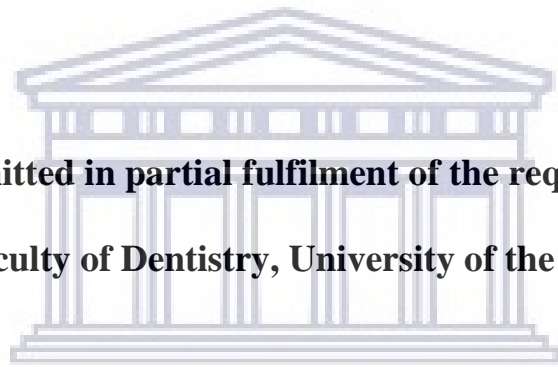


**An explorative study of the factors possibly contributing to the burden of
maxillofacial infection presenting at the Tygerberg Oral Health Centre**

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2462544

**A mini-thesis submitted in partial fulfilment of the requirements for the
degree MDS, Faculty of Dentistry, University of the Western Cape.**



**UNIVERSITY *of the*
WESTERN CAPE**

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July 2020

DECLARATION

I declare that the mini-thesis, An explorative study of the factors possibly contributing to the burden of maxillofacial infection presenting at the Tygerberg Oral Health Centre, has previously not been submitted by me for a degree or examination at this or any other university, that it is my own work and that all sources I have used or quoted have been indicated and acknowledged by complete references.



Martin Douglas-Jones

July 2020

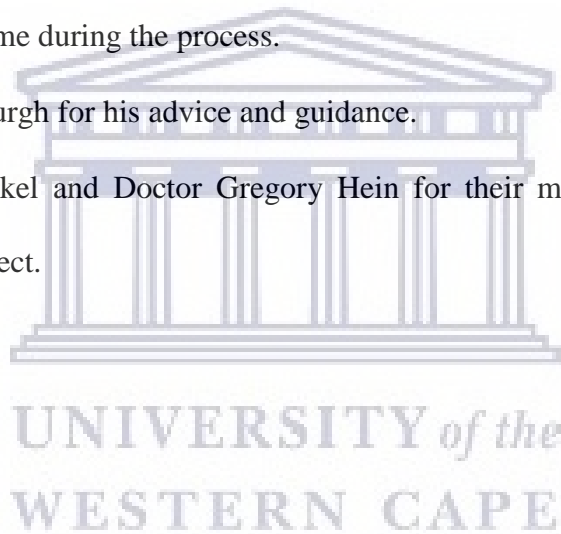
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- Professor Neil Myburgh for his advice and guidance.
- Professor Jean Morkel and Doctor Gregory Hein for their mentorship and support in completing this project.



DEDICATION

I dedicate this thesis to my beloved family.

I am forever grateful to my wife for her sacrifice, encouragement, support and love through the years and challenges in getting to this point. Reaching this point would not have been possible without my parents and brother who have supported my dreams and always encouraged the acquisition of knowledge and the questioning of the status quo.



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ABSTRACT

Background: Over the last few decades, and throughout the world, there would seem to have been an increase in the number and severity of infections affecting the maxillofacial region. In the South African setting this seems to be especially evident in the state health system. Maxillofacial infection of odontogenic origin is largely preventable. If treated appropriately and early in the pathological process, the progression of the disease process is generally prevented and complications avoided. Management of maxillofacial infections once established has serious implications for patients and an already stressed health system. The reasons for this perceived increase in infections are likely multifactorial and it is hoped that this study may aid in understanding factors contributing to this burden.

Aim: The aim of the study was to explore the factors contributing to, and reasons for, the advanced presentation of odontogenic related maxillofacial infection to the Tygerberg Oral Health Centre.

Methodology: The study design was a prospective, qualitative study of patients with odontogenic infection who presented to the Tygerberg Oral Health Centre. The qualitative study made use of the narrative approach, which was then followed by a semi-structured interview of the study participants. The interviews were transcribed verbatim and themes meeting the aims and objectives of the study were then identified by the primary researcher and an independent coder. These themes were then coded and recorded on an Excel spreadsheet along with the quantitative data.

Findings: The study found that the participants generally had negative perceptions of the health system and accessing care in the management of maxillofacial infections. There was general lack

of understanding of dental pathology and progression of disease amongst the participants. This, along with other social and socio-economic factors, contributed to delays in seeking help. Health system processes were generally regarded as being inefficient and many participants experienced difficulty in accessing primary level dental care as well as appropriate treatment for maxillofacial infection. Healthcare practitioners' understanding of odontogenic maxillofacial infections appeared to be limited and this often led to inappropriate initial management and delays in referral.

Conclusion: The study highlighted the complexity of the factors that appear to contribute to the burden of maxillofacial infections experienced at the Tygerberg Oral Health Centre. These factors, as identified in this study, contributed to the delay in presenting for definitive treatment due to reasons including: family responsibilities, misdiagnosis and/or mismanagement of the oral condition, lack of knowledge of oral disease shown by the patient (participant), and work commitments. Future research and intervention strategies aimed at further understanding of these factors may reduce the maxillofacial infective burden experienced at this oral health facility (TOHC).

KEYWORDS

Maxillofacial infection for the purpose of the study will be defined as any infection of the head and neck region requiring incision and drainage of a septic collection by the Maxillofacial Department at the Tygerberg Oral Health Centre. It will not include patients referred on to other medical specialities.

Odontogenic infections are infections where the cause of the disease is directly related to dental structures.

Advanced maxillofacial infection for the purpose of this study will be defined as an odontogenic infection that will require surgical incision and drainage in the treatment of the condition.

Areas of interception include prevention and early management of dental disease before presentation with advanced disease that requires incision and drainage.

Prevention is the early treatment of dental disease which may otherwise ultimately lead to odontogenic infection and infective collections. It includes early referral for dental treatment from healthcare providers.

Appropriate antibiotic treatment will be defined as treatment with a penicillin with the addition of anaerobic bacterial cover. Where the patient has a penicillin allergy, a lincosamide, like clindamycin, will be considered appropriate.

Unemployment for the purposes of the study will be defined as relating to those participants who report not having employment on a full-time basis. It will not include learners attending school, or participants who are attending tertiary education institutions. It may include those who occasionally or seasonally do contract work but who have no definite future employment.

A **narrative approach** has a specific focus on the stories told by individuals; it emphasizes the experiences lived and told by individuals (Creswell, 2007).



ABBREVIATIONS

TOHC: Tygerberg Oral Health Centre

NCOHS: National Children's Oral Health Survey

OECD: Organization for Economic Cooperation and Development

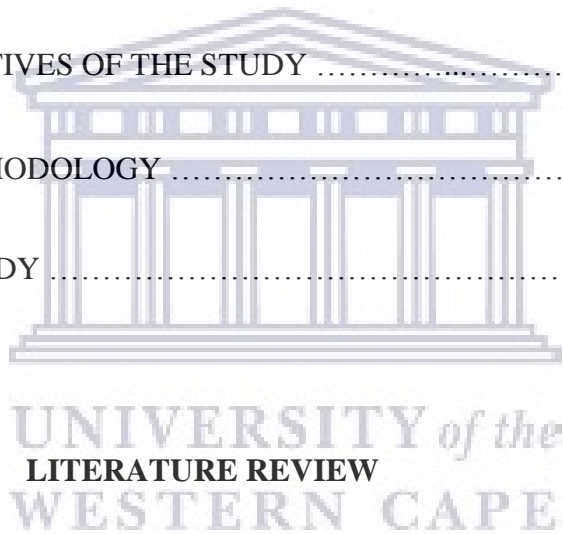
WHO: World Health Organization

NHS: National Health Service



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CHAPTER ONE

CONTEXT OF THE STUDY

1.1 BACKGROUND AND INTRODUCTION

Over the last few decades, and throughout the world, there would seem to have been an increase in the number of infections and severity of infections affecting the maxillofacial region (Thomas et al., 2008; Carter & Layton, 2009; Seppänen et al., 2010; Bowe et al., 2015). This region is vulnerable to infections from various aetiologies but of particular concern are infections originating from odontogenic pathology. These infections have been reported to have increased in severity and frequency to the extent that the management often requires surgical intervention and hospital admission (Bowe et al., 2015). It is assumed that this can be attributed to changing dental healthcare services, misdiagnosis and inappropriate management, increased trauma related infections and general fear of the dentist.

In the South African setting this seems to be especially evident in the state health system. The Western Cape is not spared from this burden and maxillofacial infections would seem to possibly be more prevalent in this province. Anecdotal evidence suggests that these ever increasing numbers, and what would seem to be delayed presentation of this condition at a healthcare facility, have serious implications for an already stressed health system and on patient quality of life in general. The additional burden on public health services in managing a largely preventable disease has many negative implications for these systems. This has an impact on health service resources, logistical planning of patient care and has a negative financial implication on already stretched health budgets. It also, often unnecessarily, adds to patient, healthcare provider and system constraints.

The public health system renders services to approximately 84% of the South African population. In the past the service has prioritised treatment for other infective epidemics, chronic medical conditions and a serious trauma burden. The purpose of this study was to gain insight into, or develop an understanding of, the factors that appear to be contributing to the presentation of maxillofacial infections.

Maxillofacial infection of odontogenic origin is largely preventable. If treated appropriately and early in the pathological process, the progression of the disease process is generally prevented and complications avoided. Warning symptoms and signs are often present early in the aetiological process and well in advance of established maxillofacial infection. If the cause of the infection is not removed and the infection not addressed early, the progression of the disease can result in significant morbidity and even mortality. The severity of the possible outcomes would seem to be underestimated by both patients and clinicians.

The reasons for the delay in help seeking or in the correct management of maxillofacial infection are probably multifactorial. Included amongst these would be: patient factors, the availability of dental services, patient numbers at healthcare facilities, the understanding of the condition, and the implications of delayed management by healthcare providers and the general logistics of referral.

Understanding the patient factors and experience, along with their perceptions of the system and logistics in seeking help, may explain the concerning increase in the condition. By determining the demographics and previous health seeking behaviour of those presenting with maxillofacial infection, the study hopes to find areas where the progression from simple dental issues to advanced maxillofacial infection could either be prevented or intercepted.

This could halt the need for more invasive and costly management of more complicated maxillofacial infections.

It is hoped that the study could aid in educating the general population as well as healthcare practitioners about the risk of developing maxillofacial infection, and the need for adequate initial management. Research may change patient and healthcare provider perceptions and education of odontogenic pathology. A better understanding of the condition may change current approaches and common mismanagement of maxillofacial infections. With these changes, it is hoped that the costs of maxillofacial infection to the South African healthcare system could be significantly reduced. The positive ramifications for patients, clinicians and an already burdened medical system could be invaluable.

To date, there has been no data on the reasons for late presentation at health facilities of this largely preventable infection in South Africa. Internationally there have been assumptions made as to the increase, but with very little supporting data. This research hopes to identify possible areas of prevention or interception of the pathological process leading to maxillofacial infection. It is hoped to achieve this by gathering data by means of interviewing patients and recording their narratives and experiences prior to presentation at the Tygerberg Oral Health Centre (TOHC).

1.2 RESEARCH PROBLEM

Severe infection of odontogenic origin in the maxillofacial region has a significant negative effect on both patients as well as the healthcare system in the Cape Town Metropole.

Dental caries and other odontogenic aetiologies of infection are a reality in the South African healthcare setting. Statistics regarding the number of tooth extractions performed by the Department of Maxillofacial and Oral Surgery (University of the Western Cape) indicate that approximately twenty thousand teeth are removed on an annual basis. Tooth decay, fractured teeth, gingivitis and periodontitis as well as failed dental restorations, may ultimately lead to maxillofacial infections, which, although can be expected to occur infrequently, have become a regular occurrence and burden on the resources at the TOHC. This has had a significant impact on the services offered to the general public and academic programme of the specialists in training at the TOHC. The academic, economic, resource and social costs of this infective scourge are difficult to determine. It definitely has a significant negative effect on state run healthcare provision. In general, maxillofacial infection of odontogenic origin should be easily prevented or managed by means of basic dental procedures. The progression to acute infection requiring hospital admission and incision and drainage of infected collections, happens largely when the basic dental procedures of tooth extraction or endodontic treatment are not carried out. The elimination or reduction of these infections with basic dental procedures generally comes at significantly reduced financial cost when compared to the procedures required with hospital admission in advanced disease.

Despite the significance of this condition in terms of resource appropriation and morbidity and mortality, very little research has been conducted in South Africa in this field. The reasons for this extraordinary burden of disease are likely multiple, with many contributing factors and influences. This study aims to explore the health seeking behaviour of patients with odontogenic infections and seeks to identify areas of intervention which could result in a decrease in the incidence of this condition.

1.3 RESEARCH QUESTION

The research question for this study was:

What are the reasons for the delay in definitive treatment of advanced odontogenic infections?

1.4 AIM AND OBJECTIVES OF THE STUDY

The aim of the study was to explore the factors contributing to, and reasons for, the advanced presentation of odontogenic related maxillofacial infection at the Tygerberg Oral Health Centre. The objectives of the study were to:

- Explore patient experiences in seeking treatment for maxillofacial infection
- Explore patient behaviour regarding dental disease
- Determine possible missed treatment opportunities
- Determine referral patterns for maxillofacial infection.

1.5 RESEARCH METHODOLOGY

The study aimed to explore the factors contributing to the late presentation of cases of odontogenic infection presenting as maxillofacial infection to the TOHC. A qualitative research approach was used as it offered the opportunity of exploring the context of the journey of the patients who present with severe odontogenic infections. Narratology or the narrative approach was used in order to gain a deeper understanding of the experiences of patients.

Narratology involves recording the story, as told by the participants, with only a few prompts from the researcher around the storyline, the participants' perceptions of the individuals involved and the context of the events (Edmunds & Brown, 2012). A narrative approach “uses

multiple forms of data to build the in-depth case or the storied experiences” of an individual who is willing to provide information about a specific phenomenon (Creswell, 2007).

The narrative approach has a variety of forms but in this study, the participants were asked to provide their story. This was then followed by a semi-structured interview to explain experiences that may have required clarity during the narrative and to obtain data that may have been omitted in the narrative.

1.6 OUTLINE OF STUDY

Chapter One has briefly focused on the introduction, purpose, theoretical framework, problem statement, research question, aim of the study, the objectives and the research methodology of the study.

Chapter Two focuses on a review of the literature as it pertains to the disease entity of odontogenic infections as well as patient health seeking behaviour and the South African healthcare system.

Chapter Three describes the research methodology, research design, and information pertaining to the participants, data collecting tools, data collection, data analysis, trustworthiness, self-reflexivity as well as ethical considerations.

Chapter Four is a presentation of the research findings. The chapter starts with an introduction that highlights common characteristics and the demographics of the study participants. This is followed by the identification of the most pertinent themes. The themes include: the patient’s experience of the disease and pathological progression of disease, referral experience, general knowledge and practices with regard to oral health and inefficiencies within the healthcare system.

Chapter Five discusses the research findings presented in Chapter four and describes the

participants' experience in the healthcare setting and in particular in sourcing oral healthcare. The discussion includes comparing the findings to the current literature.

Chapter Six presents the limitations of the study and offers recommendations related to the findings of the study which could have an influence on the prevalence and the treatment of odontogenic maxillofacial infection in the future. Areas where future research could be done to address the maxillofacial surgical infection burden are also highlighted. The chapter concludes the study.



CHAPTER TWO

LITERATURE REVIEW

2.1 MAXILLOFACIAL INFECTION

DEFINITION

Infections of the maxillofacial region may be either of odontogenic or non-odontogenic origin. An odontogenic infection is an infection that originates from within a tooth or in the structures surrounding it. The most commonly implicated causes of odontogenic infections are: dental caries, deep fillings, failed root canal treatments, periodontal disease, and pericoronitis. Odontogenic infections originate as a localised infection. The infection may remain localised to the region of origin, or it may spread into adjacent tissues, potential spaces and surrounding structures. The infective process may spread to distant sites by following tissue planes of least resistance.

Maxillofacial infection is common throughout the world (Carter & Layton, 2009; Seppänen et al., 2011) and most commonly occurs secondarily to odontogenic infections. In a study conducted by Sánchez et al., (2011) in Spain, the underlying pathogenic mechanisms of severe odontogenic infection in their sample of 151 patients requiring hospital admission, were dental caries (n=51). This was followed by post-extraction infectious processes (n=18) and pericoronitis (n=9) (Sánchez et al., 2011). Odontogenic infections generally respond well to dental management when the odontogenic cause of infection is identified and addressed. Management may also require surgical intervention and the use of appropriate antimicrobial therapy if the disease process progresses. Advanced odontogenic infections may ultimately require hospitalisation and more invasive surgical interventions which drive up the cost of treatment (Seppänen et al., 2008). The progression of the disease process to an advanced

odontogenic infection increases the likelihood of patient morbidity and possible mortality (Thomas et al., 2008).

2.2 ODONTOGENIC INFECTION

2.2.1 INTERNATIONAL AND NATIONAL TRENDS

Of concern is that maxillofacial infections seem to be increasing in regularity and in the severity of presentation (Carter & Layton, 2009) in many areas around the world. Seppänen et al., (2010), reported an increase in severity and frequency of odontogenic infections requiring admission into hospitals in Helsinki and in the Uusimaa Hospital district of Finland over a ten year period (Seppänen et al., 2010). Thomas and colleagues (2008), reported a dramatic increase in the number of dental abscesses requiring hospital admission in England when comparing admission rates to those in the late 1990's (Thomas et al., 2008).

Lack of access to primary dental healthcare may contribute to this ever increasing infective burden (Watt et al., 2015). Bowe et al., 2015, found that a change in access to primary dental care in the United Kingdom in 2010 has led to an increased rate of acute presentation at secondary and tertiary level care hospitals for dental infections (Bowe et al., 2015). Burnham et al., 2011, found that higher numbers of patients required admission for odontogenic infections after the National Health Service (NHS) in the United Kingdom changed the remuneration structure for NHS dentists. This change was from a fee for service to a banding system where only the costliest procedure could be charged, and led to fewer NHS dentists treating NHS dental patients, altering the access to dental care (Burnham, Bhandari & Bridle, 2011). In South Africa, primary dental care is free of charge at primary level healthcare facilities. The Western Cape has over 200 primary healthcare facilities (<https://www.westerncape.gov.za/dept/health/facilities/944>).

Uluibau et al., (2005) found that the commonest precipitant to seeking medical care for maxillofacial infection was pain and swelling associated with the condition. Almost half of those patients included in the study, presented with concomitant trismus. Trismus may have been a reason for presenting for treatment but also indicated the progression of the disease (Uluibau, Jaunay & Goss, 2005). Interestingly, about one third of patients in the study had sought treatment prior to presenting with maxillofacial infection. Almost half of these patients had been prescribed antibiotics without definitive treatment. Of concern was that a small number had presented to the local dentist with swelling and trismus and were not immediately seen or referred. One of these cases reported the prescription of antibiotics in the absence of a consultation and assessment by the prescribing dentist (Uluibau, Jaunay & Goss, 2005).

2.2.2 PATHOGENESIS

Maxillofacial infection is generally caused by mixed bacterial infections. There has been a thought that causative organisms have changed, or have developed resistance to antibiotics over the recent past, creating more virulent strains of bacteria. This is not entirely supported by the literature. Yuvaraj and colleagues (2012), reported that aerobic bacteria account for 68,2% of maxillofacial sepsis, while anaerobic bacteria were implicated in 9,1% of infections (Yuvaraj, Alexander & Pasupathy, 2012). Mixed anaerobic and aerobic infections occurred in 13.6% of maxillofacial sepsis. The aerobic causative organisms vary greatly with *Streptococcus* and *Staphylococcus* species generally being the commonest isolates. *Peptostreptococcus* and *Bacteroides* are generally the commonest anaerobic bacteria cultured (Aderhold, Knothe & Frenkel, 1981; Storoe, Haug & Lillich, 2001). According to Yuvaraj et al., (2012), it would seem that there has been a shift in bacterial isolates from maxillofacial sepsis over the past 20-30 years. There has been an increase in anaerobic organisms isolated from cultures taken (Yuvaraj, Alexander & Pasupathy, 2012). This change could be explained

by the advancements made in the isolation and culturing techniques, giving a higher yield of anaerobic bacteria that were previously not being isolated or cultured.

Yuvaraj et al., (2012) also reported that most organisms cultured from maxillofacial sepsis were sensitive to penicillin (over 80%). Of concern is the apparent decrease in sensitivity of the anaerobes, and in particular the *Peptostreptococcus* species, to metronidazole (Yuvaraj, Alexander & Pasupathy, 2012). It is suggested that this could be due to the overuse of metronidazole which has led to the development of resistance to it.

The commonest tooth leading to maxillofacial infection is the mandibular first molar (Sánchez et al., 2011). This may be due to the fact that the first molar is the first permanent tooth to erupt into the mouth and hence has a longer exposure to caries causing pathogens and risk factors. The second and third molars are also commonly associated with odontogenic infections. The anatomy of the mandible influences spread of odontogenic infection. The lower second and third molar apices are in close proximity to the insertion of the mylohyoid muscle with the consequence that the spread of infection into the submandibular or surrounding parapharyngeal spaces is very likely when the infection perforates the mandibular cortex (Edwards et al., 2004). The maxillary alveolar bone is generally significantly thinner on the buccal side when compared to the palatal aspect (Ariji et al., 1991). This leads to odontogenic apical infection in the maxilla commonly perforating buccally. The muscle attachments in the maxilla influence the spread of infection from maxillary teeth (Birn, 1972).

The cervical fascia plays an important role in the spread of maxillofacial sepsis into the deep neck spaces. These fascial planes are potential spaces that can create paths along which sepsis can track. Sepsis generally spreads along the path of least resistance.

Maxillofacial infections can cause a number of complications if not treated early and effectively and can result in severe morbidity and mortality. Prior to the antibiotic era, maxillofacial sepsis had an expected mortality rate of between 10 and 40% with just surgical management (Thomas, 1908). It is well documented that severe maxillofacial infection can cause upper airway obstruction or cavernous sinus thrombosis. Mediastinitis, pericarditis, meningitis and necrotising fasciitis are other possible consequences of advanced dental infection (Ruiz et al., 1993; Roccia et al., 2007). These complications of dental infection are associated with significant morbidity and are often lethal. The prognosis for uncomplicated dental infections is excellent. Dental infections that spread to deeper neck structures carry a poorer prognosis and significant mortality rate. According to the available literature, the deep neck infection related mortality rates range between 7.1% and 41.7% globally (Staffieri et al., 2014).

2.2.3 CONTRIBUTING FACTORS

Medical comorbidities are associated with an increased incidence and severity of maxillofacial sepsis and are largely due to these comorbidities compromising the immune system (Kamat et al., 2015). Commonly described comorbidities include infections like the human immunodeficiency virus (HIV), endocrine disorders like diabetes mellitus, autoimmune conditions and their treatment, malignant disease and chronic alcohol abuse. Medical comorbidities or decreased immunity have been described as a major factor in the progression of maxillofacial infections. These comorbidities have also been shown to increase the length of hospital stay in patients admitted with maxillofacial sepsis (Seppänen et al., 2008). South Africa's HIV infection prevalence in 2012 was estimated by Shishana et al., (2014), to be 12,2% of the population (Shishana et al., 2014). The International Diabetes Federation reports that there were 2,28 million cases of diabetes in South Africa in 2015. Comorbid disease is an

obvious consideration as an influence in maxillofacial infection in South Africa. These conditions, apart from having a direct influence on the susceptibility of patients to infection, also increase the number of people seeking help at health facilities. This increased pressure on healthcare facilities indirectly affects patients' access to health services.

2.2.4 APPROPRIATE MANAGEMENT

The essentials in management of maxillofacial infection have been known for centuries and were described by Hippocrates. Identification and removal of the cause of the infection with drainage of the infective collection is essential (Christensen, Han & Dillon, 2013). With the advent of antibiotics, medical management of infections has been possible. Antibiotics have added to the maxillofacial armamentarium in the management of odontogenic infections. They however do not address the fundamental principle of sepsis management, that being source control. Initial treatment with antibiotics may alleviate signs and symptoms of maxillofacial infection for a period, but without the removal of the cause, the infection will inevitably recur, often with increased severity. Antibiotic treatment of odontogenic infection, without removal of the cause of the infection, is a predisposing factor in the development of significant maxillofacial infection (Bridgeman et al., 1995) (Huang et al., 2004). Injudicious and inappropriate antibiotic use in the management of odontogenic infections may be contributing to antibiotic resistance and the development and selection of more virulent organisms.

Most patients presenting with maxillofacial infection, have had concerning and progressive symptoms and signs of odontogenic pathology, well in advance of final presentation with maxillofacial infection (Bridgeman et al., 1995). The study also found that 100% of patients presenting for maxillofacial infection had experienced pain prior to developing symptoms of

advanced maxillofacial infection. This pain was often ignored and occasionally inappropriately managed at a primary dental facility.

Maxillofacial infection can largely be prevented. Carter and Layton (2009) revealed that most patients had sought dental help prior to developing advanced maxillofacial infection and presentation at various maxillofacial units in the United Kingdom. Almost two thirds of patients, who had sought help, had been prescribed oral antibiotics without the cause of sepsis being removed by either extraction or endodontic treatment with incision and drainage. It was noted that half of the patients with significant odontogenic infection had presented to a medical casualty. Many of those presenting were from poor socio-economic areas (Carter & Layton, 2009).

In an Australian population, only eight per cent of patients presenting to a maxillofacial unit with significant maxillofacial infection had had regular dental visits (Uluibau, Jaunay & Goss, 2005). Routine dental examination and treatment should prevent the progression of odontogenic pathology into significant infections. In this Australian study, a far smaller percentage of patients (about one third) had sought help prior to presentation with significant maxillofacial infection. In those that had sought prior treatment, a significant number, contrary to best practice principles, were treated with antibiotics without source control or definitive treatment (Uluibau, Jaunay & Goss, 2005). In the study, poor socio-economic standing seemed to be a risk factor for maxillofacial infection. Thirty-four per cent of patients presenting for maxillofacial infection had major substance abuse issues and psychiatric illness. These conditions have been associated with poor health seeking behaviour. Many patients in this study admitted to having a negative attitude towards dental services, citing fear and financial expense as contributing factors.

2.3 PATIENT HEALTH SEEKING BEHAVIOUR

It is accepted that early intervention and treatment of odontogenic pathology should prevent the further advancement or progression of disease to maxillofacial infection involving fascial spaces or the development of a bacteraemia or septicaemia (Seppänen et al., 2011). In reality however, the high incidence of advanced odontogenic infection continues to stress health facilities. Cohen in 2009 reported from the United States that the disadvantaged (ethnic minorities and low income individuals) are less likely to seek dental care and often are reliant on non-traditional means to treat acute dental pathology. These include seeking help at medical casualties and pharmacies (Cohen, 2009).

There appears to be growing recognition in both the developed, as well as the developing worlds, that providing knowledge and education on an individual level is inadequate in promoting a change in dental related behaviour. Cultural and community influences impact on the delivery of health services and help seeking behaviour. Addressing these influences may go a long way in addressing dental help seeking behaviour in communities (Formicola, Stavisky & Lewy, 2003).

The social capital approach to healthcare provides a broad overview of the factors or components key to the health seeking behaviour of individuals. It provides a means of shifting the focus from individuals to social groups. In relation to the health of individuals, there is growing evidence that high levels of social capital in themselves may have a positive effect on health (Mackian, 2003).

2.4 SOUTH AFRICAN HEALTHCARE SYSTEMS

In South Africa, approximately 80% of the population utilises the public healthcare system, whilst the remaining 20% utilises the private system. The private and public health systems

exist in parallel. The government run public clinics and hospitals are divided into primary, secondary and tertiary health facilities which are managed by provincial health departments based on their location within South Africa. The national Department of Health (DOH) is responsible for coordinating the various provinces and in developing health policy. The South African Constitution, in Section 27 of the South African Bill of Rights, guarantees every citizen access to health services. According to the Organisation for Economic Cooperation and Development (OECD), 8,8% of the South African gross domestic product (GDP) was consumed by the healthcare system in 2012.

The public sector serves 84% of the South African population (Naidoo, 2012). The public sector District Health System is where the majority of South Africans access health services. This follows the preferred governmental primary healthcare approach of health service provision. The total number of dentists per 10 000 population in South Africa is 1,514 according to 2017 data from the World Health Organization (WHO). This is well below the numbers reported for other developing countries. With the public sector serving such a large proportion of the South African population, it could be assumed that a fair majority of these dentists would be employed within the public sector. The reality is that only one quarter of all South African dentists were employed by the public sector in 2009 (Strachan, Zabow & van der Spuy, 2011).

Unfortunately there is no updated information on dental health or maxillofacial infection for South Africa. The most recent South African data emanates from the National Children's Oral Health Survey (NCOHS) published in 2003. This survey recorded the presence of dental caries in specific age groups. All the surveyed groups were under 16 years of age. The

NCOHS data is of limited value for this study as it is difficult to extrapolate caries rates to the South African population as a whole.

The survey did however show that the prevalence of dental caries is extremely high. Caries if left untreated may result in odontogenic infection. The NCOHS reported: “Percentage of children in South Africa who need treatment for dental caries ranges from 45-60% and the mean number of teeth needing care per child ranges between 2 to 3. The needs varied widely from province to province. The greatest need was recorded in the Western Cape Province where almost 80% of the children needed care. The lowest need for dental care was recorded in the Limpopo Province” (van Wyk, Louw & du Plessis, 2004).

It is well known that South Africa has high levels of trauma from interpersonal violence and motor vehicle accidents (Seedat et al., 2009). Much of this trauma requires hospital care at great expense to the state and medical insurers. Violence is the leading cause of injury in eight of South Africa’s nine provinces (Matzopoulos et al., 2006). This increased trauma burden often has implications for patients seeking help with regard to other medical conditions including maxillofacial infection. Medical facilities often need to triage patients because of the increased numbers of patients seeking care. This often means patients experience extended waiting times for consultation with healthcare providers and possibly the perception by patients that they are being turned away or that their medical presentation is not being taken seriously.

2.5 CONCLUSION

The chapter reviewed current literature on maxillofacial odontogenic infection and its management, contributing factors to the pathology and the South African health system. The following chapter will discuss the methodology that was applied to the study.



CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter describes the methodology employed throughout this study. The narrative approach was used as it allowed patients to describe their experiences in seeking healthcare for odontogenic infections of the maxillofacial region. As an explorative study, the storytelling technique promoted the collection of rich data pertaining to the research question and the aim and objectives of the study. It allowed for the collection of information, not only limited to the factors pertaining to the infection, but also the drivers of the actions, or behaviour, of the patients in their search for medical treatment.

3.2 RESEARCH METHODOLOGY

A qualitative study design was utilised for this study. This framework allowed for the collection of rich data during this exploratory research.

3.3 NARRATIVE APPROACH

Narratology is an approach within the framework of qualitative research. The narrative research approach typically focusses on the lives of individuals as told through their own stories. This study utilised this approach.

Narrative research originated from literature, history, anthropology, sociology, sociolinguistics and education (Creswell, 2007). Two types of narratives were identified. The first is the analysis of narratives, which refers to the description of themes and then adapting these

themes into a plot line; furthermore to indicate how individuals are constrained or enabled by social resources (Polkinghorne, 1995 as quoted by Creswell, 2014), (Creswell, 2014). The second is the variety of forms found in narrative research practices. The forms of narrative research practices are biographical study, autobiography, life history and oral history (Creswell, 2007). The narrative approach suitably explores the journey of the patient as he/she seeks medical care for an infection of odontogenic origin. In this study, storytelling was used to afford the patients the opportunity to share their individual and personal reflections of how they experienced the healthcare system and medical care.

3.4 STUDY DESIGN

The study design was a prospective, qualitative study of patients with odontogenic infection who presented to the TOHC. The inclusion criteria for the study were: i) patients presenting with advanced infection of odontogenic nature that required incision and drainage and ii) hospital admission. Exclusion criteria included any advanced infection of the maxillofacial region unrelated to odontogenic origin or from uncertain origin.

3.5 RESEARCH SETTING

All study participants, or their guardians, were interviewed by the primary researcher in a private, quiet one-on-one setting either in the Department of Maxillofacial and Oral Surgery at the TOHC or in the Maxillofacial and Oral Surgery Ward (D3) in Tygerberg Hospital. In the case of a minor, or of the study participant being intellectually disabled, the guardian was interviewed in their presence.

3.6 STUDY POPULATION

The study population consisted of the residents of the TOHC referral drainage area and those referred from healthcare providers within this same area. The study sample was a purposive sample of patients presenting to the TOHC for incision and drainage of odontogenic infections requiring hospital admission for treatment.

3.7 DATA COLLECTION TOOLS

Study participants participated in an individual semi-structured interview. The information collected was the sole source of data. Pre-set, open-ended questions were used to guide the interview. Participants were initially asked to give a narrative of their experience and progression of the condition. Open-ended questions allow participants the freedom to express their own opinions or reveal their knowledge, while guided questions give deliberate direction in an interview or discussion but are not leading (Edmunds & Brown, 2012). The interview was followed by more direct and guided questioning. These questions were used to clarify points from the narrative and aid in acquiring information required to meet the study aim and objectives. The interview schedule consisted of six basic questions with further probing to explore any gaps during the interview sessions. The questions were as follows:

- *Referring healthcare professional? Who sent or referred you to Tygerberg Oral Health Centre and when did this occur? (Not referred/self-referral, nursing practitioner, medical professional, dental professional or other).*
- *Reason for seeking medical assistance (main complaint)?*
- *Experience in seeking help for this condition and reason for presentation at this time?
How has the condition progressed?*

- *Previous help sought for cause of the infection or for the infection itself? Where and when did this occur? Were you helped at this time?*
- *Patient comorbidities (other medical and surgical conditions which include substance use and abuse)?*
- *Previously prescribed antibiotics for cause or for current infection prior to referral/presentation, what antibiotic prescribed (appropriate antibiotic?) and when?*

(Interview question guide - see Appendix 5)

3.8 DATA COLLECTION AND MANAGEMENT

All interviews were carried out by the principal investigator except in the case of the isiXhosa speaking participant, when an interpreter, who was proficient in isiXhosa, assisted the principal investigator in obtaining informed consent and with conducting the interview.

(Informed consent form see Appendix 4)

The interview process was initiated by the principal investigator introducing himself to the study participant and explaining the proposed research. The study participant or legal guardian was then handed the study information sheet (see Appendix 3), given time to read it and then ask any questions related to the study and interview process. Written consent was then obtained (see Appendix 4). In the case of a 14 year old participant, written consent was obtained from the participant as well as telephonically from her legal guardian (witnessed by nursing staff in Ward D3 of Tygerberg Hospital).

All interviews were recorded on an Olympus VN-7600 digital voice recorder after obtaining consent. Most of the interviews took place in the single patient rooms of Ward D3 of

Tygerberg Hospital ensuring privacy and confidentiality. Of the remaining two interviews, one took place in a private office at the TOHC during patient follow-up and the other in the recovery area of the TOHC theatres (legal guardian interviewed). On completion of the interview, participants were offered the opportunity to listen to the recording. Total recorded interview time was 143 minutes and 15 seconds.

The study participants were asked to provide a narrative of their experience and management of the condition which eventually led to their admission from the TOHC. After the narrative was completed, a semi-structured interview took place in order to aid in clarifying information provided by the participant and to obtain any other data that would assist in achieving the aim and objectives of the study. Much of the data obtained in the narrative was summarized and repetitive during the semi-structured interview process. This indicated saturation of data.

Data was collected over a four month period between June and September 2019. The interviews were transcribed verbatim from the recordings in either English or Afrikaans depending on which language the study participant felt most comfortable using. In the case of the isiXhosa speaking participant, the transcription was of the English interpretation. The primary researcher obtained and recorded the data by following the process published by Terre Blanche & Kelly in 2001 (Terre Blanche & Kelly, 2001). These authors suggest that the researcher first familiarise and immerse themselves in the data. This was achieved by reading through the interviews multiple times and repeatedly listening to the recorded interviews.

Terre Blanche & Kelly then advise extracting themes that easily stand out and that relate directly to the aims and objectives of the study (Terre Blanche & Kelly, 2001). In this study the identified themes were recorded by the primary researcher and an independent coder. The

next step in this process was coding the data set. This was done by dividing the data into understandable concepts or phenomena. Once coded, the authors of this process advise exploring these themes more closely. The transcripts were then explored closely for these themes. This was followed by the final step in the process of interpreting and checking the data. The independent coder reported her coding was performed according to the guidelines of Tesch (1990) and Creswell (2013) (Creswell, 2013; Tesch, 2013). These were compared with those of the primary researcher.

3.9 DATA ANALYSIS

The thematic analysis was applied to this research. The interviewer conformed to the data analysis steps as outlined by Creswell (2007) (Creswell, 2007). The interviews were transcribed and the Afrikaans audios were translated and transcribed into English. The transcribed interviews were studied and explored for recurrent themes and information aiding in meeting the aim and objectives of the study. These themes were then coded and recorded on an Excel spread sheet along with the quantitative data essentially from the study participants' demographic data, by the principal investigator.

The transcribed interviews were also sent to an independent researcher experienced in qualitative data capture who also explored the interviews for themes related to the study goals. The independent researcher provided a report of the discovered themes with quotes from the interviews related to and emphasizing the themes discovered.

The themes from the independent researcher and the principal investigator were then compared. Many of the themes were identified by both parties contributing to the validity of the study.

3.10 TRUSTWORTHINESS

Trustworthiness is a concept which ensures neutrality in qualitative research (Krefting, 1991). The trustworthiness of the study is heavily reliant on the rigor of the methodology employed. Morse et al. (2002) defined rigor as the strength of the research design and the appropriateness of the method to answer the study question. Qualitative studies with narratology as a framework, should be conducted with extreme rigor because of the potential of subjectivity that is inherent in this type of research (Morse et al., 2002).

Trustworthiness is a measure of whether the study is credible, transferable, dependable and conformable. The **credibility** of the study was obtained by using only original information obtained from the study participants or their guardian in compiling the data. **Transferability** is the likelihood that the same research findings could be applied to other participants in similar circumstances. By using the narrative with a semi-structured interview process, a wealth of information was obtained from individual study participants from a number of referral sites. There were a number of recurring themes that were identified by the primary researcher and the independent coder which leads one to believe that the data is transferable. **Dependability** involves the consistency of the research. All study participants were provided with the identical information sheet which was explained by either the primary researcher or by the interpreter, interpreting for the primary researcher. The same format was followed for all study participants. All study participants when interviewed were questioned after the narrative to obtain clarity about the data provided if there was any confusion or ambiguity in the interview. An interview guide was also used (see Appendix 5) to obtain any data not present in the initial narrative, hence aiding in establishing the dependability of the data provided. **Conformability** allows for the tracing back of the research data. The transcripts of

the interviews have been written verbatim (patients' own words used). All the information (quotations) presented in the findings and discussion of the data, is directly from the transcripts. In the case of the Afrikaans transcripts, these have been quoted and an English interpretation of the transcripts provided. The primary researcher is able to trace the particular theme or quote back to the original transcripts if required.

3.11 VALIDITY

3.11.1 LANGUAGE DIFFERENCES

Language differences may have consequences, because concepts in one language may be understood differently in another language. This is particularly relevant for qualitative research. As qualitative research is word based, language is central in all phases ranging from data collection to analysis and representation of the textual data in publications. Language differences may occur in the first phase of a qualitative study, when interview data needs to be translated to the researcher's language.

This study included three languages, two of which the researcher was proficient in, whilst one required the use of an interpreter.

3.11.2 MEMBER CHECKING

According to Angen (2000) as stated in Creswell (2007), interpretive research describes 'validation' as 'a judgement of the trustworthiness or goodness of a piece of research' (Creswell, 2007). The participants in this study were given the opportunity to clarify the events of their story after it was told. The researcher repeated the events portrayed in the story to the participants in order for them to verify if the researcher had interpreted them correctly. Member checking was thus used as a validation strategy in this study (Creswell, 2007).

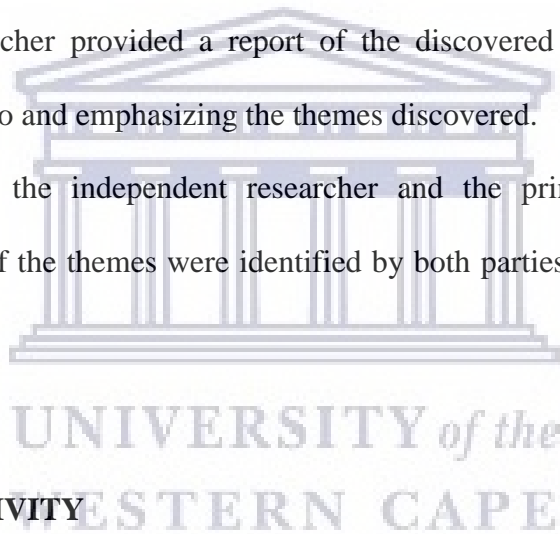
3.12 RELIABILITY

In qualitative research, 'reliability' refers to stability of responses when using multiple coders to analyse data (Creswell, 2007).

3.12.1 EXTERNAL CODER

This study employed the skills of an external coder who independently coded the data. The transcribed interviews were also sent to an independent researcher experienced in qualitative data capture who also explored the interviews for themes related to the study goals. The independent researcher provided a report of the discovered themes with quotes from the interviews related to and emphasizing the themes discovered.

The themes from the independent researcher and the principal investigator were then compared. Many of the themes were identified by both parties confirming the validity of the study.



3.13 SELF-REFLEXIVITY

3.13.1 BIAS

During his time as a trainee in the discipline of maxillofacial and oral surgery, the researcher has treated a significant number of patients with odontogenic infections requiring hospital admission. Due to his exposure to these patients and the narratives of their experiences, the risk of preconceived ideas of what the outcome of the study may be, has been increased. This was circumvented by choice of data collection strategy (narratology), member checking, and use of an external coder.

3.14 ETHICAL CONSIDERATIONS

Research ethics are the guidelines used by researchers to protect the rights of study participants and the integrity of the research (Rhodes, 2005). DiCicco-Bloom & Crabtree (2006), consider four ethical issues related to the interview process: 1) reducing the risk of unanticipated harm, 2) protecting the interviewee's information, 3) effectively informing interviewees about the nature of the study, and 4) reducing the risk of exploitation (DiCicco-Bloom & Crabtree, 2006). The study commenced after ethical approval was obtained from the Biomedical Research Ethics Committee of the University of the Western Cape. The ethics approval number, BM19/3/12, was obtained in May 2019 (Appendix 2).

The researcher adhered to the concepts of **informed consent**. All study participants, and/or their guardians, received an explanatory information sheet as well as verbal information detailing the aim and objectives of the study, including the implications of their participation in the study (see Appendix 3). It was emphasized that participation in the study was voluntary, that failure to participate would not negatively affect the care offered, and that the participant could withdraw from the study at any time. Participants were also informed that personal information would be kept confidential and that during data discussion they would not be identified. Written consent to inclusion in the study was then obtained. **Confidentiality** was ensured by storing data on a password protected laptop. By making use of code names to identify patients, **anonymity** was ensured. The personal details of the participants were only known to the primary researcher.

In the case of the 14 year old female participant, her personal consent as well as the telephonic consent from her father, was obtained prior to the interview. The information sheet

was read to the father after which he consented to the interview. This was witnessed by a member of the nursing staff.

3.15 SIGNIFICANCE OF THE STUDY

The study enabled patients to share their experiences of navigating the healthcare system in search of treatment for their maxillofacial infections, and in so doing exposed the drivers of their health seeking behaviour. Their experience will aid in identifying areas within the healthcare system which can be improved upon, as well as areas related to individuals or communities which may reduce the incidence of odontogenic infections, the advancement of the infection and/or the severity of the infection.

These experiences will also give an indication of healthcare providers' understanding of dental pathology. Improved knowledge and appropriate early intervention, by these providers, may have a positive influence in addressing the development of maxillofacial infections.

3.16 CONCLUSION

The research methodology employed in this study was the most suitable for the context of this research. This chapter discussed data collection and data analysis. The findings of the study will be discussed in Chapter Four.

CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

The aim of this study was to explore the possible reasons for the significant number of maxillofacial infections of odontogenic origin presenting to the TOHC. The study aimed to determine factors contributing to the condition that are related to patient experience and behaviour in seeking treatment for the condition; and referral patterns and missed treatment opportunities in the disease process. These factors have a potentially great influence on the delay in seeking definitive treatment for this largely preventable infection. Delayed treatment often requires more invasive and costly management with increased patient morbidity once the disease process has progressed.

Over a period of four months, June 2019 to September 2019, fifteen patients (n=15) meeting the criteria for inclusion in the study were interviewed. As no data on the health seeking behaviour for maxillofacial infections exists, this study sought to explore the experiences of a small group of patients and ascertain the merit in conducting a similar study on a larger scale. Due to the relatively small sample size, no quality quantitative assumptions will be made regarding the demographic data obtained. General statistics about the South African population will be mentioned and data will be compared to this.

Fifteen people were interviewed. Eight of these were male (53, 33%) and seven were female (46, 67%). This compares to the mid-year population estimates 2018 report released by

Statistics South Africa that indicates that the female population in South Africa is estimated at 51% of the population.

Upon analysis, a number of themes and sub-themes emerged from the data collected via the interviews. The themes which emerged that had a direct influence on achieving the aim and objectives of the study included:

- Theme 1: Signs and symptoms of oral disease
- Theme 2: Patient experience at facility of initial visit
- Theme 3: Referral patterns
- Theme 4: Knowledge and practices of oral disease
- Theme 5: Management of main complaint
- Theme 6: Reasons for delay in reaching the TOHC.

Patient understanding of dental pathology and progression of disease was generally lacking. Multiple other social and socio-economic factors also influenced patient help seeking behaviour. Health system processes were generally regarded as being inefficient and many participants experienced difficulty in accessing primary dental care well in advance of their presentation with maxillofacial infection. There did not appear to be a definite protocol for referral of oral disease within the health system and patients with odontogenic infections appeared to be inappropriately referred to district hospitals where no maxillofacial and oral surgery service is offered. This often resulted in delays and ineffective and excessive use of resources.

4.2 DEMOGRAPHIC DETAILS OF PARTICIPANTS

4.2.1 AGE

The ages of the study participants ranged from 10 to 45 years, with a mean age of 27,13 years. According to Statistics South Africa about 28,8% of the South African population is under the age of 15 years and approximately 9% is 60 years or older (Statistics South Africa, 2019).

4.2.2 EMPLOYMENT

Four of the 15 participants had full-time employment. From the sample there were three school going learners and one student. Three participants revealed that they were dependent on social grants supplied by the South African Social Security Agency (SASSA) for a monthly income: these included four child support grants (to two families) and one disability grant.

4.2.3 RESIDENCE PROXIMITY TO THE TOHC

All the study participants resided in an area within 100 kilometres of the TOHC (measured as a straight line distance). Two participants resided in Worcester, the furthest point of referral, while nine lived within a 30 kilometre straight line radius around the TOHC, with the biggest number residing in Delft (n=4). Delft is less than 10 kilometres in straight line distance from the TOHC. Other areas which participants resided in were: Khayelitsha (n=2), Kraaifontein (n=2), Strand (n=2), Macassar (n=1), Paarl (n=1) and Wellington (n=1).

4.2.4 COMORBIDITIES

Four of the study participants reported comorbid disease. These included two with human immunodeficiency virus (HIV) and two with epilepsy. Of the two HIV-positive patients, one had been initiated on anti-retroviral treatment more than a year prior to presenting for his dental problem. The other had been diagnosed more than 2 years prior to presentation, but had

not initiated treatment. Of the participants diagnosed with epilepsy, one had an associated intellectual disability, and, with the help of her family, her seizures were well controlled on anti-epileptic medication. The other epileptic had defaulted on his treatment and had not taken medication in many months. Five participants reported to smoking cigarettes and three admitted to marijuana use.

4.3 SIGNS AND SYMPTOMS OF ORAL DISEASE

From the data collected it appeared that management of asymptomatic or mildly symptomatic oral disease was not a priority for seeking or acquiring treatment. Patient attitudes toward dental treatment were generally negative.

Ten of the study participants reported to having had previous symptoms of toothache or swelling before the episode leading to their presentation at the TOHC. Ten reported to have experienced toothache previously. Six reported to having had only toothache previously. This included repeated incidents and presentation thereof. Four reported having had toothache combined with swelling prior to the presentation episode at the TOHC. Three of these study participants indicated that this toothache combined with swelling had occurred on more than one occasion. In some instances, the signs and symptoms had been present for a number of years prior to the progression of the disease symptoms that ultimately led to presentation at the TOHC. Some participants reported repeated episodes of infection which remained untreated. In many instances, no dental consultation was sought, and where there had been a dental consultation, the study participant failed to return for definitive dental management.

Study participant 6: “Twee jaar terug was dit ook so probleem wat dit nou is, maar dit was nie so erg gewees nie. Dit was net ‘n boil gewees en ek het kliniek to gegaan, Wellington Kliniek.” Translation: “Two years ago there was also a problem like this current one, but it was not as serious. It was just a ‘boil’ and I went to the clinic, Wellington Clinic.”

Study participant 7: “Yeah, there were a bad teeth before but, that teeth was not paining.”

Table 1: Synopsis of clinical presentations

Reason for presentation	<ul style="list-style-type: none"> ● Swelling (n=14) ● Pain (n=13) ● Inability to eat or swallow (n=7) ● Full sensation in throat (n=3) ● Inability to sleep (n=2) ● Difficulty talking (n=2) ● Halitosis (n=1)
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4.4 PATIENT EXPERIENCE AT INITIAL FACILITY VISIT

It was evident from those interviewed that patients had varying experiences as they sought treatment for their oral health problems. These experiences took place at a number of healthcare institutions and through a number of different healthcare providers. The perceived experiences at the point of first help seeking contact were generally negative. Most were at a

local clinic and the visit was deemed to have been unhelpful. For some this was the experience after numerous presentations at health facilities.

Study participant 1: “Then on Site B they did not help me on time, I decided to go back home. After that I decided to go to Site C Clinic (Khayelitsha). Nolongilie Clinic. When I got there I was told to come back tomorrow because they don’t know what is the problem.”

Participants experienced and expressed the frustration of long waiting periods before being assisted at local clinics. The frustration was compounded by regular misdiagnosis of the presenting condition and the underestimation of the seriousness of the condition.

Study participant 5: “En ek het gewag, en gewag en gewag met die vreeslike pyn, gewag en gewag.” Translation: “And I waited, and waited and waited with this terrible pain, waited and waited.”

Study participant 13: “...didn’t get anything. I was there from 10 until, I was there from 6 until 2 o’clock just to say you must come back tomorrow.”

The following excerpts from the narratives illustrate that the first contact with healthcare providers was often unsatisfactory and associated with perceived misdiagnosis.

Study participant 1: “Haai (no), there was no dentist. There was only a nurse and doctors”.

Study participant 13: “I went to the sister, then the sister I say no I have a problem with my teeth somewhere on the gums when it is coming out. Then she direct me to the dentist. I went to the dentist I explain to her, I have pain. Then the dentist take me back again to the sister and say no it might be the... the tonsils. Then when after that we could not go

along together so she was like no you need to come back tomorrow then you see the doctor”.

There was also a perception amongst the study participants that the clinics often wasted their time and did not consider or appreciate their efforts in getting to healthcare facilities.

Study participant 5: “Elke keur gaan dit so. Ek het ook met die kind gegaan. Toe sê hulle nee, gaan huis toe, dan kom jy weer volgende week. Baie lelik!” Translation: “Every time it goes like that. I also went with the child. They said no, go home, then you come back next week. Very ugly!”

Most participants’ first contact was with a sister or nursing staff at a clinic (n=8).

Study participant 1: “Haai (no), there was no dentist. There was only a nurse and doctors”.

4.5 REFERRAL PATTERNS

Data collected revealed that 13 patients reported multiple visits to healthcare facilities prior to reaching the TOHC for definitive treatment. The number of health facility visits before reaching the TOHC (not including the TOHC) ranged from one to five. Two participants reported five prior health facility visits, three reported four visits, eight reported two prior visits, and two reported one. The average number of visits before arrival at the TOHC was 2,67 visits. The reasons for the numerous visits were multiple and included: inaccurate diagnosis of the condition, lengthy waiting times at health facilities, and being inappropriately sent between healthcare facilities before final referral.

Two participants reported to having been admitted to a health facility for more than 2 days prior to being referred. The number of days (including the day of presentation at the TOHC) that the participants reported symptoms being present before arrival at the TOHC, ranged from three, to over 21 days. The concern here is that most participants experienced symptoms for well over 3 days before they accessed health services and when they did finally present, no definitive treatment or plan was made.

Study participant 8: “Then I go there by Delft Clinic, het gesê meneer jy sal moet gaan vir ‘n nommer. Ek het gegaan vir die nommer. Dan stuur hulle vir my trauma toe. En ek gaan by trauma en gesit en gesê meneer jy sal moet vir ‘n tydtjie moet aanhou, ons sal jou naam roep. En ek het gemaak so. En in die tyd wat ek gewag vir hulle, toe sê hulle vir my “Meneer ons gaan net vir jou pyn pille en, ja net pyn pille kan ons jou gee vir die swelsel om te sak!” En ja, dis al. Ons gaan weer ‘n datum...ons gaan ‘n datum uitskrywe wanneer jy weer moet kom”. Translation: “Then I go there by Delft Clinic, said sir you will have to go for a number. I went for a number. Then they send me to trauma. I go to trauma and sat and was told sir you are going to have to wait for a while, we will call your name. And I did that. And in the time that I waited for them, then they say “Sir we are just going to give you pills, and yes, we only give pain pills to decrease the swelling!” And yes, that is all. We going to give another date... we going to write out a date when you should return.”

Table 2: Number of symptomatic days experienced before presenting for treatment at the TOHC (including day of presentation to the TOHC)

Symptomatic days prior to presentation at healthcare facility	Number of participants (n)
3 days	2
4 days	1
5 days	2
6 days	1
7 days	1
8 days	2
10 days	1
11 days	1
> 14 days but < 21 days	3
> 21 days	1

Referral to the TOHC was made by a variety of healthcare workers. Of the 15 referrals to the TOHC, 12 were made by medical doctors (80%). Of the remaining three, two were made by nursing staff and one by a dental practitioner. One of the nursing staff referrals was under the instruction of a dental practitioner. Nine of the participants reported to having previously been

seen by a medical doctor prior to being referred to the TOHC. Four had been seen by a dentist, and eight by nursing staff.

Study participant 3: “The dentist did not do anything, just said I must open my mouth. Then she said it is not for me I must go to Tygerberg.”

4.6 KNOWLEDGE AND PRACTICES OF ORAL DISEASE

Misdiagnosis and lack of understanding of dental pathology by healthcare providers was evident throughout the interview process. Thirteen of the 15 study participants needed more than one visit to a healthcare facility before being referred on to the TOHC.

4.6.1 PATIENT KNOWLEDGE AND UNDERSTANDING OF DENTAL DISEASE

Patient understanding of dental pathology and progression of disease was generally lacking. Many of the study participants had experienced early symptoms of dental pathology but did not seek definitive dental treatment. Often after symptomatic relief, no definitive management was sought. This apathy toward dental treatment has a significant contribution to the development of this advanced pathology.

Study participant 6: “Twee jaar terug was dit ook so problem wat dit nou is, maar dit was nie so erg gewees nie. Dit was net ‘n boil gewees en ek het kliniek to gegaan, Wellington Kliniek. Hulle het vir my gehelp, antibiotika gegee, pyn pille gegee, en dit het gebreek en gespoel met sout water en dit het nou weer reg gekom.” Translation: “Two years ago there was also a problem like this current one, but it was not as serious. It was

just a boil and I went to the clinic, Wellington Clinic. They helped me, gave antibiotics, gave pain pills, and it broke and rinsed with salt water and it then got better.”

Study participant 7: “I did not take it seriously at that time. Then I take some few days, I was thought it was going to be finished. That time then I was just staying at home from Thursday. Thursday, Friday, Saturday, Sunday... no, on Thursday it was worse during the night about two weeks ago.”

4.6.2 HEALTHCARE PRACTITIONER KNOWLEDGE OF DENTAL DISEASE

Recognising, diagnosing and appropriately managing dental pathology and maxillofacial infection requires sufficient knowledge of the subject and an understanding of possible progression of disease processes. By reviewing the number of ‘misdiagnoses’, inappropriate treatment plans and the delayed optimal initial treatment of the condition, the knowledge and practices of healthcare practitioners with regard to dental pathology is questionable.

Study participant 4: “I went to the clinic then they, they send me to Khayelitsha Hospital. From there, they sent me here to Tygerberg.”

Six of the 15 study participants reported that a healthcare provider told them that definite treatment could not occur in the presence of swelling and that they should return once the swelling had subsided.

Study participant 13: “Then the dentist take me back again to the sister and say no it might be the... the tonsils. Then when after that we could not go along together so she was like no you need to come back tomorrow then you see the doctor.”

4.7 MANAGEMENT OF MAIN COMPLAINT

4.7.1 REFERRALS

Generally initial referral of maxillofacial infections was inappropriate. Thirteen patients reported multiple visits to healthcare facilities prior to reaching the TOHC for definitive treatment. Six study participants reported more than one ambulance transfer between healthcare facilities. Many primary clinics referred participants to district level hospitals where no oral and maxillofacial surgical services were available. This often led to multiple patient transfers and delayed presentation. This alludes to misdiagnosis, inappropriate treatment offerings and incorrect referral practices.

Once maxillofacial infection was diagnosed, many of the study participants were told that they could not be helped and were sent on to other healthcare facilities. This was often without discussion or referral letters and again led to numerous improper patient transfers between health facilities.

Study participant 1: "I see a dentist, but he say got to go to Tygerberg as not good for this."

Study participant 8: "Dan stuur hulle vir my trauma toe." Translation: "Then they send me to trauma."

Study participant 1: "When I got there I was told to come back tomorrow because they don't know what is the problem. After that I stay at home and decided to go to a private doctor to see what is going on. The private doctor decided I must go straight to the clinic. The clinic will know what is going on probably."

Maxillofacial infection leads to significant morbidity and possible mortality if not managed early and appropriately in the disease process. There was a recurring theme from the participants that many required referral for emergency treatment only after worsening of the initial symptoms. This regularly followed multiple initial presentations to healthcare facilities and a number of inter-facility transfers before urgent transfer for maxillofacial surgical intervention.

Study participant 10: “After that she saw in the morning, oh the swelling is going forward. So she took her again to the hospital on Thursday and then on Thursday afternoon they called the ambulance from HH Hospital. So the hospital took her to the big hospital HH. And there they told her they are going to call Tygerberg Hospital ambulance to come fetch the baby. So then anyway, the ambulance arrived today at this time so she came to Tygerberg Hospital.”

4.7.2 PRESCRIPTION OF MEDICATION

Ten of the 15 patients received antibiotics prior to referral. Three of the ten reported to having received the antibiotic on the day of referral to the TOHC. Of concern is the fact that seven of the 15 were prescribed antibiotics before the presentation to a healthcare facility from where they were finally referred to the TOHC.

Study participant 15: “And the clinic doctor saw her and prescribed antibiotics and pain tablets for her. Which she used from the Friday, Saturday, Sunday, the Monday and then on the Tuesday that was last week on the holiday.”

Study participant 10: “Every time I went back they give Panado. They say they can’t do anything to pull it out because of the swelling.” (Panado is a trademark for paracetamol).

Study participant 6: “Antibiotika gegee, en pyn pille gegee. Dan breek dit maar.”
Translation: “Antibiotics given, and pain pills given. Then it just broke.”

Study participant 15 receiving a further course of antibiotics: “...he gave me another batch of antibiotics and pain pills.”

Study participant 11: “I go to the clinic, they give me a Painblocks. They say I must wait for the day maybe it is going to be better. When it is better they going to take out my tooth. But it didn’t get better it get worse instead.” (Painblocks is a trademark for paracetamol).

Study participant 14: “Ek het die Vrydag middag dentist toe gegaan. Private dentist...Niks gegee nie.... Hy het gesê...as die ding gesak het moet ek weer terug gaan.”
Translation: “I went on the Friday afternoon to the dentist. Private dentist...gave nothing... he said... when this thing decreases, then I must go back.”

4.7.3 ABSENCE OF DEFINITIVE TREATMENT

Six study participants had been told that the cause of infection (a tooth) could not be removed while there was swelling, either during the episode that led to referral to the TOHC or at previous presentations. Three participants reported that this had been told to them by a dentist, one participant had been told this by both a dentist and a nurse, one participant by a medical doctor and one by both a medical doctor and a nurse.

Study participant 1: “The dentist said he can’t take out my tooth because my face was too big”.

Study participant 5: “Die tyd wat hulle nou sê ek die antibiotika moet klaar drink, net om die swelling te laat sak en dan kan hulle die tand trek, het ek so bietjie so ‘to-eight’ gegaan.” Translation: “The time they said I should finish drinking the antibiotics to allow the swelling to subside and then they can extract the tooth, I went a little before eight.”

Study participant 14: “Ek het die Vrydag middag dentist toe gegaan. Private dentist...Niks gegee nie.... Hy het gesê as die ding gesak het moet ek weer terug gaan.” Translation: “I went on the Friday afternoon to the dentist. Private dentist...gave nothing... he said... when this thing decreases, then I must go back”.

4.8. REASONS FOR DELAY IN PRESENTING TO THE TOHC

4.8.1 MISDIAGNOSIS

Misdiagnosis and inappropriate treatment was a recurring theme throughout the narratives. This included: being prescribed analgesics or analgesics and antibiotics and being told to return if the condition did not improve, being worked up for tuberculosis treatment or dentists sending patients to medical doctors for management. The excessive number of healthcare facility visits highlights the lack of understanding of the condition and its diagnosis. Two of the participants were admitted to peripheral hospitals for more than two days prior to being transferred to the TOHC. Worryingly, these misdiagnoses included the full spectrum of healthcare providers: nursing staff, dentists and medical doctors. The progression of disease

and possible consequences of this progression would seem to have been repeatedly underestimated.

Study participant 13: “I went to the sister, then the sister I say no I have a problem with my teeth somewhere on the gums when it is coming out. Then she direct me to the dentist. I went to the dentist I explain to her, I have pain. Then the dentist take me back again to the sister and say no it might be the... the tonsils.”

Study participant 5: “By die trauma gekom, gewag en doctor het ‘n bietjie uitgetrek by my keel, en doctor het gese ek moet ‘n bietjie wag, en vermoed dat ek TB het. Hy het gedink ek het TB kliere of TB vog wat in my in is.” Translation: “Got to trauma, waited and the doctor aspirated a little from my throat, and the doctor said I must wait a little, and presumed I had TB. He thought I had TB glands or TB fluid that was in me.”

4.8.2 DELAY IN SEEKING HELP

The participants reported symptoms being present for a range of three, to over 21 days before arrival at the TOHC (including the day of presentation to the TOHC). The concern is that the majority of the study participants reported symptoms being present for well over three days (n=13) before accessing any health services. This delay was compounded by the lack of definitive treatment plans when they did finally present to healthcare facilities.

Study participant 1: “Then on Site B they did not help me on time, I decided to go back home. After that I decided to go to Site C Clinic (Khayelitsha). Nolungilie Clinic. When I got there I was told to come back tomorrow...”

Study participant 8: “En ek gaan by trauma en gesit en gesê meneer jy sal moet vir ‘n tydtjie moet aanhou, ons sal jou naam roep. En ek het gemaak so. En in die tyd wat ek gewag vir hulle, toe sê hulle vir my ‘Meneer ons gaan net vir jou pyn pille en, ja net pyn pille kan ons jou gee vir die swelsel om te sak!’ En ja, dis al. Ons gaan weer ‘n datum...ons gaan ‘n datum uitskrywe wanneer jy weer moet kom”. Translation: “I go to trauma and sat and was told sir you are going to have to wait for a little while, we will call your name. And I did that. And in the time that I waited for them, then they say “Sir we are just going to give you pain pills, and yes, we only give pain pills to decrease the swelling!” And yes, that is all. We going to give another date... we going to write out a date when you should return.”

4.8.3 MISSED TREATMENT OPPORTUNITIES

With regard to the progression of the disease process and medical interventions, the narratives highlight the lack of primary dental services and treatment of early maxillofacial infection at clinics and local hospitals. Two of the 15 participants needed only one healthcare facility visit before being referred to the TOHC. Five needed three or more healthcare facility visits before referral. These repeated efforts at seeking help would indicate missed treatment opportunities or misdiagnosis. It also reflects that there is a strong correlation between repeated efforts at help seeking for the condition and the progression of the disease.

Study participant 7: “Thursday, Friday, Saturday, Sunday... no, on Thursday it was worse during the night about two weeks ago. And then that time I call my neighbour; to try to help me to call an ambulance. It was around past ten during the night.”

Study participant 2 on how long the patient waited at Worcester Hospital for an ambulance: "Ek sou sê ek het 4-5 uur gewag." Translation: "I would say I waited 4-5 hours."

4.8.4 EMPLOYMENT

Most of the study participants were unemployed. Those that were employed full-time did however express concern about missing work or for being 'booked off' from work for an extended period (2 of the 3 participants in full-time employment).

Study participant 12 on why he did not seek help earlier: "Ek wil nie 'n dag se werk verloor by die werk nie. Toe voel ek maar beter". Translation: "I did not want to lose a day's work. Then I felt better."

Study participant 7 on why he attended the clinic initially (was sent away without the problem being addressed): "It was because I just want to go back to work quickly you see. Because I can't stay at home without working. So I just want to get help quickly. Because that clinic is nearby me."

4.8.5 FAMILY RESPONSIBILITIES

Social circumstances often lead to delayed presentation and missed treatment opportunities. Concern as to who would look after children was mentioned by three of the study participants as a reason for late presentation.

Study participant 5: "Ek was 'worried' oor my babatjie by die huis, dit het half donker geword en was baie ver van die dag hospital af. Ek het geloop." Translation: "I was worried about my baby at home, it got half dark and was very far from the day hospital. I left."

Study participant 3: “Then she said it is not for me I must go to Tygerberg. I said I can’t go today, I can go tomorrow.” (Patient could not go immediately because she has children to attend to).

4.8.6 FINANCIAL FACTORS

Financial concerns were mentioned as a reason for either not seeking help or as a factor contributing to delayed presentation. The financial concerns were mostly related to the cost of transport to health facilities.

Study participant 1: “Ja, I didn’t go because I don’t have money to go to this thing”.

Table 3: Synopsis of reasons for delay in presenting to healthcare facilities

<p>Reason preventing participant from seeking help earlier (patient reasons)</p>	<ul style="list-style-type: none"> ● Children to attend to (n=3) ● Relief of pain with medication (n=3) ● Financial cost (lack of affordability) (n=2) ● Work commitment (n=2) ● Swelling subsided with or without some form of treatment (n=2) ● Weekend / public holiday (n=1) ● Fear of needles (n=1) ● Scheduled appointment in the future (n=1)
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4.9 SUMMARY OF FINDINGS

This study aimed to explore and identify the factors contributing to the significant maxillofacial infection burden and reasons for the late presentation by patients with this largely preventable condition. The hope thereafter was to identify areas where this could be addressed. These included preventative strategies, areas of interception and possible adjustments to the current healthcare system.

The data collected identified that the interplay between the process of patient illness response, the various healthcare systemic limitations, combined with patient and healthcare provider knowledge of oral disease and oral health services, was complex. Many factors were identified that contributed significantly to the maxillofacial infection burden at the TOHC. Most of these factors could be divided into: patient factors, systemic factors and healthcare provider factors. It is evident that any attempt to lessen this scourge would require interventions at each of these identified points and at multiple levels. The concern is that the prevalence of this disease process is likely to increase significantly if attention is not given to it in the near future.

It is clear that multiple treatment points in the progression of this disease process are often missed. Symptoms are often present well in advance of the ultimate progression to maxillofacial infection. Addressing pathology early could have a positive effect on preventing the severity of the process, the associated morbidity and the substantial resource costs.

CHAPTER FIVE

DISCUSSION

5.1 INTRODUCTION

This chapter discusses the findings of the study, compares the findings to international literature and then provides an overall discussion of the broader concepts forthcoming from the findings.

5.2 DISCUSSION OF FINDINGS

The findings of this study are based on the subjective experiences of the 15 participants. The patient narratives may be reflective of the communities from which they come and may not necessarily be reflective of the broader South African context. The findings indicate that advanced maxillofacial infection of odontogenic origin is a complex problem with multiple contributing factors. These factors include aspects related to ‘patients’, ‘healthcare practitioners’ and ‘healthcare systems’, all of which are complex in nature. These categories of contributing factors appear to impact, or play a role in, the health seeking behaviour and ultimately the oral healthcare received by these participants.

The study participants ranged in age from 10 to 45 years, with an almost equal number of males and females (eight and seven respectively). Although significant conclusions or deductions cannot be made from this explorative study, it is interesting to note that the average age of the sample is fairly young at 27,13 years old. This could possibly be

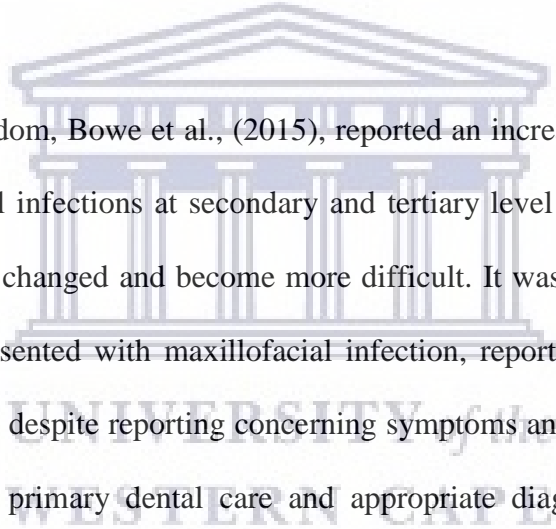
attributable to: dietary changes over the recent past, changed prevention strategies with regard to dental treatment, decreased understanding or diminished importance given to dental health or changes in the availability and procedures performed in dental treatment in the primary healthcare setting.

Only three of the study participants reported to being employed on a full-time basis and two of these mentioned that work had delayed their presentation. Concern about work absenteeism may contribute to delayed presentation amongst those employed but generally would seem to have only a minor influence in delaying help seeking for dental issues in the general population.

There were three school going learners and one college attendee amongst the study participants. Dental education and screening programs concentrating on schools and school going learners could be directed at changing dental perceptions and instituting prevention and early intervention programs for dental pathology.

An Australian study by Uluibau et al., (2005) reported poor socio-economic standing as a risk factor in the development of maxillofacial infections (Uluibau, Jaunay & Goss, 2005). Most of the participants in this study were unemployed and accordingly poor socio-economic standing would seem to be a risk factor for the communities from which these patients came. Two patients reported that financial concerns had led to delayed presentation. It should be noted that more affluent communities may seek healthcare from the private sector and as such may not have presented to the TOHC.

Tygerberg Hospital is the biggest hospital in the Western Cape and the second biggest hospital in South Africa according to the Western Cape Government website. It has a large feeder area which includes the Northern Metro Subdistricts, Khayelitsha, Eastern Tygerberg, the West Coast, Cape Winelands and the Overberg Subdistrict. Despite this large area, most of the referred study participants lived in close proximity to the TOHC where primary dental services should be readily available. It would seem that accessing primary dental services in both the rural and suburban setting is difficult with many patients being turned away. These are missed treatment opportunities where early intervention and appropriate management of early odontogenic infection would prevent the progression to advanced disease.



In the United Kingdom, Bowe et al., (2015), reported an increase in the acute presentation of patients with dental infections at secondary and tertiary level hospitals as access to primary dental services has changed and become more difficult. It was also stated that many patients who ultimately presented with maxillofacial infection, reported to being turned away from healthcare facilities despite reporting concerning symptoms and swelling (Bowe et al., 2015). Lack of access to primary dental care and appropriate diagnosis would seem to have a significant influence on the number of maxillofacial infections presenting worldwide.

Carter and Layton (2009) reported in their study conducted in the United Kingdom that most patients presenting with maxillofacial infection, had sought dental treatment prior to the development of advanced infection. They also found that many of these patients had been prescribed oral antibiotics without the cause of the infection being removed (Carter & Layton, 2009). In this study four participants reported to having seen a dentist previously without definitive treatment being performed. In this study eight participants reported to having been

seen by nursing staff and nine by a medical doctor for dental related pathology prior to the referral presentation. This is possibly due to the lack of access to dental services. Many patients had received previous antibiotics and analgesia which temporarily improved their symptoms. This often led to missed follow-up and definitive management and may ultimately have led to the presentation with advanced disease.

In the international literature maxillofacial infection severity and length of hospital stay has been associated with medical comorbidities. Diabetes mellitus, immune suppression, HIV, chronic alcoholism and malignant disease have all been mentioned as factors contributing to this (Seppänen et al., 2008). From the limited numbers in this study, it would seem that chronic medical conditions were not a major factor in presentation with maxillofacial infection at the TOHC. HIV rates were similar to those found in the general population and none of the study participants was diabetic. Two of the study participants did have epilepsy and three reported marijuana use.

Uluibau et al., (2005) reported that of those within the Australian population who presented with maxillofacial infection, only 8% had had regular dental visits. This study would seem to have similar findings. The negative perceptions and low value given to dental health amongst the study participants was evident. Patient apathy or fear of dental treatment, poor dental knowledge and education, difficulty accessing dental services and inappropriate initial dental management all contributed to these perceptions. More than half the study participants reported to having had symptoms for over a week before seeking treatment. In addressing

maxillofacial infections in the future, these factors that influence patient dental help seeking behaviour should be further explored.

Early symptoms were often alleviated after initial presentation at health facilities, where analgesics and antibiotics were prescribed. This often brought short term relief but failed to address the underlying problem which then often progressed to maxillofacial infections. Carter and Layton's 2009 study of odontogenic infections in the United Kingdom revealed that most patients had sought dental help prior to significant infection and that about two-thirds of those seeking help had been prescribed antibiotics without source control (Carter & Layton, 2009). This study revealed very similar numbers which would indicate that inappropriate antibiotic management is a factor that needs addressing. Inappropriate sole antibiotic use contradicts the well-established and accepted principle of source control in the management of any infective process (Chow, Roser & Brady, 1978). This not only raises concern about healthcare education and the understanding of dental pathology, but also of the management of infective processes as a whole. It alludes to the lack of knowledge, teaching and correct instruction with regard to the management of odontogenic infections at healthcare teaching institutions.

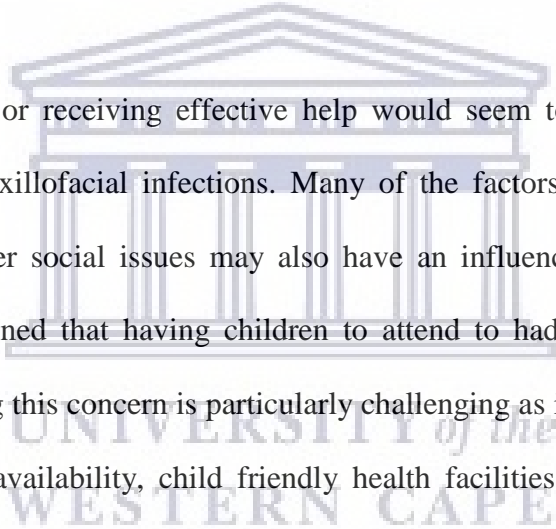
Inappropriate management and delaying odontogenic infection treatment has serious implications for patients including, significant morbidity and possible mortality. In the current era of medical litigation, this could have serious implications on future healthcare insurance and budgets. This needs to be discussed amongst the various role players involved in healthcare practitioner education and healthcare provision.

Ineffective referral patterns and channels added to delayed treatment and progression of disease. This may have been due to the misdiagnosis of the condition or due to clinic staff not knowing what treatment is offered at district level hospitals. Inappropriate referrals could possibly have been avoided if the patient had been discussed with the intended referral site. Many of the patients were told to go to district hospitals without discussion or being given a referral letter. This led to significant delays in definitive management and had significant implications regarding resources. This is particularly evident in the number of ambulance transfers and waiting times before transfer between medical facilities.

Medical doctors were generally the healthcare practitioners who ultimately made the diagnosis and referred the participants on to the TOHC. Of concern is that very few study participants were seen, or referred, by a dentist on their presentation at a health facility. The reasons for this may include: a fear of dentists, being sent away from dental clinics on numerous occasions and people with swelling related to odontogenic infection being told that no dental treatment could be provided while swelling was still present (often told to the participants by dentists). It may also indicate that accessing consultations and treatment by medical doctors was easier than with a dentist. Reasons for this should be explored in the future as management of early dental infections at primary healthcare facilities and district hospitals would go a long way in relieving the burden created by these infections.

Many of the participants presented at healthcare facilities and were referred outside of regular office hours. This has implications for an already resource stretched healthcare system and may be a contributing factor to the number of participants not seen by a dentist at presentation before being referred.

In this study many of the participants reported to having been prescribed only paracetamol. This often occurred even in the presence of a swelling. This may however be explained by the possibility that patients were familiar only with paracetamol and hence reported only paracetamol use. It could also possibly have been the only medication available to nursing staff at the primary healthcare facilities where many of the participants initially presented themselves. While not advocating for inappropriate antibiotic use without source control, this prescription trend may also again indicate misdiagnosis and a lack of understanding of odontogenic infections.



Delays in seeking or receiving effective help would seem to be a major influence in the presentation of maxillofacial infections. Many of the factors for this have been discussed previously but other social issues may also have an influence on this. Three of the study participants mentioned that having children to attend to had delayed their presentation or referral. Addressing this concern is particularly challenging as it would need to address family structures, crèche availability, child friendly health facilities and the availability of social services.

Another concerning factor mentioned as a reason for the delay in presentation, was that a study participant was given a future date to attend a healthcare facility. This again brings into question the understanding of dental pathology and triaging of potentially serious conditions.

The findings of this study have identified a number of areas of intervention or study that could in future aid in addressing the prevalence of maxillofacial infections. Addressing these areas could have a significant influence on population health and healthcare resources.

5.3 POSSIBLE SOLUTIONS

Addressing the maxillofacial infection burden could be approached by addressing patient factors, healthcare system factors and healthcare provider factors.

5.3.1 PATIENT FACTORS

The study would appear to indicate that there is a lack of dental knowledge in the general population. The importance of dental health and consequences of dental pathology are underestimated and misunderstood. Most study participants had difficulty in accessing dental treatment and unfavourable dental experiences leading to negative attitudes toward, and negatives perspectives of, dental health and services. This ultimately led to avoidance in seeking help for dental conditions. This contributed to missed early treatment opportunities and to the progression of dental pathology to marked disease.

Addressing patient factors contributing to the maxillofacial infection burden would require a dental attitude mind shift in the general population. Understanding outcomes of dental neglect and a positive change in the importance given to dental health could initiate this mind shift. It would be difficult to change current patient perceptions related to previous experiences. It

would require dental education programs geared to younger members of the community and a change in strategy from reactionary treatment of odontogenic disease to prevention programs. Realistically this would require buy-in from dental healthcare providers, the public sector dental services and primary healthcare systems. Results would likely be seen only in the medium to long term.

Changing socio-economic and social difficulties experienced by a large percentage of the South African population, and significantly contributing to patient factors related to maxillofacial infection, would be extremely challenging to address in the current economic climate. It would more than likely currently require making South African healthcare facilities more baby or child friendly and by making dental services more easily accessible.



5.3.2 HEALTH SYSTEM FACTORS

There is an increasing focus on health promotion and preventative practices with healthcare reforms throughout the world. It is widely accepted that these programs achieve success by influencing the social, physical, economic and political determinants of health. Addressing all these factors would be a monumental task and would require far more than health system changes. Health system adjustments however may be the starting point to addressing maxillofacial infection.

Improving the availability and efficiency of the dental services provided would likely lead to: more people accessing dental care, more regular dental visits and a decrease in the progression to advanced infection. Current systems make accessing dental services difficult with many patients being turned away, long waiting times and many primary healthcare facilities not having access to dental services. Addressing dental service efficiency and shortcomings with strategic use of dental resources, so as to benefit as many people as possible, would aid in addressing the systemic problems.

The referral system between clinics, district hospitals and tertiary centres needs to be addressed in order to be more practical and streamlined. Healthcare facilities need to have an understanding of maxillofacial infections and their appropriate referral channels. Inappropriate referrals come at great cost to the patient, the system and healthcare workers. Making the system more efficient would increase patient numbers and buy-in. Addressing early infection at the presenting site would also negate the need to transfer patients at great financial and resource costs.

The extent of the resource and financial cost is evident in the number of help seeking presentations at facilities and ambulance transfers for many of the study participants. Medicine costs, professional time, investigation costs, admission costs and procedure costs are difficult to determine but should be investigated in the future to aid in making an informed argument towards preventing this disease process. In the already constrained South African healthcare setting, this could have significant implications for dental services and the health system as a whole.

Addressing systemic issues would require the Department of Health to understand the systemic flaws and have a willingness to improve the current systems. It would decrease the need for specialist care and the resource investment would benefit a larger proportion of the population. This could be a medium term goal to decrease the maxillofacial infection rates.

5.3.3 HEALTHCARE PROVIDER FACTORS

It is evident that there are many false beliefs and gaps in core and the expected knowledge amongst healthcare providers. This has had a negative impact in the management of dental pathology and has contributed to the maxillofacial infection burden. This requires addressing and should be a priority.

Addressing these issues amongst the dental fraternity would require buy-in from those managing dental services and education. Critical and honest introspection and audits of dental health systems and education could identify shortcomings within these areas. This process should include those involved in providing education at both undergraduate and postgraduate level on the continuous professional development platform. By addressing general principles of management of dental pathology, infection, appropriate antibiotic and analgesic use and appropriate referral, the infective burden could theoretically be promptly and significantly impacted and reduced.

All dental training should be scientifically led. Stakeholders such as regulatory bodies (Health Professions Council of South Africa - HPCSA and South African Dental Association - SADA), in conjunction with the academic dental training institutions, should ensure that potential areas liable to cause confusion or leading to misinformation on dental management be addressed with, and by, the dental fraternity.

Many recent graduates are employed in the state sector during the compulsory dental community service year. It would be expected therefore that many would be the first point of dental contact made by patients accessing state run dental services. The study appears to suggest that a certain degree of misdiagnosis and inappropriate treatment plans are being made by dental practitioners in state employ. Because the sample size of this study is fairly small, assumptions and generalisations cannot be made regarding clinical management of these dental practitioners. In addition to this, the data on the subject is based on perceptions of the participants. A worthy exercise would be to conduct a survey on treatment protocols for odontogenic infections at state dental facilities.

The inclusion of sound basic dental education within medical and nursing programs could potentially increase the value given to dental health, reduce misdiagnosis and inappropriate management of dental pathology and limit referral and systemic inefficiencies. It could also lead to more open channels of communication amongst disciplines, which not only benefits the healthcare provider but the patients accessing care.

It is evident that maxillofacial infection has a significant negative impact not only on the TOHC but also on the healthcare system as a whole. The highlighted factors need addressing if it is hoped to make any impact on this disease process in the near or distant future. By addressing these factors, patients; healthcare providers; healthcare systems; healthcare resources and healthcare training would all benefit. It is hoped that from this study more focussed research would be initiated and targeted at the identified contributing factors to the burden of maxillofacial disease and that ultimately maxillofacial infection would become a condition rarely seen.



CHAPTER 6

RECOMMENDATIONS AND CONCLUSIONS

6.1 INTRODUCTION

This chapter summarizes the findings of the study as well as its limitations. It also presents recommendations and suggestions for future studies in areas of possible intervention in addressing the maxillofacial infection burden. Lastly, it concludes the findings.

6.2 LIMITATIONS

This study highlights many areas of concern from prior to patient presentation, at patient presentation, to the progression and management of maxillofacial infection. The study was however limited in the number of participants and did not include many patients referred to the TOHC and treated as out-patients for whatever reasons. It did not determine the exact incidence of this disease process which would aid in making future decisions with regards to resource allocation and training.

Not all actual admissions over the 4 months of the study were interviewed due to the primary researcher being based at a different health facility from where the research was being conducted for part of the study. This however should have no bearing on the study as the primary researcher interviewed whoever was present in the ward when attending the TOHC and did not specifically choose study participants.

The interview process could have been more detailed and involved more robust discussion with more participants. This could possibly have brought further understanding of the patient experiences or other contributing factors to light. It may also have guided future investigative strategies addressing maxillofacial infection.

Determining the severity of disease at presentation was difficult to establish. Many patients were treated under local anaesthesia due to the sheer number of cases needing to be managed. This may also have been influenced by clinician preference, theatre time and the availability of other resources.

Determining the financial cost of treating maxillofacial infections would go a long way in driving future interventions in addressing the burden. Determining costs would require a large and in-depth study. Factors that may have alluded to cost in this study could have included determining how many study participants were treated with general anaesthesia or local anaesthesia and recording the length of hospital admission for the condition.

An accurate data base with the number of patient presentations for maxillofacial infection, treatment performed, facial spaces involved, medication prescribed and length of hospital stay or number of follow-ups, would aid in future research projects on this subject.

6.3 RECOMMENDATIONS

The suggested recommendations should be viewed in the context of the source of the data, being that of the experiences of fifteen participants whose views may be reflective of the

communities from which they come. In addition to this, patient experience of the healthcare provider or the healthcare system is a subjective opinion.

Limited dental knowledge and misappreciation of dental pathology in both the general public and amongst healthcare providers would seem to be one of the biggest factors fuelling the maxillofacial infection burden. Exploring and addressing this may change current management myths and attitudes towards dental health and, in so doing, hopefully bring about a reduction in the frequency and severity of maxillofacial infections. Addressing these issues could possibly positively change the current experience of patients almost immediately. Educating and empowering current nursing staff, casualty officers, medical general practitioners and dentists about dental pathology; appropriate management; appropriate referral; and dispelling false and concerning beliefs about maxillofacial infection, could go a long way towards achieving the desired reduction in infection. It may also improve patient care, lead to timeous and appropriate management early in the course of disease and halt the progression of disease. Addressing this may have the added benefit of improving system efficiencies and improving patient experiences.

Perhaps increasing the dental exposure and training in nursing and medical undergraduate studies will improve the current void in dental knowledge and the extent of confusion related to treating odontogenic pathologies. By empowering these healthcare providers, prevention of dental pathologies may become more widely accepted and encouraged by healthcare workers. Timeous diagnosis and early referral to dental services could become more likely. Earlier dental treatment in primary healthcare settings would be expected to decrease the need for tertiary intervention which comes at great resource cost. Adding a dental component to these

training programs may also increase dialogue and respect between the medical and dental fields.

6.4 FURTHER RESEARCH

The information brought to light by this study highlights the need for further in-depth studies ranging from ‘health seeking behaviour’ of individuals, ‘oral health education’ at various levels, primary healthcare services for oral healthcare, to factors related to disease progression. More comprehensive studies on the knowledge and practices of oral health and oral diseases of individuals, communities and healthcare practitioners, within their social context, should be conducted. It is important to explore the social issues related to health seeking behaviours in relation to dental pathology and possibly shifting the emphasis from individual behaviour, to recognising that the drivers for change lie not solely in the individual, but within surrounding structures and relations (Mackian, 2003). The concept of social capital has been suggested by Mackian (2003), as a useful lens in exploring a framework for locating issues of collectivity and health systems dynamics (Mackian, 2003). This may provide a more useful understanding of maxillofacial infection and the potential use of health seeking behaviour as a conceptual and empirical tool in addressing the infective burden.

It is clear that advanced maxillofacial infection, as it pertains to the impact on healthcare services and systems within South Africa, requires extensive research in order for there to be a better understanding of the condition and in turn a reduction in the incidence and severity of the condition, and optimal management of the condition.

6.5 CONCLUSIONS

Maxillofacial infections have serious and significant implications for patients presenting with the condition, for the healthcare system and for healthcare providers. The delay in presenting for definitive treatment for odontogenic infection is as a result of the interplay of multiple factors. Attitudes toward dental health, lack of meaningful dental knowledge, social and socio-economic factors were patient factors contributing to the delay in seeking treatment. Healthcare provider access difficulties, limited understanding of dental pathology and inappropriate management were factors identified that regularly impeded treatment and delayed definitive management. Numerous inefficiencies in the healthcare system hindered both patients and healthcare providers in timeously intercepting or treating maxillofacial infections. Understanding these factors and identifying areas where they can be improved and positively influenced, could possibly empower patients and healthcare practitioners and ultimately contribute to addressing the serious maxillofacial infection burden.

This study has shown that there are numerous factors, and the interplay between these, which contribute to the health seeking behaviour of individuals. Favourable interaction between patients, healthcare providers and the health system are vital in providing quality healthcare to individuals and communities and would go a long way in addressing odontogenic infections. Education at all levels remains a crucial element in reducing the burden of maxillofacial infection.

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APPENDICES:

APPENDIX 1: Letter to head of facility requesting permission to conduct the study



**DEPARTMENT OF MAXILLO-FACIAL AND ORAL SURGERY
FACULTY OF DENTISTRY**
Private Bag x1, Tygerberg, 7505,
Cape Town, South Africa
T: +27 21 937 3081/7
E-mail: nbehardien@uwc.ac.za

May 2019

For Attention: The Dean
Faculty of Dentistry
University of the Western Cape
Tygerberg Oral Health Centre
Tygerberg Hospital Complex
7505

Dear Prof Osman

RE: Application to conduct research study at the Tygerberg Oral Health Centre, UWC.

Dr Martin Douglas-Jones is planning to conduct a research study as a component for the MChD-degree in Maxillofacial and Oral Surgery. We would like to conduct the study at the Tygerberg Oral Health Centre. The title of the study is "An explorative study of the factors possibly contributing to the burden of maxillofacial infection presenting at the Tygerberg Oral Health Centre".

All study participants will be interviewed after receiving treatment about their experience of maxillofacial infection and the progression of the disease process. Each patient will receive an information page and informed consent will be obtained before being included in the analysis. Ethical approval will be requested from the UWC Senate Research Ethics Committee, for consideration for registration as an approved research project.

Please do not hesitate to contact me should you require any additional information.

Yours sincerely

Dr N Behardien

FROM HOPE TO ACTION THROUGH KNOWLEDGE.

APPENDIX 2: Ethics approval (Biomedical Research Ethics Committee – UWC)



**OFFICE OF THE DIRECTOR: RESEARCH
RESEARCH AND INNOVATION DIVISION**

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09 May 2019

Dr M Douglas-Jones
Faculty of Dentistry

Ethics Reference Number: BM19/3/12

Project Title: An explorative study of the factors possibly contributing to the burden of maxillofacial infection presenting at the Tygerberg Oral Health Centre.

Approval Period: 06 May 2019 – 06 May 2020

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report in good time for annual renewal.

The Committee must be informed of any serious adverse event and/or termination of the study.

A handwritten signature in black ink, appearing to read 'Josias'.

*Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape*

BMREC REGISTRATION NUMBER -130416-050

FROM PEOPLE TO ACTION THROUGH KNOWLEDGE

APPENDIX 3: Information letter



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-937 3087
E-mail: 2462544@gmail.com

INFORMATION SHEET

Project Title: An explorative study of the factors possibly contributing to the burden of maxillofacial infection presenting at the Tygerberg Oral Health Centre

What is this study about?

This is a research project being conducted by Martin Douglas-Jones at the University of the Western Cape. We are inviting you to participate in this research project because you have presented with maxillofacial infection (infection in the face and neck) for which you need treatment. The purpose of this research project is to try understand the reasons and contributing factors leading to such infections.

What will I be asked to do if I agree to participate?

You will be asked to participate in an interview where your experiences and previous treatments leading to your presentation here at the Tygerberg Oral Health Centre will be recorded. The recording will be in an audio format and as such you will be asked to speak into a dictaphone. You will be asked about where you stay, what work you do, what help you previously sought for this condition, what treatments you previously received, your medical history and if you thought this was preventable.

Would my participation in this study be kept confidential?

The researchers undertake to protect your identity and the nature of your contribution. To ensure your anonymity, your file number and not your name will be used to record information and only those directly involved in the study will interview you and hear the recordings. To ensure your confidentiality, the audio recording will be stored in a locked office and on a password protected computer.

This research project involves making an audio recording of your interview. This will be used to determine themes and answer questions related to the research question. During the interview your name will not be used. Only those directly involved in the research will have access to, and be able to hear the recording. The audio recording will be kept in a locked office.

If we write a report or article about this research project, your identity will be protected.

What are the risks of this research?

There are no physical risks to participating in the research and should you wish not to participate in the study will still receive the needed treatment.

However all human interactions and talking about self or others carry some amount of risks. We will nevertheless minimise such risks and act promptly to assist you if you experience any

discomfort, psychological or otherwise during the process of your participation in this study. Where necessary, an appropriate referral will be made to a suitable professional for further assistance or intervention.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about factors leading to maxillofacial infection. We hope that, in the future, other people might benefit from this study through improved understanding of the factors contributing to this sort of infection. This may help in changing peoples understanding of this disease process and preventing others presenting with this condition.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify

What if I have questions?

This research is being conducted by Martin Douglas-Jones in the Maxillofacial and Oral Surgery Department, at the University of the Western Cape. If you have any questions about the research study itself, please contact Martin Douglas-Jones, on the C-floor of the Tygerberg Oral Health Centre, Maxillofacial and Oral Surgery Department or call 021-937 3087. Alternatively you can email 2462544@gmail.com.

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Department:

BMREC
University of the Western Cape
Private Bag x17
Bellville
7535
Tel: + 27 21 959 4111
Email: research-ethics@uwc.ac.za

APPENDIX 4: Consent form



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-937 3087
E-mail: 2462544@gmail.com

CONSENT FORM

Title of Research Project: An explorative study of the factors possibly contributing to the burden of maxillofacial infection presenting at the Tygerberg Oral Health Centre.

The study has been described to me in language that I understand. I understand that the interview will be recorded and that the recording will only be heard by those directly involved in the study. I agree to be audiotaped during my participation in this study. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

Participant's name.....
Participant's signature.....
Date.....

Consent Form

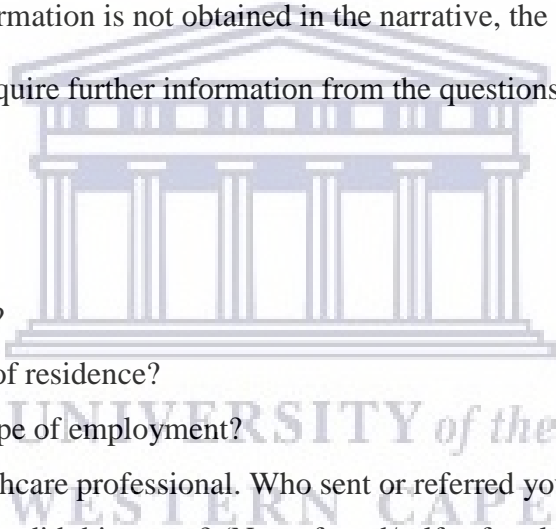
APPENDIX 5: Interview Question Guide

Interview guide for: An explorative study of the factors possibly contributing to the burden of maxillofacial infection presenting at the Tygerberg Oral Health Centre

Patient folder number:

Participants will be asked to give a narrative of their experiences, stories and progression of the condition that has led to their presentation at the Tygerberg Oral Health Centre. This will be recorded.

(If the underlying information is not obtained in the narrative, the interviewer will prompt the study participant to acquire further information from the questions below.)

- 
1. Patient age?
 2. Patient gender?
 3. Suburb/Town of residence?
 4. Employed? Type of employment?
 5. Referring healthcare professional. Who sent or referred you to Tygerberg Oral Health centre and when did this occur? (Not referred/self-referral, nursing practitioner, medical professional, dental professional or other)
 6. Reason for seeking medical assistance (main complaint)?
 7. Experience seeking help for this condition and reason for presentation at this time. How has the condition progressed?
 8. Previous help sought for cause of the infection or for the infection itself? Where and when did this occur? Were you helped at this time?
 9. Patient comorbidities (other medical and surgical conditions which include substance use and abuse)?
 10. Previously prescribed antibiotics for cause or for current infection prior to referral/presentation, what antibiotic prescribed (appropriate antibiotic?) and when?