss, but on occasion reported using toothpicks in order to remove food debris from her teeth. Intraorally, her initial assessment displayed mild gingival inflammation, a lightly plaque-coated tongue, dry lips, generalized light plaque accumulation, medium saliva, generalized toothbrush abrasion, generalized gingival recession, and overall good oral health. The following oral care recommendations were made based upon the results of the initial intraoral assessment. Anne was provided with written instructions, verbal instructions, practical demonstrations, and practice time. It was recommended that Anne slow down the pace of her toothbrushing and increase her toothbrushing time to approximately 5 minutes with a manual toothbrush. The resident was given a desensitizing toothpaste and an ultrasoft bristled toothbrush and demonstrated the proper toothbrushing technique in order to prevent further damage to her teeth and gums. A proxabrush was recommended for use whenever food was caught between her teeth. The final intraoral assessment revealed a lightly plaque-coated tongue, medium saliva, mild to moderate gingival inflammation, and moderate dental plaque accumulation. Anne reported using the proxabrush regularly and had visited her family dentist approximately 2 months prior.

Both residents had an average of 27 natural teeth present and were very compliant with the oral care recommendations that were made.

At LTC-A, the intraoral assessments took place in either the residents’ private room or in the lounge area on the resident’s floor. There were 4 independent residents from LTC-A who participated in the research study: Leslie, Margaret, David, and Arnold. Of the 4 independent residents from LTC-A, Leslie was completely edentulous (without
natural teeth). The remaining 3 residents had either a complete set of natural dentition or wore partial dentures. These 3 residents had an average number of 25 natural teeth present. The residents reported brushing their teeth twice daily on average and for approximately 1.5 minutes each time. At the time of the initial assessments, on average the residents reported not seeking regular oral care from a dentist and/or dental hygienist.

Arnold was a 75-year-old male who presented with 16 natural teeth and a partial upper denture. Arnold reported that it had been over 3 years since his last dental hygiene appointment. Arnold reported that his partial upper denture was ill-fitting, and therefore he was no longer able to wear it. Arnold requested assistance in locating a local dentist and/or denturist who operated in a wheelchair accessible location. Arnold suffers from high blood pressure, diabetes, and edema in his feet. In addition, he had been diagnosed with multiple sclerosis. Due to the progression of his condition, he was bound to a wheelchair. He reported brushing his teeth twice daily with a manual toothbrush and did not floss. Arnold reported using toothpicks whenever food was caught between his teeth as well as mouthwash whenever he went out for social gatherings. On average, Arnold spent approximately 1.5 minutes to complete his oral care. Upon initial intraoral assessment, Arnold demonstrated a lightly plaque-coated tongue, generalized mild to moderate amounts of plaque accumulation, and mild to moderate gingival inflammation. The following oral care recommendations were made based on the intraoral findings. Daily oral care recommendations consisted of increasing brushing time to approximately 5 minutes with a manual toothbrush or 2 minutes with a power toothbrush, tongue brushing, daily mouthrinsing, and the use of dental floss and/or dental picks. Practical demonstrations, verbal instructions, written instructions, and practice time were provided.
Referrals were given for local dentists and/or denturists. Three months later, a final intraoral assessment was completed.

Arnold’s final intraoral assessment displayed increased amounts of plaque and gingival inflammation. He demonstrated moderate amounts of plaque, moderate gingival inflammation, and a heavily plaque-coated tongue. Since the commencement of the research study, Arnold had scheduled an appointment with his previous dentist. His dentist adjusted his partial upper denture and reported the need for numerous teeth to be restored.

Leslie, the edentulous participant, reported that her last dental visit was over 18 months ago. At that time she had a complete upper and lower denture fabricated. The lower denture that was fabricated was reportedly uncomfortable, and she complained of daily oral pain and discomfort. Leslie stated that she was not able to eat a variety of tougher fruits, vegetables, or meat products. She requested assistance in locating a local dentist and/or denturist in order to help alleviate the pain and discomfort caused by the denture. In addition to the ill-fitting dentures, she reported a very dry mouth and a loss of taste sensation. Leslie has a variety of medical conditions that include asthma, diabetes, glaucoma, depression, and diabetic neuropathy and is currently managing her health problems with the use of approximately 22 medications. Unfortunately, dry mouth is a common side effect of many prescription medications. Therefore, the number and type of medications that Leslie is presently taking can be a large contributing factor to her salivary and taste concerns (Darby & Walsh, 2003; Peterson & Yamamoto, 2005).

Leslie displayed adequate oral health practices. She reported removing and brushing her dentures after every meal and rinsing her mouth with mouthwash. Prior to
bedtime she reported removing her dentures and soaking them in an antibacterial solution. Upon initial intraoral assessment she displayed numerous oral ulcerations, a deficient amount of saliva that resulted in a very dry mouth and tongue, and a lightly plaque-coated tongue. The following oral care recommendations made were based upon the initial intraoral assessment. Proper denture care and maintenance, tongue brushing, loss of taste sensation, and dry mouth syndrome were discussed. The use of saliva substitutes, oral wound cleansers, and alcohol-free mouthrinses were recommended to help alleviate the pain and increase the saliva production. Referrals were given for dentists and/or denturists in the local area. Practical demonstrations, verbal instructions, written instructions, and practice time were provided.

During the final intraoral assessment, Leslie demonstrated a dry mouth, a heavily plaque-coated, dry tongue, and an oral ulcer. Since the initial intraoral assessment, Leslie stated that she had returned to her previous dentist for a denture realignment. The resident reported that the denture realignment slightly improved the fit of the denture; however she still felt that a minor adjustment was necessary. Since her dental appointment she has reported eating a variety of solid, tougher foods. She did not continue with the use of the oral wound cleansers or the alcohol-free mouthrinses. Although clinically evident, she reported that her dry mouth was no longer bothersome.

The remaining 2 independent residents, Margaret and David, were a husband and wife couple who both suffer from cognitive impairments. Margaret suffers from advanced Alzheimer’s and David has been diagnosed with mild cognitive impairments. David could not recall his last dental and/or dental hygiene visit, and Margaret reported visiting a dentist approximately 1 month ago. A dental appointment card was evident for
Margaret for a follow-up appointment in 3 months time. The intraoral assessments took place in their private room. The residents' room was extremely disorderly. Numerous dirty dishes, chocolate bar wrappers, old newspapers, and empty jam packages were found throughout the living room.

Margaret reported brushing her teeth twice daily for approximately 1 minute with a manual toothbrush. Her practical demonstration of her brushing technique was very rushed, lasting less than 30 seconds. Upon initial intraoral inspection she presented with a lightly plaque-coated tongue, medium amount of saliva, mild gingival inflammation, and mild to moderate amounts of plaque accumulation. Margaret was provided with written instructions, verbal instructions, practical demonstrations, and practice time. The following oral care recommendations made were based upon the initial intraoral assessment. Instructions included slowing down her toothbrushing routine, incorporating tongue brushing, dental flossing, and daily mouthrinsing.

Three months later Margaret displayed a lightly plaque-coated tongue, moderate gingival inflammation, and moderate to heavy amounts of plaque accumulation. She demonstrated frustration with oral care routines and was very confused during the initial and final intraoral assessments. Margaret did not remember the initial intraoral assessment and was unable to confidently describe her daily oral care routines during the last 3 months.

David's oral health situation was grave. Initially, David reported brushing his teeth twice daily with a manual toothbrush for a minimum of 2 minutes. David did not report any chief oral complaints. Upon intraoral assessment he displayed medium amounts of saliva, moderate gingival inflammation, and generalized heavy plaque
accumulation. All surfaces of his teeth were covered with an abundance of dental plaque. Poor oral hygiene was evident; improved oral care was necessary. Oral care recommendations were provided through verbal instructions, written instructions, practical demonstrations, and practice time. The following oral care recommendations were discussed and practiced based upon the initial intraoral assessment: increased brushing time with a manual toothbrush to 5 minutes or 2 minutes with a power toothbrush, importance of regular dental maintenance appointments, proper brushing technique, tongue brushing, dental floss picks/dental floss wand, and daily mouth rinsing.

Upon final intraoral inspection, David displayed extremely poor oral hygiene. He displayed generalized severe gingival inflammation, generalized heavy plaque accumulation, numerous broken teeth, bad breath, and potential carious lesions (tooth decay). During the final intraoral assessment, David reported brushing a minimum of once a day. He was unable to remember if he recently visited the dentist with his wife and was unaware if he had an upcoming scheduled dental appointment with her. The Director of Care was notified of his poor oral health.

Of the LTC-A independent residents, no one reported using interdental aids such as dental floss, toothpicks, or proxabrushes, nor did any of the residents report currently using a power toothbrush. Conclusions for the independent residents were based on a combination of the data collected for residents from both long-term care facilities, LTC-A and LTC-B.

On average the independent residents from LTC-A and LTC-B displayed good to fair oral hygiene. The average plaque index score for the independent residents with natural teeth present at the beginning of the study was 46%. This score indicates that 46%
of the tooth surfaces present were free of dental plaque. Fifty-four percent of the natural teeth present visibly displayed a small amount of dental plaque. The average gingival index score for the residents with natural teeth present at the beginning of the study was 1.35. This score indicates that mild-moderate gingival inflammation was present on all gingival surfaces and slight gingival colour changes were evident.

The average plaque index score for the residents with natural teeth present at the completion of the study was 28%. This score indicates that 28% of the tooth surfaces present were free of dental plaque. Seventy-two percent of the natural teeth present visibly displayed moderate amounts of dental plaque. The average gingival index score for the residents with natural teeth present at the completion of the study was 1.96. This score indicates that at the completion of the study moderate gingival inflammation was present on all gingival surfaces and the gingival tissues were red in colour.

Upon completion of the study, the oral health status of the independent residents was fair. On average an increase in dental plaque and gingival inflammation was present.

The ability to recognize changes in gingival tissues is important in the practice of dental hygiene. The clinical appearance of the gingiva (gums) demonstrated slight changes. When healthy, the gingival tissues are described as pink or coral pink in colour, with the gingival tissues tightly bound to the tooth (Perry et al., 1996). The surface of the gingiva is often stippled and shows no signs of inflammatory colour changes. When gingival disease is present, the gingiva changes colour from pink to red and the gingival tissues begin to swell and accumulate with gingival fluid (Perry et al.). The gingiva have a tendency to bleed readily in response to toothbrushing or can bleed spontaneously when gingival disease is present (Perry et al.).
The 4 dependent subjects, Anna, Mary, Lori, and Joanne, were residents of LTC-A. The 4 caregivers that participated in the study were, Helen, Erin, Lynn, and Lisa. The intraoral assessments were completed in the residents’ private rooms along with a participating caregiver. The participating dependent resident provided written informed consent by a family member. Contact with the family members was never made, but messages were relayed via the Director of Care regarding their interest in the study. Of the 4 dependent residents, 3 residents had natural teeth and 1 resident was edentulous. The 3 dependent residents had an average of 13 natural teeth present. One dependent resident wore complete upper and lower dentures.

Anna was 93 years of age. She wore complete upper and lower dentures. Anna did not report any chief oral complaints to her caregiver. Anna’s son is a medical doctor and was very interested in allowing his mother to participate in the study. One of the caregiver’s responsibilities is to provide the resident with daily oral care. Upon initial intraoral inspection Anna presented with cracked lips, a heavily plaque-coated tongue, a hematoma (blood blister) present on the tip of the tongue, medium saliva, a denture irritation on the roof of the mouth, and fair denture hygiene status. The caregiver, Lynn, reported removing her dentures nightly and soaking them in an antimicrobial bath. In the morning, the dentures are rinsed and brushed and then placed back in Anna’s mouth. Upon examination of the dentures, they exhibited a fair amount of calculus (mineralized plaque) present on the facial surfaces. Lynn provided Anna with daily denture care but did not perform an intraoral inspection of the gingival tissues or dentures. Lynn reported that an intraoral inspection occurred only if the resident complained of oral discomfort or pain. The following recommendations were made to Lynn based on Anna’s intraoral
findings. Lynn was provided with verbal, written, and practical demonstrations. Appropriate denture care and maintenance, tongue brushing, and the importance of regular intraoral inspections were discussed and practiced.

After 3 months, a final intraoral assessment was completed. Anna was very compliant with receiving oral care during both the initial and final intraoral assessments. The final intraoral assessment revealed normal lips, a lightly plaque-coated tongue, medium saliva, a healthy roof of the mouth, and fair to poor denture hygiene status. The denture status did not improve; a fair amount of calculus was still present on facial surfaces.

The next dependent resident, Joanne, had 3 natural teeth present and wore a partial upper denture and a complete lower denture. Joanne’s daughter is a dentist. The caregiver that is responsible for Joanne’s oral care did not participate in the study. Therefore, one of the participating caregivers, Helen, demonstrated the daily oral care routine that would be provided if Joanne were her responsibility. Helen removed Joanne’s denture and demonstrated her denture brushing technique. The denture was rinsed and placed back into Joanne’s mouth. Helen did not assess if Joanne had natural teeth present, nor did she complete an intraoral inspection. The initial intraoral assessment revealed that Joanne had dry, cracked lips, an aphthous ulcer (canker sore) present on the corner of the upper lip, a lightly plaque-coated tongue, scanty saliva, a hematoma present on the inner right cheek, denture stomatitis on the roof of the mouth, fair denture hygiene status, and fair oral hygiene status. Joanne displayed moderate amounts of plaque and calculus on her natural teeth. Joanne was compliant with the oral care received and did not report any chief complaints. The following recommendations
were provided to Helen based on Joanne’s intraoral findings. Helen was provided with verbal, written, and practical demonstrations. Appropriate denture care and maintenance, tongue brushing, proper toothbrushing technique, and the importance of regular intraoral inspections were discussed and practiced.

Joanne’s final intraoral assessment revealed evidence of cheek biting, normal lips, medium saliva, a lightly plaque-coated tongue, a denture-induced ulceration on the floor of the mouth, dentures lightly coated with calculus, and poor oral hygiene status. The poor oral hygiene status was a result of the moderate to heavy dental plaque and calculus present along the gumline. Joanne reported that her daughter provided her with a new moisturizing lipstick in order to alleviate her cracked lips and had been in the process of adjusting her upper and lower dentures.

Mary, a 78-year-old dependent resident, was a participant in the research study. Mary suffered from high blood pressure and elevated levels of anxiety. Lisa, the caregiver responsible for providing her with daily oral care, was unsure if Mary would be compliant for an intraoral inspection due to her very anxious nature. Lisa mentioned that Mary can become very nervous and aggressive if she is not familiar with the individual delivering care. Initially, when Mary was approached and the intraoral assessment procedure was explained, she seemed very fearful, uncomfortable, and reluctant. After a few minutes Mary became more relaxed and was willing to co-operate for the intraoral assessment. Upon initial intraoral assessment, Mary displayed a dry mouth and tongue, scanty saliva, a clean tongue, generalized gingival recession, moderate to heavy amounts of dental plaque, moderate gingival inflammation, and poor oral hygiene status. Lisa demonstrated the daily oral care routine provided to Mary, which consisted of
toothbrushing and mouthrinsing. Lisa was provided with verbal, written, and practical demonstrations. Proper toothbrushing technique for individuals with gingival recession, the importance of regular intraoral inspections, use of a rubber tip stimulator, floss wand/picks, daily mouthrinsing, tongue brushing, and dry mouth syndrome were discussed and practiced by Lisa. Shortly after the initial intraoral assessment Mary was hospitalized with heart failure. Mary remained in the hospital for a couple of weeks. When Mary returned from the hospital Lisa had reported that the resident had visited her family dentist. Lisa indicated that the dentist did not report any concerns regarding Mary’s oral health. Upon final intraoral assessment Mary displayed a lightly plaque-coated tongue, scanty saliva, fair oral hygiene status, moderate gingival inflammation, and moderate to heavy plaque accumulation.

The final dependent resident assessed was Lori, an 86-year-old female with insulin-dependent diabetes, dementia, atrial stenosis, and hypothyroidism. Upon intraoral inspection Lori displayed dry lips, a lightly plaque-coated tongue, medium saliva, and fair oral hygiene status. Lori did not wear a partial upper or lower denture but had numerous teeth absent and/or broken. Intraorally, generalized mild gingival inflammation and localized moderate amounts of calculus were present on the maxilla. The caregiver, Erin, reported that oral care is provided twice daily for approximately 1 minute each time and consists of toothbrushing and tongue brushing. The use of interdental aids such as dental floss, toothpicks, or proxabrushes was not being practiced. Erin was given the following recommendations based on Lori’s initial intraoral findings. The recommendations proposed included increased brushing time to 5 minutes with a manual toothbrush or 2 minutes with a power toothbrush, the use of dental floss, and the
performance of proper toothbrushing techniques. Soon after the initial intraoral assessment Lori fell ill and remained in the hospital for a couple of weeks. Lori's final intraoral assessment exhibited normal lips, a lightly plaque-coated tongue, medium saliva, fair oral hygiene status, generalized mild gingival inflammation, and generalized moderate dental plaque.

On average, the initial intraoral assessments of the dependent residents from LTC-A displayed fair oral hygiene. The average plaque index score for the dependent residents with natural teeth present at the beginning of the study was 25%. This score indicates that 25% of the tooth surfaces present were free of dental plaque. Seventy-five percent of the natural teeth present visibly displayed moderate amounts of dental plaque. The average gingival index score for the residents with natural teeth present at the beginning of the study was 1.7. This score indicates that mild to moderate gingival inflammation was present on all gingival surfaces and the gingiva displayed slight colour changes.

The average plaque index score for the residents with natural teeth present at the completion of the study was 17%. This score indicates that 17% of the tooth surfaces present were free of dental plaque. Eighty-three percent of the natural teeth present visibly displayed moderate to abundant amounts of dental plaque. The average gingival index score for the residents with natural teeth present at the completion of the study was 2.02. This score indicates that at the completion of the study moderate gingival inflammation was present on all gingival surfaces and the gingiva exhibited redness.

Upon completion of the study, the oral health status of the dependent residents did not improve; the oral health status remained fair. On average, a slight increase in dental plaque and gingival inflammation was present.
Oral Health and Disease-Prevention Practices

In the study, the oral health and disease-prevention practices of the independent residents and the caregivers were examined. In order to assess the oral health and disease-prevention practices, observations were made as the caregivers performed oral care on the dependent residents that participated in the study. The caregivers would demonstrate their current oral health and disease prevention practices. The caregivers did not follow any specific oral care program that may have been implemented by the long-term care facility. The oral health and disease-prevention practices that the caregivers demonstrated were based on theoretical and practical exercises that they were taught during their formal education at the private career college. Since graduation, the caregivers have not taken continuing education courses or had any additional training in providing oral care.

During the initial caregiver interviews, the caregivers reported that they were comfortable providing the residents with oral care and felt confident with their oral hygiene skills. When asked what type of oral education they had received, Erin stated that “we were taught to clean the dentures and oral care in the morning and that’s it.” Erin stated that she was not taught about plaque, gum disease, flossing techniques, or how to assess for oral lesions. The recollection of her education consisted mainly of toothbrushing techniques. The clinical intraoral practice time occurred during her 3-month placement at the long-term care facility. Erin stated that she did not practice oral care during school.

She reported that during the 26-week course, only a few days were selected to focus primarily on oral care. Erin felt that the amount of time spent on oral care was inadequate. Since the amount of time spent on oral care was very limited, she felt the
depth and thoroughness of her oral care education was also partial. Erin graduated from the personal support worker program approximately 2 years ago.

Helen, another caregiver, who had graduated approximately 8 months before the date of the interview for this study, reported that oral care was important because it “made the residents relaxed and refreshed.” She recalled being taught denture care and maintenance, use of mouth swabs, dental flossing, and toothbrushing techniques. She stated that she was not taught how to use any other interdental aid besides dental floss.

Lynn reported that she attempts to brush the residents’ tongues in order to remove some of the plaque build-up. Ironically, Lynn did not demonstrate tongue brushing during her practical demonstration on her participating resident. She stated that most of her oral care education came from visiting her dental office on a biannual basis. The oral care that she provides to herself is the same as that which she tries to provide to her residents.

Since Lynn’s graduation from college approximately 4 years before the date of the interview for this study, she has not had supplementary training or taken continuing education courses on the provision of oral care. At the time of the study, she was working at two long-term care facilities and reported that she has never had any training in or instructions on oral care from anyone at either long-term care facility.

Last, Lisa graduated from college as a personal support worker approximately 6 years before the date of the interview for this study. Lisa reported that she is able to complete only denture care and toothbrushing on her residents because of the lack of time during her shift at work. She stated that she does not floss the residents’ teeth because they “bite her fingers.” She felt as though the time that she does spend on oral care with her residents is rushed because of the large number of residents for which she is
responsible. Lisa stated that she is responsible for attending to approximately 11 residents during her 8-hour shift.

Each caregiver was monitored as she performed oral care on the dependent residents. Each caregiver was given oral care recommendations that were aimed to improve the oral health of the residents. During the interview process, at the onset of the study, most of the caregivers felt that they had sufficient oral care education. Regrettably, upon closer observation it was evident that their oral care skills were deficient. The caregivers did not perform intraoral inspections, and when asked about this they stated that “they looked inside the residents’ mouths only if they complained of oral pain or discomfort.” For example, during one observation, Joanne, who wore both upper and lower partial dentures, had them both removed and brushed by Helen. After Helen brushed the dentures she replaced them in Joanne’s mouth without realizing that the resident had 3 natural teeth present in her mouth. It is equally important, if not more important, to brush the natural teeth in order to prevent gum disease. When informed of the mishap, Helen stated that “this was not one of her usual residents and therefore she did not know that the resident had teeth present in her mouth.” An additional recommendation was made to line the sink with a towel and fill it with water when brushing the dentures. The dentures can easily fracture or break if dropped into an empty sink. Helen stated that she was aware of the technique but did not perform it. The majority of dentures observed were encrusted with calculus. A recommendation was made to completely immerse the dentures overnight in vinegar in order to soften the calculus to facilitate its removal. Caregivers Lisa and Helen reported that they were aware of that particular method but never verbalized or practiced it. The caregivers
reported that they used only the oral care products that the residents purchased. The residents are responsible for providing the caregivers with all the necessary oral health care resources, and the caregivers utilize these supplied products. Since the residents did not supply Lisa or Helen with vinegar, they never soaked the dentures in the solution. At LTC-A, the residents are given the option of having the facility order the necessary oral care products for them, or the residents can have their family members purchase the essential products on their behalf. Most family members allow the facility to order the oral resources for the residents. The long-term care facility orders toothpaste, dental floss, denture tablets, and mouthwash.

During the study, the caregivers were required to provide the residents with oral care, with an intraoral assessment of the resident to follow. Upon interviewing and observing each caregiver, conclusions were made based on their oral care and disease prevention practices. Several oral care inconsistencies amongst the caregivers were apparent. Each caregiver demonstrated different oral care techniques. For example, Erin performed tongue brushing on a resident, while the other caregivers never practiced this procedure. Additionally, Lisa removed one of the resident’s dentures and went to the washroom to brush them. The washroom was poorly illuminated, and she failed to turn on the light to inspect the dentures for plaque and calculus accumulation, fractures, or breaks. As well, she failed to ask the resident if the dentures were fitting properly. On average, the amount of time spent on oral care was approximately 1 minute per resident. Minimal oral hygiene procedures such as toothbrushing and denture care were implemented. Dental flossing was never performed, nor was there evidence of dental floss in the residents’ washrooms. Substantial amounts of plaque were still evident on the
teeth after oral care. Ultimately, a standardized oral care program is necessary for the caregivers to follow. Furthermore, the oral care resources that the caregivers utilized for performing oral care were limited.

The independent residents performed their own oral care on a daily basis. The level of dexterity and the level of oral hygiene education for each independent resident varied. The oral health needs of each resident were individually evaluated. On average each resident reported brushing his or her teeth twice daily. The residents brushed an average of 60-90 seconds. One of the 6 independent residents, Jill, reported using an interdental aid as an adjunct to her daily oral care. Jill reported brushing three times a day and demonstrated good oral health. Her last dental visit with her dentist was approximately 3 months prior to the commencement of the study. Two of the 6 independent residents, Anne and Arnold, reported that food would catch between their teeth and on occasion they reported using toothpicks to dislodge such food.

Each resident was taught the proper toothbrushing technique, with emphasis on the angulation of the toothbrush bristles in relation to the teeth and gumline. Each resident was taught the importance of interdental cleaning in order to help reduce gingival inflammation and prevent tooth decay. The residents were taught how to use dental floss, floss wands, and floss picks according to their individual level of manual dexterity. During the follow-up assessments, no resident reported using dental floss, floss wands, or floss picks. On average, the findings revealed that the residents initially displayed moderate dental plaque accumulation and mild gingival inflammation. Upon completion of the study, the average dental plaque accumulation rose approximately 18%, and the displayed gingival inflammation rose to a moderate level. Most independent
residents reported visiting a dentist or had scheduled an upcoming appointment since the initial intraoral assessment.

Oral Care Challenges Encountered by Caregivers

At LTC-A, there are four care floors that are designated for dependent residents. Each care floor has one caregiver assigned to it. Two additional caregivers float between the four floors offering their assistance where needed. Each caregiver provides care for approximately 10 residents. Each caregiver works approximately 8 hours per day.

The caregivers reported encountering numerous challenges during their workday when trying to provide oral care. Inconsistencies among care staff with respect to oral hygiene practices, limited time to provide quality oral care, refusal of oral care and aggressive behaviour by the residents, and insufficient care staff were among the greatest challenges reported.

Inconsistencies were reported by the care staff with respect to the oral care practices of other caregivers. LTC-A employs approximately 46 staff members in the nursing department, 17 of which are full-time employees. A large majority of the care staff consists of personal support workers. The years of clinical experience varied among the care staff, as did the educational institutions at which their education was received. Inevitably, the oral care practices employed differed depending on the caregiver in question. For example, Erin reported that, on occasion, when she arrives for her shift in the morning, some residents have been left to sleep with their dentures in their mouths throughout the night. On one occasion in particular, she was unable to remove the dentures in order to brush them because there was an excess of denture adhesive that had been applied by a caregiver on the night staff. As a result, the resident was forced to keep
the dentures inserted throughout the day and until the following evening due to the strong adhesive bond that occurred. Additional inconsistencies in oral care included that some caregivers reported that they would brush the tongue of their residents and have them rinse with mouthwash, while others reported only basic toothbrushing and denture care.

Aggressive behaviour and forceful refusal of oral care was a common challenge expressed by the caregivers. Many residents refuse to open their mouths and do not allow caregivers access into their oral cavity. Some residents will push and scream at the caregivers to force them to stop. Others have bitten the fingers of the caregivers, the toothbrushes, and mouth swabs. Residents who have limited cognitive abilities will swallow the toothpaste or mouthwash as opposed to expectorating it. If residents are aggressive and resistant to oral care, the caregivers stated that they would request assistance from the additional caregivers assigned to multiple care floors. Two caregivers would work together in an attempt to perform the necessary oral care. If the resident continued to resist, oral care was ceased until a further attempt could be made during the other shift.

Ultimately, the most challenging obstacles to overcome reported by the caregivers were insufficient time to provide oral care and limited clinical care staff. The caregivers reported that they provide oral care to approximately 10 residents. The administration of effective oral care in the morning is very challenging, as breakfast is scheduled for 8:30 a.m. With the morning shift beginning at 7 a.m., and with the many responsibilities that the caregivers have including bathing, toileting, grooming the residents, as well as making the bed, it is extremely difficult to provide all of the residents with proper oral care in 90 minutes. Although not every resident requires a daily bath, there are
supplementary duties that need to be addressed during the limited timeframe. As reported previously by Lisa and Helen during their final interviews, the oral care provided is often rushed. They explained that at times they would be called to assist other residents on different residence floors. They would have to leave what they were currently tending to and address the situation that was presented to them, thus further limiting the amount of care staff on each floor as well as the time spent with each resident.

The initial and follow-up intraoral assessments were completed at the same time of the day, shortly after breakfast. The residents were resting comfortably in their private rooms. We were given the room number and the resident floor and instructed to wait for the caregiver to arrive in order to demonstrate her oral care skills. The caregivers were continuously being paged throughout the practical demonstrations. Each practical demonstration lasted approximately 10 minutes. Given that the caregivers were in constant demand, once the caregiver demonstrated her oral care routine she would leave us with the resident to complete our intraoral assessments. On one occasion, a resident requested our assistance with toileting. We assisted the resident to the washroom because the resident could not wait and the caregiver was not available. On another occasion, when we entered one of the resident’s rooms, the resident was standing in her living room with her pants and diaper around her feet, unable to pull them up. We assisted the resident with her pants and diaper and rested her on the bed. We waited over 10 minutes for the caregiver to arrive because she was called to a different care floor in order to assist another resident.
Based on the observations and the interviews with the caregivers, the level and quality of oral care provided was insufficient due to both limited time and care staff availability (see Table 3).

**Oral Care Challenges Encountered by Independent Residents**

The 6 independent residents each encountered their own obstacles when providing daily oral care. The obstacles encountered differed significantly from those encountered by the caregivers. Accessing regular dental care was a struggle that the independent residents experienced. The residents had moved to the long-term care facilities from various regions in the Greater Toronto Area and had left behind their previous dentists. The residents rely on volunteers, taxi services, public transportation, and family members to help them schedule and accompany them to their appointments. For example, Arnold has not seen a dentist in over 3 years. He is bound to a wheelchair and relies on family members to accompany him to dental appointments. He refuses to wear his denture because it has been ill-fitting for years. He is currently in the transition from receiving independent care to dependent care. Arnold has multiple sclerosis and demonstrated limited manual dexterity. When Arnold was asked if caregivers are responsible for providing his oral care, he stated that the caregivers bring him his toothbrush but that he brushes his own teeth. He has a difficult time relying on his family members for daily requests and is not quite prepared to allow caregivers to tend to his daily needs. Arnold does not want to lose his sense of independence.

Some residents were cognitively impaired, which often posed a problem with remembering to perform daily oral care. For example, David's oral health status was poor to very poor, and he was therefore in dire need of dental care. He reported brushing his
Table 3

*Reported Caregiver Challenges*

<table>
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<tr>
<th>Caregiver Challenges: Results of the Study</th>
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<tr>
<td>Inconsistencies with oral hygiene practices</td>
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<td>Refusal of oral care by the residents</td>
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<td>Aggressive behaviour by the residents</td>
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<tr>
<td>Limited time</td>
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<td>Insufficient care staff</td>
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teeth on average once a day. His intraoral assessments were performed in his living room while he was seated in his armchair. On both occasions he requested that the assessments be performed while he remained in his armchair. David’s lack of movement led to the assumption that he may also have problems with mobility that were not mentioned during the health history. His wife, Margaret, also a participant in the study, would be seen roaming in the hallways of the long-term care facility, and she would answer the door when we knocked, but her husband never was seen moving from his armchair. He also was unable to remember if he had accompanied his wife to a recent visit to the dentist. Unfortunately, his wife suffers from Alzheimer’s disease and was not able to confirm his attendance. Based on David’s poor intraoral findings, it is thought that he has not visited a dentist recently.

Last, the residents reported that dental care and oral care products were very expensive. Most of the residents are on limited incomes and do not have dental insurance. The price of regular dental care can be very costly. For example, Jill and Leslie were instructed to use an alcohol-free mouthrinse and a specific moisturizing toothpaste to help alleviate dry mouth. Jill purchased the recommended products but informed me that the oral care products were too expensive and that she would not be able to continue using them, while Leslie did not purchase the recommended products because of the added expense.

In the study, several methods were used to gain an understanding of the oral health status of seniors residing in long-term care facilities. Moreover, the study addressed the obstacles that were encountered by independent residents and caregivers when performing oral care. Interviews, observations, and oral hygiene indices were used
to gather qualitative and quantitative data. The data were examined to locate common themes. Refer to Table 4 for a summary of the reported challenges and to Table 5 for a summary of the overall factors that had an impact on the oral health status of the residents in the study.

**Summary**

In summary, the research findings revealed the oral health status of independent and dependent residents demonstrated an increase in plaque accumulation, gingival inflammation, and gingival tissue colour changes. The oral health and disease prevention strategies of the residents and the caregivers were individually evaluated. The results revealed that a standardized set of oral health practices are necessary in order to maintain consistency among the care staff. Inconsistencies among the care staff can affect the oral health status of the residents. The independent residents require regular dental care to help maintain optimal oral health. Dentists should be employed on staff to allow access for individuals with mobility problems. The caregivers and the residents reported many obstacles that were faced when performing oral care. The independent residents were concerned with the financial costs associated with accessing dental care and purchasing specific oral products. The caregivers reported time and insufficient care staff as major obstacles to providing residents with quality oral care.
Table 4

*Reported Independent Resident Challenges*

<table>
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<tr>
<th>Independent Resident Challenge: Results of the Study</th>
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<tr>
<td>Accessing regular dental care</td>
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<td>Cognitive impairments</td>
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<td>Limited mobility</td>
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<tr>
<td>Expensive dental care products</td>
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<td>Inadequate oral hygiene care techniques</td>
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Table 5

*Overall Results of the Study*

<table>
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<th>Overall factors that had an impact on the oral health of the residents in the study</th>
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<tr>
<td>Inadequate personal oral hygiene care techniques</td>
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<tr>
<td>Difficulties accessing professional oral health care</td>
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<td>Limited finances for expensive dental hygiene services</td>
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<td>Limited knowledge and proficiency of oral health practices on behalf of the caregivers</td>
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<tr>
<td>Insufficient numbers of care staff</td>
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<tr>
<td>Insufficient time to perform oral care activities</td>
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<td>Lack of professional development</td>
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<tr>
<td>Minimal interprofessional collaboration of health disciplines</td>
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<td>Lack of perseverance on behalf of the caregivers and residents</td>
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CHAPTER FIVE: DISCUSSION AND RECOMMENDATIONS

Over the past several decades, researchers have found that oral health influences the general health of the entire body (Scannapieco, 2006). Studies have shown that gum disease may increase an individual’s risk for systemic diseases such as respiratory illnesses, heart disease, diabetes, and stroke (De Stefano et al., 1993; Joshipura et al., 2003; Joshipura et al., 1996; Lamster, 2004; Morrison et al., 1999; Ritchie et al., 2002; Scannapieco; Scannapieco & Genco, 1999; University of Alberta, 2001). Gum disease may be the most prevalent chronic disease affecting children, adolescents, adults, and the elderly (Lux, 2006). These findings are especially pertinent to the older population because the likelihood of developing oral and systemic diseases increases with age (Scannapieco).

This research study had three main areas of focus. First, it assessed the oral health status of independent and dependent individuals residing in long-term care facilities. Second, it evaluated the current oral health and disease prevention practices implemented by personal support workers in long-term care facilities. Additionally, it evaluated the oral care practices of independent residents responsible for providing their own oral care. Finally, it addressed the challenges that personal support workers and independent residents faced in meeting the optimal oral health.

Many elderly living in long-term care facilities have poor oral health (Lux, 2007). The oral health findings from LTC-A and LTC-B support this statement. The findings of this study have demonstrated an increase in plaque accumulation, gingival inflammation, and gingival tissue colour changes among the independent and dependent residents over the 3-month period. The study revealed that poor oral health among the elderly was a
result of a multitude of factors. The factors that had an impact on the oral health of the residents in the study included inadequate personal oral hygiene care techniques, difficulties accessing professional oral health care, an inability to pay for expensive dental hygiene services, limited knowledge and proficiency of oral health practices on behalf of the caregivers, insufficient numbers of care staff, insufficient time to perform the personal care activities, lack of professional development, minimal interprofessional collaboration of health disciplines, and lack of perseverance on behalf of the caregivers and residents.

**Discussion and Recommendations**

This section discusses the content deficiencies of *Mosby's Canadian Textbook for the Support Worker* as well as other factors affecting optimal oral care, which includes lack of staff, lack of time, lack of continuing education, and regulation. Recommendations for changes in the textbook are made and ways to reduce the challenges experienced by caregivers and residents for the provision of good oral health are outlined.

*The Personal Support Worker (PSW) Program and Textbook*

As of April 28, 1997, the personal support worker program had replaced previous training programs for health care aides, home support workers, attendant care workers, and respite workers (OCSA, 2007). With the replacement of previous training programs, the responsibilities and duties of a PSW have increased. After graduating, PSW students are expected to develop interpersonal communication skills, adhere to safety standards, assist individuals with mobility problems, recognize abuse and perform required actions, assist individuals with cognitive impairment and mental health issues, assist individuals
who are dying, administer medication, and use specific support devices. Additionally, household management, meal preparation, care planning, personal hygiene assessment, and family coping mechanisms are cultivated (NAHB, n.d.).

As noted in Chapter Four, the caregivers who participated in the study were graduates of the personal support worker program from the same educational institution. During the course of their education, the amount of time devoted to learning the practices and procedures of personal hygiene by PSW students is minimal. For example, Erin felt that not enough time was spent on learning and practicing toothbrushing, denture care, and dental flossing throughout her education. Erin reported that she did not have time to practice these skills prior to her practical placement in a long-term care facility. Lynn stated that most of her oral care education was learnt by visiting her dentist on a biyearly basis. Lisa felt that the personal care portion of the curriculum was rushed and that a thorough understanding of the importance of performing proper oral care and the necessity of regular intraoral assessments was not stressed. After discussions with instructors at the educational institution from which the caregivers graduated, it was determined that the time spent by students learning and practicing personal hygiene activities which promote safety, comfort, and general health (Sorrentino, 2003) is approximately 3 days. During those 3 days, the PSW students are also taught to perform oral hygiene activities such as toothbrushing, flossing, denture care, and mouth rinsing. These oral hygiene activities help to keep the skin, teeth, and gums intact and healthy (Sorrentino).

The textbook that the caregivers used during the PSW program was *Mosby’s Canadian Textbook for the Support Worker*. This textbook identifies the equipment
recommended to perform oral hygiene on clients with natural dentition as a soft bristled toothbrush, toothpaste, and mouthwash (Sorrentino, 2003). Individuals with dentures are recommended to use a denture cleaner, denture cup, and denture brush (Sorrentino). Individuals with sore, tender mouths or unconscious individuals are recommended to use sponge mouth swabs (Sorrentino). Additionally, PSW students are taught how to assist an individual to brush his or her teeth at bedside as well as floss an individual’s teeth.

Using *Mosby’s Canadian Textbook for the Support Worker*, the directions provided for brushing an individual’s teeth include positioning the toothbrush at a 45 degree angle to the gums and using short back-and-forth strokes. The directions provided for flossing an individual’s teeth include holding the dental floss between the middle fingers to floss the upper teeth and between the index fingers for the lower teeth. The floss is then moved in an up-and-down motion between the teeth (Sorrentino, 2003).

Denture care instructions include removing the dentures and brushing the outer and inner surfaces with a back-and-forth motion. The dentures are brushed over the sink, which is to be filled halfway with water and lined with a towel to prevent damage if the dentures are accidentally dropped. It is recommended that the dentures be removed at bedtime and that they be stored in a cup of cool water with a denture cleanser. The dentures are not to be placed in hot water because there is the possibility of disfiguration of the dentures due to the effect of the high temperatures on the integrity of the denture material (Sorrentino, 2003).

In addition, the PSW students are instructed to report and record the presence of dry, cracked, swollen, or blistered lips; areas of redness, swelling, irritation, sores, or white patches in the mouth or on the tongue; gums that are bleeding, swollen, or red;
loose teeth; rough, sharp, or chipped areas on dentures; and complaints of pain or discomfort (Sorrentino, 2003). In this study, the caregivers and residents failed to perform these oral hygiene practices correctly or on a regular basis over the period of 3-months.

*Knowledge deficiency in the benefits of fluoridated toothpastes.* As indicated in the previous section, the amount of time allotted to covering oral hygiene practices in the personal support worker program is insufficient according to the caregivers. Furthermore, the theoretical component of the PSW Program concerning oral hygiene is also inadequate. Upon examination of the personal hygiene chapter in *Mosby's Canadian Textbook for the Support Worker*, the importance of using fluoridated toothpaste was not mentioned. Toothpastes can be classified as cosmetic or therapeutic (Harris & Garcia, 2004). Cosmetic toothpastes assist in cleaning and polishing teeth, whereas therapeutic toothpastes contain active ingredients that aid in the prevention or reduction of dental disease (Harris & Garcia). For example, fluoridated toothpastes contain fluoride ions that aid in the prevention of tooth decay. Desensitizing toothpastes contain the active ingredients potassium nitrate, strontium chloride, and sodium citrate, which are responsible for decreasing tooth sensitivity (Harris & Garcia). Toothpastes that control plaque and gingivitis, prevent tartar formation, and promote tooth whitening are additional examples of other toothpaste formulations that are available commercially over the counter. The textbook describes the use of toothpaste for daily brushing but fails to stress the variety of products that exist. Each of these various toothpaste products has a specific use. The reason for the existence of such a variety of toothpastes is that individuals have different needs that they are trying to meet. Not everyone has the same
specific oral health needs, and therefore identifying the needs of the individual residents can aid in the selection of the appropriate toothpaste.

A common complaint made by the residents residing in the long-term care facilities (LTC-A and LTC-B) was that they suffered from dry mouth (xerostomia). Xerostomia is traceable to several possible causes such as salivary gland dysfunction, side effects to radiation therapy used to treat head and neck cancer, autoimmune disorders, and most commonly side-effects to the use of prescription medications (Harris & Garcia, 2004). Saliva plays an important role in the proper function of the oral cavity since it lubricates the oral tissues that assist in speech and swallowing, facilitates the retention of dentures, and provides a source of minerals for enamel remineralization. Due to the lack of saliva, individuals are at an increased risk of tooth decay. Given that xerostomia is linked to an increased incidence of tooth decay, fluoridated toothpastes have been a recommended preventive measure (Darby & Walsh, 2003). Fluoride is the most effective agent for the prevention and control of tooth decay (Darby & Walsh). Therefore, stressing the importance of fluoridated toothpastes for prevention of tooth decay should be an essential component that the students in the personal support worker program learn and implement. Although Mosby’s Canadian Textbook for the Support Worker (Sorrentino, 2003) does not mention the importance of fluoridated toothpastes and their aid in the battle against tooth decay, the caregivers did report that the residents were using fluoridated toothpastes on a regular basis.

The textbook should also include information explaining the link between xerostomia and tooth decay. Many residents take prescription medications that commonly cause xerostomia. The caregivers need to understand how to identify the causes of
xerostomia and make appropriate oral hygiene recommendations. Management of xerostomia includes care through the use of saliva substitutes, oral lubricants, and frequent sips of water (Harris & Garcia, 2004). The management of xerostomia as well as the use of fluoridated toothpastes have the potential for a reduction in tooth decay.

**Knowledge deficiency in desensitizing agents.** Many individuals experience dental pain when exposed areas of the tooth root are subjected to hot or cold substances. To address this issue, toothpastes have been formulated with selective active ingredients that reduce or eliminate tooth sensitivity. As previously mentioned, desensitizing toothpastes contain potassium nitrate, strontium chloride, and sodium citrate, which help alleviate tooth sensitivity. Sensitivity control toothpastes take time to become effective; results are usually seen after 4-6 weeks of continued use (Harris & Garcia, 2004). Therapeutic toothpastes with a combination of desensitizing and fluoridated agents are available to solve the problems of sensitivity and tooth decay simultaneously. Not all individuals benefit from the use of desensitizing toothpaste; only individuals who experience tooth sensitivity on a daily basis should use such a product. Instead, the findings of the study indicated inconsistencies in the use of desensitizing products. Some individuals without sensitivity problems were using desensitizing toothpastes, while others with tooth pain were not using these products. Failure of Mosby's Canadian Textbook for the Support Worker (Sorrentino, 2003) to indicate the large selection of toothpastes commercially available and their recommended uses and insufficient training on these products, their uses, and benefits may be reasons for the decrease in the likelihood of a caregiver selecting or recommending the appropriate product specific to the oral health needs of each resident.
Knowledge deficiency regarding mouthrinising. Mouthrinising after toothbrushing is equally important in order to cleanse the mouth of oral debris and bacterial plaque deposits that have been dislodged during mechanical toothbrushing. Like toothpastes, mouthrinses can be classified as cosmetic or therapeutic. Cosmetic mouthrinses, such as Scope, provide minimal oral benefits (Darby & Walsh, 2003). Cosmetic mouthrinses demonstrate a negligible reduction in the amount of oral bacteria and provide short term relief from halitosis, which leaves the mouth with a pleasant taste and sensation (Darby & Walsh, 2003). The benefits of cosmetic mouthrinses are short-term, with a duration of approximately 3-5 hours. Therapeutic mouthrinses are used for the control of tooth decay, bacterial plaque, and gingivitis and are available over the counter or by prescription from a dentist or a physician.

Both cosmetic and therapeutic mouthrinses contain approximately 11-27% alcohol (Darby & Walsh, 2003). Of the most common mouthrinses recommended, Listerine has the greatest alcohol content at 27% (Darby & Walsh). The alcohol in mouthrinses acts as a solvent and a taste enhancer (Harris & Garcia, 2004). Unfortunately, the addition of alcohol can have negative effects on the oral tissues and the overall well-being of the individual. For example, alcohol-containing mouthrinses can be dangerous if ingested since they can result in intoxication, illness, or death, depending on the dosage and body weight of the individual (Darby & Walsh). Elderly individuals who suffer vision impairments or diminished cognitive abilities such as Alzheimer's disease, as many residents in the study did, may be at an increased risk of intoxication, illness, or death from ingesting alcohol-containing mouthrinses. Such mouthrinses may be contraindicated for certain individuals including recovering alcoholics, diabetics, and
individuals using antibiotics that indicate the restriction of alcohol consumption (Claffey, 2003; D. White, 2005). Similarly, products containing alcohol may be poorly tolerated by individuals who are immunocompromised, undergoing head and neck radiation therapy, and/or demonstrating inflamed gingival tissues (White). The increased alcohol content has been shown to induce elevated levels of pain on rinsing and sloughing of the gingival tissues (White). As well, a recent review investigating the epidemiology of xerostomia in the elderly population stated that mouthrinses containing alcohol have been implicated in causing xerostomia (W. Thomson, 2005).

Alcohol-free mouthrinses should be routinely recommended for individuals with xerostomia. As previously mentioned, products such as Listerine and Scope contain large amounts of alcohol by volume; these products were found to be routinely recommended and used by the caregivers and residents in the study. As with the variety of toothpastes available, numerous mouthrinses are also available commercially. Mouthrinses that contain fluoride, whitening agents, and plaque disclosing solutions are some examples of the assortment of mouthrinses found commercially. Being aware of the problems posed by the use of these products allows the caregiver or the resident the ability to purchase the products specific to their oral health needs. Failure of Mosby's Canadian Textbook for the Support Worker (Sorrentino, 2003) to indicate the selection of mouthrinses available and their recommended uses, as well as insufficient training on these products, their uses, and benefits, may decrease the likelihood of a caregiver selecting or recommending the appropriate product individualized to the oral health needs of each resident. In the study, residents with xerostomia were not using the appropriate alcohol-free mouthrinses or
mouthrinses with added fluoride, nor were they aware of their existence. Most residents were using Listerine.

Knowledge deficiency regarding power toothbrushes. The effectiveness in removing dental plaque with a power toothbrush versus a manual toothbrush is believed to be equal when used correctly (Darby & Walsh, 2003). Depending on the individual, the recommended use of a power toothbrush may vary. Some individuals would benefit more than others, depending on their need, from the use of a power toothbrush. For example, the indications for use of a power toothbrush include individuals with poor oral hygiene, limited dexterity, and periodontal disease (Darby & Walsh). Power toothbrushes are recommended for use by caregivers for residents with the above-mentioned conditions as well as for residents who are bedridden, comatose, or who cannot control swallowing reflexes (Darby & Walsh).

Power toothbrushes have special features that may make toothbrushing easier and more effective for individuals. Power toothbrush features include a built-in timer to ensure adequate brushing time, pressure sensors to minimize the force exerted on the tooth surface, various brush head sizes to accommodate variations in mouth opening and size, and different power settings for individuals with increased root exposure, inflamed gums, or tooth sensitivity (Darby & Walsh, 2003).

Wolden, Strand, and Gjellestad (2006) evaluated how caregivers felt about the use of power toothbrushes compared to manual toothbrushes for elderly residents residing in long-term care facilities. Wolden et al.’s findings indicated that, when given the choice, the caregivers in his study preferred to use power toothbrushes rather than manual
toothbrushes as they felt that the power toothbrushes were simpler and often less time-consuming.

A common misconception regarding power toothbrushes is that power toothbrushes can cause more damage to the health of the oral tissues than a manual toothbrush (Asadoorian, 2006). Research states that there is no evidence supporting this claim that a power toothbrush that is used improperly will cause more injuries to the oral tissues than a manual toothbrush that is used improperly (Asadoorian).

There are various power toothbrushes available commercially, and it is important that caregivers and residents are educated on their proper adaptation to the tooth surface and the special power toothbrush features. Mosby’s Canadian Textbook for the Support Worker (Sorrentino, 2003) does not identify the use of a power toothbrush by a caregiver. The textbook fails to stress the benefits of these instruments or the ease of use of a power toothbrush for residents with poor oral hygiene, limited dexterity, or who are bedridden. Dependent residents in the study did not report using a power toothbrush.

An increased cost is associated with the use of a power toothbrush. Expensive dental care and oral hygiene aids have been criticisms expressed by the residents in the study. Therefore, despite the added benefits of a power toothbrush, some residents may still prefer to use a manual toothbrush. All of the residents and caregivers in the study reported using a manual toothbrush for daily oral care.

*Brushing time.* For toothbrushing to be effective, the recommended duration of time of toothbrushing should be stressed during toothbrushing instruction. Research indicates that the average brushing time varies from 45-60 seconds (Darby & Walsh, 2003). Evidence has shown that power toothbrushes require less time and are easier to
manipulate when compared to manual toothbrushes (Wolden et al., 2006). It has been recommended by dental professionals that in order to consistently yield adequate reductions in plaque, 2 minutes of power toothbrushing can be as effective as 5 minutes of manual toothbrushing (Darby & Walsh, 2003). Regardless of the toothbrush utilized, toothbrushing instruction should include information regarding correct toothbrush selection, toothbrush replacement, sequence of toothbrushing, duration of toothbrushing, toothbrushing method, evaluation of the effectiveness of toothbrushing, and detrimental effects of improper toothbrushing. All of these topics were excluded from the educational curriculum requirements of the personal support worker. Without the above-mentioned information, caregivers were unable to correctly recommend the use of a power or manual toothbrush or reiterate their benefits to their residents.

Knowledge deficiency regarding the use of interdental aids. To cleanse the mouth thoroughly, interdental cleaning should be incorporated with toothbrushing. Toothbrushing is an automatic habit for most clients, but cleaning the tongue and between the teeth are not.

Dental floss is the most frequently recommended aid for cleaning plaque and debris from between the teeth of individuals with healthy gums. There are a variety of dental flosses available commercially including waxed, unwaxed, polytetrafluoroethylene, braided, tufted, and G-floss (Darby & Walsh, 2003). These flosses each have a specific intended use and offer a wide range of benefits. When recommending a dental floss, the specific oral conditions, tooth anatomy, personal preference, and manual dexterity are factors that need to be considered. Dental flossing is a skill that requires manual dexterity in order to properly align the floss with the tooth
surface. When inserting the dental floss, it is gently eased between the contact points between two teeth with a see-saw motion (Harris & Garcia, 2004). The gentle see-saw motion flattens the floss and allows the floss to pass the contact point without causing any trauma to the gums. Once beyond the contact point, the floss is adapted to each tooth surface by pulling in the same direction on both ends of the floss, thereby creating a C-shape (Harris & Garcia). The floss is then directed up and down against the side of the tooth several times until the tooth surface is clean (Harris & Garcia). The textbook used for personal support worker education fails to identify the proper positioning of the dental floss between the teeth. The C-shape is necessary in the prevention of gingival floss cuts (traumatized gum tissue). Additionally, properly positioned dental floss increases the surface area covered by the floss, thereby disrupting and removing more dental plaque (Darby & Walsh). The caregivers in this study did not report flossing any of the residents’ teeth.

It is important to note that regular flossing has been traditionally proven to be a difficult habit to embrace (Harris & Garcia, 2004). It has been estimated that 10-21% of the population practice daily flossing (Harris & Garcia). Although flossing is considered to be the superior method of cleaning between teeth, individuals may refuse to adopt flossing practices. Therefore, when circumstances prevent proper interdental care, alternative supplemental aids other than manual dental flossing are necessary for thorough oral care. Floss holders, rubber-tip stimulators, proxabrushes, sulcabrushes, end-tuft brushes, and wooden toothpick stimulators are examples of alternative interdental aids that can be utilized when dental flossing is rejected (Darby & Walsh, 2003). For example, a few residents reported that food would get trapped between their
teeth. The residents reported using toothpicks in order to dislodge the trapped food. Toothpicks are considered easier to manipulate than dental floss and are used more frequently than dental floss. Unfortunately, without proper instructions by either a caregiver or dental professional, toothpicks can be very damaging to the gums. Improper use along the gumline can lead to permanent loss of gingival tissue. The residents who reported the use of toothpicks demonstrated improper toothpick adaptation and technique.

The implementation of alternative interdental aids, descriptions of the various types of floss, evaluation of flossing techniques, and proper flossing methods are topics that are not evident in Mosby's Canadian Textbook for the Support Worker (Sorrentino, 2003).

The personal support workers were not educated regarding the variety of interdental aids available as alternatives to dental flossing. Without this knowledge the caregivers were unable to order or recommend the appropriate aids for the residents in an effort to achieve optimal oral health. Consequently, without the proper resources, the oral health of the residents could potentially decline, having a negative impact on their overall general health.

Knowledge deficiency regarding tongue brushing. Little attention has been paid to tongue hygiene. Tongue brushing can reduce the number of bacterial organisms, improve taste perception, reduce halitosis, and contribute to overall oral cleanliness (Darby & Walsh, 2003). It has been reported that the tonsils, teeth, and gums can be colonized by the bacteria found on the tongue (Danser, Gomez, & Weijden, 2003). Daily tongue brushing is therefore strongly recommended. Tongue brushing has been shown to remove the bacterial plaque and food debris responsible for 85% of cases of bad breath (Darby &
Bad breath can have either a systemic origin or may originate in the oral cavity. The top surface of the tongue continually forms a coating that consists of dead cells, food debris, and hundreds of bacteria, along with chemicals such as sulfurs produced by such bacteria (Bosy, n.d.). When left on the tongue, this coating thickens and is one of the primary sources of bad breath. Furthermore, the surface of the tongue contains taste buds which, when covered with debris, affect the sense of taste (Bosy). It has been noted that tongue brushing is especially important for increasing taste acuity in elderly individuals who experience xerostomia (Danser et al.). Danser et al. indicated that with a dry mouth, individuals have difficulties distinguishing the subtle flavors of various prepared foods.

For a number of reasons consistent tongue brushing is essential for a thoroughly clean mouth. For example, the elderly are more likely than younger individuals to exhibit a coated tongue due to dietary changes, inability to perform effective oral hygiene practices, a decrease in salivary flow, and changes in the consistency of the saliva (Danser et al., 2003). The nature of the saliva will lead to an accumulation of oral debris, which in turn will be further deposited onto the teeth and supporting structures (Danser et al.). Moreover, it has been suggested that the volume of bacteria present on the tongue tends to increase in individuals with periodontal disease, which is diagnosed more frequently in aged individuals (Danser et al.).

Tongue brushing has been neglected as a daily oral hygiene routine for the residents in the study. Attention has primarily concentrated on the protection and treatment of teeth and their supporting structures. Most of the independent and dependent residents in the long-term care facilities displayed the presence of coated tongues. Oral
hygiene education regarding the use of tongue cleaners was demonstrated by the principal investigator to the independent residents and the caregivers. The implementation and importance of daily tongue brushing as an adjunct to recommended daily oral hygiene techniques (i.e., toothbrushing, mouthrinsing, and the use of interdental aids) was not evident in Mosby’s Canadian Textbook for the Support Worker (Sorrentino, 2003), nor was it a common technique performed by caregivers or independent residents.

Knowledge deficiency regarding denture care. A large majority of elderly individuals in the study wear partial or complete dentures. Proper care and cleaning of dentures and the underlying soft tissues is essential to maintain good oral health. Care of the soft tissues on which a denture rests includes removing the denture overnight or for several hours during the day (Harris & Garcia, 2004). The dentures and the tissues should be cleaned and massaged daily. Regular oral self-care examinations should be conducted daily and the presence of any irritation should be reported. Failure to remove the denture daily may result in bad breath, irritated tissues, bacterial or fungal infections, oral disease, or the development of chronic inflammatory conditions (Harris & Garcia).

Gingival irritations may impair an individual’s eating abilities, which can have a negative impact on their nutritional health. Two residents in the study reported that their dentures were poorly fitting. One resident reported that the poorly fitting denture had an impact on her nutritional health. She indicated an inability to eat a variety of tougher meats or vegetables. The second resident reported that he no longer wore his dentures because of the gum irritations and ulcerations that they were consistently causing. It was not until the researcher recommended that the residents see a dentist in order to remedy
the denture-fit problem that the issue of gum irritations and nutritional deficiencies was resolved.

The personal support worker program curriculum indicated the necessity of denture removal but failed to identify the potential hazards of continuous denture wearing. Knowledge of these potential hazards may influence residents to remove their dentures before bedtime or for a number of hours during the day, thereby reducing the likelihood of denture-induced irritations (Harris & Garcia, 2004). In addition, a reminder to rinse the dentures and mouth after each meal helps to minimize the accumulation of food debris and plaque. The personal support worker program curriculum did recommend rinsing the dentures between meals and noted that wrapping the dentures in tissue paper or napkins be avoided to prevent the accidental disposal of dentures mistaken as garbage.

Proper denture hygiene care can be confusing for denture-wearing individuals due to the large variety of products available for home use. When selecting a denture cleanser, the safety of the denture wearer and the denture is paramount. Abrasive powders or pastes are not recommended for cleaning dentures because of the potential for the client to use these products incorrectly, thus damaging the appliances and ultimately altering their fit. Nonabrasive agents such as soap, baking soda, or commercial toothpaste may be safely used in conjunction with a soft-medium bristled denture brush (Harris & Garcia, 2004).

Immersing the denture in a denture-cleaning solution has the advantage of reaching all parts of a denture, whereas brushing may miss certain areas. Consequently, a combination of both may result in a more thoroughly cleaned denture. When selecting an immersion cleanser, the type of denture material must be considered. For example,
alcohol or essential oils (such as menthol and eucalyptus) found in commercial
mouthrinses are not compatible with acrylic dentures. Prolonged contact with these
products causes the dentures to lose their colour and dry out (Harris & Garcia, 2004).
Examples of inexpensive home immersion solutions include a combination of household
bleach, dish detergent, and water for immersing complete acrylic dentures, whereas a
mixture of hydrogen peroxide and baking soda forms an alkaline solution for dentures
with metal parts (Darby & Walsh, 2003). It is imperative that individuals be instructed to
thoroughly rinse off the dentures before placing them into the mouth after immersion.

Commercial alkaline peroxide powders and tablets are more commonly used for
denture cleaning. These products typically contain an alkaline for oxidizing, a carbonate
for effervescing, and a chelating agent (EDTA); (Harris & Garcia, 2004). When dissolved
in water these agents decompose and release oxygen bubbles, which mechanically loosen
plaque debris from the denture surface. A 99% bacterial kill has been reported with the
use of these commercial products (Darby & Walsh, 2003).

Precautions must be taken when recommending commercial over-the-counter
(OTC) products to the residents. The majority of residents from the LTC-A facility
reported soaking their dentures in an OTC denture cleaner. Careful monitoring of
residents’ use of denture cleansers is essential, especially for those who may have
difficulty reading or understanding label cautions and warnings. A large majority of the
residents in the LTC-A facility were cognitively impaired. Denture wearers and their
caregivers must be warned to never chew, swallow, or gargle with denture cleansers. For
example, in a recent study, an 81-year-old man soaked his dentures in an OTC denture
cleanser and then gargled with the remaining solution. His tongue became blue and
swollen. Despite emergency efforts the man died at the scene (Fuller, 2007). In another episode, an 84-year-old woman with a history of Alzheimer’s dementia, confusion, and paranoia ate one tablet of an OTC denture cleanser. Afterward, she vomited, became delirious, and required emergency treatment to survive (Fuller). Last, a 74-year-old nursing home resident with bronchitis ate approximately six denture cleanser tablets. She was found foaming at the mouth and experiencing difficulty breathing. After suffering cardiopulmonary arrest, she received CPR and was admitted to the hospital, where she survived (Fuller). Denture cleansers are not intended for internal use, yet in all three cases mentioned above, they were gargled or swallowed. Some OTC denture cleansers contain ingredients associated with allergic reactions, while others include ingredients that can irritate the oral tissues and may be toxic if ingested (Fuller). Fortunately, no such accidents were reported in either long-term care facility studied.

In addition to adequate dexterity and ability, attainment of optimal oral health requires motivation and daily compliance in performing oral care. To enhance compliance and skill development, the number of recommended oral hygiene devices should be limited. The preference for specific devices should be assessed when recommending supplemental oral hygiene devices and techniques. When a device is introduced, it is essential that the proper application in all areas of the mouth be demonstrated and that the potential for damage with improper use be understood.

Therefore, as a health care provider, it is essential to remain informed of the research describing new devices as they become available. Unfortunately, the relevant educational information presented in Mosby’s Canadian Textbook for the Support Worker (Sorrentino, 2003) was insufficient. Without sufficient knowledge, the caregiver did not
have the skills or knowledge to recommend the appropriate aids for each resident.

Overall, this has an impact on the overall oral health and general well-being of the individuals. Moreover, independent residents who did not seek regular dental care did not have access to dental health care professionals to provide them with the correct dental aids individualized to their needs.

Initially, at the commencement of the study, the caregivers were very confident in their oral care routines. At the end of the study, after the oral care recommendations were given, all of the caregivers reported a need for inservice training by oral health professionals in order for them to remain current with the latest oral care products as well as remain consistent in their oral care recommendations and techniques. In addition, it was acknowledged that inservice training would also ensure a consistency among caregivers regarding the level of care and variety of services provided. Postgraduate inservice training of caregivers may help to improve the oral health of the residents residing in long-term care facilities. Inservice training can be targeted to both caregivers and independent residents who fail to seek regular dental care.

Time and Staff

The Canadian Union of Public Employees (CUPE) Ontario Division in conjunction with the National Research Department commissioned a study of long-term care facilities and health care providers in Ontario. This study was conducted to assess workplace issues such as staff training, workload, perception of resident care, and worker safety and health. The authors of this study, Armstrong and Daly (2004), identified staff shortages as a central problem. Increasing acuity levels and reductions in the number of employees have resulted in overworked staff and decreased care for residents (Armstrong
To support this statement, the caregivers from LTC-A complained of a heavy workload and felt that insufficient time was being allocated to the residents in order to provide each resident with quality care.

Armstrong and Daly (2004) noted that staff shortages exist in every occupational category critical to care. Nursing, therapy, and personal care shortages are critical; equally critical are shortages in dietary, clerical, housekeeping, and maintenance services. For example, if the dietary or housekeeping staff is reduced, the remaining staff becomes responsible for feeding the residents and cleaning their rooms. Each position is critical to care, and cutbacks in one area have a dramatic impact on all workers and residents (Armstrong & Daly). For this study, I observed the cleanliness of the residents' rooms when visiting them in order to perform the intraoral assessments. One resident had a large bag of popcorn spilled all over her floor, another resident’s room had empty jam containers and candy wrappers scattered throughout the room, and another resident’s bathroom was unsanitary and foul smelling. Sadly, the garbage in this last bathroom was overflowing with soiled adult diapers. Staff shortages in housekeeping or heavy workloads resulted in untidy resident rooms.

Staffing shortages are evident in LTC-A. The four care floors that are designated for dependent residents have one primary caregiver assigned to each of them. Two additional caregivers work among the four floors, offering their assistance where needed. Each caregiver was responsible for providing care to approximately 10 residents.

Heavy workloads meant that there was not enough time to complete tasks in ways that comply with quality standards. An increased workload was coupled with increased stress, thus creating an unpleasant work environment. Armstrong and Daly (2004) quoted
a caregiver who stated that "there are not enough hands to effectively, and with dignity, feed these residents as they deserve to be fed. There are not enough hands to provide the care these residents require and deserve" (p. 8). Similar results were obtained within my study when the caregivers were questioned regarding the level of care provided. Caregivers in the study reported that at times they felt rushed in providing proper care to their residents because their services were in constant demand by other staff members. Without a sufficient number of staff, minimal time was spent on providing care to the residents. Duties were conducted in less time than was essentially required, thereby affecting the quality of care necessary for the residents.

Regulation and Continuing Education

Personal support workers are unregulated health care providers. They work under the supervision of a regulated health care professional, supervisor, or employer in the independent living environment (Ontario Ministry of Training, 2004). A regulated health care professional has the responsibility to provide continuing supervision for unregulated health care providers. Along with health care professionals, supervisors and employers are accountable for knowing and understanding the responsibilities of the personal support worker. They are liable for their decisions and actions regarding delegating, teaching, assigning, and supervising personal support workers (Ontario Ministry of Training).

When assigning tasks to personal support workers, employers, supervisors, and health care professionals must consider each situation in relation to a specific resident's condition, the task to be completed, the risk associated with performing the task, and the environmental support required to safely and competently carry out the task (Ontario
Ministry of Training, 2004). Personal support workers cannot perform a controlled act unless the authority is delegated to them by a regulated health care professional (Ontario Ministry of Training). Controlled acts are health care actions that are considered potentially harmful if performed by unqualified individuals (College of Dental Hygienists of Ontario [CDHO], 2006a).

In Ontario, health care professions are governed by regulatory bodies. Regulated health care professionals are individuals who are members of a regulatory body mandated by the Regulated Health Professionals Act (RHPA, 1991). The regulatory bodies have the responsibility and obligation to uphold the standards for practice in their professions (Ontario Ministry of Training, 2004). All health colleges in Ontario fall under the RHPA, and the key objectives of the Act include regulating the practice of the profession and governing its members, determining entry to practice requirements, assuring the quality of professional practice, promoting continuing competence, determining ethical standards, and identifying controlled acts performed by the profession (Ontario Ministry of Training). Regulation is designed to protect the public from incompetent or unqualified practitioners. Regulated health care professionals regulated by their regulatory body include dentists, dental hygienists, dieticians, occupational therapists, optometrists, pharmacists, physicians, physiotherapists, nurses, and respiratory care practitioners (Ontario Ministry of Training).

Regulatory bodies exist to protect the public interest. In Ontario, the Regulated Health Professions Act (RHPA, 1991) requires that all health regulatory colleges under the Act develop and maintain a quality assurance program to ensure the provision of optimal quality care to the public and promote continuing quality improvement among its
members (CDHO, 2006a). With respect to dental hygiene, the role of the regulatory college is to assure the public that dental hygiene care is safe, ethical, effective, and of high quality (CDHO, 2006b). The mission of the CDHO is to regulate the practice of dental hygiene in the interest of the overall health and safety of the public of Ontario (CDHO, 2006b). In the development of the quality assurance program, CDHO acknowledges that dental hygienists are competent professionals whose goals include maintaining and improving their level of competence based on accepted standards of practice (CDHO, 2006b).

Practice enhancement/remediation activities are required for dental hygienists found deficient in their knowledge, skills, attitudes, and judgment as identified through an audit process. Required courses are identified by a Quality Assurance Committee to remediate the identified deficiencies. Successful completion of these activities is required as specified in the Quality Assurance Regulations in order to remain as a practicing dental hygienist (CDHO, 2006b).

Personal support workers do not belong to a regulatory body. They are not governed by the RHPA; therefore they do not have a specific set of standards on which they are monitored to ensure continued competence of their skills and knowledge. Since graduation from the personal support worker program, the caregivers interviewed in this study reported that they have never received in-service training regarding oral care in their places of employment, nor have they taken continuing education courses specifically pertaining to oral care. Personal support workers need to set goals for continued expansion of skills and knowledge in order to respond to changes in their working environment. Continual renewal of skills and knowledge can improve
satisfaction among clients and health care providers. Without continuing education along with the support and expertise of their employers or regulated health care professionals, optimal quality care becomes a difficult goal to achieve.

**Collaboration**

Successful health care often relies on collaborative care which requires a broad network of collaborative interactions among a variety of health service providers, patients, their families and caregivers, and the community, with patients being both the focal points and full-fledged partners of the overall effort (Health Canada, 2005). Addressing the collaborative dynamics of health care has long been recognized as a key aspect of primary health care renewal in Canada (Health Canada).

Currently, teams of health care providers such as nurses, physicians, nurse practitioners, personal support workers, pharmacists, physiotherapists, dieticians, and social workers share work as a team and function in a collaborative way, where their services are integrated (Health Canada, 2005). The health care team discusses care issues and develops common understandings while still maintaining the autonomy of each profession. Collaboration between dentists and dental hygienists has been minimal or absent in long-term care facilities. In support of this statement, in *LTC-A*, a dentist visited the facility only on a yearly basis. In *LTC-B*, there was no dentist that visited the facility. Both *LTC-A* and *LTC-B* were not visited by dental hygienists. The residents in *LTC-A* and *LTC-B* were responsible for reporting a need for dental care.

The purpose of collaboration is to optimize the knowledge, skills, and abilities of all health care providers so that clients receive safe, appropriate, and timely access to care (Canadian Nurses Association, 2005). Collaborative practice means that the client has
access to the most appropriate provider to meet his or her current health care needs within an appropriate timeframe (Canadian Nurses Association).

Collaboration is a process that requires interactions among individuals. For collaboration to occur, it is influenced by an individual’s desire to want to work in a partnership (Canadian Nurses Association, 2005). It requires interdependence among disciplines that have typically worked independently, as traditionally evident in the dental field.

Organizational structures have a strong influence on the development and success of collaborative practice. Successful collaboration requires a shift from the customary hierarchical structure (top-down approach) to a more horizontal structure (Canadian Nurses Association, 2005). The organization should have leaders who know how to convey the desired vision of collaborative practice, who motivate professionals into collaborative practice, and who are able to create an environment that fosters collaboration (Canadian Nurses Association). The Directors of Care at LTC-A and LTC-B were very enthusiastic to participate in the research study. They both expressed a desire to help improve the oral health of the residents and stated that there was a growing need for increased collaboration among health disciplines.

The key elements that are essential for a successful collaboration to occur include time management and proper space and support. The leader must have organizational skills in order to schedule adequate time for team members to interact with each other and discuss care issues as well as the proper office or clinical space necessary for the health team members to work (Canadian Nurses Association, 2005). Unfortunately the collaboration among the health disciplines in the long-term care facilities was inadequate
in order to demonstrate a profound change in the oral health status of the residents. For example, at times within long-term care facilities, the Directors of Care were not prepared for the principal investigator to conduct the oral examinations or the interviews. On occasion, the appropriate equipment (nursing cart) was not available to be used by the principal investigator to transport the required oral health aids from room to room because it was being used by another provider. The caregiver interviews were not routinely conducted in a specific room in the facility, which resulted in the participants being shuffled from one room to another if a scheduled meeting was to take place. At times, some of the caregiver interviews were scheduled by management when the specific caregiver was not working, and at other times the caregivers were not made aware of their scheduled interview until the day the principal investigator arrived. Therefore, when the principal investigator arrived for the interview, the caregiver was busy attending to her specified duties. An increased amount of stress was placed on the caregivers to try to complete their current tasks and find time to conduct the interview with the principal investigator. Furthermore, at times, residents were not informed of their scheduled assessment appointments. When the principal investigator arrived, these residents were not in their rooms, were out running errands, or were ill and could not participate in the research study at that time. Therefore, the assessments had to be rescheduled. Last, the Directors of Care may not have placed enough importance on the research project and therefore did not strongly encourage the participation of the residents or caregivers. This may have been an explanation for the minimal study participants obtained. Further collaboration among the health disciplines is necessary in order to
improve the overall oral health of the residents and improve the care provided by the caregivers in the long-term care facilities.

Interprofessional Collaboration and Education

Health care is a collaboration, not a competition. Training health care providers, including dental hygienists and dentists, to work collaboratively must start before they enter into practice. An opportunity for students to learn with each other, from each other, and about each other's professions is essential for the success of collaborative practices. An educational system that helps dental hygiene students and other health disciplines recognize the values and responsibilities of their own profession while teaching them the benefit of working within a team of health providers with different skills is beginning to surface (Health Canada, 2007). Taking an interprofessional approach to education can help achieve this.

Interprofessional education has been described as learning together to promote collaboration. It involves socializing health care providers to work together, sharing problem-solving and decision-making tasks, developing a mutual understanding of and respect for the contributions of various disciplines, and instilling the requisite competencies for collaborative practice (Health Canada, 2007). For example, in 2006, first-year nursing students and first-year dental hygiene students from an Ontario community college participated in an interprofessional practical skill development project. Having separately learned the classroom theory behind blood pressure and oral care, the students collaborated in demonstrating and teaching each other proper techniques (Canadian Interprofessional Health Collaborative [CIHC], 2005). As well, in Nova Scotia, the Faculty of Dentistry and the School of Dental Hygiene are trying to
form a partnership with other professional training institutions to pursue interprofessional learning activities in clinical practice and research that will help promote increased interdisciplinary awareness of oral issues among graduating health professions (CIHC).

In long-term care facilities (such as LTC-A and LTC-B) or in hospital settings, hosting collaborative continuing education opportunities regarding seniors’ oral health issues to both residents and nondental practitioners may increase comfort when addressing and identifying oral health issues. Training physicians, nurses, dieticians, pharmacists, personal support workers, and residents regarding oral screening, so that it becomes a routine delivery, and/or scheduling routine oral care appointments for the residents by dental health professionals can be alternative solutions to meet the growing demands of quality care.

Ultimately, we are trying to change the way that we educate our health care providers to achieve a system of change and to ensure the health care providers have the necessary knowledge and training to work effectively on interprofessional teams within our evolving health care system (Gilbert, 2007). Prior to graduation, interprofessional education within the health care disciplines is slowly evolving. Currently, as an attempt to improve the oral health issues of individuals residing in long-term care facilities, we should continue to focus our collaborative efforts on routinely educating practicing health care providers, residents, supervisors, and Directors of Care.

Benefits of Interprofessional Collaboration

Collaborative interprofessional practice is designed to promote the active participation of several health care disciplines and professions. It enhances patient, family, and community-centered goals and values, provides mechanisms for continuous
communication among health care providers, optimizes staff participation in clinical decision making (within and across disciplines), and fosters respect for the contributions of all providers (Gilbert, 2007). There is growing consensus that interprofessional collaborative practice, across all health sectors and along the continuum of care, will contribute to improved population health, improved patient care, improved access to health care, recruitment and retention of health care providers, improved patient safety and communication among health care providers, more efficient and effective employment of health human resources, and improved satisfaction among patients and health care providers (Health Canada, 2007).

Changing the way we educate health care providers is key to achieving system change and to ensuring that health care providers have the necessary knowledge and training to work effectively on interprofessional teams within the evolving health care system (Health Canada, 2007).

**Concluding Remarks: Maintaining Oral Health**

The results of this study indicate that there is a need for improved oral health in long-term care facilities. There are many issues that need to be remedied in order to improve the oral health status of the residents within these facilities.

Prevention of oral disease in the elderly requires early intervention, education of caregivers for better identification of patients at risk, and implementation of preventive programs. There are no formal policies and practices for managing seniors’ oral health care in Ontario. To help fill this void, further longitudinal investigation is needed in order to identify a structured oral health protocol that can be utilized throughout all long-term care facilities across the province of Ontario.
A structured oral health educational program that provides oral hygiene instruction and demonstrations of oral hygiene techniques combined with systematic evaluation of the learners are the requirements needed for the development and implementation of a long-term oral hygiene program. The structured oral hygiene protocol should provide the long-term care facility with dental status information of the residents on a biannual basis. Implementation of regular dental examinations by local dentists or dental hygienists should be included. Many individuals, not just dentists and dental hygienists, are integral to helping to improve the oral health of seniors; therefore family members and the general public should be made aware of the oral health needs of the elderly and their impact on general health through health promotion strategies. Family members and the public can take a more proactive approach to ensuring that the appropriate goals for healthy aging are both established and met. Moreover, if seniors and their families do not learn to recognize the importance of oral health, they may continue to avoid seeking proper oral care. Advocating oral health education programs to administrators of long-term care facilities can serve to educate seniors and nondental health professionals such as physicians, nursing personnel, nutritionists, social workers, and policymakers, prompting the promotion of oral health as an integral part of general health and quality of life.

Good oral health is a combination of early access to prevention and treatment of dental diseases. However, the most important aspect of oral health is having the ability to maintain it. Understanding the causes of poor health and properly performing the preventive actions may help to sustain oral health. Unfortunately, this is not a simple model to follow.
Influencing people to comply with or adhere to regimens of oral hygiene care is a major challenge facing dental hygienists (Darby & Walsh, 2003). Compliance with oral hygiene recommendations can be interrupted by lapses or temporary slips back to one’s former behaviour. Occasional lapses are normal and may not necessarily threaten oral health, but complete breakdown of an individual’s oral health program must be prevented (Darby & Walsh). Maintaining oral health requires persistence and perseverance on the part of both the health care provider and the individual.

In continuing research into the oral health of elderly, future researchers can focus on educating the caregivers and residents in maintaining optimal oral health. Speaker presentations and workshops for caregivers and residents to learn more information regarding oral health is essential. For example, information can be presented during oral health week in the month of October, thus ensuring that educational sessions are provided on an annual basis to the long-term care facilities. Future researchers can also focus their attention on the textbooks that caregivers utilize during their formal education. The textbooks that caregivers utilize should be revised on a regular basis and should incorporate more current information regarding oral health. The health care educators should respond to the shortfalls in their oral health care education programs and must design relevant and effective education programs. Last, provincial policymakers within the health care system must be informed of the current oral health situation, for if they are not informed, oral health will continue to remain peripheral to general health concerns.

Overall, oral health is essential, and maintaining optimal oral health requires a commitment of individuals, investments in partnerships, and sustainability of effective programs. It is believed that increased collaboration and communication between dental
hygienists and caregivers within long-term care facilities can help seniors to access oral health services that may ultimately have a positive impact on their general health.
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http://www.dent.ualberta.ca


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Yates, J. (2003). The role of a meticulous oral hygiene program in reducing oral assessment scores, plaque scores, colonization of dental plaque and exposition to pathogen colonization may lead to nosocomial respiratory infections in selected ICU patient population. Proquest Dissertations and Theses, George Mason University, Virginia, United States. (Publication Number: AAT 3074023).
Appendix A

Glossary of Terms

**Bacteremia:** the presence of microorganisms in the blood stream

**Bacterial plaque:** a dense, organized matrix of microorganisms that form on the teeth, gingiva, and restoration; the cause of dental caries and periodontal disease.

**Calculus:** mineralized bacterial plaque; lay term is tartar

**Cementum:** a mineralized bone-like substance that covers the roots of teeth and provides a surface of attachment and anchorage for the periodontal fibers

**Coated tongue:** a yellow, whitish, or pigmented covering on all or a portion of the tongue’s dorsal surface; indication of the need for tongue cleaning or an underlying disease

**Collaboration:** the process of working together for the achievement of common goals; dental hygienists and other health professionals cooperating as colleagues to integrate their respective care regimens into a single comprehensive approach to quality client care.

**Dental caries:** an infectious, bacteria-caused disease characterized by the acid dissolution of enamel and the eventual breakdown of the more organic, inner dental tissues

**Dental hygiene:** the study of preventive oral healthcare and the management of behaviours required to prevent oral disease and promote health

**Dental hygiene clinician:** the role focuses on the assessment of signs of health and disease in the oral cavity

**Dental hygiene educator/oral health promoter:** the role used when a dental hygienist explains disease processes and home-care techniques, any time a client has learning needs

**Dentifrices:** substance (gel, paste, or powder) used in conjunction with a toothbrush to facilitate bacterial plaque removal, or a vehicle for transporting therapeutic or cosmetic agents to the tooth and its environment

**Denture stomatitis:** inflammation of the oral mucosa associated with wearing dentures. Commonly found under maxillary dentures, mucosal tissues have generalized red and velvety appearance. Pain varies from little or no pain to burning sensations. Primarily the result of chronic *Candida albicans* infections.

**Edentulous:** being without teeth or lacking teeth
Erythema: a red area of variable shape and size reflecting inflammation, thinness, and irregularity of epithelium, and lack of keratinization

Gingiva: that part of the oral mucous membrane attached to the teeth and the alveolar processes of the jaws.

Gingival margin: the edge of the marginal gingiva that is nearest to the incisal or occlusal area of the tooth; marks the opening of the gingival sulcus

Gingival sulcus: the space between the marginal gingiva and the tooth. The healthy gingival sulcus measures 0.5 to 3.0mm from the gingival margin to the base of the sulcus.

Gingivitis: inflammation of the gingival tissue with no apical migration of the junctional epithelium beyond the cementoenamel junction.

Hard palate: roof of the mouth which is digitally palpated for lesions, swellings, hard masses, and colour changes during an intraoral examination

Health: a state of well-being with both objective and subjective aspects that exists on a continuum from maximal wellness to maximal illness.

Health promotion: activities in which individuals and communities can engage to promote healthy lifestyles.

Oral health: defined as the oral condition that results from the interaction of individuals with their environment, under varying levels of human need fulfillment; oral health and overall health status are interrelated because each impacts the other.

Oral mucosa: the lining of the oral cavity of mucous membrane composed of connective tissue.

Periodontitis: inflammatory disease of the periodontium characterized by the loss of connective tissue attachment, destruction of bone, and possible tooth mobility.

Periodontium: the supporting structure of tissues that surrounds the teeth; includes the gingiva, periodontal ligament, root cementum, and alveolar bone.

Plaque control: the regular removal of bacterial plaque from the teeth and adjacent oral tissue or the prevention of its accumulation.

Remineralization: the deposition of minerals into previously damaged areas of a tooth; facilitated by fluoride therapy.

Xerostomia: dry mouth caused by a variety of conditions such as a salivary gland dysfunction, medications, and radiation therapy to the head and neck.
Appendix B
Brock Research Ethics Board Clearance

Office of Research Services
Research Ethics Office
St. Catharines, Ontario, Canada L2S 3A1
T: 905-688-5550, Ext. 3055/48-6 F: 905-688-0748
www.brocku.ca

DATE: December 22, 2006
FROM: Julie Stevens, Vice - Chair
Research Ethics Board (REB)
TO: Joe Engemann, Education
Sylvia IERACI
FILE: 06-133 IERACI
TITLE: Examination of the Oral Health Status of Functionally Independent and Dependent Seniors Residing in Long-Term Care Facilities

The Brock University Research Ethics Board has reviewed the above research proposal.

DECISION: Accepted as clarified.

This project has received ethics clearance for the period of December 22, 2006 to March 31, 2007 subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The clearance period may be extended upon request. The study may now proceed.

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and cleared by the REB. During the course of research no deviations from, or changes to, the protocol, recruitment, or consent form may be initiated without prior written clearance from the REB. The Board must provide clearance for any modifications before they can be implemented. If you wish to modify your research project, please refer to http://www.brocku.ca/researchservices/forms to complete the appropriate form Revision or Modification to an Ongoing Application.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

The Tri-Council Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form Continuing Review/Final Report is required.

Please quote your REB file number on all future correspondence.

JS/Nov.
# Appendix C

## Maintenance of Oral Health-Assessment Form

<table>
<thead>
<tr>
<th>Name: __________________________</th>
<th>Room Number: _______</th>
<th>Time: _______</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessor: ______________________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teeth</th>
<th>Full Denture</th>
<th>Partial Denture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>CUD</td>
<td>PUD</td>
</tr>
<tr>
<td>Lower</td>
<td>CLD</td>
<td>PLD</td>
</tr>
<tr>
<td>No teeth present</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Lips</th>
<th>Tongue- Appearance</th>
<th>Tongue-Cleanliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Normal</td>
<td>Clean</td>
</tr>
<tr>
<td>Dry</td>
<td>Red</td>
<td>Lightly coated</td>
</tr>
<tr>
<td>Cracked</td>
<td>Fissured</td>
<td>Heavily coated</td>
</tr>
<tr>
<td>Lesions:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Saliva</th>
<th>Mucosa</th>
<th>Palate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abundant</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Medium</td>
<td>Lesions:</td>
<td>High</td>
</tr>
<tr>
<td>Scanty</td>
<td></td>
<td>Shallow</td>
</tr>
<tr>
<td>Dry mouth</td>
<td></td>
<td>Torus</td>
</tr>
<tr>
<td>Burning Sensation</td>
<td>Lesions:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Floor of Mouth</th>
<th>Oral Hygiene Status</th>
<th>Denture Hygiene Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td>Torus(i)</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Lesions:</td>
<td>Fair</td>
<td>Fair</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td>Very poor</td>
<td>Very Poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denture Wearing Habits</th>
<th>Acceptance to Oral Care</th>
<th>Oral Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily and nightly</td>
<td>Compliant:</td>
<td>Independent</td>
</tr>
<tr>
<td>Removes nightly</td>
<td>Always</td>
<td></td>
</tr>
<tr>
<td>Does not wear</td>
<td>Sometimes</td>
<td>Assist:</td>
</tr>
</tbody>
</table>

|                            | Usually                  | Dependent:  |
|                            | Rarely                   |            |
Appendix D

Medical History Form

Health History:  
Medical Alert Status

Name:

Date of birth:

Sex:  M  F

Physician Name:  

Phone Number:

Dental History:

1. What are your current oral hygiene practices?

2. How often do you brush your teeth?

3. How long do you brush your teeth for?

4. Do you wear removable dental appliances (dentures)? If so, how often do you remove your dentures and clean them?

5. Do you soak your dentures overnight?

6. Do your dentures fit properly? Or are they lose fitting?

7. Do you have any lumps or sore spots in your mouth?

8. Do your gums bleed when you brush your teeth?

9. Does food catch between your teeth?

10. Are your teeth sensitive to cold air or foods?

11. Do you use dental floss, toothpicks, or any other dental product between your teeth?

Medical History:

1. Have you had a medical condition in the past 2 years that has or is requiring treatment?
2. Are you taking any prescription or non-prescription medication?

Please list (name and dosage):

3. Are you taking herbal or nutritional supplements?

Please list (name and dosage):

Please circle any of the following health conditions that you have, or may have had in the past:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td>Hepatitis A, B, C</td>
</tr>
<tr>
<td>Aids/HIV</td>
<td>Heart attack</td>
</tr>
<tr>
<td>Artificial Heart Valve</td>
<td>Heart murmur</td>
</tr>
<tr>
<td>Blood disorders</td>
<td>Heart pacemaker</td>
</tr>
<tr>
<td>Cancer</td>
<td>Heart surgery</td>
</tr>
<tr>
<td>Congenital heart disease</td>
<td>High/low blood pressure</td>
</tr>
<tr>
<td>Diabetes (type I or II)</td>
<td>Liver disease/jaundice</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>Joint replacement</td>
</tr>
<tr>
<td>Fainting or dizzy spells</td>
<td>Kidney disease</td>
</tr>
<tr>
<td>Stroke</td>
<td>Lung disease (TB, asthma, bronchitis)</td>
</tr>
<tr>
<td>Thyroid condition</td>
<td>Organ transplant</td>
</tr>
<tr>
<td>Rheumatic fever</td>
<td>Psychiatric problems</td>
</tr>
<tr>
<td>Rheumatic heart disease</td>
<td>Other:</td>
</tr>
</tbody>
</table>
Appendix E

Plaque and Gingival Index Assessment Form

**Gingival Index:**
Evaluate the mesial, distal, lingual, and facial surfaces of all natural teeth with the appropriate score.
The following criteria can be used for scoring:
- 0: clinically healthy gingival, no inflammation
- 1: mild inflammation, slight gingival colour change
- 2: moderate inflammation, redness, and edema
- 3: severe inflammation, redness, edema, spontaneous bleeding, ulcerations

Add the total score per tooth

**Gingival Index:**
\[
\text{total score of examined surfaces} \div \text{number of examined surfaces} = \text{GI } \% 
\]

**Plaque Index:**
Evaluate the mesial, distal, lingual, and facial surfaces of all natural teeth with the appropriate score.
The following criteria can be used for scoring:
- 0: gingival area is free of plaque (no debris present)
- 1: small amount of plaque visible after use of disclosing dye or running the probe along the gingival margin
- 2: moderate amounts of plaque visible with naked eye
- 3: abundance of plaque visible with the naked eye

Add the total score per tooth

**Plaque Index:**
\[
\text{total score of examined surfaces} \div \text{number of examined surfaces} = \text{PI } \% 
\]
Appendix F

Initial Oral Assessment

**Gingival Index:**

<table>
<thead>
<tr>
<th>Maxillary</th>
<th>18</th>
<th>17</th>
<th>16</th>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
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<th>26</th>
<th>27</th>
<th>28</th>
</tr>
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**Mandibular**

<table>
<thead>
<tr>
<th>48</th>
<th>47</th>
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</tbody>
</table>

**GI**___%  

**Assessor’s Signature:** __________________________  
**Date:** ____________________

---

**Plaque Index:**

<table>
<thead>
<tr>
<th>Maxillary</th>
<th>18</th>
<th>17</th>
<th>16</th>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
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**Mandibular**

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**PI**___%  

**Assessor’s Signature:** __________________________  
**Date:** ____________________
Appendix G

Final Oral Assessment

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