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Health Professional Students' Understanding of Oral Health in Traumatic Brain Injury

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Abstract

Oral health is a significant consideration in recovery following severe traumatic brain injury (TBI) as it is associated with overall health. Health-care providers play an essential role in rehabilitation following TBI. Thus, using qualitative descriptive research and focus groups, this thesis examined the experiences and perceptions of eight final-year health-professional students in nursing, occupational therapy, and speech-language pathology with respect to oral health in TBI. Results suggest that health-professional students lack a deep understanding of i) what constitutes oral health, ii) common oral health challenges that may be faced by persons with TBI, and iii) optimal oral care in persons with TBI. The findings from this study may help to inform the educational curricula of the various health professional programs regarding the need to incorporate more educational learning experiences in oral health, TBI, and specifically oral health problems in persons with TBI. Implications and directions for future research are discussed.

Keywords

Oral Health, Traumatic Brain Injury, Health Professional Students, Nursing, Occupational Therapy, Speech-Language Pathology, Physical Therapy, Physiotherapy

Co-Authorship Statement

A scoping review titled “Oral Health in Traumatic Brain Injury: A Scoping Review of the Literature” was first conducted to inform the creation and organization of this thesis.

Samira Omar made significant contributions to the retrieval of the data, analysis, interpretation, and the creation and revision of various drafts along with the approval of the version used in this Master’s thesis. Dr. Ruth Martin made significant contributions regarding the analysis and interpretation of the data used in the scoping review along with the creation and revision of various drafts, and the approval of the version used in this Master’s thesis.

Upon completion of the scoping review, this qualitative Master’s thesis study titled “Health Professional Students’ Understanding of Oral Health in Traumatic Brain Injury” was created.

Samira Omar made significant contributions to data collection, analysis, drafting of the study, revisions of various drafts, and approval of the final version used for this Master’s thesis. Dr. Ruth Martin made significant contributions to data collection, analysis, drafting of the study, revisions of various drafts, and approval of the final version used for this Master’s thesis.

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Chapter 1: Introduction

1 Introduction

1.1 Oral Health: A Global Problem

According to the Universal Declaration of Human Rights (1948), all individuals have the right to be able to live in conditions that allow them to have good health, and the ability to access reasonably priced and appropriate health care.

Being able to access oral health services is an important and fundamental human right (Kuijken, Naaldenberg, Nijhuis-van der Sanden, &van Schrojenstein-Lantman de Valk, 2016). Oral diseases including periodontal disease (gum disease), dental caries (cavities), and tooth loss are significant global health concerns (Petersen, Bourgeois, Ogawa, Estupinan-Day, Ndiaye, 2005). In particular, periodontal disease and dental caries are some of the most common (FDI World Dental Federation [FDI], 2014) and debilitating oral diseases. Poor oral health is associated with a variety of factors including socioeconomic status, sociogeographical location, environmental factors (Petersen et al., 2005; Pitts et al., 2011), disability, and health status. With respect to disability and health status, according to the World Health Organization (WHO), more than one billion of the world's population is dealing with a disability on a daily basis (World Health Organization [WHO], 2018). Moreover, about 35% of the world's population have untreated dental caries (Canadian Dental Association, 2017), and greater than 70% of the entire population are not receiving care that meets their needs (Helderman & Benzian, 2006). However, having access to oral care also means receiving care from people who are knowledgeable and skilled and who can factor the social determinants of health into care. As such, it is also equally important to consider the knowledge and skillset of health-care providers as it influences the quality of care that patients receive (Campbell, Braspenning, Hutchinson, & Marshall, 2002).

One particular population of individuals who have a disability are those who have sustained a moderate to severe traumatic brain injury (TBI). Persons with TBI may be at increased risk for poor oral health due to a number of disability-related impairments. Oral health in persons with moderate to severe TBI was the overall focus of the present research.

1.2 Definition of Oral Health

Over the past several decades, numerous definitions of oral health have arisen and have been followed by clinicians, researchers, and various health-care providers (Lee, Watt, Williams, & Giannobile, 2017). While oral health is determined by a number of biological, social, economic and cultural factors, the WHO defines oral health as being in a position where an individual is not in pain or does not have any oral diseases such as oral infection, periodontal disease, tooth loss, and being in ill health to the point where it lessens one's psychosocial well-being, including the ability to smile and chew amongst other factors (WHO, 2012). This definition was problematic for many reasons. The WHO's definition of oral health focuses on the absence of disease. Like many other definitions, this definition leaves out essential aspects of health (Lee et al., 2017) that are influenced by and affect an individual's health such as the social determinants of health. What about the other factors that influence and interact with one another to affect and create the opportunity to develop oral disease? Lastly, the challenge with more than one definition is that they make it increasingly difficult for practicing professionals, policy stakeholders, and researchers to work towards lessening the burden of oral disease as multiple interpretations lead to different understandings of the same problem making it difficult to communicate within and across professions, and to patients (Glick et al., 2016). Some of these challenges include the use of technical terms and concepts that may not resonate with different health-care professionals and not understanding the full scope of oral health (Glick et al., 2016).

The meaning of good oral health goes beyond the mere absence of disease, and in recognition of this, a new definition of oral health was developed by the FDI World Dental Federation in 2016. As Glick et al. (2016) described, this new definition is a transformation of the many pre-existing ones. However, the difference is that it takes the whole person into account. As such, while oral health is a versatile concept that encompasses the capacity to smell, smile, taste, speak, touch, chew, swallow and communicate many emotions by way of facial language without the burden of aches, displeasure, and oral disease, it also factors in mental health, a person's attitudes, perspectives, experiences, and the various aspects that influence change in each of those variables such as other individuals and societal beliefs (Glick et al., 2016). Oral health is now seen as a versatile aspect of health and well-being that is influenced and shaped by contextual factors, social factors, and individual circumstances.

While the meaning of oral health encompasses a holistic framework that accounts for the various aspects that influence change in oral health status, oral/dental care is subjective and can have different interpretations according to the perspectives and views of a specific profession and what their scope of practice may contribute to managing a patient's oral health.

The connection between oral health and general health have been documented in the literature. As an example, severe periodontal disease may be linked to an increased risk for other diseases such diabetes mellitus, ischemic heart disease, chronic respiratory failure (Health Canada, 2008; Petersen & Yamamoto, 2005), and cardiovascular disease as these connections have been documented (Khader, Albashaireh, & Alomar, 2004). The effects of poor oral health include but are not limited to chronic pain, poor nutritional intake, re-occurring infection, and difficulties concentrating and learning (Sheiham, 2006). In addition to physical health, poor oral health also affects psychological well-being as those suffering from oral health problems also encounter difficulties with self-esteem, reduced dignity, and social connectedness, all of which have been shown to have negative health implications (Bedos, Levine, & Brodeur, 2009; Benyamini, H. Leventhal, & E.A. Leventhal, 2004; Watt, 2007).

1.3 Oral Health in Vulnerable Populations

Individuals with physical and cognitive difficulties present unique oral health and dental care needs, and additional challenges as they are more susceptible to dental caries and periodontitis due to their limitations which have been shown to negatively impact survival and ability to successfully recovery (CDA, 2010). Individuals with the most problems with oral health and the poorest oral health tend to be those who may receive limited oral and dental care (Hart, 1971). Despite efforts, people with special needs such as vulnerable groups including but limited to those with cognitive and physical limitations are amongst the few groups of individuals who have difficulties accessing care, poorer oral health, and are reliant on caregivers due to their physical limitations (CDA 2010). Although the WHO has made specific efforts to create improvements in priority groups such as tobacco smokers and people with HIV/AIDS (WHO, 2017), and substantial research has been done to highlight the importance of oral health in other neurological groups including individuals with

Alzheimer's disease and Parkinson's disease (Fukayo, Nonaka, Schimizu, & Yano, 2003; Mancini, Grappasonni, Scuri, & Amenta, 2010), the relationship between oral health and TBI has received little attention in both clinical care and research (Zasler, Devany, Jarman, Friedman, & Dinius, 1993). Persons with TBI are likely to be at risk for poorer oral health.

1.4 Traumatic Brain Injury: A Public Health Concern

TBI is a form of acquired brain injury (ABI) in which unforeseen trauma damages the brain and can occur when the head hits an object, or when an object penetrates the skull and enters brain tissue (National Institute of Neurological Disorders and Stroke [NIH], 2017), and will surpass many other diseases as the major leading cause of death and disability worldwide by the year 2020 (Kumar et al., 2018). The Glasgow Coma Scale (GCS), duration of post-traumatic amnesia, and duration of loss of consciousness are indicators often used to classify the severity of TBI (Malec et al., 2014). Depending on the scope of the injury, TBI symptoms are classified and can range from mild to moderate or severe such as a persistent vegetative state (NIH, 2017; Rosenthal, 1990). Mild TBI otherwise known as a concussion is characterized as the absence of anatomical lesions of the brain and is classified as a loss of consciousness under 30 minutes (Malec et al., 2014; Signoretti, Lazzarino, Tavazzi, & Vagnozzi, 2011). Some of the clinical symptoms of a concussion include problems with memory, attention, and headaches (Malec et al., 2014). However, unlike moderate to severe TBI, concussions are mostly caused by functional difficulties rather than changes to structural functioning (Malec et al., 2014). Although TBI can affect people of all ages, it is more pronounced within the age ranges of 0- 4 years, 15-19 years, over 65 years of age, and especially in older adults over 75 years of age who have been documented to experience the highest frequency of hospitalized cases and death as a result of the injury (Faul, Wald, Xu, Coronado, & Dellinger, 2010).

TBI has been described as a 'silent epidemic' as society is not well informed of the size of its existence (Hyder, Wunderlich, Puvanachandra, Gururaj, & Kobusingye, 2007; Roozenbeek Maas, & Menon, 2013). It is estimated that over 10 million of the world's population sustain a TBI every year (Hyder et al., 2007). As such, millions of people may be currently living with a long-term disability due to the consequences of TBI. Just under 80 billion dollars is spent every year on treating TBI and providing rehabilitative care

(Finkelstein, Corso, & Miller, 2006). Oral care is considered an important element of holistic health (Bissett & Preshaw, 2011), and is often overlooked in acute care settings (Salamone, Yacoub, Mahoney, & Edward, 2013). The underexplored nature of oral health in TBI make this population an important group to further explore in research. Collectively, these factors make oral health a concern in this population.

1.4.1 Traumatic Brain Injury Related Impairments and Oral Health

Survivors of TBI often share similar, yet diverse changes as a result of the injury (Zasler et al., 1993). Some of the most commonly reported changes after TBI include physiological, behavioral, personality, and emotional alterations (Khan, Baguley, & Cameron, 2003; Kreutzer, Zasler, Wehman, & Devany, 1992; Zasler et al., 1993). The aftermath of TBI may involve reduced sensory, motor and cognitive functioning (Khan et al., 2003) which can make certain tasks such as being independent in providing oral care, difficult or impossible. These neurobehavioral changes resulting from the injury might serve as obstacles that can complicate the main goal of rehabilitation that is to reintegrate an individual back into society as these changes have been shown to affect memory, concentration, attention, and can induce fatigue (Zasler et al., 1993). Lastly, these changes may diminish the ability to perform regular oral hygiene as taking part in effective oral health care routines require a basic level of cognitive understanding, ability, and initiative (Zasler et al., 1993). However, an important consideration is that all of these changes are not affected across all severity levels of TBI.

Oral hygiene problems can result in unique needs for people (Prendergast, Hallberg, Jahnke, Kleiman, & Hagell, 2009) with TBI that are not often noticeable by most people who are around them (Zasler et al., 1993). Depending on the severity of the injury, people with TBI typically require the support of a ventilator, and artificial airway as a means of maintaining respiration and it has been shown that these individuals are particularly susceptible to poor oral health as oral bacteria may give rise to chest infection (Prendergast et al., 2009). In particular, poor oral health can increase the risk for respiratory infections such as pneumonia which can contribute to morbidity and mortality (Seedat & Penn, 2016; Prendergast et al., 2009). Lastly, individuals with TBI often experience difficulty controlling saliva (Zasler et al., 1993), and may have swallowing impairments known as dysphagia

(Alhashemi, 2010; Seedat & Penn, 2016). In fact, swallowing impairments are associated with morbidity, low quality of life (Alhashemi, 2010), and can make daily oral care increasingly difficult. Given the complexity of swallowing problems and oral care in general, a team approach consisting of the efforts of various health professionals is key to successful and optimal recovery (Alhashemi, 2010).

1.5 Physical Rehabilitative Medicine and Interprofessional Collaborative Practice

1.5.1 Physical Rehabilitative Medicine.

The optimal goal for anyone who sustains a TBI is community reintegration following the injury (Doig, Fleming, & Tooth, 2001; McCabe et al., 2007; McColl, 2007). To minimize the aftermath of the injury, and facilitate the goal of community reintegration, physical rehabilitative medicine is crucial (Neumann et al., 2010). Furthermore, Neumann et al. (2010) describe that the purpose of physical rehabilitative medicine is to help produce the most favorable outcomes in areas regarding social participation and quality of life for people living with adverse health problems including acute and chronic health conditions (Neumann et al., 2010). In physical rehabilitative medicine, health-care providers are required to motivate the patient or client to achieve autonomy consisting of lessening the impairments and its effects on the person's daily activity and modifying the environment to encourage, maximize, prevent, and treat existing problems (Neumann et al., 2010). An important aspect of these goals is to provide patient-centered care which involves respect and awareness about the patient’s differences and their individual needs (Knebel & Greiner, 2003). However, one physician or clinician alone is not able to achieve any of these outcomes (Neumann et al., 2010) as working effectively together in a team setting has been shown to produce desirable outcomes including improved patient outcomes and lessened work load (Bosch & Mansell, 2015; Interprofessional Collaborative Practice in Healthcare, 2013) and increase survival rates (Khan et al., 2003).

1.5.2 Interprofessional Education and Collaborative Practice in Traumatic Brain Injury and Oral Health

The effectiveness of rehabilitation is increased when members of interdisciplinary teams collaborate to provide care for their patients (Khan et al., 2003). Interdisciplinary teamwork consists of the combined efforts of multiple individuals with a diverse range of knowledge and skills to maximize the health benefits of the patients under their care (Neumann et al., 2010), and occurs when other health professions work together with patients, families, and various disciplines to provide quality care (Bosch & Mansell, 2015). Nevertheless, for health-care professionals to work together, they must understand the roles and skills set of the other members of the team (Neumann et al., 2010). In particular, interprofessional education happens when two or more students learn more about each other's professional roles and responsibilities to work more effectively together in a collaborative setting to maximize the health outcomes of the patients that they serve (Interprofessional Collaborative Practice in Healthcare, 2013; WHO, 2010). As such, there are two parts to working effectively in a team setting, the first involving an understanding of the skills set of the other members on the team, and the second involving an awareness of what the individuals own profession can contribute (Neumann et al., 2010).

1.5.3 Specialties in Physical Rehabilitative Medicine

Collaborative practice in physical rehabilitative medicine includes but is not limited to occupational therapists (OT), speech-language pathologists (SLP), nurses, and physiotherapists (PT; Neumann et al., 2010). Each of these health professionals play a role in the community reintegrating process and work to enhance and improve the quality of life of people recovering from TBI (Elbaum & Benson, 2007). While all of these professionals have the responsibility to educate and support their patients or clients, they all have specific roles and responsibilities that they are required to fulfill (Neumann et al., 2010).

The Canadian Association of Occupational Therapists (CAOT) state that OTs help people overcome problems that get in their way of engaging in everyday activities that have importance to them (Canadian Association of Occupational Therapists [CAOT], 2016). These include activities of daily living (ADLs), occupation, and leisure activities (Elbaum &

Benson, 2007). OTs play an important role in the rehabilitation of individuals with TBI as they are required to judge how the impairments affect ADLs (Elbaum & Benson, 2007).

Speech-Language and Audiology Canada defines the profession of SLP as "health professionals who identify, diagnose and treat communication and swallowing disorders across the lifespan" (Speech-Language and Audiology Canada [SAC], 2016). SLPs work on various areas such as social and cognitive communication, language comprehension and expression, and how swallowing disorders and communication affect everyday living (SAC, 2016).

Similarly, Registered Nurses (RNs) provide holistic care to individuals throughout the lifespan providing all kinds of health-care services to help individuals recover from illness, injury, disability, and achieve the best health possible (Canadian Nursing Association [CNA], 2015). Other categories of nurses in Canada are nurse practitioners (NPs), licensed practical nurses (LPNs), and registered psychiatric nurses. However, all of these bodies of regulated health professions provide care for people through the promotion of good health, and the prevention of disease (CNA, 2015).

Lastly, PTs use their understanding and awareness of the body and how it functions to assess, diagnose, and treat a range of diseases, injuries, and disability (Canadian Physiotherapy Association [CPA], 2018). In health care, PTs play an important role in health promotion, and treatment of injury and disease (CPA, 2018).

1.6 Purpose of the Study

Despite existing literature on oral health in TBI, to our knowledge, no publications are available in the research that addresses the issue of health-professional students' understanding of oral health in TBI. Given the complexity of TBI related impairments and the possibility of neurobehavioral changes following the injury (Khan et al., 2003; Zasler et al., 1993), it is imperative that the knowledge of health professionals entering into practice be explored to further understand their awareness of oral health in this population and their awareness of the diversity of the impairments. The overall aim of this study was to explore the question of what do health professional students in Southwestern Ontario who are in their final year of undergraduate nursing (BScN) and graduate level training programs in OT, SLP,

and PT know about oral health in TBI? More specifically, the objectives of this study were to gain insight into the experiences and perceptions of final-year health-professional students in regards to oral health in TBI through focus group discussions.

It is important to focus on students as knowing more about what students know about oral health in TBI can lead to a better awareness of what various health professional students know about the topic at hand and existing gaps in their knowledge. Furthermore, a better understanding of what students know about oral health in this population may also shine a spotlight on the profession-specific roles of the various professional programs represented in this study, and what they can contribute to managing oral health in TBI. Additionally, if the knowledge gaps and skills around oral health in TBI of students are better understood, this study can be a step in creating additional competencies and helping students strengthen the connection between oral health in TBI for them to be better prepared to identify oral problems and prevent undiagnosed oral disease in TBI.

Chapter 2: Literature Review

2 Literature Review

This chapter of the thesis will review relevant literature on the perceptions and understandings of TBI, and oral health from a variety of perspectives including health-care professionals. This will then be followed by a scoping review of the literature on oral health in TBI, and a summary of the identified gap in the literature and study rationale.

2.1 Perceptions and Understandings of Traumatic Brain Injury

2.1.1 Perceptions about Traumatic Brain Injury Amongst Patients and Family.

Several years ago, a study by Springer, Farmer, and Bouman (1997) demonstrated that the general public and many family members have a number of misconceptions about TBI, which have also been shown in a prior study (Willer, Johnston, Rempel, & Linn, 1993) and amongst university students (O'Jile et al., 1997). Decades later, researchers are still reporting similar findings. In a study assessing the accuracy of knowledge about mild TBI with veteran participants and their family members, Block et al. (2014) found that while both groups were knowledgeable in identifying the exact symptoms relating to mild TBI, there were still gaps in their knowledge pertaining to recovery, and physical, cognitive and emotional sequelae. These findings raise questions regarding the type of information that is received, especially amongst families of individuals with TBI. Biester et al. (2016) administered online surveys to investigate what patients with TBI and their family and friends thought about the information that was given to them in their first six months' post injury. Responses to the survey indicated that patients, family, and friends were not given adequate information specifically regarding symptoms of brain injury, recovery expectations, the meaning of various cognitive tests that were performed, and the fact that emotional changes can occur post injury (Biester et al., 2016). It is clear to see that there is a gap between accuracy of facts regarding the nature of TBI and neurobehavioural sequelae, and the general public, patients and family members' perceptions and understanding. This is concerning as it may suggest that health-care providers might also harbor incorrect beliefs

and misconceptions regarding TBI which is then communicated to patients and family members as health-care professionals are a source of information.

2.1.2 Perceptions about Traumatic Brain Injury Amongst Health Professionals.

According to the literature, several years later dating back to the early 90's, health-care professionals in a range of health professions such as nursing, OT, PT, and SLP working in a variety of settings including, schools, hospitals, and rehabilitation centres hold misconceptions and inaccurate beliefs about TBI.

Many studies have been published exploring nurses' perceptions and beliefs about TBI and the provision of care for individuals representing this population. In a study exploring nurses' beliefs about caring for patients with moderate-to-severe TBI, Oyesanya, Thomas, Brown, & Turkstra (2016) found that nurses had inaccurate beliefs with respect to sex-based differences for the occurrence of TBI amongst men and women, and were under the impression that the type of care provided for patients was the same irrespective of sex. Likewise, another study assessing the nurse's perceptions regarding the provision of care for pediatrics with a similar severity level of TBI reported that nurses also had incorrect perceptions regarding care, specifically sex-based differences, recovery and that nurses failed to see the importance of understanding and being aware of differences in level of severity of the injury in practice (Oyesanya & Snedden, 2018). However, these findings were also evident in nursing students. In fact, Ernst, Trice, Gilbert, and Potts (2009) highlighted misconceptions and inaccurate beliefs amongst nursing students across a range of areas including amnesia, recovery, unconsciousness, facts about seat belts, and brain damage. It was particularly interesting that those students who had experiences working with TBI survivors had a higher rate of incorrect beliefs than those who did not have such experiences, which was indicated and expressed by the study authors (Ernst et al., 2009).

A more recent study found similar findings in practicing nurses, and discussed that those who expressed the most confidence and greatest reported experiences in providing care for patients with TBI ultimately believed that they had the least amount of knowledge compared to other participants (Oyesanya, Brown, & Turkstra, 2017), and low perceived knowledge in providing care for patients with a mild TBI (Watts, Gibbons, & Kurzweil,

2011). Oyesanya et al. (2017) rationalized that a reason for this finding may be due to the fact nurses who have more experiences have a better understanding of what they do not know. Also, nurses report lack of knowledge as a barrier that can affect care for patients and their families. In particular, lack of knowledge including lack of evidence-based practice was shown to affect their ability to provide the right assessments for patients, recognize abnormal behaviour patterns, and educate families. An influential factor in their perceived limited knowledge was their lack of experience in providing care for patients with TBI (Oyesanya, Bowers, Royer, & Turkstra, 2018). Despite the importance of having clinical experience with providing care for individuals with TBI, multiple studies have shown that having experiences in TBI does not lead to lower levels of misconceptions and inaccurate beliefs (Ernst et al., 2009; Oyesanya et al., 2017). Furthermore, in specific settings such as a school environment, nurses also expressed barriers which affected their ability to function within a team including lack of the necessary training required to work with concussed students in a school setting (Wing, Amanullah, Jacobs, Clark, & Merrit, 2016).

Riedeman and Turkstra (2018) recently investigated the knowledge and confidence levels of SLPs working with individuals with TBI who also had cognitive-communication disorders in a variety of care settings such as hospitals and outpatient centers. Upon examination, it was found that there were knowledge gaps in some of the SLP participants' understanding of the underlying symptoms of mild TBI (Riedeman & Turkstra, 2018). Despite that many of these practicing clinicians had experiences working with individuals with TBI, some of them perceived to lack knowledge and had lower levels of confidence (Riedeman & Turkstra, 2018). Even in practicing clinical physical therapists where they have been given concussion training, there are misconceptions about TBI and knowledge gaps specifically in areas such as treatment for concussed youth, and the use of assessment tools for concussion (Yorke, Littleton, & Alsalaheen, 2016). This is not to say that they entirely lacked knowledge. Over 90% of the physical therapists were able to recognize symptoms associated with a concussion and the appropriate assessment tools used to evaluate individuals with a concussion (Yorke et al., 2016). Experienced US military health-care professionals who frequently work with individuals with a mild TBI such as military psychologists, psychiatrists, and psychiatric nurses also have misconceptions and inaccurate beliefs around areas such as consciousness, memory, and recovery (Bradford, 2015).

A qualitative study using focus groups was conducted to investigate factors that affected OTs beliefs about which patients have the ability to rehabilitate and will make best use of inpatient rehabilitation, some who had a TBI (Shun, Bottari, Ogourtsova, & Swaine, 2017). The OTs in this study indicated that patient-specific factors such as patient and family expectations, and other factors including profession specific skills, experiences, and scientific literature are deciding factors that are used when working with and advocating for patients that are more likely to recover from an ABI (Shun et al., 2017). Given their perceived lack of knowledge, health professionals recognized the need to be educated and competent regarding the nature of TBI, and the underlying signs, symptoms, and appropriate care for both the patient and their family. These criteria are beneficial for providing the best care for patients, and communicating the most accurate information for both the patient and their families. Nurses expressed the importance of knowledge when dealing and providing care for patients, and recognized the unique aspects of the injury such as cognitive impairments that these patients may face over the course of their care, which warrant care distinct from the care provided for patients with other health problems (Oyesanya et al., 2018; Oyesanya & Snedden, 2018; Wing et al., 2016). Educational training and knowledge on TBI were necessary for the patients to prevent causing further harm as that was a concern for nurses, and along with providing the correct information for families of patients with TBI (Oyesanya et al., 2018; Oyesanya et al., 2016). Nurses also agreed that nurses caring for patients with moderate-to-severe TBI require specialized training (Oyesanya et al., 2016). Similarly, a more recent review of the literature on the experiences of providing and being the recipient of care for individuals with TBI including the perspective of nurses working in acute care and rehabilitative settings revealed that nurses require appropriate practical skills and competencies in order to understand and provide the most suitable care for the individuals with the injury, and their families (Kivunja, River, & Gullick, 2018).

Additionally, over 90% of SLP clinicians reported the significance of knowledge in TBI in their practice, which was also found amongst clinicians who had no experience working with individuals with TBI (Riedeman & Turkstra, 2018). Considering that the incidence in this group is on the rise, being knowledgeable in this population would better prepare clinicians to help educate future patients and their families. Education on TBI is not only important for providing accurate and appropriate care for patients and their families, but

it is also necessary to lessen the potential to harbour negative and inaccurate beliefs about individuals with a disability. In a group of nursing students from Midwestern State University, education about disability added into their curriculum helped these students harbour positive attitudes, and overcome false myths about individuals with a disability by the end of their final year of study (Thompson, Emrich, & Moore, 2003).

2.2 Perceptions and Understanding of Oral Health Amongst Health Professionals

Several studies assessing nursing students' knowledge of oral health in various care settings demonstrated that there might be gaps in their understanding. Smadi and Nassar (2016) explored the attitudes regarding oral health in nursing students and their understanding of oral health and oral diseases. Students were administered a questionnaire that assessed both of these dimensions (Smadi & Nassar, 2016). It was found that less than half the nursing participants were able to correctly respond to questions regarding dental health including plaque, gingivitis, periodontitis, and were not able to recognize the early signs of tooth decay (Smadi & Nassar, 2016). The authors in this study expressed that the findings were a reflection of the level of prioritization of oral health in the nursing curricula as all the students commented that they were not provided with specific training with respects to oral health (Smadi & Nassar, 2016). The importance of incorporating oral and dental health education into undergraduate training and the nursing curricula was also discussed as a way to see improvements in students' knowledge and awareness (Smadi & Nassar, 2016). Multiple studies have shown that final-year nurses lacked knowledge as half of the students correctly identified pain in relation to tooth decay, and even less were sure about indicators of tooth decay and coloured deposits found near the gums (Deogade & Suresan, 2017). Furthermore, students were found to lack knowledge regarding oral diseases such as periodontal disease, gingivitis, and periodontitis (Gronkjaer, Nielson, Nielson, & Smedegaard, 2017). Consistent with other studies (Deogade & Suresan, 2017), students agreed that oral health was essential to general health and expressed interest in seeking additional competencies including improvements to the educational curricula of their nursing program (Gronkjaer et al., 2017). Several studies have indicated that lack of knowledge may render students unable to provide quality care as a result of their current level of understanding (Gronkjaer et al., 2017; Smadi & Nassar, 2016). However, nearly all the

nursing students acknowledged a relationship between oral health and general health, and have indicated interest in knowing more about oral diseases and oral health (Deogade & Suresan, 2017).

While the literature on other health professionals' understanding of oral health such as SLPs, OTs, and nursing is limited, nursing students are not the only ones who lack sufficient knowledge in oral health but also dental hygienists. A recent study has provided evidence suggesting that non-dental health-care professionals from medicine, PT, social work, nursing, and psychology have some understanding regarding oral care, the promotion of oral health and the prevention of oral disease in the elderly population (Martins et al., 2011). However, the authors discussed that this knowledge might be a factor of Brazil and the education that is provided to these professionals as it factors in the social determinants of health such as culture, occupation, income, and wealth (Martins et al., 2011). In dental health professionals such as dental hygienists, the need for more education is evident to be able to provide comprehensive education to patients such as including patient expectations regarding care (Rantanen et al., 2010).

The oral health beliefs of various health-care professionals such as nursing staff, SLPs and dental hygienists working in long-term care facilities have been examined (Yoon & Steele, 2012). Through focus group discussions, the various health professionals agreed that it was the responsibility of the nurse to provide oral care especially since it was a daily requirement (Yoon & Steele, 2012). The authors discussed that the SLP and dental hygienists' roles were there to enhance the oral health of patients (Yoon & Steele, 2012). In particular, for SLPs this consisted of advocacy and education on the significance and benefits of oral health (Yoon & Steele, 2012). The importance and benefits of collaborating in a team setting were also discussed. Particularly in practicing nurses, oral care provided to patients was found to be influenced by the level of education that a nurse has such that the more education, the better the quality of care (Furr, Binkley, McCurren, & Carrico, 2004). Second, the attitudes and beliefs of nurses were also found to positively influence care (Furr et al., 2004). According to the authors, if nurses perceived to have had more time and gave more precedence over oral hygienic care, the overall quality of care would be better (Furr et al., 2004). Similar to other studies mentioned above regarding experiences in TBI and misconceptions (Ernst et al., 2009; Oyesanya et al., 2017), having experiences in oral health

was not related to attitudes or the quality of care provided (Furr et al., 2004). Nevertheless, education was significantly important not only in raising the precedence of oral hygiene and quality of care in different care settings such as ICUs but also in helping to lessen the belief that oral care is an unpleasant task for providers of care (Furr et al., 2004).

The significance of education has also been highlighted in a study by Kullberg et al. (2010) who examined what dental hygiene information can do for nursing staff in a long-term care facility for seniors. In the oral hygiene programme, nurses were given instructions for providing oral care to residents of the nursing home and were also provided with training (Kullberg et al., 2010). Regarding education, nurses were repeatedly prepped on the importance of oral health and the connection between general health specifically for the elderly and were given access to the dental hygienist (Kullberg et al., 2010). Ultimately this education programme was beneficial in significantly reducing oral health problems such as gingival bleeding and plaque scores, and the resistance amongst the residents of the nursing home (Kullberg et al., 2010) as nurses used the tools that they were exposed to during their training. Not only was this educational programme beneficial for the patient, but it also changed the attitudes of the nurses as they later expressed that they had enough time to provide oral care and would give it more precedence than before (Kullberg et al., 2010). Nurses have also expressed the importance of education in teaching them how to provide oral health care for patients with varying complex problems (Yoon & Steele, 2012).

Similar findings were also discovered in a study by Forsell et al. (2010) who explored the effects of adopting an oral hygiene education programme on the beliefs and perceptions regarding oral hygiene in nursing staff. The oral hygiene education was administered in three different stages beginning with an overview of the specific needs of the residents, a group session led by a dental hygienist, and a focus on the interconnected association between overall health and oral health particularly amongst older adults (Forsell et al., 2010). Comparable to other studies, nursing staff harboured negative associations regarding oral care and that was primarily a factor of the patients' compliance to care (Furr et al., 2004; Forsell et al., 2011). Nevertheless, unlike other studies, education did not lead to change in perceptions or beliefs (Kullberg et al., 2010). A likely explanation may be the number of times that this educational training program was administered as a previous study suggested that repeated education in dental hygiene can change perceptions and attitudes regarding oral

health (Kullberg et al., 2010), or the nature of the questions that were asked. The authors speculated that it could also be due to the fact that nurses had regular access to dental health professionals (Forsell et al., 2010). Despite the importance of education and knowledge in improving oral health care practice for health-care professionals and the provision of care for patients, it should also be noted that OT has benefits in promoting oral hygiene and independence in dependent and cognitively impaired patients (Bellomo et al., 2005). More specifically, Bellomo et al. (2005) provided evidence supporting the fact that movements incorporated from OT such as those involving opening a tube of toothpaste and denture brushing decreased plaque scores for all patients in the study.

The elderly face many barriers in the provision of care in institutionalized settings such as uncertainty regarding self-competency (Garrido, Romo, Espinoza, & Medics, 2012), lack of timing, staff, patient health status, and lack of dental care professionals who could be asked for advice regarding oral care (Unfer, Braun, de Oliveira Ferreira, Ruat, & Batista, 2012). While some caregivers indicated that they were not trained to provide oral care for older adults, informal caregivers such as family members were shown to provide more oral care despite formal caregivers having had more education (Garrido et al., 2012). The authors of the study discussed that it might be due to the number of patients that formal caregivers see on a daily basis as informal caregivers are only responsible for their loved ones.

Furthermore, Unfer et al. (2012), conducted a qualitative study using semi-structured interviews to explore caregivers' beliefs of oral health in institutionalized individuals living in a nursing home, barriers to providing oral hygiene, and proficiency in delivering care and as a result, caregivers expressed that the quality of oral care was not the same each time it was provided (Unfer et al., 2012). Although caregivers described that they were given the material to provide oral hygiene, other aspects of care seemed to take greater precedence (Unfer et al., 2012). The training and education that they received was perceived as general, and the need for additional competencies, a multidisciplinary team to be able to provide adequate and quality care, and to also educate the patients in order to communicate and bring awareness regarding the importance of oral health was discussed (Unfer et al., 2012). Oral health may be overlooked due to nurses being concerned about harming patients under their care was a perceived barrier to providing oral care to elderly residents (Forsell et al., 2011).

Overall, existing literature suggests that a number of misconceptions and inaccurate beliefs exist amongst the general public and among practicing health professionals in various professions regarding TBI with respect to the nature of TBI, neurobehavioural sequelae, and recovery. There are also misconceptions surrounding oral health amongst health-care professionals and health-professional students in regards to the recognition and understanding of various oral problems such as gingivitis, bleeding gums, plaque, and periodontitis.

2.3 Oral Health in Traumatic Brain Injury: A Scoping Review of the Literature

Oral health education has benefits in improving attitudes, perceptions, and oral health knowledge amongst health-care professionals and ultimately improving oral health for patients. While the elderly is one population who face risks for poor oral hygiene, other vulnerable populations such as those with TBI warrant further research particularly into the oral health status and needs of this group. Before engaging in an exhaustive discussion of the implications of this current study, however, it is helpful to take a step back and consider the work that has been done on oral health in TBI.

To explore and examine the extent, range and nature of the existing literature on oral health in TBI a scoping review was conducted, which is a technique aimed at mapping relevant literature in a wide area of interest where multiple study designs may be used (Arksey, & O'Malley, 2005; Khalil et al., 2016). Arksey and O'Malley's (2005) six stage methodological framework was used as a guide when conducting this scoping review.

To ensure consistency and reliability PubMed, EBSCOhost, PsychINFO, EMBASE, Dissertation and Theses, and Scopus databases were searched three times to identify appropriate literature, capture the breadth of the existing literature, and to ensure that all relevant papers were not missed. The search covered the period from the inception of the database through June 2018. The following search terms were employed: traumatic brain injury, head injury, oral health, oral hygiene, oral health care, deglutition, dental caries, dental plaque, dental health, dental care, periodontal disease, periodontitis, teeth, dentures, and pneumonia. Reference lists of the retrieved articles were manually searched. Inclusion criteria were English language studies, wherein any portion of the sample met the study

criteria for TBI or head injury and oral health. Reviews, commentaries, case studies, opinion pieces or case reports were included if they met the criteria. Both TBI and oral health were defined a priori. The WHO's definition of oral health and the NIH's definition of TBI, as previously mentioned, were used for this review. The studies were limited to those in which adult populations were examined, and duplicates were removed. See **Figure 1** for flow diagram.

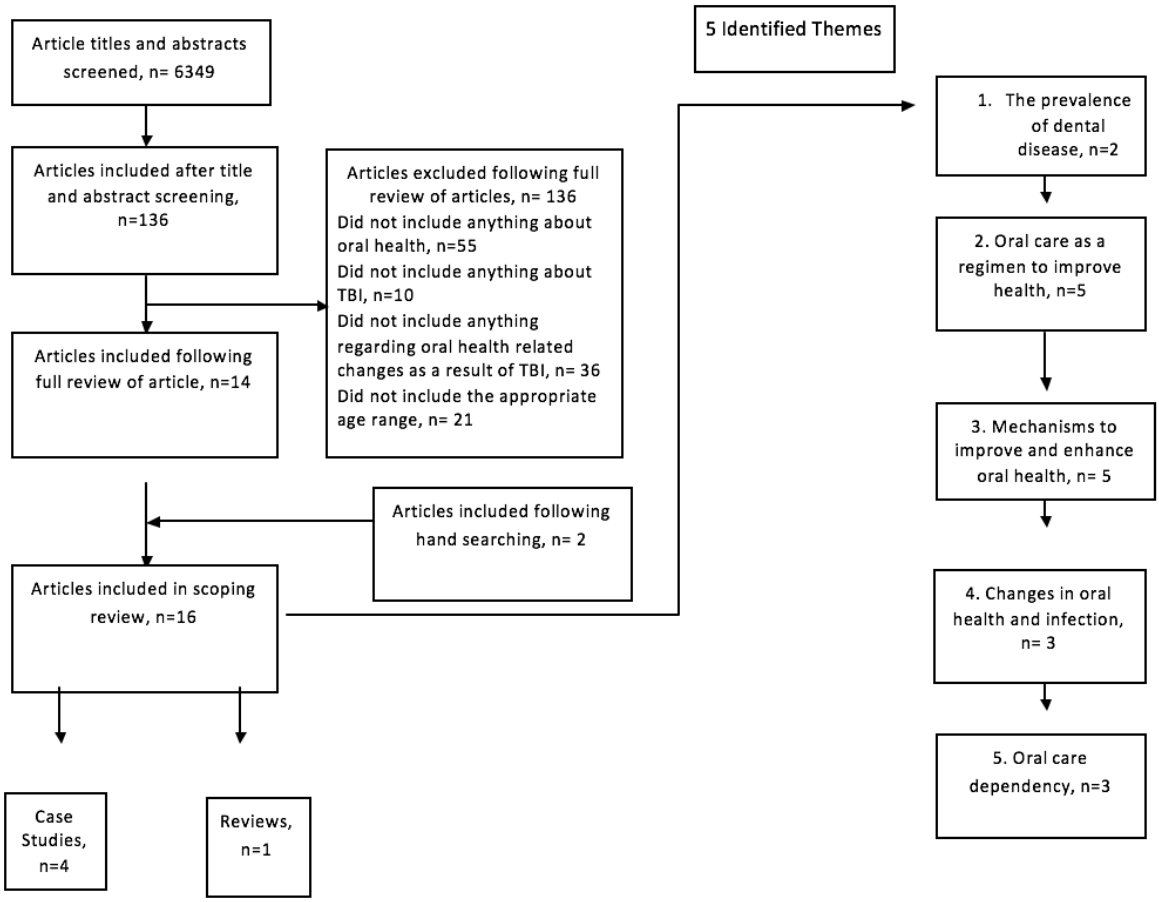

Figure 1. Flow diagram of literature search results. Some articles under identified themes belonged to more than one category. *N =136 entails the articles that were excluded, and shows a breakdown of why the papers did not meet the study criteria after a full review of the entire article was conducted.

Arksey and O'Malley's (2005) six stage framework for conducting a scoping review were used including identifying the relevant research question; identifying the relevant studies; selecting the relevant studies; charting the data; summarizing and reporting the results. The initial triage, based on title and abstract, identified a total of 6,349 results, of which 136 were thoroughly examined. Of these, 16 met the study criteria and were included

in this scoping review. A total of five content themes were identified: (1) the prevalence of dental disease; (2) oral care as a regimen to improve health; (3) mechanisms to improve and enhance oral health; (4) changes in oral health and infection, and (5) oral care dependency. The content themes in this scoping review were identified according to the focus and findings of the studies.

2.3.1 Theme One: The Prevalence of Dental Disease

A total of two studies were found examining the prevalence of dental disease and the oral health status in individuals with TBI.

One study examined the prevalence of dental disease, risk factors for and treatment needs of individuals 8 to 14 years post TBI in comparison to other groups with a disability (Stiefel, Truelove, Persson, Chin, & Mandel, 1993). Participants were assessed by dental hygienists and dentists for dental status, gingivitis, periodontal pocket depth, plaque, and salivary flow. Patients with TBI had significantly more decayed and filled teeth (n = 19, 30.6 average), fewer teeth (n = 19, 24.8 average), higher levels of gingivitis (n = 19, 44.4%), and greater levels of oral bleeding sites (n = 19, 45%) compared with other groups including spinal cord injury.

In a more recent study, oral health in 13 individuals with an ABI, including three individuals with TBI in an ICU was assessed by a dentist using a modified form of the oral assessment guide (OAG) for neuro ICU patients (Kothari, Spin-Neto, & Nielsen, 2016). The OAG is used to evaluate the oral health of hospitalized patients, including the elderly and has been shown to have acceptable levels of validity and reliability (Andersson, Hallberg, & Renvert, 2002; Miller & Kearney, 2001; Ross & Crumpler, 2007). According to Kothari et al. (2016), this study was the first to do a comprehensive and detailed oral health assessment of individuals with a neurological condition. All patients had chronic generalized periodontal disease (Kothari et al., 2016). However, individuals with TBI had better oral health including lower levels of plaque (mild-moderate) and inactive periodontal disease, and were healthier and younger (19-23 years vs. 26-55 years) compared to patients with other forms of ABI.

Taken together, the findings from these studies suggest that oral health may be reduced in TBI. While one reported poorer oral health in TBI compared with other ABI

(Stiefel et al., 1993), the other study suggested that oral health in TBI is better than that among individuals with other forms of brain injury (Kothari et al., 2016). However, the findings from Kothari et al. (2016) may suggest that there have been improvements in oral health and oral healthcare.

2.3.2 Theme Two: Oral care as a Regimen to Improve Health

The following five studies examined the use of oral care as a regimen to improve some aspect of health in TBI.

One study examined the effects of facial oral tract therapy, consisting of therapeutic oral hygiene routines, on functional oral intake status of patients with severe TBI in a subacute rehabilitation unit (Hansen, Engberg, & Larsen, 2008a). This approach was based on the view that stimulating the oral cavity is significantly important for a number of reasons including the prevention of hypersensitivity, hyposensitivity, bad oral hygiene, and loss of functional oral gains (Hansen et al., 2008a). The time to return to an unrestricted diet was also monitored (Hansen et al., 2008a). During the time of admission, 93% of patients had problems with oral intake, and 63% relied on a feeding tube. Results indicated that the severity of the TBI was a strong predictor for an unrestricted diet, such that more severe brain injury was associated with a lower chance of an unrestricted diet before discharge. Facial oral tract therapy was associated with an increase in return to an unrestricted diet in 64% of the patients at the time of discharge, with an average time of 28 days, and the longest being 126 days (Hansen et al., 2008a). The functional gains made by participants were maintained over time (Hansen et al., 2008a)

Two studies, published eight years apart, examined the effects of povidone-iodine oral care on the occurrence of ventilator associated pneumonia (VAP) in individuals with severe head trauma in an ICU. One study reported that the regular application of povidone-iodine as an oropharyngeal rinse in these patients significantly reduced the prevalence of VAP compared to standard oral care regimens (Seguin, Tanguy, Tirel, and Malledant, 2006). The second study used a randomized, placebo controlled trial, and found no evidence for the efficacy of povidone-iodine in preventing VAP in individuals with a TBI. In fact, acute respiratory distress occurred in five patients in the povidone-iodine group but none in the

placebo group, suggesting that povidone-iodine may have increased the risk for acute respiratory complications (Seguin et al., 2014).

In a fourth study, Robertson and Carter (2013) tested the efficacy of an enhanced oral care protocol in reducing the incidence of non-ventilator hospital-acquired pneumonia in an acute care setting with a non-care dependent/non-intubated population of neurologically injured patients, some of whom had a TBI. Whereas in the enhanced oral care group, oral care was administered by nurses who were trained by the study authors, nurses providing oral care in the standard oral care group received no training (Robertson & Carter, 1993). Compared to a standard oral care routine, enhanced oral care was significantly associated with reduced incidence of hospital-acquired pneumonia in non-ventilator dependent patients (i.e, 25.5% to 6.3%). The authors noted two cases of hospital-acquired pneumonia in the enhanced oral care group in patients who had a tracheostomy (Robertson & Carter, 2013). While the findings from this study suggest that an enhanced oral care protocol may be advantageous in reducing the incidence of non-ventilator associated hospital-acquired pneumonia, it also sheds light on the effectiveness of oral care training and the differences between the quality of care that was given to patients where nurses were not provided with any training. This raises questions regarding the type of oral health educational training that is given to health-care providers who provide oral care to dependent patients, such as nursing staff.

Another study examined the effects of using step-by-step instructions in providing oral care on aspiration pneumonia in patients in an acute care setting who had oropharyngeal dysphagia and TBI (Seedat & Penn, 2016). Oral care was administered by nurses who were trained by an SLP (Seedat & Penn, 2016). Dysphagia is characterized by the dysfunction of one or more parts that make up the function of swallowing, such as the tongue, the oral cavity, the pharynx, the airway, and the esophagus (Shaker, 2006). Oropharyngeal dysphagia results from abnormalities that affect the upper esophageal sphincter, pharynx, larynx, and tongue (Shaker, 2006). The study authors reported that there was an inverse relationship between the oral care and aspiration pneumonia as indicated by chest x-rays (Seedat & Penn, 2016). Eight participants, (5 of whom had TBI) in the study group showed signs of aspiration but did not develop aspiration pneumonia (Seedat & Penn, 2016). Seedat and Penn (2016) found that at the end of the dysphagia treatment, none of the participants who received oral

care developed aspiration pneumonia compared to the comparison group who received oral care that varied. Implementing an oral care regimen was seen as a contributing factor in the prevention of aspiration pneumonia in patients with oropharyngeal dysphagia as oral care was reported to ensure the clearance and prevention of bacteria buildup (Seedat & Penn, 2016). This study suggests that providing training for health professionals who provide oral care for individuals who have a swallowing disorder and TBI may be beneficial in preventing aspiration pneumonia.

As a whole, these studies provide evidence that oral care interventions may be effective in reducing the risk of chronic health problems in individuals with TBI and in some cases preventing respiratory infection. However, the appropriateness of some methods, such as povidone-iodine, remains unclear. Although enhanced oral care protocols may be beneficial in reducing the incidence of hospital-acquired pneumonia in non-ventilator dependent patients with a TBI, the existence of a tracheostomy may also increase the risk of developing pneumonia

2.3.3 Theme Three: Mechanisms to Improve and Enhance Oral Health

Five studies examined the use of various approaches to improve or enhance oral care. The first study examined the effects of implementing personalized oral care routines on the oral health status of individuals with TBI. Zasler et al. (1993) examined the effects of verbal, oral hygiene instructions on the removal of plaque in patients with TBI in an acute inpatient brain injury rehabilitation unit with the instructions tailored to each patient's cognitive status, oral needs, and physical abilities. Results demonstrated significant decreases in plaque scores, as indicated through the Silness Loe's plaque index, in participants who received the oral care intervention in comparison to the control group who were not given oral care instructions (Zasler et al., 1993). The findings from this study suggest the importance of being mindful of TBI related impairments in oral health as taking such an approach to care has been shown to improve the occurrence of plaque.

The other four remaining studies were case studies, two of which examined the use of systematic desensitization for treating oral hypersensitivity to improve oral care. One case study described a 56-year-old man, ten months following severe TBI as the result of being hit

by a train, who was then unable to engage in daily oral hygiene due to difficulties related to oro-facial hypersensitivity, and oral dyspraxia (Gilmore, Aram, Powell, & Greenwood, 2003). At the end of a 2-week intensive, systematic desensitization program, tolerance to oral care significantly improved, with decreased negative reactions to touch and movement (Gilmore et al., 2003). The individual was able to take part in full daily oral hygiene routines including cleaning the tongue and palate. The associated benefits related to the caregiver were briefly discussed (Gilmore et al., 2003).

The second case study described a 36-year-old man, 15 months' post closed head injury due to an automobile accident (Brown, Nordloh, & Donowitz, 1992). When the patient was transferred to a rehabilitation center, he was severely sensitive to any kind of stimulation of his face, gums, and tongue (Brown et al., 1992). After 37 days of systematic desensitization, the patient overcame oral hypersensitivity and was able to move towards a pureed diet including and liquids, which was maintained after a 6-month follow up (Brown et al., 1992).

The third case study described a 24-year-old edentulous female patient about to undergo implant treatment five years post severe TBI (Flanagan, 2011). The patient lost most of her teeth during her accident and was unable to appropriately perform effective oral hygiene, making her dependent on family and caregivers (Flanagan, 2011). As a treatment, this patient received bimaxillary removable dentures, which ultimately benefited the patient as it simplified daily oral functions, and assisted with the ability for other care providers such as family to help with daily oral hygiene (Flanagan, 2011).

The last case study examined a 48-year-old patient who endured a significant traumatic head injury, seizures, uncontrollable mandibular clamping, and grinding movements that produced significant ulcerations to the lower lip (Cohen, Patel, & DiPede, 2009). Results indicated that when a mouth guard was in place, the mandible was able to relax, and there were significant improvements to the affected lip. After two weeks, clamping and grinding was reduced and eventually the use of the mouth guard was discontinued in a matter of weeks (Cohen et al., 2009).

In two separate cases of individuals with TBI, systematic desensitization reduced oral hypersensitivity/hyposensitivity, thereby increasing tolerance to oral care and the progression

to a diet consisting of pureed food (Brown et al., 1992; Gilmore et al., 2003). The latter two case studies of patients with TBI demonstrated the use of oral prostheses, such as maxillary removable dentures and a customized mouth guard, in the improvement of oral hygiene and oral function in addition to the cessation of clamping and grinding of the mouth respectively.

2.3.4 Theme Four: Changes in Oral Health and Infection

Three studies addressed the association between oral health and the occurrence of respiratory infection. Hansen et al. (2008b) examined the frequency, onset and risk factors for pneumonia at the beginning of subacute rehabilitation for patients with a severe TBI. All participants were dependent on feeding tubes regardless of whether they were able to take anything by mouth (Hansen et al., 2008b). Results demonstrated that those who had GCS scores less than nine were at an increased risk of acquiring pneumonia (Hansen et al., 2008b). Furthermore, 81% of patients who developed pneumonia had a feeding tube (Hansen et al., 2008b). Patients who also had a tracheostomy tube were at a greater risk of developing pneumonia (Hansen et al., 2008b). A reported association existed with having a tracheostomy tube and/or feeding tube and a higher risk of the occurrence of acquiring pneumonia (Hansen et al., 2008b).

Another study investigated changes in oral health when patients with a TBI in a neuro ICU were intubated, and the occurrence of VAP as a result of these changes (Prendergast, 2009). Oral assessments were conducted by nurses to assess the quality of care that was provided by the patient's bedside nurse (Prendergast et al., 2009). Based on OAG scores, oral health significantly declined when patients were intubated (Prendergast et al., 2009). The rate of VAP reached 25% on the fourth day, and 46% by the 10^{th} day (Prendergast et al., 2009). Oral health was significantly reduced during the period of intubation but returned to baseline levels almost immediately upon extubating (Prendergast et al., 2009). The findings from this study demonstrate that oral health appears to decline during lengthened periods of intubation in neuro ICU patients, which later improved after extubating (Prendergast et al., 2009).

Seedat and Penn (2016), examined the effects of regular oral care and the consumption of water when combined with a dysphagia intervention for the prevention of aspiration pneumonia in TBI patients with oropharyngeal dysphagia. A barium swallow was used to confirm if a participant had a lung infection suggesting aspiration pneumonia (Seedat

& Penn, 2016). The findings indicated that none of the participants who received a strict oral care regimen developed aspiration pneumonia (Seedat & Penn, 2016). Furthermore, Seedat and Penn (2016) expressed that the oral care regimen applied in the study, including the monitoring and communication between the nurse and SLP, may have prevented the incidence of penetration and aspiration with coughing, throat clearing and chocking from developing into aspiration pneumonia (Seedat & Penn, 2016). In contrast, poor oral hygiene, combined with oropharyngeal dysphagia, in TBI increased the risk of acquiring aspiration pneumonia (Seedat & Penn, 2016). The findings from this study suggest that interprofessional collaboration between SLP and nursing may be beneficial for the health of the patient.

These studies demonstrate that decreases in oral health are associated with an increased risk for the development of various forms of respiratory infection such as pneumonia for individuals with TBI, with severity of the injury being associated with risk for infection (Hansen et al., 2008b). Other variables, such as the use of mechanical ventilation (Prendergast et al., 2009) and feeding tubes (Hansen et al., 2008b) appear to elevate the risk of VAP (Prendergast et al., 2009), and aspiration pneumonia (Seedat & Penn, 2016).

2.3.5 Theme Five: Oral Care Dependency

Three studies reported on the relationship between oral care dependency and the quality of care given by caregivers for individuals who have TBI. Only one study reported barriers to providing care to this population. Stiefel et al. (1993) indicated that all participants with TBI in the study were residents of long-term care facilities and were dependent on care, and suggested that care dependency and institutionalization may have played a factor in the higher levels of plaque and prevalence of gingivitis that were found in the study.

In another study, Robertson and Carter (2013) indicated that when caregivers such as nurses were given instructions on how to provide oral care to individuals with TBI in the enhanced oral care protocol, more than 90% were compliant, and recognized the importance of oral hygiene for the patient's comfort level, and making it easier to assist patients on a daily basis (Robertson & Carter, 2013), which may positively impact overall health. Robertson and Carter (2013) also discussed time as a contributing factor to providing oral care. In the enhanced oral care protocol, the nurses' workload was reported to be reduced as

there were fewer patients who developed hospital-acquired pneumonia (Robertson & Carter, 2013). Moreover, the nurses participating in the study reported that patients receiving the enhanced oral care protocol required less tracheostomy suctioning and had an easier time caring for their mouths, which improved their ability to monitor the occurrence of oral infection (Robertson and Carter, 2013). Clearly, the findings from this study indicate the benefits of receiving instructions for providing oral care for both the health-care provider, and the patient.

Alibhai (2013) administered surveys to caregivers to investigate perceived barriers to providing oral care. This was the only study that examined barriers to providing oral care for individuals with TBI. About 90% of caregivers agreed that oral care was part of their job but felt as though they were not given enough training to provide proper and sufficient oral care, and lacked knowledge and confidence in delivering this service (Alibhai, 2013). Although the majority of the caregivers reported feeling qualified to administer oral care and most have received some form of training, the quality and effectiveness of those educational sessions are not clear (Alibhai, 2013). Furthermore, more than half the caregivers reported facing obstacles to administering oral care in people with TBI (Alibhai, 2013). Approximately 66% of caregivers found that patients did not want to open their mouth, 49% reported patients moving their head to avoid oral care, and 51% indicated that patients were verbally defensive and refused care (Alibhai, 2013). A few of the caregivers also addressed that patients occasionally hit them (Alibhai, 2013). It was also reported that disability-related impairments such as lack of communication skills, and language were barriers to administering care (Alibhai, 2013). According to the nurses providing care, resistance to oral care was likely due to poor oral health, including bleeding gums, and physical and cognitive limitations (Alibhai, 2013). Although the majority of the caregivers in this study were given some training in oral care, the study author was not able to further comment on the quality of that training. However, it is important to recognize that the findings from this study were based on one location, therefore generalizability might be difficult.

The findings from these studies outline some of the barriers that are faced by caregivers when providing care oral care for individuals with TBI, and how this affects the quality of care that is given. Nursing staff indicated patient-specific behaviours as some barriers to providing care (Alibhai, 2013). Additionally, time was discussed as a contributing

factor in administering care as a result of patients who may require more attention (Robertson & Carter, 2013).

2.4 Reviews

One review discussed dysphagia in severe TBI. Alhashemi (2010) found that oral and pharyngeal stage abnormalities were common in dysphagia secondary to a TBI. In the oral phase, loss of teeth rendered difficulties in eating a regular diet, and severe TBI patients with dysphagia were not able to communicate due to decreased levels of consciousness, and the presence of a tracheostomy (Alhashemi, 2010). Findings also indicated that 50% of patients undergone a tracheostomy following a severe TBI which may contribute to decreased oral health status (Alhashemi, 2010).

2.5 Gap in the Literature and Study Rationale

Around the world, TBIs account for 9% of global mortality and is a threat to health in every country worldwide (Tabish & Nabil, 2015). The incidence is far greater than any other common disease such as Parkinson's disease, breast cancer, HIV/AIDs, and multiple sclerosis (Prins, Greco, Alexander, & Giza, 2013). Despite the prevalence, in the span of over two decades, available literature on oral health in TBI is sparse and has been largely under-explored. The various studies included in the scoping review were organized in a way that made sense of the existing literature in order to showcase the type of studies that have been done to date. Existing literature suggests that oral health may be reduced in individuals with TBI (Kothari et al., 2016; Stiefel et al., 1993); oral health may be used to improve health (Hansen et al., 2008b) such as reducing the incidence of pneumonia (Robertson & Carter, 2013; Seedat & Penn., 2016) specifically when nurses were given training before providing care; oral health may be improved when an individual's limitations are taken into consideration and their impairments are factored into their care (Brown et al., 1992; Cohen et al., 2009; Flanagan, 2011; Gilmore et al., 2003; Zasler et al., 1993) and; being dependent on care may affect oral health status (Alibhai, 2013; Robertson & Carter 2013; Stiefel et al., 1993).

While there are a number of gaps in the literature and many areas in which research could be contributed to regarding oral health in TBI, a major gap is a lack of understanding

with respect to what health-care providers know about the issue at hand. Many of the participants from these studies were sampled from one location in one part of the world which makes generalizing the findings increasingly difficult as patients are different in their level of impairments and competence respectively. As previously mentioned, health-care professionals including nursing students have misconceptions and inaccurate beliefs regarding TBI, and there seems to be lack of knowledge regarding oral health amongst health-care providers. In many of the reported studies, health-care providers' knowledge prior to receiving any training or administering care was not examined. However, it has been show that when nurses are educated on the importance of oral health and are provided with instructions and training on how care should be provided, patients had reduced incidences of non-ventilator associated hospital-acquired pneumonia (Robertson & Carter, 2013), and preventing aspiration pneumonia (Seedat & Penn, 2016) compared to the control group. This raises the question of what health-care providers know about oral health in TBI prior to being trained or given education such as participating in an educational program. More specifically, this raises the question of what students learn and are taught during their professional training as health-professional students.

To our knowledge, oral health in TBI has been scarcely investigated from the point of view of various rehabilitative health-care professionals. Also, very little is known about what students know about the topic and whether there are any gaps in their current educational training. While Robertson and Carter (2013) mentioned that a possible next step in the research is examining nurses' attitudes and importance placed on oral health in their practice it is equally important to first understand what health professional students know about oral health in TBI before they enter into practice. To our knowledge, this present study is the first to explore the experiences and perceptions of health-professional students in their final-year of professional training in nursing, OT, PT, and SLP.

When comparing the methodologies employed by other researchers in studies assessing perceptions, beliefs, and attitudes most of the studies used quantitative methods. Whereas very little have employed qualitative methodology (Unfer et al., 2012; Yoon & Steele, 2012), and have also used focus groups as a means to collect data (Yoon & Steele, 2012). This study will use qualitative methods and focus groups to understand what students know about oral health in TBI. By asking questions about students' learning experiences

about oral health, TBI, and oral health in TBI it is easier to understand students' awareness of the topic at large and map out existing gaps in their knowledge. This study will contribute to the limited literature on oral health in TBI, and will add a new perspective to the research. The knowledge generated from this study may be used to inform the educational curricula of the various health-professional programs.

Chapter 3: Methodology and Methods

3 Overview of Methodology and Methods

The overall aim of this study was to explore what health-professional students in their final year of nursing, OT, PT, and SLP programs know about oral health in TBI. More specifically, the objectives of this study were to gain insight into the experiences and perceptions of final year health-professional students regarding oral health in TBI. This research question was addressed using qualitative research. Qualitative methods unravel the perceived experiences of research participants in a specific context (Krueger, 1994). In contrast to quantitative research which refers to the quantification of data and manipulation of variables to obtain an objective truth (Denzin & Lincoln, 2000), a key hallmark of qualitative research is the existence of multiple truths or realities which can only be comprehended through exploring the subjective knowledge people attach to their experiences, and interactions in the social world (Carpenter & Suto, 2008). Qualitative findings consist of participants' natural responses, behaviours and comments, which are used to describe the experience of a given concept or phenomenon. This chapter will provide a description of the qualitative research design employed in this study including the research paradigm and methodological approach; sampling and participants including the sample of interest, sampling strategy, participant recruitment and setting, and ethical considerations; data collection; data analysis; and criteria to ensure trustworthiness and authenticity

3.1 Qualitative Research Design

3.1.1 Research Paradigm

This study was guided by the philosophical assumptions of the constructivist paradigm which influenced the choice of methodology (qualitative descriptive research), participants, and method of data collection (focus groups) in this research (Denzin & Lincoln, 2000). This paradigm was deemed appropriate as there were multiple views in understanding oral health in TBI as the participants were from various health-professional programs. In research, the paradigm that is chosen for a study guides the researcher in a set of philosophical assumptions about the specific research, and the various assessment tools that could be used within the context of the study (Denzin & Lincoln, 2008). The concept of

paradigm can be defined as a set of interconnected assumptions about the world that accompany a framework to view that world (Filstead, 1979). According to Guba and Lincoln (1994), a paradigm is a belief system that serves to guide the researcher in their selection of methodology and methods. Concerning philosophical assumptions, every paradigm follows a set of ontological and epistemological beliefs about the world and what is known (Ponterotto, 2005). Ontology refers to the form in which the reality takes and what is known about that reality, and epistemology considers the relationship between the researcher and the participant, the nature of knowledge and how the knowledge is generated (Ponterotto, 2005). This study adopted a constructivist paradigm and is discussed further in the next section.

Constructivists hold true to the belief that what is often taken as the objective truth and knowledge is due to altering perceptions (Guba & Lincoln, 1994), and is composed of the individual, whereas positivists believe in only one objective truth. By nature, constructivists adhere to a relativist position which essentially means that they do not believe in one truth, and are guided by the idea that multiple and equally acceptable realities exist that will differ from one individual to another (Guba & Lincoln, 1994). In particular, knowledge is constructed through human experiences. In the constructivist paradigm, the relationship between the researcher and the participant is transactional which entail that results generated from a given study emerge from knowledge co-constructed by the investigator and the respondent (Guba & Lincoln, 1994). As such, the findings from this study emerged from the participants' experiences and perceptions of oral health in TBI through group discussions with the researcher.

3.1.2 Methodological Approach

In qualitative research, the choice of methodology is often influenced by the set of beliefs aligned with the chosen paradigm which guides the research process as a whole (Ponterotto, 2005). There are numerous qualitative approaches in qualitative research (Sandelowski, 2000) that are used to explore the multiple realities aligned with the constructivist paradigm including grounded theory, ethnography, narrative, and phenomenology (Sandelowski, 2000). Given the many existing methodologies, this study adopted a qualitative descriptive approach as outlined by Sandelowski (2000). This methodological approach was deemed appropriate since qualitative descriptive research is often used in qualitative studies exploring health care related phenomenon (Kim, Sefcik, &

Bradway, 2017). Moreover, qualitative description is the best option when the goal of the research is to display an accurate description of the phenomenon in question (Sandelowski, 2000; Willis, Sullivan-Bolyai, Knafl, & Cohen, 2016). More precisely, qualitative description was the methodology of choice as the end goal of this study was to provide a rich straightforward explanation of the everyday experiences, and perceptions of the participants using language that has accumulated from the collected data (Kim et al., 2017). Qualitative description gives way for the opportunity to capture a detailed description or summary of a phenomenon of interest of which little is known (Sandelowski, 2000).

Qualitative descriptive research is sometimes confused with descriptive phenomenology as the objectives of both approaches are to illustrate and improve the comprehension of human experiences and events that are not typically described or precisely understood (Sandelowski, 2000). Whereas descriptive phenomenological research is based on phenomenological philosophy, and requires the researcher to adopt phenomenological reduction, bracketing, and accompanies a desire to uncover the essential structure of individuals lived experience, qualitative descriptive research describes the range of responses to a given phenomenon using everyday language (Willis et al., 2016).

There are some underlying features used by researchers adopting a qualitative descriptive approach in their studies (Kim et al., 2017). To begin with, qualitative descriptive research is based on naturalistic inquiry, which implies that there is no manipulation of variables and allows the phenomenon of interest to reveal itself as it is in its natural state without any theoretical commitments made before-hand (Sandelowski, 2000). In qualitative descriptive research, every attempt is made to stay as close to the data and the words used by the participants compared to other qualitative research methodologies (Sandelowski, 2000). In that sense, qualitative description is “data-near” (Kim et al., 2017, p.68) as language is used to get the participant’s point across rather than interpreting their perspective.

Secondly, qualitative description is not as interpretive as other forms of qualitative methodologies which adopt a set of procedures, techniques, or a theoretical framework to help support the findings of their study (Sandelowski, 2000). Furthermore, of all the existing qualitative approaches, qualitative descriptive studies are known to be the least theoretical (Kim et al., 2017; Sandelowski, 2000; Willis et al., 2016). In particular, those adopting this approach are not encapsulated by pre-existing theoretical obligations (Sandelowski, 2000) as using a theory may affect the way in which the data is viewed (Colorafi & Evans, 2016;

Sandelowski 2000). As a result, qualitative descriptive research is characterized as being low-inference which easily results in findings that generate a consensus amongst other researchers (Colorafi & Evans, 2016; Sandelowski, 2000). Lastly, researchers using qualitative descriptive research use a variety of sampling, data collection, and data analysis approaches (Willis et al., 2016).

Overall, qualitative descriptive research is less dependent on interpretation, and more on describing experiences or events as the goal of the research is to account for the participant's experiences in their own words. In this study, the goal was to depict a representation of what health-professional students understood about oral health in TBI, through a straightforward depiction in their own words, which is why a qualitative descriptive approach was used to co-construct knowledge between the researcher and the participants.

3.2 Sampling and Participants

3.2.1 Sampling Strategy

Purposeful sampling is the strategy that is most often used in qualitative descriptive research (Sandelowski, 2000). In qualitative descriptive studies, researchers often use purposeful sampling strategies as they have been found to be useful in gaining a wide range of insight and rich information (Neergaard, Olesen, Andersen, & Sondergaard, 2009; Sandelowski, 2000). Specifically, this study employed maximum variation sampling which involves purposefully sampling or selecting participants who may be knowledgeable and have experience with the phenomena of interest to capture a breadth of variation (Creswell & Plano Clark, 2011; Patton, 1990). Maximum variation allows for a greater understanding of how the phenomenon of interest is understood amongst a diverse set of individuals. More precisely, this sampling strategy was appropriate since the aim of the study was to gain insight into health-professional students' understanding of oral health in TBI, and the target population was from various professional health programs. When organizing participants into focus groups, the goal was to have an interprofessional mixture as professionals in these areas of practice typically work together in health care settings. This study aimed to recruit a total of 9 to 15 participants.

Participants were required to meet the following inclusion criteria:

(a) current Western student in their **final year** of one of the following graduate health-professional programs: MSc OT, MPT, or MClSc CSD, or undergraduate nursing program
(b) 18 years of age or older
(c) understand, read, write, and speak in English
(d) consent to audio recording of the focus group discussion

3.2.2 Sample of Interest

Interdisciplinary team members in primary rehabilitative medicine are made up of professionals who have a broad range of skills and knowledge, and are not limited to but may include OTs, SLPs, PTs, and nurses (Neumann et al., 2010). As a result, this study recruited senior level students form Western University who were in their final year of the professional masters programs in OT, SLP, PT, and undergraduate nursing. Students in their final year of professional training were the target population as they would have had some sort of a) in-class course experience regarding theoretical knowledge on oral health and hygiene according to their profession, b) clinical opportunities to provide oral health care, and c) would be getting ready to enter into practice. More specifically, students in these four entry-to-practice programs were chosen as these are areas of practice in which practitioners work on specific goals that aid in rehabilitating individuals back into society after a brain injury. Particularly, in these health professional programs, students have the potential to work with individuals with varying difficulties including those with neurological conditions such as TBI.

Students from these health-professional programs were chosen because OTs help individuals get back to everyday activities that were once important to them such as diverse aspects of self-care (CAOT, 2016), in which brushing your teeth could be an essential component. Similarly, amongst many other tasks, SLPs help with improving swallowing functions (SAC, 2016), a significant criterion when it comes to maintaining oral hygiene (Yoon & Steele, 2012). On the other hand, while understanding how and why function and movement take place, PTs work on improving and promoting optimal mobility through the prevention of disease, injury, and disability (CPA, 2018). Lastly, students from the nursing program were included as their professional practice provides disease management and holistic care for all kinds of individuals through the promotion of good health, and the prevention of disease (CNA, 2015). According to the nurses' best practices guideline, a nurse

is required to provide, supervise, and remind patients of their oral care multiple times a day (Registered Nurses' Association of Ontario [RNAO], 2008). Collectively, OT, SLP, PT, and nursing work on improving aspects of everyday well-being that contribute to good oral health.

3.2.3 Participant Recruitment and Setting

All participants were recruited from Western University, and all data was collected on the university campus. This study was conducted according to the approved ethical guidelines **(See Appendix A for Ethics Approval)**. The following are the strategies used to recruit participants in this study. Recruitment posters were placed **(See Appendix B)** on the bulletin boards of the professional programs for OT, SLP, and PT in Elborn College, of Western University. Recruitment posters were also placed in the Health Science Building, and the FIMS and Nursing Building. Email requests **(See Appendix C)** were sent to course instructors in the various disciplines teaching in the fall of 2017 and the winter 2018 semester once in November and again in January, and February. The study invitation and recruitment poster were attached to the emails sent to the course instructors, and the same email requests were also sent to the Graduate Program Assistants in the various programs in order to send the study invitation to the email accounts of students in those specific cohorts. Additionally, the Graduate Program Assistants were also emailed if the course instructor's name was missing from the program website. Lastly, study invitations were posted on the Facebook group page **(See Appendix D)** for the nursing, OT, and SLP students as these students had an existing group page for the students in their program. Students interested in participating in the study contacted the researcher directly through email at which point they were sent a short screening survey to confirm eligibility **(See Appendix E)**. Students also had the option of contacting the researcher through telephone **(See Appendix F)**.

It is important to note that Western offers "combined programs" that provide opportunities for students to earn both their clinical master's, and a doctoral degree, within a 5-year period. Only students in their second year of the combined MClSc/PhD in SLP were eligible to participate in the present study as they complete their professional training in SLP in their first two years of the five-year program. After confirming eligibility, eligible students were sent a copy of the Letter of Information with the Consent Form **(See Appendix G for the Letter of Information and Consent Form),** three options for focus group dates, and

were asked to provide written consent through email if they were interested in taking part in the study. Follow-up emails were sent to interested participants after 48 hours if they did not reply back to the email that included details about the study. Similarly, all students were sent reminder emails 48 hours before their assigned focus group date. The focus groups took place in the conference rooms in Elborn College and the Dean's Office in the Health Science Building.

3.2.4 Ethical considerations

On November 21st, 2017, ethical approval was obtained from Western University's Health Sciences Ethics Review Board, upon which participant recruitment began. All eligible participants were emailed a copy of the Letter of Information, and written consent was obtained by each student before the start of their focus group session. Students were informed that confidentiality could not be guaranteed given the nature of focus group discussion. However, to facilitate anonymity, participants were informed that all identifying information would be removed from the transcripts and they would be given descriptive labels to protect their identity in the production of the results. All raw data were stored on a password-protected computer in the principal investigators (PI) lab [REM], and paper copies were kept in a locked cabinet in the PI's [REM] office. The institutional policy at Western University was followed for permanent data destruction such as shredding for paper copies, and electronic data were permanently destroyed from the secured University server.

3.3 Data Collection

Focus groups was the method of data collection used to gather information about the experiences and perceptions of the participants regarding oral health and hygiene in TBI. Data collected in qualitative descriptive studies typically aims to unravel "the who, what and where" of events or experiences (Sandelowski, 2000, p.338). Focus groups are a common method of data collection in qualitative descriptive research (Willis et al., 2016), and helps in revealing detailed information about a broad range of events (Sandelowski, 2000). More specifically, a focus group is a unique kind of group concerning the way in which it is organized, and the various people that are included (Krueger, 1994). What makes them unique is the fact that the data and insight that are generated are only found through the use of group interactions (Morgan, 1988), and the types of discussions that happen are intended

to unravel the participating individuals' attitudes and perceptions on a well-defined concept or topic (Krueger, 1994). The purpose of the focus group was to encourage self-disclosure amongst the contributors in the discussion (Krueger, 1994) and to identify a multitude of perspectives on a defined research topic (Hennink, 2014), specifically oral health and hygiene in patients with TBI. Some of the limitations with focus groups include difficulty with scheduling, as more people are needed and members of the group discussion may feel pressured to give the same response as the other participants in the discussion. Focus groups were chosen for this study rather than in-depth interviews as individuals from these health professions typically work together in rehabilitation medicine.

In this study, each focus group aimed to have three to five members with an interprofessional mixture of the four professions in each group. Krueger (1994) suggests a conducting a minimum of three focus group discussions. A total of three focus groups were conducted in this study. Characteristically, focus groups are made up of 6-10 people, but the proportion of individuals included in the discussion can vary from 4 to 12 people (Krueger, 1994) as the more people involved, the greater generation of knowledge. On the other hand, small groups consisting of four to five participants allow for enhanced possibilities to share thoughts and ideas (Krueger, 1994). Additionally, an unstructured group discussion was the chosen format of the focus groups, and all questions were open-ended. During the focus group sessions, an interview guide was used which consisted of eight questions related to the participants' experiences and perceptions about oral health and oral hygiene in TBI. Questions were carefully considered since the students differed in their level of education as the professional programs were at the undergraduate or graduate level. For example, students were asked "thinking back in your own education, over the course of your first year, and the exposure you have gained in your program, to what extent have you learned about traumatic brain injury?" **Appendix H** provides a complete list of the focus group questions.

The focus groups were moderated by two researchers, one of whom asked questions and led the discussion [SO] while the other took notes during the discussions [REM]. The notes taken by [REM] were supplementary and were used if something was not clearly heard in the audio recording. General and vague statements by the participants were probed to provide clarity and establish a greater understanding of the participant's perceptions which gave way to more depth in the discussion. Focus groups lasted between 35-45 minutes. All focus groups were audio recorded, and then transcribed verbatim by the researcher [SO].

3.4 Data Analysis

This study applied thematic analysis as guided by Braun and Clarke (2006), which involved six successive phases of analyzing the data. The generation of codes, themes, and subthemes were data-driven. Qualitative descriptive studies report comprehensive thematic summaries, clustering common ideas from numerous individuals to represent the data (Willis et al., 2016). In qualitative descriptive research, the goal is to provide a detailed summary of the participants' experiences in the same language used to express those events (Sandelowski, 2000). Thematic analysis is a strategic tool that gives way to a rich, detailed, and elaborate account of the data (Braun & Clarke, 2006), and is one of the most common techniques used to analyze focus group data (Hennink, 2014). Data analysis and data collection were iterative processes and occurred simultaneously.

3.4.1 Phase One in Thematic Analysis: Becoming Familiar with the Data

At the end of each focus group discussion, the audio recordings were transcribed verbatim by [SO]. All identifying information was removed from the original transcripts, and descriptive labels were assigned to each member of the focus group discussion. The transcripts were repeatedly read to become fully immersed and familiar with all parts of the discussions (Braun & Clarke, 2006), and the characteristics of the participants. Each transcript was read while listening to the audiotape to ensure completeness and accuracy before the analysis process began. Lastly, notes were taken in the margins of the transcripts, and initial codes and ideas were written down. These notes consisted of ideas for potential codes in the form of short words and phrases.

3.4.2 Phase Two in Thematic Analysis: Creating Codes

After having been familiarized with the transcripts, by reading them multiple times over, initial codes were created as the next step in the data analysis process. This particular phase consisted of an inductive approach to identifying codes which entailed that the analysis was data-driven (Patton, 1990). All codes and themes were derived from the data itself to assure that the participants' perceptions were accurately captured and that categories were designed specifically regarding the data. Codes were used to label ideas or phenomenon

within the transcriptions and were re-used as similar ideas recurred (Krueger, 1994). In this study, the focus group transcripts were coded individually, and codes were re-used as similar content came up in the following transcripts. Coding was done manually through the use of notes on various paper copies of the transcripts. These notes consisted of words and phrases which were used as codes to organize the data and were written on the margins of the paper. Initial themes were also noted while the data was being coded and each set of data was then uploaded on to Quirkos (2018), a qualitative software. Noting initial themes consisted of listing small phrases of potential broader themes to be used to capture the codes that were identified. Quirkos created a visual representation of the themes and subthemes, and the data was then collated together in the form of a report.

3.4.3 Phase Three in Thematic Analysis: Looking for Themes and Subthemes

This third phase of the analysis process consisted of constructing themes typically broader than the codes and looking for meaningful patterns in the data. Searching for themes involved identifying concepts that have been intensively, and frequently expressed (Krueger, 1994). Krueger suggested seven factors that should be taken into consideration when analyzing and interpreting the data (Krueger, 1994), and were used in the analysis of the focus group data. These factors included being mindful of the words used by the participants; considering the context in which the words have been said and interpreting the response in light of that environment; the internal consistency of the responses such that some participants position may change based on what another member of focus group has said; considering the intensity of the comments involving careful examination of the participants tones, talking speed, and changes in the way in which they verbalize that will indicate their strength in feelings regarding the topic; the specificity of responses; and finding the big ideas by taking a step back and looking at the bigger picture (Krueger, 1994).

A thematic map was used to aid in the creation of themes and to help understand how the themes relate to the codes and to one another. This map was a hand drawn visual of the codes and how they relate to one another in the formation of themes. This map was used for the purposes of helping the researcher [SO] visually see the themes and codes. Themes were broader and were created using the codes identified from the data. Overall, careful consideration was put into the relationship such as the similarities and differences between

the codes, themes, and the various levels of the themes such as the subthemes. Codes were organized into broader themes and subthemes within them. Various versions of the outline consisting of the themes and subthemes were checked multiple times by both researchers [SO, REM]. Checking the outlines involved going through the themes and various subthemes and making sure that what was categorized as a theme or subtheme had actual data extracts representing the participants' experiences and perceptions. At the end of this phase, there was a detailed and organized outline of the various themes and subthemes including direct quotes from the participants at each level. Quirkos was used to organize the accompanying themes, subthemes and direct quotes into a coherent report. Quotes are significant to include as they represent evidence indicating participants' experiences and perceptions on the topic namely oral health in TBI. In the Quirkos report, each subtheme had a set of quotes representing the students' perceptions and experiences on the oral health in TBI.

3.4.4 Phase Four in Thematic Analysis: Going Over Themes and Subthemes

In the fourth step, the identified themes were reviewed and modified. This step consisted of reviewing the themes and checking to see if enough data was supporting them, breaking down themes into separate themes if they were distinct, and merging themes if they are similar (Braun & Clarke, 2006). In particular, there were two levels of analysis in this phase. In the first level, all the extracts under each level of the thematic organization were reviewed to ensure that the examples fit with the associated theme and subtheme. Specifically, during this phase some subthemes were deleted and others were merged into other themes as there was redundancy in the extracts and some of the themes did not have data supporting the claim. In the second level, the data extracts and themes were compared as a whole to identify whether or not there was an accurate representation of the data. This consisted of going back to the themes and making sure that there was data backing up the findings. At the end of this phase, there was a detailed outline which presented a coherent story of the entire data.

3.4.5 Phase Five in Thematic Analysis: Providing Meaning and Refining Themes and Subthemes

The fifth step of the analysis process involved defining and further refining the names of the themes and subthemes. The essence of what each theme was about and what was interesting about the theme such as unexpected findings was recorded. This included differences between the various health-professional students, what the underlying meaning of each theme meant, and what the themes meant in relation to one another. Additionally, this step involved conducting a complete analysis of each theme which consisted of describing the story each theme conveyed, and how it fit with the bigger picture regarding the data and research question. At the end of this phase, the names of the themes and subthemes were clear and concise.

3.4.6 Phase Six in Thematic Analysis: Creating the Written Report

The final step of the thematic analysis process produced the final written report of all themes and subthemes in a coherent way that conveyed a logical and progressive story with supporting evidence such as the inclusion of data extracts.

3.5 Qualitative Criteria to Ensure Trustworthiness and Authenticity

In order to highlight the standards of quality in qualitative research, trustworthiness and authenticity were addressed. According to Colorafi and Evans (2016), it is essential to address trustworthiness and authenticity in qualitative descriptive research. Miles, Huberman, and Saldana (2014) stated that there are five standards often used to examine the trustworthiness and authenticity in qualitative descriptive studies including: (1) objectivity, (2) dependability, (3) credibility, (4) transferability, and (5) application. As such, the researcher was aware of and thought about these criteria before the collection and analysis of the data.

3.5.1 Objectivity

The process of objectivity refers to the researcher being free from all biases and their ability to remain neutral throughout the research process (Miles et al., 2014). Objectivity was

addressed in this study in two ways. The first way in which objectivity was enhanced was through the transparency about the study methods and procedures, and how the data were collected and analyzed (Miles et al., 2014). Particularly, all the study procedures and methods were recorded along with a detailed account of the data analysis process. Second, the researcher [SO] engaged in the cognitive exercise of locating themself within the domain of the research question at hand, and rigorous reflective notes were taken. Although qualitative descriptive research is not reliant on the researcher to engage in phenomenological reflection (Willis et al., 2016), rigorous reflexive notes were taken before and after each focus group session to ensure neutrality of the researcher and a conscious self-awareness of any existing biases and preconceptions. In these reflections, the researcher [SO] reflected on their thoughts about what the discussion would lead to before the start of the focus groups, any fears, and what it felt like to experience what each profession does during their time as a caregiver. Some examples of reflected thoughts included what the various students would contribute to the discussion according to their profession. After each focus group session, the researcher [SO] would take some time again to reflect on the group session and write down what was felt about the discussion and the various comments made by the participants such as interesting and unexpected findings discussed by the members of the focus groups. This is significantly as it helps the research to be aware of and keep track of biases before and after the focus group discussions and throughout the data analysis process. More specifically, reflexive notes were also taken throughout the data analysis process which consisted of the researchers [SO] thoughts and perceptions about the content of the transcripts, arising themes, and codes. These notes where written on paper copies of the transcripts, stickie notes, and were used to keep track of any biases and remain neutral. According to the constructivist paradigm, knowledge is co-constructed between the researcher and the participants and qualitative descriptive research does not rely on interpretation. While remaining neutral is not entirely possible, there are steps taken to help the researcher be more aware of and acknowledge their biases such being reflexive so as to reflect the participants' perceptions and experiences in their words.

In terms of locating oneself within the domain of the study, the researcher [SO] detailed their experiences that sparked interest in this study. Furthermore, as a researcher, it is essential to acknowledge the personal experiences that influenced the interest to conduct this study. The researcher's [SO] interest in oral health in TBI stemmed from the personal

experiences of being a caregiver for a family member who sustained a severe TBI. This unique experience and academic background have given her a deep and holistic understanding of rehabilitation, and the various components that affect successful reintegration back into the community. This lead the researcher [SO] to wonder how the community reintegration process could be improved, through evidence-based research. After conducting a scoping review, it became clear to the researcher [SO] that this was a gap in the literature that needed to be further explored. Throughout the study, the researcher was aware of any biases and remained objective and neutral during data collection and analysis. This was done through the reflexive notes that were taken throughout the data collection and data analysis process.

3.5.2 Dependability

Dependability refers to the rate in which consistency was established with respect to the methods and procedures for all participants of the study (Miles et al., 2014), and helps with the authenticity of the research (Colorafi & Evans, 2016). In this study, dependability was achieved through numerous avenues including: a) clearly establishing the researchers' roles in the study, b) ensuring consistency in the data collection phase by having the same moderator and note-taker at each focus group discussion, and using the same questions in the exact order each time rather than being flexible so as to ensure authenticity and that there were no differences arising in terms of methods for data collection, c) conducting data analysis and data collection at the same time which allowed the researcher the opportunity to identify any errors and account for revisions in the analysis process, and to collect in-depth information about the students' understanding of oral health in TBI. Furthermore, as the data was collected, previously conducted focus group discussions were analyzed simultaneously, and this occurred continuously throughout the presentation of the results. During this iterative process, the audio recordings of each focus group discussion were transcribed verbatim and data were analyzed immediately after and as other focus groups were being conducted.

3.5.3 Credibility

Tracy (2010) describes credibility as the trustworthiness and plausibility of the study results. In qualitative research, some of the ways in which credibility is achieved include

thick descriptions of the findings, and multivocality which were applied in this study. Thick description is one of the most significant ways to achieve credibility (Tracy, 2010), and was established by providing a comprehensive and in-depth account of the participants' perceptions and experiences. Multivocality refers to the representation of varying voices and perspectives in the analysis process (Tracy, 2010). In particular, multivocality was achieved through the inclusion of multiple perspectives from the various health-professional students with the use of direct quotes in the analysis and presentation of the results.

3.5.4 Transferability

Transferability speaks to the various ways in which the study could be extended further by other researchers, and the findings could be transferred to other settings or groups (Elo et al., 2014). Particularly, in this study, transferability was supported through a detailed description of the participants included in the study such as their program and year of study. This is important as it will help make comparisons between groups. However, the findings of the study are not meant to be generalized in qualitative research. Lastly, transferability was enhanced by discussing the various ways in which the findings from the study could be extended by other researchers (Colorafi & Evans, 2016). A detailed description of suggestions for future research is provided in the discussions section of this thesis.

3.5.5 Application

Application in qualitative research refers to the utilization of the findings such that it discusses what the study can achieve and influence for the participants on a larger scale. More specifically, Miles et al. (2014) said "even if we know that a study's findings are valid and transferable, we still need to know what the study does for its participants and its consumers" (p. 314). To support the application of this research, poster presentations of this study were presented at multiple conferences, and the manuscript will be published on Western University's School of Graduate and Postdoctoral Studies Electronic Theses and Dissertation site. Further, this study also suggested action to promote additions to the educational curricula of the represented health-professional programs, and implications for the TBI population and practice along with directions for future research.

Chapter 4: Presentation of the Results

4 Presentation of the Results

This study had a total of eight participants as this was the number of students that expressed interest and were eligible to take part in the focus group discussions. All of the participants in the focus groups were females between the ages of 21-29. **Table 1** provides a summary of the participant demographics.

Table 1. Participant Demographics

Program Name	**Year of Study**	**Age**	**Sex**	**Participant Identifier**
Master of Clinical Science in Speech language Pathology (MClSc)	2	24	Female	Participant 011S
Master of Science in Occupational Therapy MSc OT	2	24	Female	Participant 011O
Bachelor of Science in Nursing (BScN)	4	21	Female	Participant 011N
Combined Master of Clinical Science in Speech Language Pathology/PhD	2	29	Female	Participant 021S
Combined Master of Clinical Science in Speech Language Pathology/PhD	2	24	Female	Participant 022S
Combined Master of Clinical Science in Speech Language Pathology/PhD	2	22	Female	Participant 023S
Master of Clinical Science in Speech language Pathology (MClSc)	2	26	Female	Participant 031S
Master of Science in Occupational Therapy MSc OT	2	27	Female	Participant 031O

One of the aims of the focus groups was to have an interprofessional mix of the various professionals. However, one of the groups had three students from the combined MClSc/PhD program in SLP. Most of the students in this study were from OT and SLP, and there was one student from nursing and no representatives from PT. **Table 2** provides a detailed summary of the organization of the focus groups.

Table 2. Focus Group Details

Focus Group	Date	Number of Participants	Participants	Moderator	Note-Taker
Focus Group 1	December 4th, 2017	3	Participant 011O Participant 011S Participant 011N	SO	REM
Focus Group 2	February 5th, 2018	3	Participant 021S Participant 022S Participant 023S	SO	REM
Focus Group 3	March 5th, 2018	2	Participant 031S Participant 031O	SO	REM

Five major themes were identified from the analysis of the data: (1) limited previous learning experiences in TBI and oral health; (2) limited understanding of oral health in TBI; (3) awareness and appreciation of profession-specific roles, and responsibility; (4) low perceived self-competency in assisting with oral care and; (5) oral health perceived as being overlooked in care.

4.1 Limited Previous Learning Experiences in Traumatic Brain Injury and Oral Health

The participants described their classroom-based learning experiences in TBI and oral health. This theme was further divided into two subthemes: a) variability in course experience and b) minimal clinical and practical experience.

4.1.1 Variability in Course Experience

The participants described a variety of course experiences from nursing, OT, and SLP. This subtheme was further divided into two other sub-sub themes: a) course work in TBI and b) course work in oral health.

4.1.1.1 Course Work in Traumatic Brain Injury

When asked about the extent to which the participants learned about TBI in their education, there was a considerable amount of variability described in the learning experiences that students in the final year of their health-professional training gained from lectures and theory and practice courses. In particular, these learning experiences ranged in the degree to which TBI was discussed, and the amount of time that was dedicated to discussing this topic. With some uncertainty based on observation, a nursing student described that her first-course experience was in a class that took place two weeks before her focus group discussion, where she reported to have learned about a condition related to TBI, namely concussions. The nursing student's learning experience consisted of a general overview of concussion and surrounding myths and assumptions: *"…we learned about signs and symptoms of a concussion when to return to work, sports, and the myths and kind of assumptions associated with concussions umm stuff like does a helmet help, does a mouth guard help"* (Participant 011N, focus group 1). Similarly, students from the OT program reported their learning experiences in TBI, and some of their responses were perceived to draw on general knowledge rather than specific knowledge. In particular, students expressed that they had a course where they learned about general strategies and assessments used when working with a TBI patient in an acute rehabilitation setting such as the hospital. One student commented:

> "…in our first term, in the first year, we had a neurological conditions course, and we covered a lot of common conditions that people would see going into their first placements…we did have a class specifically talking about the brain and TBI, and kind of what like a mild versus moderate versus severe would look like, Glasgow Coma Scale, and some of the symptoms" (Participant 011O, focus group 1).

While nursing and OT students predominately gained experience from one or two courses where TBI came up in a general sense, students from the SLP program had a variety of learning experiences through multiple courses and throughout their professional training. As two SLP students reported:

> "We had a class, and I forget what it is called, on stroke, brain injury and that sort of thing in our first year, second semester…we probably had like maybe three lectures specifically on TBI. We also spoke about it this year as well because we take… a course on motor speech disorders and so a lot of those can be caused by a brain injury so we kind of touch on it in multiple different courses as well" (Participant 011S, focus group 1).

Further, students from the SLP program had a range of learning opportunities from the perspectives of speech, swallowing, the associated mechanisms, and presentations in a TBI patient, to general strategies and assessments for all populations. As one SLP student reported:

> "We did a class on acquired, well it was our neuro disorders course for speech, and then we also talked TBI in our swallowing like in our dysphagia course…we just would go through the different populations and learn about what swallowing might look like in a TBI patient if it is impaired, and then we learned like general strategies and like different kinds of assessments but that was for every population, and risk factors for aspiration" (Participant 031S, focus group 3).

Additionally, students in the SLP program also had a "special topics course" entirely dedicated to TBI. In this course, SLP students reported to have been given the learning opportunity to acquire a mixture of both general knowledge surrounding demographics, and specific knowledge regarding assessments, treatments, and how cognitive processes underlying communication might be affected with various severity levels of TBI.

One of the students from the combined MClSc/PhD program shared that she was able to gain additional learning experience in TBI through a project consisting of a literature

review on mild concussions. This student believed that being a combined program student placed her at an advantage as she acquired extra knowledge that otherwise would not have existed, *"I would have not been doing that unless I was in the program" (Participant 021S, focus group 2).*

Although there was variety in the learning experiences amongst the three different professions, nearly all the participants of the focus group discussions perceived their learning to be limited. Many of the students expressed that their courses lacked specific knowledge with respect to TBI, and as a result, quite a few felt that the topic was brushed over at the last minute:

> "Very little, so far I've learned very little in my education and I think it comes up briefly when I think about acquired language disorder [course name] it wasn't covered in extent in my opinion so very little" (Participant 022S, focus group 2).

Accordingly, when discussing other populations of neurologically impaired individuals and possible assessments that could be used, some students were under the impression that TBI was not the main focus in many of their classes. Also, students reported that often when they learned about an assessment tool, it would be for another population and they were taught that it could apply for TBI. As one student said:

> "I don't know that we did it in the context of TBI. I know we did attention retraining in the context of acquired language disorders, but that's relevant in dementia and stroke as well and I think that was really the perspective that they were really taking" (Participant 023S, focus group 2).

4.1.1.2 Course Work in Oral Health

When asked to what extent students learned about oral health over the course of their education and training, one nursing student described that oral health and oral hygiene were not addressed in any of her courses but were brought during her clinical placements. Similarly, students from the OT program expressed that they were not able to think of anything specific regarding oral health other than the fact that it was introduced as a component of an individual's ADLs such as brushing one's teeth. These participants said,

> "…we talk a lot about activities of daily living, so ADL's, and we would classify oral health under like grooming so typically that would include like brushing your teeth, brushing your hair, putting on makeup" (Participant 011O, focus group 1).

Students from the SLP program described that oral health was something that was discussed a great deal by their instructors, and emphasized that it was mostly discussed within the context of swallowing. These students reported to have learned to be mindful of oral health as it could be a risk factor for different forms of respiratory infection, especially in patients with swallowing difficulties:

> "… for somebody who's not able to brush their own teeth, in terms of like if you're not swallowing properly and your mouth is not being taken care of…and if any of that ends up in your lungs, you can get a really bad infection and a lot of people actually end up dying in the hospital from aspiration and so that plays like a huge role" (Participant 011S, focus group 1).

Furthermore, for the SLP students, some of their learning opportunities in oral health consisted of case studies where they were encouraged to think about oral health when working with a patient. In fact, students in the SLP program were also taught that oral health was part of their scope and should be practiced in certain care settings.

Given all of their learning experiences in oral health, nearly all of the health-professional students perceived their learning to be limited, and some students commented:

> "I would say, from an OT perspective, I really haven't learned anything about oral health… I would say like the specifics on oral health, and umm what that would look like for a lot of different people we would see have been pretty limited" (Participant 011O, focus group 1),

> "…We talk about oral mechanisms in almost every course but like actually hygiene and health, not as much" (Participant 031S, focus group 3).

Students also reported having not been certain if they have been taught anything in their courses with respect to oral health-care strategies. As one student expressed:

> "so I would say that we really didn't cover oral health specifically… but we don't really specify, we don't really have any kind of assessments that I have been made aware of or any treatments specifically… when it comes to our actual courses, nothing has really gone into oral care, I wouldn't say" (Participant 031O, focus group 3).

4.1.2 Minimal Clinical and Practical Experience

Differences were reported by the various health-professional students regarding clinical experiences in oral health and TBI. For instance, a nursing student described that they were encouraged to think about oral health during their clinical practice:

> "…in clinical practice where they say to remember the little things like hygiene, make sure they are getting their bed bath, brushing their teeth, umm but really that's as far as it goes in terms of oral health education" (Participant 011N, focus group 1).

The students from the OT program adopted a more functional approach during their clinical placements and would ask patients if they had problems brushing their teeth:

> "but we are always looking at function, and so it's one of those things like in my homecare placement, for example, you went in and you would do a basic assessment and ask someone about how they are like *oh are you brushing your teeth ok, is that a problem* [emphasis added]" (Participant 031O, focus group 3).

One SLP student reported to have had a placement, and was the only student who reported having experience in oral health in an individual with TBI:

> "I did a placement in St Thomas Hospital and we were on the acute medical ward, in the stroke ward, we were all over the place and working with patients with um acquired brain injury and traumatic brain injury, and basically, yah oral. We were finding, usually we would go into assess a patient for their swallowing and what not and oral, um doing basic oral care was often where we started" (Participant 031S, focus group 3).

Some of the students perceived their clinical learning experience in oral health and TBI to be limited. In particular, one OT student described that she had not had a patient who has dealt with any oral health problems:

> "…I also haven't had any hospital placements yet, so it's just an area that I am not as familiar with. I've worked at a children's treatment centre but none of my kids were dealing with that" (Participant 031O, focus group 3).

Similarly, an SLP student commented:

> "…I haven't seen a hospital placement or anything so I am not sure how much we are advocating for oral health care um to our patients and educating them about risks" (Participant 022S, focus group 2).

Another OT student commented that she was unsure as to what poor oral health would look like in a potential client:

> "…I don't know what the problems would come up with, what kind of issues I would have to deal with" (Participant 011O, focus group 1)

Another SLP student reported having only gained clinical experience in oral health as a result of her clinical supervisor who provided oral care to a patient to conduct the necessary assessments:

> "The only real exposure that I've had to like how to do that was like in the hospital and that was because the SLP just felt like she had to get that out of the way so that she could proceed to do what she was there to do" (Participant 031S, focus group 3).

Summary of Theme One:

Students in their health professional training may have some in-class learning experiences in oral health and TBI ranging from class lectures to fully dedicated courses. However, in spite of their exposure, the majority of the students' perceived their learning to be limited, particularly in oral health. Although students were encouraged to think about oral health when working with a patient, many reported to have lacked clinical experience and were unsure as to how oral health problems would present, not only in a patient with TBI but any patient under their care.

4.2 Theme Two: Limited Understanding of Oral Health in Traumatic Brain Injury

This theme emerged with respect to the students' understanding of oral health and oral health in the context of TBI. This theme was further divided into two subthemes: a) perceived lack of knowledge in oral health and treatment and b) degree of comprehension of TBI related impairments in oral health.

4.2.1 Perceived Lack of Knowledge in Oral Health and Treatment

When asked, "what comes to mind when you think of oral health and TBI," many students described a lack of knowledge specifically in oral health. In particular, one nursing

student described that oral health would be a grey area for her as it was something that lacked discussion and emphasis in her training, and all the other participants in the focus group discussion agreed. Also, the nursing student said:

> "If a patient were to ask me, I don't know something about their oral health and they had a TBI, because we don't really discuss that. They really emphasize the need to rest afterwards, and I would maybe take that as still brush your teeth but not anything that aggravates you…is it like the type of tooth brush that would change, would you still floss, do you use mouth wash, like do you use an electronic tooth brush, or do you not use that because of the concussion? I don't know" (Participant 011N, focus group 1).

Likewise, students in the OT and nursing programs also reported to have not been familiar with oral health in TBI and had a difficult time envisioning how oral health would present in a patient and the kinds of problems patients might have. As one OT student said:

> "I would completely agree. When I think of those terms together, I don't even know… I'm totally unsure what those two mean together" (Participant 011O, focus group 1).

Nearly all the students emphasized that oral health in TBI was a connection that they would not have made prior to this study, and that they would tend to associate TBI with higher level cognitive difficulties. More specifically, one SLP student said: "…Oral health wouldn't necessarily be something that I would think of right away… I don't necessarily connect the two, a lot in my mind." (Participant 021S, focus group 2). In fact, one student from the OT program expressed that, when she thought about the importance of oral health, she imagined the social implications: "…there is like social implications, and you know like identity too and feeling that sense of independence. So those are all important aspects of a person as well so I guess that's why I think it is important…" (Participant 031O, focus group 3).

While students from the SLP program reported learning about the implications of poor oral health, students from the OT and nursing programs expressed being unaware and lacking knowledge of the potential risks. One OT student reported to have not thought about what the implications of poor oral health would be aside from the understanding that oral care was something that was needed to be done. Additionally, the OT student further described that she was unsure of the differences between patients with other neurological disorders and how that would compare to TBI. This student said:

> "Specifically, someone with a TBI, if they don't have good oral health I don't know how, like I don't know the implications specifically like for that population versus someone with a stroke. Like why one population would have different risks, would it be worse, what things I should expect from one population versus another" (Participant 031O, focus group 3).

Consequently, as a result of their perceived lack of knowledge, both the nursing student and OT students described that they would treat every patient the same when dealing with oral care:

> "…because of my limited knowledge about like TBIs and OT specific, I would say the same with um any other client like why it's an activity of daily living, why it is just something that is important to be doing as part of being healthy and being a part of your routine" (Participant 031O, focus group 3).

Although SLP students reported having some understanding of the implications of oral health as a risk factor for certain respiratory infections, many also communicated that they lack the appropriate strategies needed for good oral health-care practices. Some of the SLP students emphasized:

> "… I didn't know any particular strategies. I remember I was talking a little bit about how you could brush someone's teeth that is NPO (restricted from oral intake), like how you could brush someone's teeth without water. But I don't remember how… that's the only strategy that I can think of" (Participant 023S, focus group 2).
>
> "… I don't think we like gained the training that you would need in order to assist with like maintaining oral care" (Participant 021S, focus group 2).

On the other hand, nearly all the students agreed that they would benefit from seeking additional competencies such as speaking with experienced health-care professionals if they were in an environment where they were required to assist a patient with their oral care. Furthermore, students were interested in knowing how frequent oral care would take place for someone with TBI, including what the standard would be for someone in acute care. Overall, all students indicated that they were uncertain of the meaning of oral health, and the various components that make up the phenomenon as some understood that oral health went beyond the simple act of brushing one's teeth. Some students also said that they would benefit from a definition of oral health:

> "I think we would also benefit from a definition of oral health, because we do care for like around the mouth and you know like cracked lips or sores or whatever like that, I don't know if that's oral health or if that's more like integumentary system because its skin like so yeah, that's another grey area, what is oral health. Is it just what dentist is in charge of, like I don't know (Participant 011N, focus group 1).

The participants expressed that a better understanding of what constitutes oral health would potentially influence the importance placed on oral hygiene by the student for a patient with TBI. However, in spite of their perceived lack of knowledge, all students expressed that they would be able to help a patient with oral care, and would use their profession-specific skills to problem solve in the same way they would for any other issue that a patient had.

4.2.2 Degree of Comprehension of Traumatic Brain Injury Related Impairments in Oral Health

When asked what difficulties they could foresee in someone being able to take part in oral care after a TBI, many of students expressed uncertainty, and nearly all the students reported there might be complications with higher level cognition including a) motor problems affecting an individual's ability to physically brush their teeth, b) impairments in memory and executive functioning, and c) self-regulation. For example, students from the various health-professional programs said:

> "cognitively or, their motor abilities because I know that TBI or concussion can be very challenging to still think the same way that you did before so maybe you're not prioritizing your oral health" (Participant 011N, focus group 1)

> "... like we've been talking about a lot of the executive functioning so memory might be one thing that is affected so they may just completely forget that this is something that I should be doing and taking care of and that it is important for my overall health" (Participant 021S, focus group 2).

On the other hand, SLP students also recognized that there are individuals who may have difficulties with swallowing as a result of their injury. Students in the SLP program went on to illustrate the risk factors and implications of swallowing impairments (i.e., dysphagia) in someone with TBI, and the importance of oral hygiene:

> "…poor oral care puts these patients of TBI, and all other kind of medically fragile patients at risk for aspiration pneumonia if they already have dysphagia. If there is a

> presence of like a swallowing impairment um that oral care should be addressed with vigor, and nursing, family or whoever it is should be on top of that especially because if they are aspirating like we want to prevent any bacteria from going in there…Oral care is just one of these things, it's like it can be done, and it is a good thing to do always" (Participant 031S, focus group 3).

Some of the SLP students also described that, depending on the severity of the injury, other secondary injuries and mechanisms of care might affect the individual's ability to take part in an oral care routine. In particular, students explained that an individual might not necessarily be thinking about their mouth and brushing their teeth, especially if they are NPO as they are not using their mouth:

> "… for some people who if their TBI was from something like a motor vehicle accident, perhaps they have injuries to their arms that would prevent them or they have severe like quite a bit of bandaging on their face, it would be difficult to do their oral health care. So maybe other injuries could affect their ability to do that" (Participant 023S, focus group 2).

Alternatively, the students also expressed that perhaps the patient may not be as attentive to oral health as the result of other limitations that are perceived to be more significant. As one SLP student commented:

> "…maybe they are not worried about it because you know maybe they can't walk anymore and their just so focused on that aspect of their recovery and that they just couldn't be bothered to even think of that as something important" (Participant 011S, focus group 1).

Similarly, other students conveyed that, after a TBI, most people would not be thinking about oral health immediately. Students further acknowledged that, after a TBI, most people might have a lot going on in their lives, and many would be worried and anxious about the future.

Summary of Theme Two:

On the whole, focus group participants expressed lack of familiarity with oral health, and oral health in TBI and many had a difficult time conceptualizing the concept and perceived that they lacked knowledge. In particular, students in nursing, OT, and SLP perceived that they lack the skills and training needed for best oral health-care practices, and expressed that they would benefit from seeking additional competencies including a better

understanding of the meaning of oral health. Although students in nursing, OT, and SLP had a general understanding of some of the associated impairments of TBI that may affect an individual's ability to take part in oral care, most students associated the injury with higher level cognitive impairments and very few commented on the risk factors and social implications. Students also expressed an understanding that the significance of oral health in TBI partly depends on the individual's preference and whether they perceive other limitations to be more important.

4.3 Theme Three: Awareness and Appreciation of Profession-Specific Roles, and Responsibility

This theme evolved through the participants' understanding of their professional responsibilities, and contribution to managing oral care for individuals with TBI. This theme was further divided into four subthemes: a) education advocacy role, b) holistic health advocacy role, c) triaging patient-specific factors, and d) low perceived self-competency in assisting with oral care.

4.3.1 Education Advocacy Role

Given their limited experiences and perceived lack of knowledge in oral health, including oral health in TBI, students had an appreciation of their profession specific contributions in oral health. Students in the SLP program believed that their professional responsibilities fell under the advocacy role and as an SLP it was their job to advocate on behalf of the patient in making sure that they were receiving oral care. In particular, all of the SLP students felt confident and understood that it was their responsibility to communicate and educate the patient on the risk of not receiving oral care. Further, these students understood that they had a significant role in educating the patient on the risks of developing a respiratory infection such as aspiration pneumonia, especially if the individual was already at risk of acquiring such an infection:

> "…I agree that we definitely have a strong role in terms of advocacy. There's a lot of areas in our practice that where we are advocates um and so I think that's something that where most of us are confident in, that that's our role" (Participant 023S, focus group 2).

Nearly all the students agreed that they had enough understanding and scope to be able to clearly communicate the risks of poor oral health as it was something that they perceived to fall under their scope of practice. However, one student described that, during her clinical placement, her SLP supervisor was either providing a lot of the oral care or setting up the patient with the necessary tools to be able to do it themselves. This was due to the fact that as it was often not done and would be a requirement before they were able to proceed with their assessments. Although students began their clinical practice with providing oral care, they were taught to advocate and educate for oral health care first, and then provide the oral care if were necessary:

> "I think we are taught to be advocates first before we actually do it ourselves so um raising awareness of the importance of oral care in this population in our place of work" (Participant 031S, focus group 3).

The education-advocacy role was perceived as significant as SLP students expressed that, after a TBI, the patient may be overwhelmed and as a result would be pre-occupied with other challenges. Consequently, if the risks of poor oral health were not articulated, it would rank low on their priorities. One SLP student commented:

> "It's probably very individualized, and I think it would depend a lot on the education that they get. I can imagine that most people after having some kind of concussion or brain injury wouldn't *think oh I got to make sure I don't forget to brush my teeth* umm cause I'm sure they're like well *I can't focus, I can't remember what's going on* and I don't know, other sensitives that they're going to be more overwhelmed" (Participant 021S, focus group 2).

Another student discussed that, if a patient were NPO, they may not be aware of the bacteria in their mouths and may not see the need to brush their teeth if their oral cavity is not being used. The SLP students acknowledged that it was their responsibility to educate their patient and family members, and recognized that, if the individual were educated and aware of some of the risks, it may positively influence their attention to oral health and oral care.

The SLP students also expressed the importance of taking the individual's abilities into consideration as not everyone with a TBI would have difficulties with oral care. Further, SLP students' discussed that it was crucial to be aware of and factor in the individual's deficits due to the fact that some people may have risk factors that make them more likely to acquire aspiration pneumonia. As one SLP student said:

> "I think that should be something that when you are doing an assessment of the person's skills that that should just be something that's taken into account because of the fact that we know that some people are going to have certain risk factors that make them more likely to be aspirating. I don't think its necessarily something that is vital for every single person that has a brain injury" (Participant 011S, focus group 1).

In addition to educating the patient, students also described their responsibility in checking in with other health-care professionals such as OTs and nurses to a) make sure that the other profession understood the importance of oral health for the patient and b) problem solving with other health-care professionals who work more closely with the patient, and c) consulting with other professionals with respect to cognitive assessments that they had done to garner a greater understanding of the deficits that the patient may have. As one SLP student said: "…I think of us as a communication point in making sure that the nurses understand that this is something that they need to do" (Participant 021S, focus group 2). Another student shared that in her hospital placement, her clinical supervisor was a major advocate for oral care and would organize monthly workshops for new nursing staff, and would educate the staff on swallowing, oral health, oral care and its importance in dysphagia.

4.3.2 Holistic Health Advocacy Role

When describing what their profession contributed to managing oral care, the OT students expressed that they take a holistic perspective in looking at all the factors that would contribute to good oral health and having a functional oral hygiene routine. The students explained that OTs are client-centered and work on aspects of daily living that their client sees as a priority. Students were taught that a priority was anything that a client or patient saw as being important. Further, the students shared that, while they did not put oral health at the bottom of the list, as an OT, it often came to mind as something to be worked on in many care settings. Students understood that, as a profession, OTs take a broader perspective relating to the client. They consider the degree of assistance or environmental modifications required in order to facilitate independence, especially if this is a desire of the client. More specifically, this consisted of taking a broader look at the individual's limitations to get a better understanding of what can be changed to offset the risk of poor oral health:

> "…with the occupational therapy role we would be looking at enabling the person to be able to do that themselves, like more of that angle as opposed to actually being the primary person in charge of doing that" (Participant 031O, focus group 3).

In addressing oral care, the OT students described that this consisted of assessing the patient and addressing cognitive problems with cognitively based treatments, and motor/physical limitations through environmentally based modifications to make the individuals' living or workspaces more accessible. Further, the students reported that this also involved putting specific supports in place as needed including caregivers, personal support workers (PSW), and family members. As one OT student said:

> "From the OT perspective more of the function again, looking at how you can help someone to be able to do these things independently or connecting them with people they need to make sure that they are getting their oral care taken care of, but um yah, not necessarily us like doing it" (Participant 031O, focus group 3).

Although students understood that it was central to work on what a patient deemed as important, there was a consensus amongst the students that safety was always their first priority, and if oral health care was in the best interest of their patient's safety, it was something that should be addressed.

4.3.3 Triaging Patient-Specific Factors

The nursing student understood that, as a profession, nurses looked at the entire individual and assess their injury to ensure that they receive appropriate attention with respect to prioritizing care needs that are more urgent and need to be addressed first. This student expressed that, with TBI, there are many other complications and injuries. Based on her experience with TBI patients, this student emphasized that, as the result of other injuries, oral care never received much attention and was not seen as an immediate concern. More specifically, this nursing student commented:

> "In terms of nursing, … I've only dealt with one patient with a TBI, and that was actually in Rwanda so there was a language barrier with the nurses but I think again as a nurse you look at prioritizing, then you triage what needs to be looked at first like … a lot of times with a TBI comes a lot of other stuff, and she ended up being beaten so it was just a whole bunch of you know like looking at her vision. I remember we did pay attention to that but never oral care" (Participant 011N, focus group 1).

4.3.4 Uncertainty Regarding Profession Specific Boundaries

Students in the SLP program expressed that, while they were certain about their role as advocates and educators for oral health, they were less certain about other aspects. In particular, SLP students were uncertain as to where their scope of practice began and ended, and how often a patient's oral care was managed. Some of the SLP students commented:

> "…I don't know if it would fall into our scope of practice to be like, how often this is being taken care of" (Participant 021S, focus group 2),
>
> "I definitely think it is our scope [oral health] but I don't know when it happens…" (Participant 022S, focus group 2).

Additionally, the students were unsure if it was within their scope to be involved in physically maintaining their patient's oral care, or how often that happened. As one SLP student said:

> "I don't know if executing oral care falls within our scope. That is a little bit fuzzy for me but I think we are pretty confident that education and advocacy is important for us (Participant 022S, focus group 2).

In particular, the SLP students reported that providing and maintaining oral hygiene would not fall under their scope of practice as some professions such as nursing are likely to see the patient multiple times, even on a daily basis. The students explained that, since they would not see patients on a daily basis, maintaining oral care could not have been their responsibility:

> "I know that, when someone has you know a severe TBI, we might be in the hospital like on a more regular basis assessing them and seeing how their cognitive abilities are changing, but yeah it probably isn't daily" (Participant 022S, focus group 2)
>
> "...in terms of frequency, I don't know how often we'd get in there and have the time" (Participant 021S, focus group2).

The SLP students were taught that oral care was not part of their job and that they would provide it on a case-by-case basis if it were needed. One student shared that at times, the SLP would be the first person noticing their patient's poor oral health as they proceeded to do their swallowing assessments or oral mechanism exam:

> "Yes, oh yah no… it wasn't in her role to do it but it was something that uh she would do because it had to be done, and she would just say that it was easier for her to do it

> herself than go and get a nurse and wait for the nurse to do it and then her proceed with her assessments. So she was doing it on a yah case by case (Participant 031S, focus group 3).

Similar to the SLP students, the OT students also expressed that they were uncertain if oral care would fall within their scope of practice and that often they would learn on the spot as to where their role fits with others. However, students in the OT program emphasized that it would be inappropriate of them to physically help a patient with their oral care as they understood that it was their job to help a client problem solve and work on the various factors that may be affecting their ability to independently carry out their oral hygiene routine as opposed to doing it for them. For example, one student said, "yah it doesn't feel as though that would be within our scope either" (Participant 031O, focus group 3).

Both the OT and SLPs reported that there were times where an OT would conduct a cognitive assessment to get a better understanding of how it would affect that individual's ability to carry out that ADL. The students further reported that such an assessment can be useful for an SLP, as it relates to cognitive communication and the two professions would work together. In particular, one SLP student described that, in the hospital, they would do tests that would require the patient to use their memory and recall specific parts of their day, which would also be useful information for an OT and their professional role:

> "…and then sometimes when we do cognitive communication stuff it kind of blurs with OT …I 've seen firsthand in our field it can be almost controversial in a way and there is a bit of blurring of lines of scope and some frustrations I think um in our field" (Participant 031S, focus group 3).

Theme Three Summary:

Altogether, the participants of the focus group discussions had an understanding of the contributions of their profession-specific roles and responsibilities in managing oral health in individuals with TBI. To begin with, the SLP students expressed the significance of their role as advocates and educators for oral health. Secondly, students in the OT program demonstrated the importance of exercising holistic health in their profession and a) taking a broader look at all the factors that may affect an individual's independence in oral hygiene and b) placing the correct supports in place. Lastly, the nursing student indicated that it was their professional responsibility to assess a patient's current medical state and prioritize care

needs according to their level of urgency. However, given students' appreciation of their professional roles and responsibilities, there was uncertainty regarding boundaries of their scope of practice, particularly in providing oral care for patients with TBI.

4.4 Theme Four: Low Perceived Self-Competency in Assisting with Oral Care

This theme relates to the participants' perceived self-competency in assisting with oral health care in patients with TBI. This theme was further divided into three subthemes: a) confidence and comfort limited by lack of preparation, b) confidence dependent on stage of recovery and place of occupation, and c) confidence dependent on the availability of collaborative interprofessional practice.

4.4.1 Confidence and Comfort Limited by Lack of Preparation

Many of the students expressed that they lack the necessary skills and knowledge required to assist a patient with their oral health. Although students had an appreciation of their profession-specific roles and responsibilities, their current level of knowledge and educational background has affected their confidence and comfort level in helping a potential patient with oral hygiene. When asked how prepared they felt to take on assisting individuals who have had a TBI with managing their oral care routines, two student said:

> "I don't feel prepared to go and perform oral care on someone…I haven't had any practice…I don't feel like I would be comfortable" (Participant 031S, focus group 3).

However, the participants of the focus groups expressed that they made new connections and discovered aspects of oral health and oral health within the context of TBI that they have not thought of before their focus group including differences in oral health amongst other populations:

> "I think this was just really good to have this conversation for me because it's something that I clearly haven't even thought about before, so like in specific with a specific population" (Participant 031O, focus group 3).

Furthermore, students also explained that the knowledge that they gained from participating in their focus group session had given them a new perspective that they perceived to be useful and would take into future practice:

> "…it is an interesting think to think about this and I will take it into my next placement. My next placement is in a hospital so it is something that I will actually be able to think about and see the implications not necessarily for just TBIs but you know even oral health in general and see if it is being addressed where I am" (Participant 031O, focus group 3).

4.4.2 Confidence Dependent on Stage of Recovery and Place of Occupation

In some cases, students expressed that their confidence level with respect to assisting patients who have TBI with oral hygiene would depend on the individual's stage of recovery. More specifically, one student emphasized that her confidence would be low in an acute-care setting as other self-care activities such as toileting and getting dressed may take precedence over oral hygiene. This student further described that an inpatient rehabilitation environment would give her more time to devise a realistic schedule for the patient and have a greater understanding of what the individual's difficulties are in maintaining their oral hygiene which would ultimately increase her confidence level in assisting the person:

> "In some places like a hospital, I would feel like it would become easily neglected…maybe in a rehab setting, or an inpatient setting where I had more time…I'd feel more confident kind of like in exploring the issue and really diving deep into what are the issues…so I think I can do a better task analysis in that sense" (Participant 011O, focus group 1).

4.4.3 Confidence Dependent on the Availability of Collaborative Interprofessional Practice

Nearly all of the participants of the focus groups emphasized the importance of collaborative interprofessional practice when working with patients. Students expressed that an appreciation of the perspectives of other professional roles would provide them the opportunity to work in a more effective team setting: "I'd like to get the perspective of other um health-care professionals and I think it's just good for use to know what each other knows so that you can work on a team effectively" (Participant 031S, focus group 3).One student reported that her past experiences had given her an understanding of what other professions,

namely nursing, may contribute to oral health, which made her more comfortable in asking for assistance with care needs that are perceived to fall outside her scope of practice. As some students said:

> "…I think because I've seen it in clinic I would know how to problem solve around it and I would know to go to nursing and um ask for help or assistance if I didn't feel like I should be using a suction alone, um or that sort of thing" (Participant 031S, focus group 3),
>
> "…honestly, I feel like if I had an SLP on my team, I would rely quite heavily on maybe what their perspectives would say about that area…I feel like I would really consult in that way with them" (Participant 011O, focus group 1).

However, a nursing student expressed that the perspective of dentists has never been discussed or included in the interprofessional care team as those professionals were reported to not be available in the acute care. This student conveyed that she would rely on a dentist for assistance or expertise in oral health, and a lack of that perspective would be confusing as to whom she should go to:

> "But thinking about the interprofessional team that we would refer or talk to, I don't think dental has ever been discussed or included in that team because it's not like you have them available in the hospital. I don't know if those connections are even there…I don't know who I would turn to" (Participant 011N, focus group 1).

While the students appreciated interprofessional collaboration, many said that they would like additional opportunities in their professional training to be able to learn from other professional practices. The students suggested ways in which their programs might integrate a more holistic interprofessional education. In particular, the nursing student proposed that students in her program would benefit from having guest lecturers from SLP and OT. The same student explained the significance of including a profession that advocates for oral health as it may be an influential factor in introducing oral health content within their curriculum:

> "I definitely think it was very interesting, just kind of learning the gist of what SLP and what OT do…I think we would really benefit from even guest lectures, SLP coming to our lectures, same with OT, like you know what I mean just that collaborative umm function and even to have like an advocate for oral care to come into a lecture and have that enforced in our curriculum would I think be beneficial. Or

> even educational opportunities on the floor, you know have it included in the e-learning" (Participant 011N, focus group 1).

The OT and SLP students shared that they along with PT, take part in interprofessional education nights, which place the nursing students at a disadvantage considering that they do not participate. Further, students expressed that the inclusion of all professions in such an environment may give students a better understanding of what other health professions contribute to oral health. As one student said:

> "I would definitely agree, I think first of all I think that it's also like we are here at Elborn and maybe nursing is at a little bit of a disadvantage that you do not get to join our fun IPE *(Interprofessional education*) nights, umm but yeah I think we would definitely benefit from more collaboration, especially on issues such as this where I think it's sometimes easy for us to maybe say like oh this is clearly like an SLP area" (Participant 011O, focus group 1).

In particular, the OT students described that their program recently incorporated vision as it was recognized to be an urgent need. One of the students perceived that taking part in the focus group discussion has given her a new perspective on oral health which she believed may contribute to added changes in their curriculum:

> "…for me personally it just highlighted that yeah I do need more education. Umm in our curriculum we just started to really incorporate vision so this is an area that they recognize as a serious need and so I feel like I've patted our program on the back for really doing a good job of incorporating it in that sense. And then now I think about oral health, and like other senses that maybe we haven't like really thought about the deficits that come to play there, umm so we should work on incorporating those as well in terms of our curriculum" (Participant 011O, focus group 1).

Summary of Theme Four:

As students approached the end of their professional training, many perceived their self-competence in generally assisting individuals with oral health care especially in TBI to be low as they perceived to lack preparation and training, which influenced their comfort and confidence level. Students described some factors that would impact their confidence level in assisting with oral care in TBI and oral care in general. Students expressed that their confidence level depended on the amount of training and experience they received in their

professional program. Secondly, students' confidence level was perceived to be associated with the patient's stage of recovery which relates to acute care and rehabilitation settings. Lastly, students reported that their confidence level was contingent on the availability of collaborative interprofessional practice.

4.5 Theme Five: Oral Health Perceived as Being Overlooked in Care

This theme highlights students' perception of oral health being overlooked in care, and the variety of reasons that contribute to their understanding. This section was divided into two sub themes: a) perceived patient-related barriers and b) perceived health services-related barriers.

4.5.1 Perceived Patient-Related Barriers

Self-competency was perceived to be low amongst the various participants of the focus groups. When asked how important they thought oral health would be for someone with a TBI, the students expressed that patient-specific factors influenced whether or not an individual's oral health was attended to or overlooked, and was ultimately seen as a barrier. Some of the students explained that the problem with oral health being overlooked in care was due to the fact that people did not see it as being important. In particular, some of the participants said:

> "…I use to work with people with brain injuries and we had some clients where it was just that they didn't want to brush their teeth so I think from my understanding…of the issue is that it's just people aren't taking care of their oral health, and it's not that they need a special tooth brush or they need anything specific to do that" (Participant 011S, focus group 1),

> "…I mean if the client is not interested in it all you can't make someone focus on something that they don't want to" (Participant 031O, focus group 3).

Nearly all the participants expressed that, if oral health were not a priority for the individual, it would be forgotten and the person may not recognize the significance.

Students highlighted some of the reasons they believed that an individual might not prioritize their oral health. In addition to previously reported physical and cognitive

disability-related impairments, some of the students explained that, if oral hygiene was uncomfortable for the patient due to their injury, it might contribute to a patient neglecting it as a part of their care. More specifically, one student said:

> "… I'm thinking about something like going to a dentist appointment could maybe be something that would be really difficult depending on like, sometimes people with brain injuries will…be really sensitive to certain sensory things" (Participant 011S, focus group 1).

Secondly, students from the SLP program explained that the importance that is placed on oral health depends on whether the individual had an oral care routine prior to their injury. Further, the students emphasized that, if the routine was not there before, it would make it even more difficult to sustain afterwards. One of the SLP students said:

> "If for somebody like oral care isn't a priority to them before the concussion, probably won't be something that they'll consider as important" (Participant 021S, focus group 2).

Lastly, the participants commented that, unless the patient addressed oral health as a problem, it would be easily overlooked in care. For example,

> "I keep picturing only that one patient that I have had and she was like she wasn't even able to speak or feed herself or like anything like that so you know oral health isn't obviously something like that she could advocate for herself. Yeah to be honest we were just looking at other aspects of her care" (Participant 011N. focus group 1),

> "Unless it was flagged as a problem then you wouldn't really necessarily address it so it's something that comes up on a case by case basis" (Participant 031O, focus group 3).

Additionally, the students emphasized the importance of having a support system of family and health-care providers who can advocate for the individual's health and oral health needs. Many of the students expressed that, in the absence of a support system, oral health could easily become a care need that becomes overlooked. A care team could highlight the importance of oral health and lend assistance to those that need it. One OT student said:

> "I would wonder, um you know some patients have a lot of visitors and a lot of family would be thinking about that and doing that or you know some nursing would be on that or the SLP might be on that. But then on the other cases where if the

patients left to do it and they can't, they won't and it won't get done" (Participant 031S, focus group 3).

4.5.2 Perceived Health Services-Related Barriers

Some of the students discussed perceptions of barriers related to health services with respects to oral health in certain health-care settings which accounted for their perception of oral health being overlooked in care. In particular, the students expressed that the health-care system may not consider dental care as medically necessary. A student from the OT and nursing program commented that oral health might be neglected due to lack of funding and the perception that it may be an inefficient use of health-care dollars. These students said:

> "…maybe people who are providing the health care, people who are allotting time for funding might say this is not an efficient use of our health-care dollars to be spending you know an hour looking at breaking down how someone takes care of their oral health everyday so maybes it's just being neglected just due to the system" (Participant 011O, focus group 1),

> "…because like in terms of what's deemed medically necessary, it doesn't include dental care right? So maybe that's that wall that needs to be broken like even with like vision or umm dental like I know that that's not covered in what we focus on" (Participant 011N, focus group 1).

Likewise, the SLP students said that, within their professions, oral health was often neglected in hospitals, and it was their professors who have been raising awareness and encouraging students to advocate for oral health. Some of these students said:

> "In an acute or hyper-acute context oral health is going to take a significant back seat. So to me, the first thing that comes to mind is that it's like a don't forget it item because otherwise it will get forgotten and that's the problem right now that it's getting forgotten" (Participant 023S, focus group 2),

> "…I get the sense in speech that SLPs find that it gets neglected often in hospitals, I found that in my clinical placements too" (Participant 031S, focus group 3).

One student from the SLP program expressed that her clinical supervisor held monthly workshops advocating for oral health because she found that many of the nurses may not

have been aware or have been taught about its importance. Another student emphasized that oral care sometimes received little attention by care providers, particularly nurses since they dealt with many health issues and oral health may not have been a need that came to mind.

Given the SLPs' roles as advocates for oral health, many expressed that they may not see a patient until that individual has reached the outpatient phase of their recovery. As a result, nearly all the students from the SLP program explained that they were unsure of how involved they would be in a patient's care. These students emphasized that the only time they would see a patient was if that individual presented with problems related to feeding and swallowing:

> "I think we would only interact if they had swallowing issues…unless we might see them for like executive functioning and stuff like that down the line. In acute care I think it would have to be very severe and then in that case I think we are looking at swallowing" (Participant 022S, focus group 2),

> "…one thing that I am also not sure about is our level of involvement…in most service delivery contexts we are not going to be doing daily therapy. That is not something that really happens in speech much anymore. So we would be seeing them on a much more infrequent basis" (Participant 023S, focus group 2).

One SLP student shared that she once had a patient whose first time seeing an SLP was two years post-TBI. The individual was starting to notice there were obvious difficulties with higher level language which was what brought them to an SLP. The same student believed that this was something that could have been addressed if they were able to see the patient earlier in their recovery.

Additionally, the SLP students said that, in some cases swallowing assessments may fall to another profession such as OT. The students also discussed that a doctor can restrict a patient from oral intake in the absence of a swallowing assessment. The students expressed that, if a patient were at risk for the health complications of poor oral health such as aspiration pneumonia, they would not be able to address it immediately as they may not see the individual until after some time. For example, the students said:

> "…but I'm pretty sure you could put someone, like a doctor could put someone NPO without having a swallowing assessment. So even someone who is at risk for the health complications for poor oral health care because having a tube in there increases

> your risk factors for aspiration pneumonia…we might never have seen them because that might have not been seen as a priority at the time" (Participant 022S, focus group 2),
>
> "We might not even see them for swallowing. Even if there is a swallowing assessment done that might fall to another profession. Like I know OT sometimes do swallowing assessments so like if there was oral care or any language complications, we might not see them till a few years down the line" (Participant 021S, focus group 2).

Summary of Theme Five:

Given students' understanding and experiences, various participants of the focus groups perceived oral health to be overlooked in care for a diverse set of reasons relating to the patient factors and health services-related barriers. In particular, the students from OT, SLP, and nursing addressed patient-related barriers including individuals intentionally neglecting their care as the result of prior habits, and lack of a support system. Lastly, some of the SLP students also expressed the delivery of health services subsequently impacting certain professions such as SLPs in terms of fully exercising their profession-specific roles and responsibilities.

Chapter 5: Discussion of Major Findings

5 Overview of Discussion of Major Findings

This study highlights students' understanding of oral health in TBI. The findings from this study are not meant to be generalized across all students in these programs; rather it is meant to give a rich description of the participants' understanding of oral health in TBI. To our knowledge, this was the first study to incorporate the perspectives of various rehabilitation health-professional students specifically with this topic. Guided by the constructivist paradigm, this study adopted the qualitative descriptive methodology using focus groups to understand students' perceptions and experiences about oral health in TBI. The following five themes were identified from the collected data: (1) limited previous learning experiences in TBI and oral health; (2) limited understanding of oral health in TBI; (3) awareness and appreciation of profession-specific roles and responsibilities; (4) low perceived self-competency in assisting with oral care, and (5) oral health perceived as being overlooked in care.

This section will address the major findings and make connections with the existing literature. Additionally, this chapter of the thesis will discuss the implications of this study, limitations, and suggestions for future research.

5. 1 Limited Knowledge of Oral Health in Traumatic Brain Injury

The findings from this study demonstrate that students' understanding of oral health in TBI, stemming from their educational training involving in-class and clinical experience, was perceived as insufficient and limited. This was due to the fact that nearly all the students described that they had never heard about oral health in TBI before participating in this study and expressed difficulty envisioning what oral health problems would look like for this population. An important feature to highlight is that the students from the SLP program had the greatest comprehension and reported in-class and clinical opportunities in both oral health and TBI as their training touched upon risk factors for poor oral hygiene and aspiration pneumonia, and the effects of swallowing impairments in TBI, which have been documented in the literature (Prendergast et al., 2009; Seedat & Penn, 2016; Shaker, 2006). This also

supports other documented evidence that SLPs help in managing dysphagia including the use of approaches to prevent aspiration pneumonia (Langmore et al., 1998; Yoon & Steele, 2012). The students from SLP may have had the greatest understanding as their profession focuses specifically on the oral cavity.

5.1.1 Related to limited knowledge in Traumatic Brain Injury

Students' limited knowledge of oral health in TBI may be related to their lack of learning experiences specifically with this population. Swift and Wilson (2001) have documented that there are misconceptions and incorrect beliefs about the time of recovery, the extent to which an individual can recover, and the nature of impairments amongst the general population and health professionals who do not regularly work with individuals with TBI. Similarly, if students lack educational learning experiences in TBI during their professional training, they may foster inaccurate beliefs when providing care for individuals with this injury as this is a population that they will likely encounter. Although there were some learning experiences around TBI, participants from the OT and nursing program mostly reported on general knowledge consisting of myths and assumptions about TBI. It is important to note that specifics about this knowledge were not discussed in this study as students generally described what they were taught, but did not adequately report on exactly what they learned.

In contrast, students from SLP acquired a mixture of both general knowledge surrounding demographics, and specific knowledge regarding assessments, treatments, and cognitive communication with respect to how it might be affected with various severity levels of TBI. Since the details of that knowledge were not discussed at length, it cannot be said with certainty if students entirely had an accurate understanding or had any misconceptions about TBI. However, as previously reported in the literature review, a more recent study by Riedeman and Turkstra (2018) found that some practicing SLPs have some gaps in their knowledge regarding symptoms of mild TBI. In future studies, this may be worth exploring amongst students in various health professions including the ones represented in this study. Similarly, a study by Ernst et al. (2009) provided evidence suggesting that nursing students have a considerable amount of misconceptions surrounding TBI and recovery, which has also been found in a more recent study using a sample of

practicing nurses (Oyesanya et al., 2016). In this study, nearly all of the student participants lacked knowledge of the social implications and risk factors for poor oral health and oral hygiene suggesting that students may not fully understand the nature of TBI-related impairments.

Nurses are among the health-care professionals who see neurological patients in various stages of their care including the acute phase of the injury, and acute and subacute rehabilitation (Elbaum & Benson, 2007; Oyesanya et al., 2018). Previous research has shown that practicing nurses perceive not to be prepared to care for individuals with a brain injury (Long, Kneafsey, Ryan, & Berry, 2002). The fact that the nursing student in this study had only one lecture on concussions in her final year of training suggests that additional learning experiences may be needed to provide preparation for appropriate care for individuals with ranging levels of severity in TBI such as moderate and severe (Oyesanya et al., 2017), and to face challenges that may occur when providing care for individuals with this injury (Oyesanya et al., 2016).

Also, in physical and rehabilitative medicine, OTs have a significant role in evaluating and treating individuals who have sustained a brain injury (Elbaum & Benson, 2007). More specifically, when working with individuals who have a TBI, OTs are required to understand how physical, cognitive, and behavioural deficits impact ADLs (Elbaum & Benson, 2007). This is a skill that can be successfully exercised if more comprehensive educational experiences in TBI are incorporated into their graduate training. To best meet the needs of people with TBI relating to oral health, students in OT and nursing should have more in-depth learning experiences with this population, especially since it is expected to be the leading cause of death and disability globally by the year 2020 (Kumar et al., 2018). A more complete and thorough understanding of TBI and the various challenges that individuals from this population may endure can help students be more prepared and confident to provide appropriate care for this group as previous studies have shown that the confidence and knowledge of health-care providers contribute to the quality of care that a patient receives (Campbell, Braspenning, Hutchinson, & Marshall, 2002).

5.1.2 Related to Limited Knowledge in Oral Health

All students expressed that they lacked the necessary skills and training required for good oral health-care practices and were unaware of how oral health problems would present not only in a patient with TBI but any individual under their care. However, the most significant gap in students' knowledge was the participants perceived lack of knowledge and understanding regarding the definition of oral health which was clear in the students' responses. In particular, nearly all the students' expressed the importance of understanding the underlying meaning of oral health. Oral health is a multidimensional concept that extends beyond the absence of disease and involves both the physical and social implications of health and other aspects pertaining to quality of life such as mental health (Glick et al., 2016). However, students had difficulties expressing what they knew about oral health as they had an insufficient comprehension of the various components that contribute to the meaning. At most, students described oral health in relation to tooth brushing, toothpaste and questioned if the type of toothbrush being used was a defining factor of oral health in TBI. While some of the SLP students had some understanding of the relationship between swallowing and oral hygiene, none of the students discussed anything regarding oral diseases or the oral cavity including dental caries, gingivitis, plaque, and periodontal disease. This is an important area in which students should have some knowledge and awareness.

Although this current study examined the perspective of other health-professional students, the findings are contrary to other studies which have employed a similar sample of participants in their final year of undergraduate nursing (Deogade & Suresan, 2017; Smadi & Nassar, 2016). Smadi and Nassar (2016) reported that less than half of the nursing participants showed some degree of comprehension of oral health knowledge related to dental disease. This was also consistent with a previously reported study showing that students had some degree of understanding regarding oral diseases such as dental caries, periodontal disease, and tooth decay (Deogade & Suresan, 2017). However, the discrepancies in the findings between this current study and those mentioned above (Deogade & Suresan, 2017; Smadi & Nassar, 2016) may be due to the study design such as the methods used to collect data, and the type of questions asked. In this study, students were not asked specific questions about oral health nor were they given any prior definitions. Rather, the purpose was to gain insight into students' current level of knowledge based on their understanding,

experiences, and perceptions. It is vital that health-care professionals have educational training in oral health and have the knowledge to be aware of oral diseases as the limited literature on oral health in TBI has provided evidence supporting the existence of dental disease, and reduced oral health status in this population (Kothari et al., 2016; Stiefel et al., 1993).

The nursing student's comments suggested that oral health was not covered in any of her classes and was only addressed in clinical placements as an informal reminder. This finding was unexpected and suggests that oral health may not be a topic that receives much attention in their professional training. In fact, it has been documented that non- dental health professionals including nurses often receive little education and training regarding issues concerning oral health and oral diseases (Institute of Medicine and National Research Council, 2011; National Institute of Dental and Craniofacial Research [NIDCR], 2000). In a more recent study, it was found that oral health and dental-health education was not included into the educational curriculum of nursing faculty as all students reported not to receive any specific education and training (Smadi & Nassar, 2016; Sonde, Emami, Kiljunen, & Nordenram, 2011; Spurr, Bally, Hayes, Ogenchuk, & Trinder, 2017), a finding that is also supported in other work (Kraus, Connick, & Morgan, 2002).

5.1.3 Students' Understanding of Profession Specific Roles and Responsibilities

It is important to recognize that, in spite of whose responsibility it is to administer oral care physically, all three health-care professions contribute to and play a role in managing the oral health of a patient (Cox, Lynch, Holm, & Schuberth, 2007; Yoon & Steele, 2012). Given the participants' understanding of their professional roles, students were largely uncertain and confused as to which profession was responsible for physically maintaining oral care for a potential patient or client. In particular, the SLP students were under the impression that providing and maintain oral hygiene would not fall under their scope of practice as other professions such as nurses were more likely to see patients on a frequent basis. This particular finding is consistent with another focus group study which has shown that practicing health professionals such as SLPs, nurses, and dental hygienists perceive oral hygiene to be the responsibility of nursing staff and are within their boundary

of practice (Yoon & Steele, 2012). A source of their confusion might have been from their clinical experiences where they were taught that oral care was not in their job description. While it is the responsibility of nurses to physically assist in maintaining a patient's oral care (RNAO, 2008; Yoon & Steele, 2012), practicing SLPs do acknowledge their role as being critical in identifying patients who might be at risk for swallowing impairments, in addition to advocating, monitoring, and preventing the occurrence of respiratory infection such as pneumonia (Yoon & Steele, 2012). In some circumstances, such as the absence of other health-care providers such as nurses, SLPs have been shown to physically provide oral care (Yoon & Steele, 2012).

Similarly, OTs are not required to physically assist patients with the provision of daily oral hygiene as they try to maximize independence (Elbaum & Benson, 2007). However, they have more roles and responsibilities in oral health than what was acknowledged and reported by the participants in the focus group discussions. In fact, feeding, eating, and swallowing are some of the many areas of meaningful occupation that fall under their professional scope of practice (CAOT, 2010; Cox et al., 2007). As such, OTs are required to have the entry-level knowledge, skills, and experience to be able to evaluate oral and swallowing functions and efficiently assist clients (Cox et al., 2007). Evidence supports the advantages of using OT to improve oral hygiene in elderly adults. More precisely, OT was found to be beneficial for improving oral hygiene in patients who were dependent and cognitively impaired, and encouraging autonomy in ADLs such as oral care (Bellomo et al., 2005).

5.1.4 The Importance of Integrating Oral Health Education

Notably, in TBI, poor oral health has been shown to negatively influence psychological well-being, self-esteem and social connectedness (Bedos et al., 2009; Benyamini et al., 2004; Watt, 2007). Despite existing evidence in support of the unique oral health needs of individuals with TBI (Stiefel et al., 1993), and the importance of individualized treatment programs and services (Zasler et al., 1993), students reported that they would treat all patients in the same manner. This was unsurprising as many of the students lacked educational opportunities in oral health and TBI. In light of these findings, it

is clear that health-professional students need more educational and learning experiences in TBI and oral health to be able to appreciate the unique needs of people from this group.

Furthermore, given the contribution of each health profession in managing oral health (Bellomo et al., 2005; Yoon & Steele, 2012), it is imperative that oral-health education be integrated into the educational curricula of the various health-professional programs in order to see improvements (Deogade & Suresan, 2017; Gronkjaer et al., 2017; Smadi & Nassar, 2016) as students can use such knowledge as a foundation to seek further competencies once they enter into practice. To begin with, oral-health education might benefit those OT students who reported low perceived self-confidence working in an acute care setting as OTs work in many settings including hospitals where they are required to assess patients' safety in eating, swallowing, and make suggestions for a patient's diet (American Occupational Therapy Association [AOTA], 2018). Moreover, lack of time to be able to prepare assessments in acute care effectively have been documented in the literature (Shun et al., 2017), and was expressed by the OT student. Oral health education can also help students in SLP in being more aware of dental disease or other noticeable problems during the administration of their assessments. Lastly, from a nursing perspective, having a comprehensive understanding of oral health and TBI can help in making appropriate referrals and interventions, help recognize early signs of cavities and tooth decay (Gronkjaer et al., 2017), and prevent undiagnosed oral diseases all of which has been shown to be beneficial for individuals with TBI and their recovery long-term. It is particularly important that students acquire the appropriate entry-level skills required to effectively assist and help patients manage their daily oral care (Gronkjaer et., 2017; RNAO, 2008).

5.2 Interprofessional Education and Collaboration in Oral Health

Participants in this study recognized the importance of interprofessional education and collaborative practice, an unexpected but significant finding that contributed to the health-professional students' understanding of oral health in TBI. This was unexpected as students expressed their lack of experiences and understanding of oral health and TBI which raised questions regarding other areas of practice. Students described that the availability of other health-care professionals was beneficial for their self-confidence and self-competence in being able to assist a potential patient or client with their oral health needs. This finding is

in support of Cooper et al. (2017) who provided evidence demonstrating that interprofessional education can increase the skill set of health-care professionals. In particular, results from Cooper et al. (2017) demonstrated that students' knowledge, confidence, and clinical practice improved after completing an interprofessional practice course (Cooper et al., 2017). These types of educational opportunities were shown to influence students' future practice as they were more likely to apply it in their patient's care (Cooper et al., 2017). Evidence suggests that interdisciplinary teams produce better results (Interprofessional Collaborative Practice in Healthcare, 2013). Several studies have indicated that, by working together and understanding the role of other health professionals, health-care workers can enhance the health of populations they are working with (Deogade & Suresan, 2017; Gronkjaer et al., 2017; Interprofessional Collaborative Practice in Healthcare, 2013; Smadi & Nassar, 2016).

Also, in this study, the participants acknowledged and showed appreciation for the interprofessional education nights that students from the OT and SLP program engaged in along with their colleagues from the MPT program. The student from OT and SLP expressed that nursing was left out of this educational opportunity and highlighted the importance of incorporating their perspective as it can help them better understand what other health-care professionals contribute to managing oral health in their clients. Considering that these health professionals work together in a team setting (Neumann et al., 2010), it is quite surprising that nursing was not included in this educational opportunity especially since nurses and SLPs collaborate in practice (Yoon & Steele, 2012). In fact, the CNA (2011) discusses the benefits of interprofessional collaborative practice in strengthening the health-care system. Comments made by the nursing student might lead us to believe that there may not be a lot of interprofessional education opportunities in their program. Thus, having a combined interprofessional night for students in OT, PT, SLP, and nursing may produce students who are more knowledgeable, proficient, self-competent, and skilled in not only assisting their clients with oral health in a manner that aligns with their professional scope of practice, but also mindful of what other health professionals can contribute to the task at hand. The collective benefits of interprofessional education and collaborative practice is in the best interest of the patient, health-care professional, and the health-care system.

Additionally, comments made by some of the SLP students might suggest that they have a limited understanding of the scope of practice of other health-care professionals such as physicians, and how they work together in an intercollaborative setting. Specifically, these students lacked an understanding of the appropriateness and benefits of physicians restricting patients from oral intake.

5.3 Oral Health Being Overlooked in Care

Some of the students in the focus group discussions expressed that oral health was overlooked due to barriers related to health services. In particular, students commented that the neglect in oral health might have been due to the perception that it may be an inefficient use of health-care dollars according to the health-care providers and the health-care system. Health-care providers might look at the time that they have to provide care and the various care needs of their patient, and oral health may not be on the list of their priorities which is related to health-care dollars. More specifically, more urgent life-threatening care needs may be of greater priority and take precedence over oral health. Oral health may be better appreciated in the context of life-threatening health concerns.

Participants also described some patient-related barriers as a contributing factor for oral health being overlooked in care. Students highlighted that the patients might not place much importance on oral hygiene due to poor understanding of oral health, and the prioritization of other care goals such as the ability to walk. A patient might be more receptive to oral health and oral care if they were given a better understanding of the associated importance and significance. Moreover, the full nature of oral health means considering the fact that it involves and is impacted by the individual's experiences, beliefs, and expectations. If students had fully understood the meaning of oral health, they might have expressed awareness and appreciation of this aspect not only in patients with TBI but also in other patients.

Another possible explanation for oral health being overlooked by a patient is the absence of a support system of family, friends, and care providers, which was also indicated by the students in the focus group discussion. Certainly, in patients with TBI who cannot communicate and advocate for themselves and lack a support network, oral health will be neglected. In a review by Strom and Egede (2012), social support was shown to improve

clinical outcomes and psychosocial well-being in adult populations. Moreover, the SLP students indicated that in clinical practice they were the first ones to notice that a patient did not receive oral hygienic care. A likely explanation for this finding might be that nurses are often faced with many conflicting care needs and oral health might be less of a priority due to workload, schedule times, inadequate understanding of the importance of oral health, and lack of oral care strategies to assist patients (Forsell, Sjogren, & Johansson, 2009; Wardh, Hallberg, Berggren, Andersson, & Sorensen, 2000; Weeks & Fiske, 1994). The nursing student also expressed that oral health was not a care need that was focused on when working with patients during clinical placements, suggesting that part of the issue is how oral health is being perceived and what emphasis it is given in care as it seems be viewed as an "add-on".

5.4 Implications of the Study

5.4.1 Implications of the Study for Health-Professional Education and practice

The findings from this study shed light on students' lack of understanding of oral health in TBI. At large, these health-professional students appeared to have a poor understanding of oral health and lack educational training in their program. According to the comments and thoughts of the various health-professional students, oral health appears to receive little attention and coverage in their professional training (NIDCR, 2000). Many of the students reported to lack the necessary skills and strategies required to best assist in oral health not only in patients with TBI but any individual under their care. This study highlights the need to incorporate greater learning experiences and oral health education into the curricula of the three programs, OT, SLP, and nursing as all of these professions have a role in contributing to the management of oral health in their patient's care. This is especially important in nursing as they see patients on a more frequent basis and have the ability to promote oral health, and can provide oral health assessments if they have the necessary educational background and experience (Deogade & Suresan, 2017).

On the other hand, students also lacked a comprehensive understanding of the nature of TBI related impairments and how the injury may affect daily oral care such as problems with behaviour (Alibhai, 2013) This suggests that health-professional students in these programs may not be ready to effectively assist clients who have a TBI with managing their

oral care. People with TBI have been shown to have unique oral health needs (Stiefel et al., 1993), and suffer from dental disease and reduced oral health status (Kothari et al., 2016; Stiefel, 1993). As such, students require more specific knowledge in TBI to better support their oral health care needs. Additionally, the findings from this study also highlight the importance of integrating nursing into the interprofessional education nights of the other health-professional programs such as OT, SLP, and PT to improve their knowledge capacity, skills set, self-competence, and understand the role of other health professionals. Ultimately, if students are provided with the appropriate educational training, skills, and knowledge in both oral health, TBI, and oral health in TBI, they will be in a better position to provide the best care for these patients. It is suggested that students be given more importunities for interprofessional education in order to strengthen collaborative practice. It is also suggested that students be introduced to the definition of oral health to be able to better understand the holistic nature of the concept.

5.4.2 Implications of the study for Traumatic Brain Injury Population

Oral health is particularly important for older adults with disabilities as frail adults are susceptible to aspiration pneumonia and older adults are becoming increasingly vulnerable to dental disease (CDA, 2010), and may also have a TBI. This study outlines the potential ways that various health-professional students may contribute to managing oral care which might be beneficial for patients with TBI. To begin with, the findings from this study highlight the importance of interprofessional education and collaborative practice in oral health which is also beneficial for patients as it may prevent oral problems such as periodontal disease, dental caries, plaque, and tooth decay (CDA, 2010), and ultimately avoid undiagnosed dental disease. Secondly, by highlighting the gaps in students' knowledge, it creates a platform for health-professional students to seek additional competencies in both oral health and TBI to better assist potential clients or patients from this group. Aside from the medical problems, poor oral health including unattractive teeth and unappealing breath has social implications which affect an individual's ability to successfully reintegrate back into the community (Zasler et al., 1993). A better understanding of students' comprehension of oral health in TBI might assist with the goal of community reintegration in this population.

5.5 Limitations of the Study

While this study does shed light on the limited knowledge and experiences of health-professional students in oral health in TBI, it has some limitations that are worth discussing.

The results of this study might have been different if there were more varied perspectives within and across professions. Every effort was made to reach out to students in the nursing program through multiple avenues including social media, course websites, and email. However, only one student reached out and expressed interest in participating in this study, and there were no students represented from the MPT program. A number of factors might have impacted students' availability and interest to take part in this study including their schedules, and lack of interest in the topic. Another possible explanation may be that students from PT felt that oral health was not in their scope of practice which may account for the lack of response from this professional group. While one can argue that the scope of practice of PTs does not include oral health, recent research has acknowledged the importance of the contribution of health-care professionals to oral health such as the addition of oral health screening in their examinations (Markowski, Greenwood, Parker, Corkey, & Dolce, 2018). Certainly, it is entirely possible that the findings from this study might have produced different results if there was a more fulsome perspective from the nursing program as this study relied on the experiences of one nursing student. Additionally, the results might have been different if there were PT students in the focus group discussions, along with students from other health profession programs such as dentistry. Adding dentistry might have directed the conversation to cover aspects of oral health such as common oral diseases including dental caries, plaque, and periodontal disease.

Another limitation is the number of focus groups, and sample size of the participants included in the study. The benefits of small numbers in focus groups allows for a more intimate discussion where everyone can have the opportunity to speak (Krueger, 1994). However, this study had a total of eight participants and two to three students in each group. Given the small sample size and the number of professions within and across the three groups, we do not believe that this study reached saturation which is the process of data collection until no new findings emerge (Strauss & Corbin, 1990). It is important to note that the findings from this study may have been different if in-depth interviews had been used in

addition to focus groups as one-on-one interviews may have generated different discussions than those expressed in a group environment. Lastly, students in this study were all sampled from one university in Southwestern Ontario, and there were no male participants.

5.6 Suggestions for Future Research

The findings from this study contribute to the growing body of literature on oral health in TBI and shed light on the knowledge capacity of final-year health-professional students on the topic at large. To our knowledge, this is the first study to investigate health-professional students' understanding of oral health in TBI and provides insight into future practice and research. Although one of the aims in this study was to have an interprofessional mix in the focus groups, it may be beneficial to have a combination of within and between professions as it will allow students a greater opportunity to bounce ideas off one another and gain new insight. To add to the growing research on this topic, future research should: a) further explore students' understanding of oral health in TBI and incorporate more of the nursing perspective and that of other health professionals such as students from dentistry, PT, and perhaps dental hygiene, b) use various data collection methods such as in-depth interviews and focus along with within and between variation amongst the group, c) develop educational tools and materials to increase students' awareness of the importance of oral health especially in TBI and strengthen their understanding of the association, d) explore the accuracy of students' understanding of TBI and oral health including the definitions, and e) explore the experiences and understanding of oral health in TBI amongst health professionals in practice. Additionally, this study also raises the question of what students know about other areas in their scope of practice. Future research should also investigate the confidence and experiences of SLP students' in other areas of practice related to oral health such as artificial airways. However, it is important that health professional students participate in this type of research as the benefits extend towards strengthening their knowledge and skills and understanding their gaps in training to better prepare them for future practice.

While health policy was not the focus of this study, it raises questions regarding the perceptions of policy stakeholders with respect to oral health in the health-care system. As such, future research should also examine health policy related to oral health and explore the

perceptions and beliefs of various policy stakeholders regarding oral health in the health-care system.

Chapter 6: Conclusion

6 Conclusion

This qualitative descriptive study was undertaken to explore the experiences and perceptions of oral health in TBI. Based on three focus groups involving eight final-year health-professional students in nursing, OT, and SLP, a total of five themes emerged after thematic analysis of the focus group data. These themes were (1) limited previous learning experiences in TBI and oral health; (2) limited understanding of oral health in TBI; (3) awareness and appreciation of profession-specific roles, and responsibility; (4) low perceived self-competency in assisting with oral care and; (5) oral health perceived as being overlooked in care.

From the research that has been conducted, it is possible to conclude that students lack a fulsome comprehension of oral health in their educational training as health-professional students have insufficient understanding of TBI, the spectrum of changes that may affect daily routines, and the link between oral health and TBI. As such, the findings from this research suggest that students require additional competencies in oral health and TBI to be able to strengthen the association between oral health in this population and to better serve patients or clients with TBI. Furthermore, as expressed by a number of students in this study, and given the significance and importance of interprofessional education and collaboration, it may be beneficial for nursing students to take part in the interprofessional education nights that students from OT, PT, and SLP engage in monthly. Interprofessional education and collaborative practice is critical in helping students work together more efficiently, and to understand the contributions of other health professions. Secondly, students may benefit from receiving more comprehensive educational learning experiences in oral health to confidently understand the full meaning of this multidimensional phenomenon and its importance to physical health and psychosocial well-being. Lastly, more comprehensive learning experiences in TBI may bring greater awareness regarding the nature of the impairments and provide insight into how it may disrupt daily oral hygiene.

A greater understanding and awareness may contribute to best practices as it may improve the confidence and self-competence of health-professional students in assisting

individuals who have TBI with their oral health. Collectively, if students feel more competent and confident in providing care, this will positively affect the quality of care provided. Also, health-professional students may use their learning experiences as a foundation to seek additional competencies in future practice post educational training. This is important as it will also benefit the patient or client receiving the care as the implications of oral health play a role in community reintegration. Future research should explore the connection between oral health and TBI among other health-professional students and with a fulsome representation of students from various health-professional fields.

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Appendices

Appendix A: Ethics Approval

Western Research

Date: 6 November 2017

To: Dr. Ruth Martin

Project ID: 110108

Study Title: Exploring and understanding oral health in traumatic brain injuries.

Application Type: HSREB Initial Application

Review Type: Delegated

Full Board Reporting Date: 21NOV17

Date Approval Issued: 06/Nov/2017 11:30

REB Approval Expiry Date: 06/Nov/2018

Dear Dr. Ruth Martin

The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the above mentioned study, as of the HSREB Initial Approval Date noted above. This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
Appendix 1 Focus Group Questions (V October 27th)	Focus Group(s) Guide	27/Oct/2017	3
Appendix 2 email to profs & Study Invitation (V. October 23th)	Email Script	23/Oct/2017	2
Appendix 3 Recruitment Poster (V. October 12)	Recruitment Materials	12/Oct/2017	2
Appendix 4 LOI- Oral Health Study (Version. October 31th)	Written Consent/Assent	31/Oct/2017	3
Appendix 5; Screening Survey (inclusion) (V. October 12)	Online Survey	12/Oct/2017	2
Appendix 6 Telephone Script (v. Oct 27)	Telephone Script	27/Oct/2017	2

Documents Acknowledged:

Document Name	Document Type	Document Date	Document Version
Reference for Rationale of Study	References	11/Sep/2017	version 1

No deviations from, or changes to, the protocol or WREM application should be initiated without prior written approval of an appropriate amendment from [Committee Name], except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University HSREB operates in compliance with, and is constituted in accordance with, the requirements of the TriCouncil Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); the International Conference on Harmonisation Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Devices Regulations and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Nicola Geoghegan-Morphet, Ethics Officer on behalf of Dr. Marcelo Kremenchutzky, HSREB Vice-Chair

Appendix B: Recruitment Poster

Western

[RECRUITMENT POSTER]

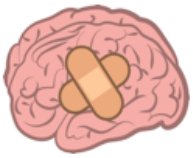
Study PI: Dr. Ruth Martin

RESEARCH PARTICIPANTS NEEDED FOR A STUDY TITLED:

Exploring and Understanding What Final Year Health Professional Students Know About Oral Health in Traumatic Brain Injuries.

By the year 2020, traumatic brain injuries will be one of the major leading causes of death and disability worldwide.

We are looking for volunteers to take part in a study that will explore what **final year** professional health students in **MSc OT, MSc PT, MClSc, & undergraduate nursing** know about oral health in traumatic brain injuries.



Taking part in this study involves participation in **ONE** focus group session **of one-hour and 15-minute duration.**

Where: Seminar room in the Health and Rehabilitation Science office (EC ___) on the Western University Campus in Elborn College
When: On a weekday, between 4:00 and 7:30 pm.
Light refreshments will be provided.
If you are interested in participating or have any questions and would like more information about this study, please contact:

Samira Omar
Health and Rehabilitation Sciences, Western University
[redacted]

Version Date: October 12th, 2017

Appendix C: Email Request to Professors and Invitation to Study To be Posted on OWL

Subject Line: Participants needed for research study

Email Message to Professor:

Hello, my name is Samira Omar and I am a 2nd year MSc student in the Graduate Program in Health and Rehabilitation Sciences at Western University. I am emailing to see if you would be interested in posting an "invitation to participate in a research study" message on the OWL page of your course website as a way to recruit participants. This study will seek to explore and understand what final year health-professional students in various entry-to-practice programs such as nursing *[insert name of the program according the professor being contacted]* know about oral health in individuals with a TBI. This research study will add to the literature on knowledge translation in health professional education. The study is being led by Dr. Ruth Martin, Associate Dean, Graduate and Postdoctoral Programs in the Faculty of Health Sciences at Western University in collaboration with Samira Omar, MSc student.

Invitation Message Below to be posted on course OWL site:

Study title: Exploring and Understanding What Final Year Health Professional Students Know About Oral Health in Traumatic Brain Injuries.

You are being invited to participate in a study that we, Dr. Ruth Martin, Associate Dean Graduate and Postdoctoral Programs in the Faculty of Health Sciences and Principle Investigator, and Samira Omar, MSc student in Health Promotion in the Graduate Program in Health and Rehabilitation Sciences, are conducting. Briefly, this study is aimed at understanding what final year entry-to-practice students in southwestern Ontario know about oral health in traumatic brain injuries. The information gained through this study will contribute to understanding health-care needs related to oral health in traumatic brain injury.

We are recruiting participants who are currently studying in their final year of the undergraduate nursing program [insert name of program depending on professor being contacted] at Western University. We are seeking your **participation in one focus group**

session of one-hour and 15 minutes in duration. The focus group session will occur on the Western University campus, in the seminar room in the Health and Rehabilitation Science office in Elborn College on a weekday, between 4:00 and 7:30 pm. Light refreshments will be provided.

If you are interested in participating or have any questions and would like more information about this study, please contact Samira Omar.

Thank you,

Samira Omar

Health and Rehabilitation Sciences

MSc Student, Health Promotion

Western University

[redacted]

[redacted]

Appendix D: Facebook Post

You are being invited to participate in a study that we, Dr. Ruth Martin, Associate Dean Graduate and Postdoctoral Programs in the Faculty of Health Sciences and Principle Investigator, and Samira Omar, MSc student in Health Promotion in the Graduate Program in Health and Rehabilitation Sciences, are conducting. Briefly, this study is aimed at understanding what final year entry-to-practice students in southwestern Ontario know about oral health in traumatic brain injuries. The information gained through this study will contribute to understanding health-care needs related to oral health in traumatic brain injury.

We are recruiting participants who are currently studying in their final year of the *[insert name of program depending on the Facebook group]* at Western University. We are seeking your participation in **one focus group session of one-hour and 15 minutes in duration.** The focus group session will occur on the Western University campus, in the seminar room in the Health and Rehabilitation Science office in Elborn College on a weekday, between 4:00 and 7:30 pm. Light refreshments will be provided.

Please **DO NOT reply to this Facebook post.** If you are interested in participating or have any questions and would like more information about this study, please contact Samira Omar **either via email or telephone.**

Thank you,

Samira Omar

Health and Rehabilitation Sciences

MSc Student, Health Promotion

Western University

[redacted]

Version Date: November 26th, 2017

Appendix E: Screening Survey

If you choose to provide this information over email, please be informed that email is not secure.

1. Program of study at Western University
2. Year of study in program
3. Name
4. Age
5. Email

Version Date: October 12th, 2017

Appendix F: Telephone Script

(To be used when a potential participant contacts Samira Omar)

Hi, [**repeat the name of the potential participant here**] this is Samira Omar, MSc student in the Graduate Program in Health and Rehabilitation Sciences. Thank you for calling regarding the study on oral health in traumatic brain injuries. The study is being conducted by Dr. Ruth Martin, and myself. This study will be exploring what final year health-professional students know about the oral health of individuals with a traumatic brain injury. Participating in this study would entail participating in one focus group of 1 hour and 15-minute duration. Would you be interested in hearing more about this study?

If no Samira Omar will thank them for their time and say good-bye

If yes, continue to explain study details to them based on the Letter of Information

Do you accept to receive the Letter of Information? ** If yes, continue with the study. * If no, thank them for their time and say good-bye.* To what email address shall I send the Letter of Information? The email address is solely to send you the Letter of Information now so that you can follow it as I will be reading it to you in one moment. I will also send you a reminder email 48 hours before your chosen focus group session (Send the Letter of Information now). I am now going to read you the Letter of Information over the phone [**Clearly read the letter of information to the participant over the phone**]

Do you have any questions?

[**Answer any questions they may have**]

Do you agree to participate in this study? If so

**If yes, continue with the study and kindly ask the student if they could sign the consent form. Once I receive the consent form I will then book a focus group session.*

**If no, thank them for their time and say good-bye*

Appendix G: Letter of Information and Consent Form

Exploring and Understanding What Final Year Health Professional Students Know About Oral Health in Traumatic Brain Injuries.

Principal Investigator: Ruth Martin, Professor

Associate Dean Graduate and Postdoctoral Programs

Faculty of Health Sciences, Western University

[redacted]

[redacted]

Master Student: Samira Omar, MSc Student

Health and Rehabilitation Science, Western University

[redacted]

[redacted]

Background

We, Professor Ruth Martin, Principal Investigator, and Ms. Samira Omar, MSc Student, are conducting a qualitative study exploring what professional health-sciences students in their final year of various professional entry-to-practice programs at Western University know about oral health in individuals who have sustained a traumatic brain injury (TBI). To that end, we are conducting confidential focus group discussions with students of health professions that work with individuals with TBI.

We are asking you to participate as a member of one of the focus groups. If you choose to participate, during the focus group, you and 3 to 5 other students will discuss your thoughts and opinions regarding oral health in people who have a TBI. The information that is generated from this study will contribute to healthcare education. The health professions to be explored are occupational therapy, physiotherapy, speech language pathology, and nursing.

We have reached out to you as a Western student in an entry-to-practice health-professional program. As a student in one of these programs, you have a unique perspective on the extent to which students are aware of the oral health concerns of persons with a TBI.

We hope that our focus group will provide you with the benefit of learning more about what other healthcare professional students know about the oral health of individuals with a TBI. We will publish the results of the study as research papers for the use of health educators and other allied healthcare professionals.

You CAN participate in this study if you are a:

- current Western student in their **final year** of one of the following graduate health-professional programs: MScOT, MPT, or MClSc CSD, or undergraduate nursing
- 18 years of age or older
- understand/read/write/speak English

You CANNOT participate in this study if you:

- cannot communicate in English
- do not meet the inclusion criteria above
- do not consent to an audio recording

Research Procedure

We ask for about one hour and 15 minutes of your time. The focus group session will be confidential and you will not be identified by name in the resulting published work; rather, you will be referenced by a descriptive label such as “PARTICIPANT001” or “PARTICIPANT002”. We will make every effort to protect your confidentiality as a research subject, including assigning you a study number, but confidentiality cannot be guaranteed. This study number will be tracked on a master list that will include all

participants in the study. Focus groups will be audio-recorded to ensure that we have a wholly accurate record of the focus-group discussion. You have the right to leave the focus group at any time. If you do not want to answer a question, you may simply say pass.

We will use the information that you share with us in the focus group interview only for the purposes of this study. Interview notes will be securely stored in a locked office; audio recordings will be stored in encrypted form in a password-protected computer. The notes and recordings will be retained for seven years.

The focus groups will be conducted by Professor Ruth Martin, Principal Investigator, and MSc student Samira Omar.

Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions by saying pass, or withdraw from the study at any time with no effect on your future academic status or your status at your job. You have the right to withdraw from the study. Once the focus group has been conducted, it will not be feasible to withdraw your data. The investigator has the right to withdraw you from the study at any time for reasons related to you (e.g. not following the study-related direction), or because the entire study has been stopped.

Risks and Discomforts

You may experience slight stress, discomfort, or anxiety speaking during the focus group in front of a small group. When collecting personal health information, there is the risk of privacy breach. Otherwise, there are no other known or anticipated risks or discomforts associated with participating in this study.

Benefits

There is no direct benefit to participating in this study.

Privacy & Confidentiality

If the results of the study are published, your name will not be used. No information that discloses your identity will be released or published. Individual results will be held in strict confidence and all data will be placed in a locked cabinet. Only the research team members will have access to your records, however, study data including identifiers may be required by certain groups with rights to access such data such as representatives from Western University, and when required by the law. At any point, you are encouraged to ask questions regarding the purpose of the study. Representatives of the University of Western Ontario Health Sciences Research Ethics Board may require access to your study-related documents to oversee the ethical conduct of this study. Please be advised that, although the researchers will take every precaution to maintain confidentiality of the data, the nature of the focus groups prevents the researchers from guaranteeing confidentiality. The researchers will remind participants to respect the privacy of your fellow participants and not repeat what is said in the focus group to others. In accordance with university policy, the researcher will keep any personal information about you in a secure and confidential location for 7 years.

Compensation

There will be light refreshments provided at the focus group session. Participants will also receive $20 to cover any costs (e.g., parking) that may incur through participating in the study.

Legal Rights

You will be given a copy of this Letter of Information and Consent Form once it has been signed. You do not waive any legal rights by signing the Consent Form.

If you have any questions about this study, please contact:

Dr. Ruth Martin, Ph.D, Principal Investigator [redacted]

Samira Omar, MSc Student [redacted]

If you have questions about your rights as a research participant or the conduct of this study, you may contact the Office of Human Research Ethics at [redacted] or by email at [redacted]

LETTER OF INFORMED CONSENT

Exploring and Understanding What Final Year Health Professional Students in Southwestern Ontario Know About Oral Health in Traumatic Brain Injuries.

Consent Statement

Investigators

Ruth Martin, PhD	Principal Investigator, Supervisor
Samira Omar	MSc Student

I have carefully read the "Letter of Information", have had the nature of the study explained to me, and I agree to participate and have the discussion audio recorded. All questions have been answered to my satisfaction.

_____	_____	_____
Name (please print)	Signature	Date (dd/mm/yy)
_____	_____	_____
Name of Person Obtaining Consent (please print)	Signature	Date (dd/mm/yy)

Appendix H: Focus Group Questions

Begin with General Introduction to The Topic

Preamble: Thank you for making time to speak to us today. We appreciate your time and look forward to hearing your thoughts. This focus group session is intended to be a casual discussion and there are no right or wrong answers. You may decide not to answer any question that would create any discomfort. You may choose not to respond to a given question by saying pass. You may leave the focus group session at any time and this will not impact your job prospects or your studies. It is important that each and every single one of you maintain the confidentiality of other participants, however, confidentiality cannot be guaranteed. Once the focus group discussion begins, I ask that each and every single one of you respects the other members of the group by not talking when others are speaking and this includes any side conversations while the conversation is taking place. I also ask that you state your name each time that you speak as this will help to keep track of who is speaking throughout the discussion.

What is known about oral health in traumatic brain injuries? This is a topic that has been under-explored in both research and clinical care. As students in an entry-to-practice health professional program, you have taken the first step of committing a large part of your lives to improving the lives of other people in aspects of everyday health and well-being that contribute to good health through the prevention of injuries and chronic disease. Some of the many populations that professionals in your area of practice work with include individuals with a traumatic brain injury and as the prevalence of traumatic brain injuries is expected to increase in the next coming years, it is important to understand what students in their final year of an entry-to-practice program know about oral health in traumatic brain injuries. This will be the topic for today's focus group discussion.

Audio Recording of the discussion will now begin: Start the audio recording now.

Ice-breaker: Going around the room, what is one thing you enjoy about your current health professional education?

Probing statements such as “What do you mean by that statement?”, or “Can you elaborate on your thought?” will be used to clarify any unclear statements.

Question 1(a): Thinking back in your own education, over the course of your first year, and the exposure you have gained in your program, to what extent have you learned about traumatic brain injuries?

Question 1(b): Over the course of your education and training to what extent have you learned about oral health?

Question 2: As a student approaching the end of your professional training, how prepared do you feel to take on assisting individuals who have a traumatic brain injury with the management of oral care routines?

Question 3: Do you feel you have sufficient knowledge to approach such a task?

Question 4: What comes to mind when you think of oral health and traumatic brain injuries?

Question 5: As students in various health fields that are committed to the enhancement of health and well-being, what do you believe your profession contributes to the management of oral health in individuals with a traumatic brain injury?

Question 6: What difficulties can you foresee in someone being able to take part in oral care routines after sustaining a traumatic brain injury?

Question 7: How important do you think oral health is to someone with a traumatic brain injury and why?

Question 8: Going around the room, is there anything else that you would like add to add before the discussion comes to an end?

Curriculum Vitae

Name: Samira Omar, HBSc, MSc Candidate

POST-SECONDARY EDUCATION AND DEGREES

Western University, London, *ON, CA* 2016- 2018

MSc Candidate in Health and Rehabilitation Sciences, Health Promotion

Master's Thesis Title: *Health Professional Students' Understanding of Oral Health in Traumatic Brain Injury.*

Graduate Supervisor: Dr. Ruth Martin

University of Toronto, *Scarborough, ON, CA* 2015-2016

Non-Degree Student

University of Toronto, *Scarborough, ON, CA* 2010-2015

Honours Bachelor of Science (HBSc)

- Supervised Study in Psychology: *Finding strength in feelings: When intuition fosters resilience in product choice.*

Undergraduate Supervisor: Dr. Sam Maglio

RESEARCH EXPERIENCE

University of Toronto 2013- 2016

Behavioural Research Assistant

- Worked on various studies exploring and assessing intuition and choice making behaviours
- Conducted multiple literature reviews
- Designed research questionnaires and surveys
- Recruited over 300 human research participants at the University of Toronto and in the GTA
- Collected and analyzed quantitative data using SPSS
- Assisted in the write up of quantitative data for manuscripts
- Excelled in scientific writing and communication

- Demonstrated findings and presented final written reports, and oral presentations to graduate students

Principle Investigator: Dr. Sam Maglio

University of Toronto 2014-2015

Supervised Research Study Student

- Completed a yearlong research study titled *"Finding strength in feelings: When intuition fosters resilience in product choice"*
- Examined the role of emotions and its associated role on decision-making
- Recruited over 100 participants at the University of Toronto and in the GTA
- Created questionnaires, and executed the study from start to finish
- Presented final written report of the findings and an oral presentation

Principle Investigator: Dr. Sam Maglio

University of Toronto May 2013- July 2013

Research Assistant, Social Ecology Lab

- Examined the social-ecological foundations of human social behaviour
- Coded natural interactions according to the Big Five Personality Traits
- Enhanced in the ability to work both in a team setting and independently
- Generated findings in the form of a written report

Principle Investigator: Dr. Marc Fournier

University of Toronto May 2012- Sep 2012

Research Assistant, Health & Wellness Centre

- Organized and analyzed data using SPSS
- Successfully conducted literature reviews and wrote critical summaries of all papers
- Summarized intake therapy forms and entered confidential information on a secured excel file
- Committed to ethics, integrity, and patient confidentiality
- Developed strategies to help new and international students cope with the transition to university
- Produced written reports and oral presentations in front of faculty and students
- Project Title: Flourish: To grow intellectually, emotionally and socially

- Second Project Title: Assessment of Positive Traits in Children and Adolescents

Principle Investigator: Dr. Tayyab Rashid

AWARDS & SCHOLARSHIPS

Graduate Teaching Assistantship, Western University	2018
Western Graduate Research Scholarship	2017-2018
Nominated for a Graduate Teaching Assistant Award	2017
Faculty of Health Sciences Graduate Conference Travel Award	2017
Health and Rehabilitation Sciences Conference Travel Award	2017
Graduate Teaching Assistantship, Western University	2017
Western Graduate Research Scholarship	2016-2017
Peer educator of the month, University of Toronto	Sep 2013

CERTIFICATES ACHIEVED AND IN PROGRESS

Certificate in University Teaching and Learning (in progress)	2017-Present
Teaching Assistant Training Program	2016
Tri-Council Policy Statement 2	2016

TEACHING EXPERIENCE

Graduate Teaching Assistant

Western University, London Ontario Winter 2018

OT 9542X (Evaluating Occupation in Context)

Instructors: Professor Donna Dennis and Dr. Jessie Wilson

- Assisted with the set-up of the OWL course site for first year occupational therapy students
- Uploaded weekly class notes and readings on OWL site
- Prepared class labs consisting of setting up various occupational therapy assessments
- Graded exams for all 59 students
- Corresponded with students via email and in person in relation to course material

- Proctored exams

Graduate Teaching Assistant

Western University, London Ontario Winter 2017

HS 3701 (The Aging Body)

Instructor: Dr. Aleksandra Zecevic

- Provided assistance to 72 students with the modification of the Empathy Lab Manual which was presented by students at the 2017 Western University March Break open house, and in front of faculty and stake holders
- Assisted course instructor with the tutorial sessions
- Monitored the online class discussion forum
- Prepared and created quiz questions consisting of short answer, multiple choice, and true/false questions.
- Held weekly office hours for students
- Graded all student work including bell-ringer, assignments, and exams with extensive constructive feedback regarding strengths and areas of improvement
- Proctored exams

PROFESSIONAL EXPERIENCE [EXTRA-CURRICULAR ACTIVITIES]

Brain Injury Society of Toronto (BIST) Aug 2017- Present

Blog article content creator for Brain Injury Blog Toronto: Create and share content based on traumatic brain injury

Western University May 2017- June 2018

Health and Rehabilitation Sciences Graduate Student Society

Vice- President of Student Development

Health Science Inquiry April 2017- Present

Student blogger: Create scientifically supported blog articles on pressing issues surrounding traumatic brain injury

Western University Mar 2017-Sep 2017

Committee member, *Graduate Student Teaching Assistant Awards*

Western University Dec 2016- Feb2018

Abstract Committee member, *Health and Rehabilitation Sciences 2017 Graduate Research Conference*

University of Toronto 2013- 2014

Peer Educator, *Leave the pack behind*

Baycrest Hospital 2013-2015

Friendly volunteer, *Long-term care facility*

Supervisor: Rachel Gavendo, Therapeutic Recreation Specialist

University of Toronto Scarborough 2010-2014

Women and Trans Centre, Volunteer

PUBLICATIONS ACCEPTED AND IN PROGRESS OR IN PREPARATION

Omar, S., Martin, R.E. (in progress). *Health professional students' understanding of oral health in traumatic brain injury.*

Omar, S., Martin, R.E. (in preparation). *Oral health in traumatic brain injury: A scoping review of the literature.*

Omar, S. (in progress). *Global health, human rights, and the empowerment of women in the Global South.*

Omar, S. (2017, December 22). My traumatic brain injury: Sister caregiver experience [Blog Article]. Retrieved from https://torontobraininjuryblog.com

Omar, S. (2017, April 1). Do basic psychological needs exist? A health promotion initiative through the lens of traumatic brain injury survivors and their caregivers. Part 1 [Blog Article]. Retrieved from https://www.healthscienceinquiry.com/dobasicpsychologicalneedsexist

CONFERENCE PRESENTATIONS

Omar, S., Martin, R. E. (March, 2018). *Health Professional Students' Understanding of Oral Health in Traumatic Brain Injury*. Poster presented at the 28th Annual Rotman Research Institute Conference: Traumatic Brain Injury and Concussion, Baycrest, Toronto, ON, CA

Omar, S. (February, 2018). *Oral Health in Traumatic Brain Injury: A Scoping Review of the Literature.* Poster presented at the Toronto Rehab Traumatic Brain Injury Conference, UHN, Toronto, ON, CA

Omar, S., Martin, R.E. (February, 2018). *Health Professional Student's Understanding of Oral Health in Traumatic Brain Injury.* Poster presented at the 11th Annual Health and Rehabilitation Sciences Graduate Research Conference, London, ON, CA

Omar, S. (November, 2017). *The mystery of oral health in traumatic brain injuries.* Poster presented at the Ontario Public Health Association Annual Fall Forum, Toronto, ON, CA.

Omar, S. (May, 2017). *Oral health in traumatic brain injuries: A scoping review of the literature.* Oral presentation presented at the 19th Annual Rehabilitation Research Colloquium, Kingston, ON, CA.

Omar, S. (March, 2017). *Why oral health in traumatic brain injuries?* Poster presented at the Annual Enviro Con Research Conference, London, ON, CA

Omar, S. (March, 2017). *Oral health in traumatic brain injuries*. Presented at the Annual 3 Minute Thesis Health Sciences Faculty Heat competition, London, ON, CA.

Omar, S. (February, 2017). *Why oral health in traumatic brain injuries?* Poster presented at the 10th Annual Health and Rehabilitation Sciences Graduate Research Conference, London, ON, CA