DETERMINANTS INFLUENCING THE ORAL HEALTH OF ADULTS IN SEYCHELLES

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KEY WORDS

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Oral health status

Oral health behavior

Oral health knowledge

Oral health attitude

Social structure

Socio-economic factors

Oral health system

Policy and practice

Primary health care

LIST OF ABBREVIATIONS AND ACRONYMS

ADA	American Dental Association
ANC	Antenatal Care
APDAR	Agency for the Prevention of Drug Abuse and Rehabilitation
BMREC	Biomedical Research Ethics Committee
CAHO	Chief Allied Health Officer
CAMO	Chief Medical Officer
CNO	Chief Nursing Officer
DMFS	Decayed Missing Filled Surfaces
DMFT/dmft	Decayed Missing Filled Teeth
DPA	Depart of Public Affairs
FDI	Federation Dentaire Internationale
FGD	Focus Group Discussion
HCA	Health Care Agency
HBM	Health Belief Model

HIS	Health Information System
HPC	Health Professional Council of Seychelles
HREC	Health Research Ethics Committee
IEC	Information Education Communication
NBS	National Bureau of Statistics
NCDs	Non-Communicable Diseases
NIHSS	National Institute of Health and Social Studies
OHL	Oral Health Literacy
OHSD	Oral Health Services Division
PHC	Primary Health Care
PS	Principal Secretary
RCT	Root Canal Treatment
SDGs	Sustainable Developmental Goals
SES	Socio-economic Status
SLA	Seychelles Licensing Authority
SMDC	Seychelles Medical and Dental Council
SRC	Seychelles Revenue Commission
SSB	Sugar Sweetened Beverages
TCM	Traditional Chinese Medicine
VAT	Value Added Tax
WHO	World Health Organization

ABSTRACT

Title: Determinants influencing oral health of adults in Seychelles

Oral diseases are a major public health problem in the Seychelles, amidst a contracting budget coupled by a lack of national oral health policy and strategic plan to promote oral health. The oral disease burden is attributed to numerous determinants operating at different levels – macro, population and community, and at the person level. The study set out to examine the determinants that contribute to poor oral health in the Seychelles through an exploration of the social, cultural, economic and environmental factors influencing the oral health of adults. The purpose of the study was to develop an evidence-based theoretical framework that would inform future policy and practice for oral health. Set in the mixed research paradigm, a qualitative and quantitative research approach was used to obtain a deeper understanding of the pathways and mechanisms operationalizing determinants. Using a purposive sampling approach, individual and group interviews were conducted with patients, dental staff and a representative of the upper management. Policy and related oral health statistical documents were reviewed to ascertain the oral disease burden in conjunction with how oral health was located and implemented from a national to a district level. Thematic analysis and content analysis were used to analyze and interpret the qualitative data in search of meaning, commonalities, relationships and differences across the data. Thematic analysis allowed for the reporting of meanings and experiences, and the reality of participants through the process of coding and generating themes whilst content analysis of documents involved understanding, interpreting and reporting the content in a meaningful way. Quantitative data which included documents, surveys and statistical data was analyzed through content analysis. Deconstructed data was entered into Microsoft Excel and the frequency for occurrence was established. This study illuminated many ways in which the oral health of Seychellois adults was affected by determinants. At the macro level, the influence of globalization, governance and the distribution of wealth were significant. At the population and community level, the health system was an important pathway which determined how culture, oral health literacy, and community engagement influenced factors operating at a lower level. At the level of the person, the likelihood of oral health behavior was influenced by beliefs, predisposing characteristics, enabling factors, and perceived needs. An evidence-based oral health framework relevant to the Seychelles context has emanated from this study and is intended to inform the Oral Health Services Division, Ministry of Health, and relevant stakeholders on future strategic planning and policy development for the Seychelles.

DECLARATION

I, Cynthia Yara Sheela Noshir declare that *Determinants influencing the oral health of adults in Seychelles* is my own work, that it has not been submitted before for any degree or examination in any other university, and that all sources I have used or quoted have been indicated and acknowledged as complete references.

Cynthia Yara Sheela Noshir

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Signed: C.Noshir

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The behavioral choices people make are entrenched within social structure, both the historical and political context, as well as amidst an interplay between environmental, behavioral and intrapersonal cues (Patrick et al., 2006; Moyses, 2012; Lee & Divaris, 2014; Healthy People, 2020). The mechanisms and processes which influence people's behavior are called determinants operating as disparities that impact on the oral health outcomes of the population and individuals (Petersen, 2003; Moyses, 2012; Tiwari et al., 2017). Identifying and understanding how the mechanisms in which these determinants and their pathways affect oral health knowledge, and behaviors and ultimately oral health, are the initial stages towards obtaining answers to addressing these determinants (Tiwari et al., 2017). Implementing upstream policy that reaches across sectors to produce an environment (social, cultural, economic and physical) that encourages healthy living is the most effective approach to advance the health across the population and to lessen health disparities (Moyses, 2012). Upstream policies are therefore crucial measures to improve the oral health of a population at local, national or international level (Watt, 2007).

This chapter presents an outline of the study titled 'Understanding determinants influencing oral health of adults in Seychelles" and which proposes a framework to guide upstream strategic plan and oral health policy development. The chapter contains the background to the research, the problem statement, the study purpose, the questions guiding the research, the significance and limitations of the dissertation. It concludes with a summary of the organization of the rest of the study.

1.2 Background to research problem

The Republic of Seychelles is located in the middle of the Western Indian Ocean with a population of 98055 inhabitants with the majority of individuals in the age group of 15 to 44 years old (National Bureau of Statistics, 2020). The people of Seychelles are a blend of different races bringing with them their distinct traditions and customs that have contributed to the current multicultural lifestyle and by extension, the Seychellois culture. The economy of Seychelles is classified as a high-middle-income country (Ministry of Foreign Affairs, 2013).

Oral health services in Seychelles are provided mostly by the Oral Health Service Division (OHSD), a section in the Ministry of Health. There are numerous documents such as National Health Policy (2016), National School Nutrition Policy (2008), Seychelles National Health Strategic Plan (2016-2020), and the Seychelles Strategy for the Prevention and Control of Non-Communicable Diseases (2016-2025) shaping the health and oral health situation in Seychelles. Despite this, there are no specific oral health policy and strategic plans. Based on empirical evidence, the lack of a national oral health policy and strategic plan to promote oral health in the Seychelles is a major contributing factor to the increasing incidence of oral diseases in the population. Result of surveys show that oral diseases in increasing in Seychelles (Tillberg et al., 1993; Ernesta et al., 2007; Oral Health Directorate, 2010). Furthermore, statistical data shows that majority of patients accessing public dental facilities are coming on emergency basis or for the relief of pain (OHSD, 2019). A draft policy was formulated in 1999 but was not implemented. The reason for the lack of policy implementation is unclear.

The absence of specific oral health policy and strategic documents has also been contributing to a lack of political commitment and support to promote oral health at a national level in Seychelles. Moreover, the lack of policy documents is resulting in challenges to secure funding for oral diseases prevention and oral health promotion because oral health is given less priority compared to other NCDs in Seychelles. Insufficient funding has resulted in the OHSD budget being primarily directed towards curative care (management of oral diseases and restoring oral function), which has consequently resulted in a reduction in oral health prevention programmes. This misplaced focus has led to a rise in oral diseases and poorer oral health outcomes for the population accessing public dental services.

Despite this, the OHSD has been implementing a few programs in the population aimed at improving the oral health of specific population groups. However, program coverage is low. Implementation of these programs are the sole responsibilities of dental professionals such as dental hygienists (also known as oral hygienists) and dental therapists with minimum inter-professional collaboration. Currently there are minimum to no records or evidence on the impact of these oral health programmes in Seychelles. The poor programme implementation is the result of the lack of oral health policy, protocol and guidelines which is also essential for political support and funding.

A further problem in oral health care service provision is that the majority of the dentists and dental specialists working in Seychelles are foreigners. As such, they are not familiar with the context of the Seychelles, the challenges within the health care system, the language and the culture. Prior to joining the oral health sector in Seychelles, the foreign dental professionals have largely been exposed to private practices where the focus is more on curative rather than preventive care. As such when they are employed in Seychelles their approach to service provision is therefore focused on curative treatment. To aggravate this situation, all allied dental staff such as dental therapists, dental laboratory staff, dental surgery assistants and dental hygienists are Seychellois. Restrictions of duties for the dental hygienists and dental therapists due to their respective scope of practice often poses challenges in terms of optimal provision of dental services. Bureaucracies thus resulted in unnecessary delays for adults to access preventive dental care, hence influencing oral disease progression and poorer oral health outcomes.

1.2.1 Statement of the problem

Statistical data and results of past surveys show that the incidence of oral diseases is increasing in the Seychelles (Tillberg et al., 1993; Ernesta et al., 2007; Oral Health Directorate, 2010; OHSD, 2019). Empirical evidence shows that the public oral health system in Seychelles is under pressure to cope with the increasing demand of dental care for the relief of pain. The absence of an oral health policy and strategic framework which aims to reduce the burden of oral diseases, encourage healthy living and lessen oral health disparities, is a major contributing factor to the poor oral health outcomes among the Seychellois population. The mechanisms through which the absence of oral health policy and strategic framework is contributing to poor oral health outcomes among the Seychellois population is unclear. Identifying and understanding the cause of oral health disparities and developing an evidence-based theoretical framework for oral health was therefore crucial in the Seychelles as an initial stage.

Provision of mass service without understanding the causes for the burden of disease may undermine the more powerful effects of power differentials, social stratification, and the comprehension of different beliefs, practices and cultures that contribute to poor oral health outcomes (Patrick et al., 2006). Furthermore, interventions that narrowly focus on lifestyle and which fail to recognize and address the fundamental social determinants of health inequalities are ‘victim-blaming’ in nature (Watt, 2007). These victim blaming approaches assume that

knowledge and skills automatically lead to change in behavior, and are frequently expensive and ineffective as wider determinants that caused people to get sick in the first place are not address (Kwan & Petersen, 2010). Efficient action to tackle oral health inequalities can only be established when the underlying root causes of the problem are identified and comprehended (Watt, 2007). It is important to tackle root causes rather than the symptoms, focusing on upstream factors that cause poor oral health and create inequities (Kwan & Petersen, 2010). Such factors include policies, legislation, regulations and fiscal measures (Watt, 2007).

In order to reduce the burden and to improve the oral health of the Seychelles population, it is therefore important to understand the determinants impacting on oral health of adults and the population in general for the development of oral health policy and strategic framework so as to mobilize government efforts from an evidence-based position. Previous research which have been done in Seychelles on dental health have focused more on the curative aspects of oral diseases whilst health systems and social determinants were never quite understood to address the increasing burden of oral diseases in the population. This gap together with a lack of oral health policy in the country provided a case for understanding the determinants and for the drafting of a theoretical framework that will serve to guide future policy development. Adopting or adapting oral health policies from other countries in the Seychelles context was not feasible due to the uniqueness of the Seychelles context in comparison to other countries of similar socioeconomic development.

1.3 Research questions

In the context of the lack of a strategic plan and oral health policy framework in Seychelles, this study sought to answer the following set of questions:

- What is the estimated burden of oral disease in Seychelles?
- Which health systems factors have the potential to influence service delivery at the Oral Health Directorate?
- In what way does the oral health system in Seychelles impact on service delivery and hence the oral health of the population.
- What are the factors operating at the population level that influences oral health outcomes?
- What are the perspectives of adult patients on accessing dental care and what are their attitudes, beliefs, behavior and practices regarding their oral health?

As the study progressed, it was important to pay careful attention on the following to address the research questions:

- The study context in terms of the degree to which the socio-economic environment of Seychelles impacted on oral health outcomes.
- The macro level, and population/community level determinants in terms of its influence on the health system factors and inevitably oral health outcomes.

1.4 Rationale for the study

In the Seychelles there is an increasing demand on the government dental services to manage oral health problems, there is insufficient funding for oral disease prevention, and there is a lack of national oral health policy and strategic plan to promote oral health. Moreover, public dental services are provided free of charge to the Seychellois population which should imply that the population should have good oral health outcomes in comparison to other countries where there is a fee for dental service. The reasons for the country experiencing these problems are unclear and motions the need for research to understand and to provide direction to alleviate the problem. This study thus responded to the gap which provided a case for the drafting of a theoretical framework that will serve to guide future strategic plans and policy development.

Aim and purpose

This study set out to examine the determinants that contribute to poor oral health in the Seychelles through an exploration of the social, cultural, economic and environmental factors influencing the oral health of adults in Seychelles. The purpose of the study was to develop an evidence-based theoretical framework that would inform future policy and practice regarding oral health.

The objectives of the study were:

1. To evaluate the oral health system in Seychelles and determine how it impacts on service delivery and subsequently the oral health outcomes of the adult population.
2. To determine the factors influencing service delivery at the Oral Health Directorate and how these factors impact on oral health outcomes of adults in Seychelles.
3. To determine the extent existing policy and strategic documents influenced oral health outcomes of adults in Seychelles.

4. To determine the perspectives of Seychellois adult patients regarding opportunities and barriers to promoting good oral health.
5. To understand the influence of social, cultural, economic and environmental factors on the oral health of Seychellois adult patients.
6. To develop a theoretical framework for oral health that is context-specific.
7. To make recommendations to the Seychelles Oral Health Directorate for the development of a strategic plan and policy for oral health in Seychelles.

1.5 Conceptual underpinning

The study is grounded on the assumption that determinants operating at different levels in society contribute to the cause of people's behavior. These determinants of oral health disparities represent a complex combination of behavioral, biological, socio-economic, cultural, and political factors (Patrick et al., 2004; Moyses, 2012; Tiwari et al., 2017). Moreover, these determinants are often the result of the absence of policy or strategic documents at the macro level which influence oral health outcomes at the level of a person (Patrick et al., 2004; Moyses, 2012; Lee & Divaris, 2014; Tiwari et al., 2017).

There were numerous concepts underpinning the current research. These serve as lenses for examining how determinants influence oral health outcome of adults in the Seychelles in order to inform the development of strategic plan and oral health policy framework. The study draws on the constructs of *public health* in relation to dentistry, *oral health* in the context of public health, and lastly the *determinants* of oral health in order to answer the study questions. These constructs are discussed in details in the theoretical chapter.

In the current study, the framework by Lee and Divaris (2014) was used as a lens for guiding the identification and understanding of determinants of oral health in Seychelles in order to inform the development of strategic plan and oral health policy framework. The framework conceptualizes the influence of determinants operating at three levels on oral health outcomes: macro-environment, population and community level, and person level. The framework also identifies mediators and pathways which have an influence on oral health outcomes. Notwithstanding the framework by Lee and Divaris (2014) that was used as an overarching framework, identifying oral health behaviour as a person level factor, and the manner in which this determinant had an influence on oral health outcomes remained unclear. The Extended

Health Belief Model (HBM) (Rosenstock et al., 1988) was therefore used as lenses in the current study to understand this influence. That is to understand the barriers influencing the adoption or likelihood of behaviour, and the factors influencing the cues to action. This lens was crucial in order to answer the research objective 4. That is determining the perspectives of adult patients regarding opportunities and barriers to promoting good oral health in Seychelles. Moreover, in order to evaluate the oral health system in Seychelles, and understand its impact on the population/community level factors (objectives 1), a model used to evaluate the oral health system proposed by the World Health Organization (Petersen, 2003) was utilized. Using the Lee and Divaris (2014) framework, the Extended Health Belief Model (Rosenstock et al., 1988) and the model proposed by the WHO (Petersen, 2003) an evidence-based theoretical framework was developed which was used to understand oral health determinants in Seychelles.

1.6 Research design and methodology

The research design and methodology used in the current study will be explained in detail in Chapter 4. In summary, a mixed research design was used. Using this approach was beneficial in the current study as it allowed the researcher to analyze and draw interpretations from multiple forms of data to present a holistic picture of the problem being studied. The current study participants were sourced through purposive sampling, which is a method that allows the researcher to select participants that are likely to give rich information in terms of the particular needs of a project (Robson, 2011). Content analysis and exploratory data analysis were used in combination to analyze quantitative data (Robson, 2011; Rose et al., 2015). Data was entered into Microsoft Excel and frequencies of particular variables were collated. Thematic analysis and content analysis were used to analyze the qualitative data.

1.7 Significance and limitations of study

1.7.1 Significance

Mass service provision without understanding the reasons for the disease burden may undermine the more influential effects of power differentials, social stratification, and the standing of different cultures, beliefs and practices that contribute to poor oral health (Patrick et al., 2006). In view of dental treatment and clinical prevention being limited in addressing the burden, it is imperative to seek insight into the determinants as a means to provide an evidence-based theoretical framework for future initiatives. To date, no research has been done in Seychelles to explore determinants of oral health nor was there any research conducted

towards the development of a framework for oral health. The results with particular mention of the theoretical framework for oral health obtained from this study, will serve to guide future development of strategic plan and policy for oral health in Seychelles. In particular, it supports the calls for institutions to understand determinants and how it impacts on the oral health outcomes of the population, and impresses the need for health systems intervention in developing oral health policies to reduce oral health disparities by tackling the determinants. Furthermore, the research will be the first to explore determinants of oral health and to propose an evidence-based theoretical framework for oral health as well as to serve as a baseline study for forthcoming research in Seychelles. The study will also add to the growing body of literature and evidence around the multiple levels at which determinants operate making contributions both internationally, and importantly at a national level in the Seychelles. Lastly, this study will serve as evidence in guiding future context-specific endeavours in developing dental programmes aimed at improving the oral health of the population.

1.7.2 Limitations

The findings of this study are limited to the study context in which the research is conducted in the Seychelles. As there are no recent DMFT statistics in the Seychelles that provide information on the oral disease burden of adults, the health system data base therefore provided an indication of the burden of disease through records of treatments provided, numbers of patients frequenting public health facilities, and the mode dental services was accessed (emergency or appointment basis).

Furthermore, as the research is part of a thesis, there was restrictions on the number of interviews that could be conducted, due to time constraints and resources availability. The researcher also could not conduct a focus group interview on the inner islands due to difficulty to group people in one location due to budget constraints. Moreover, accessing representation from the upper management was challenging and limited the information collected that otherwise could have added further value to the findings.

1.8 Overview of study

An overview of the structure and arrangement of the remaining chapters of the thesis is provided in the next section. In this thesis, the researcher is adopting the Harvard citing in-text referencing from earliest to latest so as to demonstrate the growth and contribution to the field of knowledge over timelines.

Chapter Two presents the literature surrounding the determinants which create disparities in oral health. The determinants are presented according to macro level, community and population level, and person level factors. The manner in which these determinants interrelated to influenced oral health outcome is highlighted.

Chapter Three explains the research context. It presents oral health in the context of the social, economic and political landscape in Seychelles.

Chapter Four presents the theoretical framework and locates the study within framing the theoretical aspects of the research: the area of public health, the context of oral health and determinants. Numerous models and frameworks were used as lenses to examine how determinants influence the oral health of adults in Seychelles. This includes Lee and Divaris' (2014) framework which address oral health disparities, the Oral Health System Evaluation Model by World Health Organization (Petersen, 2002) to evaluate an oral health system, and the extended Health Belief Model (Rosenstock et al., 1988) to understand factors influencing the likelihood of oral health behaviour. The chapter concludes with a proposal of an evidenced-based framework to understand the influence of determinants on the oral health outcomes of the Seychellois population.

Chapter Five presents the methodology. This chapter portrays the mixed research paradigm (quantitative and qualitative approach), together with related methodologies, as a suitable approach to responding answering the research questions. The chapter concludes with the principles used to guarantee rigour in conducting an ethically sound study.

Chapter Six analyze the influence of macro level factors on community and population level factors, and on person level factors. This chapter provides insights into how socioeconomic and political factors, and public policies which often interrelate, contributes towards the oral health outcomes of adults in Seychelles.

Chapter Seven explains how community and population level factors influence person level factors. Pathways are introduced as mechanisms in which determinants influence oral health outcomes. The oral health system is considered an important pathway at the level of the population. The perspectives of dental staff and a representative of upper health management

are presented to contribute to the multi-level understanding of the factors shaping the oral health outcomes of Seychelles adults.

Chapter Eight analyzes the influence of person-level factors on oral health outcomes. Insight was obtained from patients, firstly in terms of their engagement with the oral health system, and secondly, the challenges faced to perform positive oral health behaviour.

Chapter Nine concludes this thesis. A restatement of the purpose of the study is presented, followed by a deliberation on the methodological approach used. Concluding statements about the significant results, and the significance of the study findings is made. Recommendations are then given for oral health management, the Ministry of Health, and key stakeholders. Suggestion for future research is provided at the end chapter.

1.9 Summary of the chapter

The chapter introduced the study titled, 'Understanding determinants influencing oral health of adults in Seychelles". It highlighted the research background, the problem statement and the purpose of the research. This study set out to examine the determinants that contribute to poor oral health in the Seychelles through an exploration of the social, cultural, economic and environmental factors influencing the oral health of adults in Seychelles. The purpose of the study was to develop an evidence-based theoretical framework that would inform future policy and practice regarding oral health.

Chapter Two that follows reviews literature relating to the determinants of oral health. The framework by Lee and Divaris (2014) and the proposed framework for Seychelles were used to guide the systematic arrangement of the chapter. Determinants which causes disparities in oral health were grouped as macro level, population and community level, and person level factors.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The chapter provides a review of the literature on the determinants of oral health which was guided by the objectives of the current study. These were (i) evaluating the oral health system in Seychelles to determine how it impacts on service delivery and subsequently the oral health outcomes of the adult population, (ii) determining the factors influencing service delivery at the Oral Health Directorate and how these factors impact on oral health outcomes of adults in Seychelles, (iii) determining the extent to which existing policy and strategic documents influenced oral health outcomes of adults in Seychelles, (iv) understanding the factors that created opportunities and barriers to promoting good oral health for Seychellois adult patients, and (v) understanding the influence of social, cultural, economic and environmental factors on the oral health of Seychellois adult patients. The chapter starts with an understanding of the oral determinants of health followed by a discussion of the various determinants operating at different levels which influence the oral health outcomes of an individual. To facilitate the discussion these are classified into macro, population and community level, and person-level factors. A review of the literature and theories on determinants of oral health suggested that health determinants could be classified into 3 broad categories. That is, macro level determinants – the upstream or distal factors; population and community level determinants – factors operating at the population and community level; and lastly person level determinants – factors operating at the level of the person or an individual (Patrick et al., 2006; Moyses, 2012; Lee & Divaris, 2014).

2..1.1 Understanding determinants of oral health

Moyses (2012) stated that it is crucial to have a better grasp of the causes of people's behaviours, that is, the cause of the cause, to understand why people behave the way they do. Patrick et al. (2006) further added that these are processes and mechanisms called determinants that operate at all levels of society. Behaviors are related with the conditions, in which people are born, live, work and age (Moyses, 2012). Furthermore, Moyses (2012) added that despite people making choices about how to behave, the choices are made within social structure, historical, cultural, economic, political context, and there is interplay among behavioural, environmental and intrapersonal causes. It was therefore important for the researcher in the current study to identify and understand the different processes and mechanisms affecting the

way adults in Seychelles are born, live, work and age, and how they interplay to create disparities to achieve positive oral health outcomes.

With regards to oral health disparities, determinants signify a complex mix of, behavioural, political, cultural, biological, economic and social factors (Moyses, 2012). Although many progresses have been made in oral health sciences, including the development of diagnostic, preventive and therapeutic agents and methods, oral health disparities continue amongst diverse population groups (Lee & Divaris, 2014; Healthy People, 2020). Inequity still exists regardless if oral health is a basic human right. For example, in numerous countries, significant amounts of the population are not covered by oral health care as there is a critical shortage of oral health manpower (Petersen, 2014) and funding (Gambhir & Gupta, 2016). Petersen (2014) further added that worldwide there are also considerable differences in oral health care coverage for different age groups, whereby priority is given mostly to children while older individuals are very much the neglected target group. Contrary to this, oral health care is recognized as a basic human right and is freely available to the Seychellois population at government health facilities and yet people have poor oral health outcomes. It was therefore important for the understand the complexities of how determinants influence the oral health outcomes of adults in Seychelles. The impact of economic, social, and cultural factors, and varying population demographics on oral health services delivery in countries and populations and the ways in which people care for themselves is therefore important (Petersen, 2003).

Identifying and grasping the mechanisms in which these determinants and their pathway affect oral health knowledge, behaviours, utilization of care and ultimately oral health, are the initial stages towards obtaining answers to these inequalities (Tiwari et al., 2017). Currently, most dental approaches to prevent oral diseases are focused at behavioural change which have had inadequate positive impact on dental health (Moyses, 2012). Reducing these oral health disparities (unequal distribution of social, political, economic, and community characteristics) are crucial to the goal of improving the health of the population (Patrick et al., 2006) as the choices people make influences their oral health behaviours. The Ottawa Charter (WHO, 1986) recognizes the role of social, economic, political, cultural, environmental, behavioural and biological factors on health. According to the Ottawa Charter, health promotion programmes and approaches should be adapted to the local needs of the population with the focus on (i) creating a supportive environment, (ii) building healthy public policy, (iii) developing personal

skills, (iv) strengthening community action, and (v) re-orientating health services (WHO, 1986).

Lee and Divaris (2014) classify determinants of oral health into three categories. These include (i) macro level; (ii) population and community, and lastly (iii) person level factors. These categories will be used to guide this chapter's presentation when discussing the influence of oral health determinants on oral health outcomes. First macro level determinants will be discussed.

2.2 Macro level factors

Macro level factors are the distal or upstream determinants which have an influence on health behaviours, environmental exposures and health care. In the section below, numerous macro level factors which have an influence on oral health behaviour and inevitably oral health outcomes will be discussed. Such includes (2.2.1) globalization dynamics, (2.2.2) the distribution of wealth, and lastly (2.2.3) governance and strategic directions. The influence of globalization on oral health will be discussed first.

2.2.1 Globalization dynamics

Globalization is not only the greater transfer of jobs, goods and capital beyond borders, but also includes equally important cultural, political and environmental components (Hobdell, 2001). The increasing gap between rich and poor at both international and national levels, which is defined as an increase in relative poverty which is influencing health is the result of economic globalization (Hobdell, 2001). In the context of oral health, the uneven distribution of wealth as a result of globalization in some countries and population has resulted in the unequal pattern of access to preventive oral health programmes, and increased exposure to certain risk factors to common oral diseases such as sugar in relation to dental caries (Hobdell et al., 2002). Hobdell (2001) stated that the key causes of a number of oral problems appear to have a socio-economic element in which economic globalizations could play a role. Moreover, economic globalization is expected to widen disparities in level of diseases with oral symptoms as per infection with HIV, which will have an enormous implication for oral health care workforce (Hobdell et al., 2002).

Furthermore, the process of globalization has also led to nutrition transition resulting in diseases (Alsuraim & Han, 2020). Nutrition transition observed in low-middle income

countries (LMICs) is leading to heightened rates of non-communicable diseases (NCDs) such as oral diseases and diabetes (Athavale et al., 2020). Globalization processes such as economic growth, free trade liberalization, urbanization and education have been linked to nutrition transition (Alsuraim & Han, 2020; Athavale et al., 2020). This is because global urban growth has resulted in alterations in the living environment, availability of a range of food choices and lifestyle (Alsuraim & Han, 2020). In rural societies economic growth has resulted in an increase in the quantity of sugar and other fermentable carbohydrates in dietary intake due to a change towards diets and habits related to modern living (Moynihan & Petersen, 2004). Studies conducted in India and Brazil showed a link between urbanization and prevalence of dental caries (Aguiar et al., 2019; Athavale et al., 2020). The early and recurrent exposure to sugars developed taste preference and addiction to carbohydrates which increased the risk for dental caries.

Globalization has also resulted in food companies selling their products through television advertisements, internet and newspapers which expose their audiences to messages which influence their oral health behaviour and inevitably oral health outcomes (Ghimire & Rao, 2012). Fast foods, sugar sweetened beverages, and high sugary diets are greatly promoted during peak time programs that target all population groups (Ghimire & Rao, 2012). According to Ghimire and Rao (2012), repeated exposure to these media advertisement may increase the cravings for these foods hence oral diseases such as tooth decay. A study conducted in India showed that youngsters who viewed television adverts and requested for soft drinks and food items were found to have more decayed teeth and DMFT/dmft index, compared to children who did not ask for those food (Ghimire & Rao, 2012). The study concluded that the adverts had an impact on the youngster's behaviour, character and eating pattern, thus resulting in greater prevalence of dental caries.

Lastly, the relocation of dentists to more wealthy regions or countries, is also a source of concern facilitated by increased globalization (Glick et al., 2012). This will be highlighted later in the chapter as it is related to oral health workforce.

In the current study it was important to understand the influence of globalization dynamics, and nutrition transition on the oral health outcomes of adults in Seychelles. This is because the Seychelles economy is dependent on globalization. Moreover, nutrition transition has resulted in an increased in NCDs, and could be the possible cause of increased dental caries observed

in the population of Seychelles. It was therefore important to review literature at the onset of the study in order to gain a deeper understanding of the possible influence of globalization on oral health outcomes of Seychellois adults. The next section is about how the distribution of wealth impacts on likelihood of behaviour and inevitably oral health outcomes in population groups.

2.2.2 Distribution of wealth

There is a very clear and consistent link between socio-economic status and the prevalence and severity of oral diseases (WHO, 2020b). Oral diseases disproportionally influence the poor and socially-disadvantaged individuals in the community (Ogunbodebe et al., 2015; Vettore & Aqeeli, 2016; WHO, 2020b). People at the top of the social hierarchy experience better oral health than those directly below them, and when one moves downward the social scale oral health worsens more (Petersen, 2003; Vettore & Aqeeli, 2016). Disadvantage communities often face a greater risk of both non-communicable diseases (including oral diseases) and infectious diseases (Chidzonga et al., 2015). This statement is supported by Sanders et al. (2006) who stated that people with lower socio-economic position experience higher levels of oral disease than those from wealthier groups. This is not limited to only the adult population but also in children as well. As a common trend in developing countries, country wide increase in wealth has seen the increase in dental caries among children, and this difference between low socioeconomic groups and more advantaged groups is becoming more obvious in periodontal status (Hobdell et al., 2002).

Furthermore, numerous studies have demonstrated that there is a difference in prevalence or incidence of oral health problems between individuals of higher and lower socioeconomic status (SES) (Timis & Danila, 2005). Studies conducted in Korea, Iraq, Serbia and the USA concluded that individuals of lower socio-economic status (SES) had significantly more missing teeth, and increased risk of dental caries in comparison to those of higher social groups (Kahabuka et al., 2012; Jamel et al., 2004; Hilton & Lester, 2010; Song et al., 2016; Markovic et al., 2019). The difference in eating behaviour and ability to purchase fluoridated toothpaste are a possible contribution. Individuals of higher socioeconomic status have minimum barriers to afford healthy food options and to purchase fluoridated toothpaste (Kikwilu et al., 2008; Chidzonga et al., 2015; Mayen et al., 2016; Agrawal & Gupta, 2020).

Socio-economic disadvantage which reduces access to dental services and consecutively play a role to the large social disparities in oral health (Wamala et al., 2006; Cane & Butler, 2014; Farmer 2016) is another factor for poorer oral health outcomes in lower SES individuals. Studies conducted in Germany, and the USA show that lower income population group were less likely to have a dental visit compared to higher income group (Brzoska et al., 2017; Nyugen et al, 2020). Individuals who experienced decline in their economic situation during financial downturns tend to put off consultation and treatments (Glick, et al., 2012). Furthermore, lower income groups are less likely to visit the dentist for preventive treatment because they tend to go only when in pain, compared to people in a high socio-economic position who tend to visit the dentist routinely (Ola et al., 2012; Ogunbodebe et al., 2015). Farmer et al. (2016) further added that lower income people are more prone to voice out unmet treatment need or obstacle to accessing dental care and reduced likelihood of stating dental insurance. Price of dental services is therefore an important barrier to individuals of low socio-economic strata and those with minimum household income (Baskaradoss & Geevarghese, 2020).

Contrary to the above, there are studies which show that people of high SES have higher incidence and prevalence of oral diseases. People with an improved socio-economic status consume refined and high sugary food, and consume carbonated drinks more as compared to low-income individuals, so appear to have more dental caries (Bokhari, 2006; Ogunbodebe et al., 2015). Moreover, relocation from rural to urban areas which improved the SES of families or individuals results in the adoption of a westernized diet which increases the risk of oral diseases such as dental caries (Dahlan et al., 2019). High SES and poorer oral health outcomes are reflected in studies conducted in Iraq and Ethiopia (Jamel et al., 2004; Tafere et al., 2018). Despite the increased risk of oral diseases, individuals of higher SES will have less unmet needs as they have better access to oral health care to manage or treat oral diseases in comparison to those of lower SES.

In addition, maxillofacial injuries arise from interpersonal aggression associated to the harsh living circumstances that occur in low-income countries (Chidzonga et al., 2015). Moreover, psychological influences of low revenue incline disadvantaged individuals to indulge in risk actions such as smoking which has been proven to be a risk factor for developing oral cancer and periodontal disease (Boing et al, 2011). To conclude, this section highlighted the influence of certain macro level determinants on the likelihood of oral health, and on oral health

outcomes. The next section will explore the debates and positions around how the population and community level factors influences oral health outcomes.

This section covered the distribution of wealth on oral health outcomes which are imperative in the current study. The literature reviewed were crucial to guide the data collection process and interpretation of results. The influence of governance and strategic directions on population factors, person level factors and inevitably oral health outcomes is discussed next.

2.2.3 Governance and strategic directions

Implementing upstream policy interventions that reach across sectors and produce an environment (social, economic, cultural and physical) that encourages healthy living is the utmost effective approach to advance health across the population, and to lessen health disparities (Moyses, 2012). This is an important aspect of public health as the overall focus is on health promotion to improve health outcomes. Moreover, this statement is in line with the FDI definition for health which recognize health as multi-layered and not merely the absence of diseases. Upstream policies are therefore measures that can be used to elevate oral health either at local, national or international level (Watt, 2007). Recognizing and understanding the role of policy implementation across all sectors on the oral health outcomes of adults in Seychelles was crucial in the current study. This is because policies have the ability to reduce or increase oral health disparities which will impact on the oral health outcomes of the population. The influence of public policies, public health policies and strategic plans, oral health policies, and rules and regulations implemented by professional bodies will be discussed in the next section.

2.2.2.1 Public Policies

Public policies are important in population health, and universal access to health services by having positive effects on different health outcomes (Aguiar et al., 2018). Moreover, public health policies that initiate preventive actions have been proven to be valuable in decreasing the global burden of disease (Esfandiari et al., 2010). There are numerous public policies operating at different levels with direct or indirect influence on oral health outcomes. These include policies pertinent to dental caries such as regulations and legislation significant to the food trade, policies on food offered in schools, nurseries and other public catering channels, and the limitations on adverts of food and drinks containing carbohydrates (Esfandiari et al., 2010; Aguiar et al., 2018). There are also available policies not related to dental caries. These

include higher taxation on tobacco products and alcoholic beverages, banning and enforcing bans on tobacco and alcohol advertising, sponsorship and promotion, strict zero-tolerance policies for drunk driving. Other policies aimed at reducing poverty, reducing barriers to healthcare, protecting minority and vulnerable groups, promoting affordable housing, safe water and sanitation, and improving level of education and employment (Esfandiari et al., 2010; Aguiar et al., 2018). Some of these policies have been identified and are discussed below. Their role on population level factors, person level factors (oral health behaviour) and inevitably oral health outcomes will be highlighted.

Sugar tax

Increased Sugar Sweetened beverage (SSB) consumption is linked to an increase in dental caries (Silver et al., 2017; Sowa et al., 2018; Urwannachotima et al., 2020). Recently, taxes on sugar-sweetened beverages (SSBs) have been implemented by a growing number of governments (Chalpoupka et al., 2019). A tax on SSBs is thus a public policy which may both head to a decrease in SSBs use or amounts of sugar in these beverages while growing government revenue to re-compensate for the health costs bring about from excess consumption of SSBs without taxing the remainder of society (Allen & Allen, 2019). Numerous countries have implemented tax on SSBs. Soft drinks are mostly targeted. Examples of countries with SSBs tax include Hungary, Mauritius, France, Chile, United Arab Emirates, South Africa, Ireland, United Kingdom and Philippines (Sowa et al., 2018; Allen & Allen, 2019; Urwannachotima et al., 2020). The threshold for tax on SSBs is different amongst countries (Allen & Allen, 2019).

The influence of sugar tax on oral health outcomes has not been well documented as this regulation is still in its infancy. A study conducted in Australia concluded that a change in sugar consumption due to sugar tax led to a material decrease of tooth decay and associated health care costs, amounting to 3.9 million fewer DMFT units due to tooth decay averted, and a cost savings of A$666 million, over 10 years (Silver et al., 2017; Allen & Allen, 2019; Sowa et al., 2018). There are numerous challenges with the implementation of taxes on sugar. Such include lack of resources for implementation, opposing arguments from industries, and the opinions that low-income households tend to consume more sugar than richer ones hence causing additional burden to the poor population groups (Sowa et al., 2018). Tobacco and alcohol related policies is another example of public policies which have an impact on oral health behaviour and outcomes. This is discussed next.

Tobacco and alcohol related policies

Tobacco and alcohol are risk factors for oral cancer and periodontal disease (Ide et al., 2008; Moreno-Lopez et al., 2000; Boing et al., 2011; Ahsan et al., 2020; Antunes et al., 2013). There are numerous public policies which target tobacco use and alcohol consumption. Despite these policies, implementation was not related directly to oral health, and positive oral health outcomes is an indirect goal (WHOb, 2010).

Increasing taxes on tobacco is the most efficient strategy to decrease tobacco consumption (WHO, 2010b). Two prominent examples of such policy instruments are South Africa and Turkey where there was a remarkable reduction in the proportion of tobacco smokers with the steady increase in exercise taxes alongside implementation of other policies (WHO, 2010b; Blecher, 2015). In addition to raising of tax on tobacco products, there are public policies which ban the advertisement, sponsorship and promotion of tobacco products. Under the WHO Framework Convention for Tobacco Control (WHO FCTC), all parties to the treaty are obligated to institute a complete ban on tobacco promotion, adverts and sponsorship within five years of the Convention's admission into force for that specific country (WHO, 2012). Despite this, most countries lacked full bans. By the end of 2014, only 29 countries with 832 million people which accounted for 12 percent of the world population had passed a comprehensive ban.

Despite the taxation of tobacco for economic and health reasons is now universally acknowledged, the application of taxes on alcohol to impact on health is still in its early stage even if commonly adopted as a fiscal tool (Nugent & Knaul, 2006). Nugent & Knaul (2006) and Hawkins et al. (2018) further added that even though there are substantial health harms associated with alcohol, policies in numerous nations (and in subnational jurisdictions accountable for alcohol policy) stay weak in contrast to tobacco control policies. In South Africa, excise tax is put on the quantity of pure alcohol, with the aim of reducing the consumption of higher volume alcohol beverages which are more likely to cause additional harm than beverages with lesser alcohol volume (Blecher, 2015).

Banning the advertising, sponsorship and promotion of alcohol beverages is also supported by certain countries through the implementations and enforcement of bans. Such approaches deliver critical measures to prevent the influence of alcohol in altering cultural and social norms

that encourage detrimental use of alcohol. Local, state, and national laws and policies that reduce the days of the week on which alcohols can be vended could be means of decreasing excessive consumption of alcohol and associated problems (Hahn et al., 2010). A review of literatures done by Hahn et al. (2010) showed that expanding the period when alcohol may be retailed by ≥2 hours augmented alcohol-related problem, such as facial injuries. Other alcohol related public policies orientate towards zero-tolerance for drunk driving, administrative suspension of driving licences, and enforcing higher limit for blood alcohol level.

Another public policy with an influence on oral health outcomes is the tax on dental products as discussed next.

Tax on dental products

The price of mouth care products can be an obstruction for people who desire to attain the lowest level of biofilm control that is considered fitting with positive oral health outcomes (Dutra et al., 2015; McCutchen, 2015). Tariffs and taxes on fluoridated toothpaste at times notably contribute to greater prices, lesser demand and inequity (Goldman et al., 2008). Toothpastes are frequently categorised as a cosmetic item and as such often greatly taxed by government (Goldman et al., 2008). As fluoride toothpastes is a public health measure, it would be in the benefit of nations to free them from the duties and taxation related to cosmetics (O'Mullane et al., 2016). The World Health Organization (WHO) encourages approaches to make inexpensive fluoridated toothpaste accessible in developing countries (Goldman et al., 2008; O'Mullane et al., 2016).

Ability and the availability of people to buy and use fluoridated toothpaste is mainly dependent on the cost of toothpaste (Goldman et al., 2008). In the 13 high-income countries the price of toothpaste signifies fewer than one percent of per capita domestic expenses compared to middle- and low-income countries which is considerably higher (Goldman et al., 2008). Numerous taxes such as excise tax, Value Added Tax (VAT), local taxes in addition to taxation on the packaging and ingredients contribute to a high trade price of toothpaste in India, Nepal, and Burkina Faso (Goldman et al., 2008).

Currently, there are sugar tax, tobacco and alcohol related policies, and tax on dental products in Seychelles. It is therefore expected that the Seychellois population should be having good oral health outcomes, but this is not the case. It was therefore crucial to review literature in

order to understand how public policies and their implementation have an influence on the oral health of a population. Apart from public policies, there are public health policies and strategic plans which have an impact on oral health outcomes. These public policies often orientate towards specific diseases which are mostly linked to country's political priority as discussed below.

2.2.2.2 Public health policies and strategic plans

Public health policies may both reduce or intensify the social disparity in health (Aguiar et al., 2017). Successful health policies can lessen oral diseases and negative circumstances, and enhance dental public health (Leake & Birch, 2008; Mandal et al., 2014; Schwab et al., 2014; WHO, 2021c). In the past decade, the increased acknowledgement of the global significance of Non-Communicable Diseases (NCDs) and the demand for combined policy response within national health programs have been observed (Mathur et al., 2015; WHO, 2021c). The making of health policy, like other sectors policy, remains on the accumulation and usage of power by the individuals included in the policy process (Lewis, 2012). Leake and Birch (2008) further added that the trend of public health policy has gazed towards more market-oriented answers to the problems of distributing health care resources, both by privatization of services or the initiation of 'internal competition' within services funded publicly. This development coincided with, or could have been pushed by, political urgencies for reduced public costs and related tax reductions.

As one of the roles of public health, implementing policies to address public health services can progress oral health (Mandal et al., 2014). According to Mandal et al. (2014), this can be done through assessing the public oral health status, analysing determinants of oral health, by decreasing obstacles to care and increasing use of services. Glick et al. (2012) stated that in recent years there has been an increasing understanding that oral health comprises an essential part of overall health, and a very optimistic move has been noted on the way to the addition of oral health into general health strategies. Inclosing policies in oral health, grounded on incorporation of oral health into national and community health programmes, and encouraging oral health as a valuable dimension for policy growth of society have been emphasised to be important by the WHO (Petersen, 2003; Singh et al., 2010). Although public policies aim at improving the health and oral health outcomes of the population, some authors argued that public health policies could both lessen or enhance the social gap in health (Aguiar et al., 2018). This is because universal public health interventions might primarily reach those with upper

socio-economic status, henceforth increasing disparities. Aguiar et al. (2018) therefore proposed that implementing population policies using non-behavioural strategies may have good results in reducing health inequalities when compared to policies that require individual behavioural changes.

However, Mathur et al. (2015) added that oral diseases despite sharing common risk factors with various NCDs have often not been incorporated within the NCDs policy agenda at both national or global level. Oral health care has obtained minimum attention from governments with public policy frequently being restricted to the regulation of providers (Leake & Birch, 2008). Benzian et al. (2011) further added that oral health has regularly been overlooked in national health plans and global health plans. This is reflected in statements by Moyses (2012) and Glick et al. (2012) who expressed that oral health is often an overlooked part of global health and has conventionally been graded low on the radar of country-wide policy makers, where in numerous nations oral health is not built-in national health surveys. It is therefore important to support oral health and work together with health authorities, policy makers and public health administrators (Petersen & Kwan, 2011). Moreover, it is essential to policy-makers to create impartial policies for oral health so as to make sure the establishment of financially reasonable oral health care and to thrive for the universal access in oral health care as stressed by the WHO Primary Health Care (PHC) approach (Alma Ata Declaration, 1978).

As there are numerous public health policies and strategic plans in Seychelles, it was crucial to understand their possible influence on oral health outcomes on the adult population. Reviewing literature therefore provided information which could be explored during the data collection phase of the study. Such include the area of policy implementation, and the inclusion of oral health in public policies. The next section will highlight the influence of oral health policies and strategic plans on oral health consequences and the likelihood of oral health behaviour.

2.2.2.3 Oral health policies and strategic plans

At the time of data collection, there was no specific oral health policy or strategic plan in Seychelles. It was therefore imperative to gain understanding on the possible consequences of delivering oral health services in the absence of policy or strategic document on the oral health outcomes of the population. This section therefore reviews literature on the need for political commitment to achieve positive oral health outcomes, and the availability and implementation

of oral health policy as crucial in creating oral health disparities. Examples of oral health policies are then highlighted.

In 2015, the Tokyo Declaration on oral health care and oral health for healthy longevity was implemented which appealed for the increased prominence of oral health on the global health agenda, for policies that address determinants of poor oral health, and to ensure that oral health is available to all without hardship (WHO, 2021c). Despite this, the political attention to this public health challenge remains low (Janakiram et al., 2018). This is due to factors such as lack of agreement on the problem, its portrayal and possible solutions. In the last decades one hundred and ninety-three (193) WHO member countries have placed general policies for oral health actions, but these have a differing opinion not only between nations, but also within countries at national and regional levels (Harnagea et al., 2018). Moreover, Harnagea et al. (2018) added that in a good number of countries, policies have paid attention on care coordination strategies instead of fully oral health integrated plans. Singh et al. (2010) further added that often there is a gap in the translation of policies into actions. This was due to factors such as inconsistency and fragmentation in the integration of health policy initiatives, and the lack of evidence of policy implementation. In numerous developing countries, India included, lack of national oral health policy implementation has impacted on universal accessibility, affordability, and appropriate oral health care services for all which is widening oral health disparities (Singh, 2010; Janakiram et al., 2018). In most developed countries such as Australia and the UK, the government has made an obligation to oral health and dentistry by formulating policies to improve the population's oral health, predominantly in children and to improve access to primary oral care packages (Leake & Birch, 2008; Esfandiari et al., 2010; Moyses, 2012; Gambhir & Gupta, 2016). These policy efforts have resulted in the decline of dental caries in most industrialized countries (Esfandiari et al., 2010; Moyses, 2012).

Numerous examples of oral health policies have been identified in the literature. These policies are at times integrated fully or partially in other health related policies. Dental caries, one of the most prevalent NCDs, is often targeted through the formulation of policies which advocate for community water fluoridation, tax on sugary foods and drinks, salt and milk fluoridation, preventive measures for dental caries in dental clinics, and fluoride dentifrices. These policy examples will be discussed in detail below.

Fluoride policy

Fluoride intake is beneficial to lessen the incidence of tooth decay (WHO, 2019). The need of policies to direct initiatives on the use of fluoride to prevent dental caries is recommended (WHO, 2019). The objectives of community-based programmes should thus be to execute the most suitable constant low level of fluoride in the mouth as possible (Petersen, 2003). The fluoride can be obtained through salt and milk fluoridation, community water fluoridation, and/or through fluoride toothpaste. The various mode of exposure to fluoride to prevent oral diseases is highlighted below.

a) Community water fluoridation

Community water fluoridation plans/policies are considered to be extremely cost-effective in decreasing the prevalence of tooth decay in regions with access to public water supplies (Slade et al., 2003; Pizzo et al., 2007; Esfandriari et al., 2010; Kroon & Van Wyk, 2012; Harding & O'Mullane, 2013; Mandal et al., 2015; Pullishery et al., 2015; Young et al., 2015; O'Mullane et al., 2016; Aguiar et al., 2017). Regulating the fluoride concentration of the water supply prevents between 50% and 70% of dental caries (Allukian et al., 2017). Studies conducted in Australia, USA, Brazil, Ireland and South Africa have shown a reduction in dental caries when exposed to water fluoridation (Slade et al., 2003; Esfandriari et al., 2010; Kroon & Van Wyk, 2012; Harding & O'Mullane, 2013; Aguiar et al., 2017).

In spite of the clinical confirmation reinforcing the benefits of community water fluoridation, opposition still exists in some countries (Esfandriari et al., 2010; Pullishery et al., 2015). Some countries such as Switzerland, Hungary, West Germany, Denmark and France, have rejected the practice of water fluoridation as non-beneficial and possibly harmful (Pizzo et al., 2007; Pullishery et al., 2015). Some countries or States started off with water fluoridation only to disrupt it in the future (Sweden, East Germany, Finland, Calgary-Canada and Netherland (Pizzoet al., 2007; Pullishery et al., 2015; McLaren & Petit, 2018). Other vehicles to expose the public to fluoride were considered such as fluoride varnish and dental sealants. The implementation of water fluoridation is often hindered by infrastructure and economic issues. This is because a centralized water supply is not accessible to all under-privileged regions in developed and developing countries (Pizzo et al., 2007; Esfandriari et al., 2010; Pullishery et al.,2015; McLaren & Petit, 2018).

Numerous literatures also stated that a reduction in dental caries has been attributed to the extensive accessibility of fluoridated toothpastes and salt (Pullishery et al., 2015; Pizzo et al., 2007). Salt fluoridation is discussed next.

b) Salt fluoridation

In communities where community water fluoridation is not viable, salt fluoridation programs could be put into action (Esfandriari et al., 2010). According to studies performed in Columbia, Switzerland, Hungary and Jamaica, many public health specialists have concluded that salt fluoridation shares comparable efficiency with water fluoridation for decreasing dental caries (Jones et al., 2005; Esfandriari et al., 2010; Aoun et al., 2018). Despite this, there are many challenges associated with salt fluoridation programs. In communities or countries with high prevalence of cardiovascular diseases, salt fluoridation is contraindicated (Aoun et al., 2018). Hypertension is linked to high salt consumption. Determining the suitable quantity of fluoride to put in to salt is therefore a challenge faced by governments and salt production companies (Esfandriari et al., 2010). Esfandriari et al. (2010) explained that this is apparent when salt manufacturing companies supply fluoridated salt to many different regions that acquire their water supply from various sources. Excessive fluoride intake can lead to dental fluorosis. Another vehicle to expose fluoride to the public is milk fluoridation as discussed next.

c) Milk fluoridation

Milk fluoridation is another example of exposing the population to fluoride without obliging the customers to change their behavior or take on particular responsibilities (Jones et al., 2005). Systematic reviews are available on the clinical efficiency of milk fluoridation in preventing tooth decay. Results of programmes targeting children in Switzerland, Scotland, Hungary and Bulgaria reported reduction in dental caries (Jones et al., 2005; Aoun et al., 2018). Fluoridated dentifrice is discussed next.

d) Fluoride dentifrices

Probably the utmost prevalent and significant medium used for fluoride has been toothpaste (Jones et al., 2005). The use of fluoride dentifrices has been identified in literature to be substantially effective in decreasing dental caries. Recommendations have been made by various organizations to urge stakeholders, including government, civil society, and industries to ensure that effective fluoridated toothpaste is made universally accessible and affordable to the population through the exemption from duties and taxation applied to cosmetics (WHO,

1994; FDI, 2000). Tariffs and taxes on fluoride toothpaste which is usually classified as a cosmetic product by government often significantly add to lower demand, higher prices and inequity (Goldman et al., 2008).

In spite of this, numerous countries such as the USA and Philippines are selling fluoridated toothpaste at an affordable price with the aim of maximizing the population's exposure to fluoride (Esfandiari et al., 2009). Despite this, access to affordable fluoride toothpaste is not an option for certain countries. A study comparing the price of toothpaste in 48 countries concluded that there were substantial disparities in the affordability of fluoridated toothpaste across countries (Goldman et al., 2008). The poorer the nation, the greater the amount of the domestic expenditure required to pay for one yearly dosage of toothpaste for one individual. This expenditure burden therefore impacted on purchasing power of fluoride toothpaste of individuals from low socio-economic community or developing countries. Policy with the focus on equity in pricing and improved accessibility of fluoridated toothpaste was recommended (Goldman et al., 2008). Rules and regulations that are implemented by professional bodies which have an influence on oral health outcomes are discussed next.

2.2.2.4 Regulation of oral health professionals

Provision of dental care is done by different oral health professionals in Seychelles. Similarly, to other countries, their practice is usually directed by regulatory bodies and scope of practice. The type of services being offered by public dental facilities in Seychelles could be linked to opposition in expanding the existing scope of practice, or the nature of the current scope of practice of allied dental professionals. These act as barriers which limits access to timely oral health services by the population. It was considered fundamental to therefore understand the possible role of public regulations on the function of oral health professionals especially in the area of primary health care through the review of literature.

The regulation of responsibilities and the scope of practice of oral health professionals is usually attained through a mixture of direct government regulations, joint with rules implemented by professional associations (Knevel et al., 2017). Since the 1970s, the United States of America has kept on expanding allied scopes of practice through their corresponding dental practice acts (Blue et al., 2013). Despite this, Blue et al. (2013) added that increasing

the scopes of practice for allied dental providers has not radically changed the type of services provided to the public by these professionals due to opposition as discussed later in the section.

Recent legislation has allowed a broadened scope and independent dental hygienist practice in many different nations (Reinders et al., 2017). The strategies are element of task shifting to enhance efficiency, increase patients' comfort, reduce costs, and make oral health care more available (Reinders et al., 2017). In spite of this, in some countries the scope of practice of dental hygienists are governed by regulations which reduce the access of the population to preventive dental services (Maxey et al., 2017). These regulations affect preventive oral care provided by mid-level providers especially in underserved populations (Hopcraft et al., 2008; Maxey et al., 2017).

Opposition in the expanded scope of allied dental professional is well documented in literature. In Australia, USA and Canada, professional dental associations' common concerns are related to training and the potential compromising of public safety (Hopcraft et al., 2008; Blue et al., 2013; Reinders et al., 2017). Scope encroachment adds to the disharmony. The assumption is that there will be loss of professional control over treatment provided, possible economic loss, and seeming threat to quality of care (Blue et al., 2013; Reinders et al., 2017; Balasubramanian et al., 2019). In South Africa, despite the country's need and recommendation for the government to create more job positions to employ dental therapists with an emphasis on education and prevention, this is not happening (Bhayat & Chikte, 2019).

2.3 Population and community level factors

Population and community level factors are determinants operating at the level of the population or community which have an influence on oral health outcomes. Such includes the oral health system and provider characteristics, oral health literacy, cultural norms and values, and physical environment. In the current study the researcher therefore considered it important to grasp the impact of population and community level determinants on the oral health of adults in Seychelles. Moreover, the need to understand their linkage to macro level factors and person level factors was required in order to understand the complexities of determinants operating at each level as discussed below.

2.3.1 Oral health system and provider characteristics

In order to determine the influence of an oral health system and its alignment towards primary health care, it was important for the researcher to understand the definition and operation of an ideal oral health system through the reviewing of literature. The different components were crucial to consider in order to evaluate the Seychelles oral health system in comparison to other country settings.

According to literature, an ideal oral health system should be coherent with the policies and principles of the country's and world's leading authorities in public health (Petersen, 2003; Tomar & Cohen, 2010; Kandelman et al., 2012). Such attributes as identified by Tomar and Cohen (2010) reflects the principles of the Primary Health Care (PHC) approach (Alma Ata Declaration, 1978) which have been re-emphasized 40 years later in the Astana Declaration (2018). These 5 principles of PHC include (i) social equity, (ii) nation-wide coverage/wider coverage, (iii) self-reliance, (iv) Intersectoral coordination, and (v) people's involvement (Alma Ata Declaration, 1978). The next section will discuss the integration of oral health system with the rest of the health system.

2.3.1.1. Integration with the health system

The inclusion of oral health into general primary health care is crucial (Alma Ata Declaration, 1978; Chidzonga et al., 2015; Astana Declaration, 2018). While it is known that there are marked diversities in structure and scope of health systems between countries, the shared principle is improving health (Kandelman et al., 2012). The outcomes of an ideal oral health system are not derived from the oral health care system only, but are affected by other elements in the general health care system (Adeniyi et al., 2012) and political focus of the countries as previously discussed in the chapter. Oral health systems relying on public coverage seem to display lesser disparities in dental care utilization than those without public dental coverage (Palencia et al., 2014). Thus, it is recommended that patient care would be more universal if the oral health system was to be appropriately integrated into the overall health care systems (Adeniyi et al., 2012). Despite this, the inclusion of oral health into the health system is complicated by the insufficient importance given to oral health, and subsequently the association with general health and well-being is not provided the attention it merits (Singh et al., 2010; Kandelman et al., 2012). This is due to a poor comprehension of the oral health status of the population and low ranking of oral health on the agenda of political personnel's including the absence of appropriate oral health policies (Harnagea et al., 2017).

The price of human resources issues, integrated services and scarce administrative infrastructure were described as major obstacles in implementation of oral health integrated care at the population and macro level (Harnagea et al., 2017). The disintegration of health care and the separation between medical and dental care have worsened the undue burden of oral disease and weak access to care in certain minority groups (Shrivastava et al., 2020). Practice types such as working in silo and contract-based services were described as obstacles for coordination, linkage and combination of services (Harnagea et al., 2017). For example, a study conducted in Malaysia revealed that only 13.9% of antenatal mothers were referred by their doctors or nurses for dental appointment (Saddki et al., 2010).

Often, preventive and oral health education programmes effected in the population are done in separation from other health projects, resulting in a repetition of effort and wastage of useful resources (Watt, 2007, Singh et al., 2010). Bourgeois et al. (2014) advocate that universal and equitable access to reasonable and suitable quality oral health services should be grounded on preventive-oriented services and multi-sector strategies. Correctly designed health systems have a robust preventive component which can identify possible illnesses and risk factors (Kandelman et al., 2012). Furthermore, interventions grounded on oral health education have been proven to improve knowledge and change certain oral health behaviours, but such changes are not sustained over time as they ate short-term in nature (Watt et al., 2015). Watt et al. (2015) added that improvements in oral health and a decrease in oral health disparities can be attained by working in collaboration amongst all disciplines and sectors through population-based public health strategies.

Moreover, health care systems are essentials in improving and upholding the health nations (Kandelman et al., 2012).

Availability and access to oral health services

Control of oral disease is dependent on the accessibility and availability of the oral health care system which is oriented towards primary health care and prevention (Alma Ata Declaration, 1978; WHO, 2003). Access to primary oral health care services has been highlighted in literature to be crucial, especially in developing countries (Honkala, 2014). Ensuring access to providers and routine use of oral health care is one way to improve oral health (Alma Ata Declaration, 1978; Chou et al., 2019). According to Chou et al. (2019) and Akbar et al. (2019) availability and access to oral health services is dependent on numerous factors such as (i)

sufficient, well-trained dental workers, (ii) access to dental coverage, (iii) an economic environment and (iv) proximity of services from the place of residence. A four-level model by Ferdie and Shortell (2001) is a model used to clarify the dynamics and structure of the health care system, the rough divisions of labour and interdependencies between major components of the system, and the levers for alteration. According to the model, the health system is nested into four levels (i) the individual patient, (ii) the care team, (iii) the organization that supports the work and development of the care team, and the economic and political environment (Ferdie & Shortell, 2001).

Access to oral health services is different for developed and developing countries. In low-to-middle income countries where the majority of the patients rely on the State health service provision, access to oral health care is a universal problem (Moyses, 2012). In numerous Industrialized western countries, oral health services are made available to the people, comprising of curative and preventive services, and are founded on either public or private systems (Petersen 2003). This reflects the principles of PHC (Alma Ata Declaration, 1978). Whereas in developing countries, oral health services are generally provided from regional or central hospitals of urban centres and little, if any significance is provided to restorative or preventive dental care (Petersen, 2003; Kandelman et al., 2012). This is due to many developing oral health care systems emphasising the relief of orofacial pain and dental trauma, leaving a large proportion of their inhabitants to experience neglect (Adeniyi et al., 2012). There is therefore a lack in the level of care, and a referral system. Furthermore, in the African region even if there are well-qualified dentists to provide oral health services, dental care for the majority of the population is mostly restricted to the relief of pain or urgent care (WHO, 2016). In Nigeria, oral health care focuses on the management and prevention of oral health emergencies, but services are provided at only selected primary health care centres countrywide (Adeniyi et al., 2012).

The impact of access and availability to oral health is even more obvious between underserved populations challenged with access barriers such as lack of coverage for dental care, affordability, availability of transportation, the mal-distribution of dental workers, access to childcare, distance from health facilities, and chance to take time away from work (Curtis et al., 2007; Meija et al., 2008; Ahn et al., 2011; Hescot et al., 2013; Emami et al., 2017; Nyungen et al., 2020). Moreover, it is well-known that public transport systems are less developed in

rural areas compared to urban areas, and the insufficient access to dental facilities can be a challenge to regular dental visits (Aguire-Zero et al., 2016; Akbar et al., 2019).

In addition, the operating hours of dental clinics often impacted on access to dental care. A study conducted in the USA revealed that dental offices not having extended hours had an influence on access (Aguire-Zero et al., 2016). This had an impact on the population group that cannot get time off work, resulting in those individuals accessing emergency dental care rather than preventive care. Funding for oral health services and how it impacts on oral health outcomes will be discussed next.

Funding for oral health

The relative shortage of publicly funded oral health care has been mainly assigned to 'affordability' for governments, and in most nations oral health care falls to the bottom of the list of governments' financial concerns (Leake & Birch, 2008). Moreover, globally the management of oral diseases is a substantial burden on healthcare resources, whether remunerated for directly by the government or by the patient (Moyses, 2012; Sheiham et al., 2015). Due to the non-life-threatening nature of most oral problems, government budgets allocated to oral health-related activities is small (Gambhir & Gupta, 2016). Some governments have even viewed oral diseases as less significant than other more life-threatening conditions, whereby investments in oral health care is low (Moyses, 2012). Such countries include Canada and India (Farmer et al., 2006; Kishor, 2010). This is not always the best practice as oral health is a basic human right. Moreover, minimum financial resources to expand oral health service delivery results in increased oral health disparities as in some countries only few individuals can afford private dental services or insurance (Patrick et al., 2004). The characteristics of the workforce and its influence on oral health behaviour and outcomes is discussed next.

Workforce

The distribution of dental workers across regions is important for ensuring fairness in access to oral health care (Singh & Purohit, 2013; Birch et al., 2020). In many countries, state capacity and resources (human, material and financial) are still inadequate to ensure the availability of and access to fundamental health services of high quality for people and populations, particularly in disadvantaged communities (Petersen, 2003; Kishor, 2010; Birch et al., 2020). This mal-distribution creates intraregional disparities in the distribution of dentists (Gallagher & Hutchinson, 2018).

Globally dentistry is facing a mal-distribution of service provider, with a great majority of dentists practicing in urban and wealthier areas (Ahn et al., 2011; Knevel et al., 2017; Balasubramanian et al., 2019). In the rural areas, stagnation in regards to infrastructure and the basic facilities made it difficult for those areas to attract workers (Kishor, 2010). The World Health Organization (WHO) suggests a dentist to population ratio of 1:7500 (Singh & Purohit, 2013). In numerous countries such as the Democratic Republic of Congo, India, Australia, South Korea, Nepal, and the USA, dentists are mostly distributed in urban areas and in the private sector (Cane & Butler, 2004; Hilton & Lester, 2010; Singh & Purohit, 2013; Gallagher & Hutchinson, 2018). Cross border relocation of dental workers has also emerged as a major problem (Balasubramanian et al., 2019). This is due to the monetary benefits that the dentists get in more developed countries (Kishor, 2010). A shortage of oral health professional affects access to timely and appropriate oral health care (Cane & Butler, 2004; Emami et al., 2017).

Disparities in workforce provision between developed and developing countries can, however, seem even starker when scrutinizing the population per clinical dental workers, instead only per dentists (Gallagher & Hutchinson, 2018). In Japan, South Korea, Ethiopia and Nigeria there are more dentists compared to dental hygienists (Adeniyi et al., 2012; Gallagher & Hutchinson, 2018). Patterns of dental disease are shifting and requires intervention thus clinical services aimed at diagnosis, prevention and restorations appear to be gaining more prominence (Balasubramanian et al., 2019). Despite this, many countries need to treat pain and sepsis due to their oral disease pattern. It is a priority for a dentist in the public sector to attend to patients with pain and sepsis (Smit & Osman, 2017). Prevention is therefore vital to change the focus.

Studies have shown that waiting time to access dental services has an influence on the likelihood of oral health behaviour, and also oral health outcomes. This is discussed in the next section.

Waiting time to access dental services

Waiting time is a significant quality indicator in evaluating the outcomes of any medical services (Saddki et al., 2010). Limitation of time for delivering oral health care by dental workers is a perceived barrier for utilization of dental services (Saddki et al., 2010; Marino & Giacaman, 2017; Bahramian et al., 2018) as it results in patient dissatisfaction with the care provided (Saddki et al., 2010). Studies conducted in South Africa, Malaysia, USA, Chile and

Iran revealed that high waiting time resulted in a large daily volume of patients seeking oral and dental care, compromised quality of care, difficulty to get appointment for urgent and preventive care (Saddki et al., 2010; Smit & Osman, 2017; Aguire-Zero et al., 2016; Marino & Giacaman, 2017; Bahramian et al., 2018; Motloba et al., 2018). The average waiting time for treatment was 1.5 hours in some of the studies (Motloba et al., 2018)

Lastly, continuous quality assessment and assurance is discussed under the sub-heading oral health system.

Continuous quality assessment and assurance

Ensuring the availability of health services that meet the least quality standard and safeguarding access are important roles of a health system (WHO, 2010c; Akbaret al., 2019b). Quality healthcare comprises of features such as accessibility, acceptability, availability, affordability, appropriateness, timeliness, competency, confidentiality, attentiveness, caring, responsiveness, and fairness (WHO, 2020c; Mosadeghrad, 2014; Baumgarten et al., 2018). Availability of resources affects the quality of medical services (Mosadeghrad, 2014). In developing countries health services may be inadequate in structure, resources and obviously scope (Kandelman et al., 2012).

The monitoring of service delivery has direct relevance for the organization of health services (WHO, 2020c). Quality assurance centres on the acceptability of the treatment to the client, the effectiveness of treatment, the accessibility of treatment, and the efficacy and continuity of care (Bilawka & Craig, 2003; WHO, 2020c). In order to survive and achieve patient satisfaction all hospitals need to monitor, measure, and improve the quality of health services (WHO, 2020c; Akbar et al., 2019b). This can be done through periodic surveys, facility assessment, supervisory checklists and audits (WHO, 2020c).

Most developed nations possess well-structured health systems, frequently planned on the foundation of research information acquired within the country and routine health facility reporting system (Kandelman et al., 2012; WHO, 2020c). Collecting data on service delivery is crucial to provide useful information for planners at all levels such as availability and functionality of basic infrastructure, quality of care, service provision, staffing and general status (WHO, 2020c). In majority of developing nations, information on oral diseases are limited because of either scarce financial resources or the lack of qualified investigators

(Kandelman et al., 2012). In Nigeria, the absence of a coordinated system for gathering health information (including on oral health) nationwide makes accurate evaluation of the oral health care system challenging (Adeniyi et al., 2012). The next section highlights the impact of oral health literacy on oral health outcomes.

2.3.2 Oral health literacy

Health literacy is a clear predictor of a person's health, health behaviour and health outcomes (Baskaradoss, 2018). Oral health literacy is a complex procedure of obtaining and trusting information, grasping concept, developing of skills and technique-intensive behaviors, and utilizing them correctly (Horowitz & Kleinman, 2012). Ideal health related practices are more prone to be adopted if a person feels better control over their health through an improve understanding of diseases and their etiology (Blaggana et al., 2016). Oral health literacy (OHL) is an interaction between society and culture, the education system, health system and oral health outcomes (Horowitz & Kleinman, 2012; Sistani et al, 2013). Numerous frameworks have been proposed to explain the influence of health literacy on oral health outcomes. In the framework proposed by Brega et al. (2016), the authors stated that inadequate health literacy is related to weak outcomes as it serves as an obstacle to the improvement of oral health knowledge, self-efficacy and more positive attitudes concerning oral health, and (2.3.2.4) appropriate self-care behaviour. Oral health literacy has therefore been proven to be significant in decreasing oral health inequalities and in oral health promotion (Horowitz & Kleinman, 2012).

Individuals who have taken on board oral health knowledge and a sense of personal charge over their oral health are more liable to take up self-care practices (Bourgeois et al., 2014; Blaggana et al., 2016). Moreover, Horowitz and Kleinman (2012) stated that gaining, comprehending and utilizing information to prevent oral diseases and to promote oral health are crucial parts of individual health maintenance. A study conducted in USA concluded that stronger oral health literacy resulted in substantial perceived seriousness of oral health problems, considerable perceived benefits of proposed oral health behaviour and fewer barriers to adopting good oral health behaviour (Brega et al., 2016). The lack of integration of oral health messages in school curriculum is a contributor of low oral health literacy in the population (Kwan et al., 2005; Smit & Osman, 2017). As a consequence, it acts as a contributor

of poor oral health outcomes in a person, and by extension, oral health outcomes in a community, leading to health inequalities (Hongal et al., 2013; Reshmi et al., 2014).

Studies conducted in Japan, United States of America and Iran showed that individuals with higher OHL brushed their dentures or teeth more often, self-checked their oral condition using a mirror and had regular dental checkup, and better dental hygiene status compared to those with low OHL (Khodadadi et al., 2016; Baskaradoss, 2018; Ueno et al., 2013). Insufficient parents' OHL was also associated with kids having high number of decayed teeth and fewer dental fillings as discussed later in the chapter.

Low health literacy has a considerable influence on the person's intention or motivation to utilize preventive methods and hence influences their health outcomes (Horowitz & Kleinman, 2012; Reshmi et al., 2014). Individuals with low OHL are unlikely to use preventive dental measures and do dental screening compared to those with a high OHL (Adeniyi et al., 2012; Horowitz & Kleinman, 2012; Geltman et al., 2014) as they lack the ability to navigate through the oral health system (Hongal et al., 2013; Reshmi et al., 2014; Baskaradoss & Geevarghese, 2020). This arises because there is difficulty in communicating with dental workers, to organize appointments or put their names on dental appointment waiting list, to navigate their way to the dental facility, to complete the necessary documents and to adhere with any required regimes, such as follow-up visits and obedience with prescribed medicine (Hongal et al., 2013; Reshmi et al., 2014; Baskaradoss & Geevarghese, 2020). The next section will highlight the influence of cultural norms and values as a determinant of oral health.

2.3.3 Cultural norms and values

Culture impacts on health which shapes society's response to both disease and health inequalities (Newton & Bower, 2005). Culture affects diet, preventive orientation, care-seeking behaviour, dental fear and use of home remedies (Fisher-Owens et al., 2007; Butani et al., 2008; de Castilho et al., 2013). Culture is reflected in religion and religious practices, household structure and social function, language, social norms, health beliefs, use of preventive oral health service, and attention to oral hygiene. Two aspects of cultural norms and values will be discussed in the section below. These are (i) nutrition transition and dietary acculturation, and (ii) belief and practices.

Nutrition transition and dietary acculturation

Economic development and urbanization have resulted in fast modifications in lifestyles and diets (Petersen, 2003). This nutrition transition and dietary acculturation are propelled by globalization and industrialization of the food market (Holmboe-Ottesen & Wandel, 2012), which started in the high-income countries and has expand to low income countries in the past decades and has intensified, initially in urban areas and recently to rural areas (Popkins, 2009; Ogunbodede et al., 2015). In majority of developing countries, the levels of tooth decay were minimal until recent years but an increase in the prevalence rates of dental caries and untreated tooth decay is being observe associated with an increased rate of sugar consumption (Petersen, 2003; Moynihan & Petersen, 2004; Petersen et al., 2005; Reddy & Anitha, 2015; Kanemoto et al., 2016; Tafere et al., 2018). Ultra-processed food which are easily accessible are inexpensive, high in sugar, fat and other refined carbohydrates (Holmboe-Ottesen & Wandel, 2012; Reddy & Anitha, 2015).

Another driving force – dietary acculturation – has been described as the change in original culture towards mainstream culture. These changes in cultural norms can be either beneficial or detrimental to general and oral health (Dahlan et al., 2019). Satia-About et al. (2003) stated that exposure to host culture (through radio, advertisement, books, television etc.) may lead to changes in the diet of people. One important attribute of a number of the medium-income countries is that numerous individuals are moving into the urban areas to obtain paid labor. This movement appears to cause an increase in use of sugar and preference for food that contains high level of carbohydrates (Jamel et al., 1996) which is different from their original staple diet or traditional diets which is low in refined carbohydrates (Holmboe-Ottesen & Wandel, 2012). The next section will discuss beliefs and practices.

Beliefs and practices

Culture is frequently termed as coherent, collective patterns of beliefs or behavior specific to named population groups which can facilitate or act as barriers in obtaining positive oral health outcomes (Butani et al., 2008). Amount of time staying in a host country is one of the most significant causative factors of dental services utilization (Dahlan et al., 2019) amongst immigrants. In the United Kingdom, Germany, USA, Canada and Norway immigrants with longer years spent in the country were more familiar with the health care systems, had improved mouth care practices, less incidence of oral diseases, and improved access to preventive oral health care (Gao & McGrath, 2011; Geltman et el., 2014; Dahlan et al., 2019)

Globally, tooth loss is still viewed by numerous individuals as expendable and a natural result of growing old (Petersen, 2003; Butani et al., 2008; Goettems et al., 2012; Moyses, 2012). Such includes the USA, China, United Kingdom (Butani et al., 2008; Gracia et al., 2008; Smith et al., 2013). Furthermore, inconsistent patients' actions and attitudes associated to compliance with treatment routines is often an outcome of cultural difference between minority patients and their service provider (Gracia et al., 2008). For example, in Chinese and African-American culture, the use of Traditional Chinese Medicine (TCM), home remedies or self-medication is favoured over dental care (Butani et al., 2008; Smith et al., 2013). In some cultures, such as African and Asian, the removal of healthy teeth to keep off evil spirit, mutilation of teeth for social reasons and rite of passage, chewing betelnut as breaths freshener and for social reasons are common cultural practices with detrimental effects on oral health outcomes (Friedling & Morris, 2005; Petersen et al, 2005; Kwan & Petersen, 2010; Swati et al., 2014). This shows that poor teeth and poor oral health have diverse significances to different sections of society, which impact what individuals are ready to do to prevent oral diseases. The physical environment as a determinant of oral health is discussed next.

To conclude there are numerous factors operating at the level of the population and community which have an impact on the likelihood of oral health behaviour and oral health outcomes. These include the oral health system, oral health literacy, cultural norms and values, and the physical environment as discussed. It was considered important to gain understanding on how these determinants operates in order to understand the Seychelles context. The next section will highlight oral determinants at the level of the person. These determinants include age, gender, and education; and lastly the influence of family support on an individual's oral health outcomes are discussed in terms of how they influence the likelihood of oral health behaviour.

2.4 Person level factors

Person level factors are determinants operating at the level of an individual which has an influence on oral health outcomes. These include oral health behaviour and family support as discussed below.

2.4.1 Individuals' oral health behaviour

The prevalence of oral diseases decreases with improvements in oral health behaviour (Ansari et al., 2003; Blaggana et al., 2016; Al-Qahtani et al., 2019). Good oral health behaviour comprises of the constant application of binary sets of behaviour: utilization of oral health care

(oral health promotion, regular dental checkup, and professionally applied preventive methods), and personal-care habits (good dental hygiene, application of fluoride products, and restriction of sugar intake) (Petersen, 2003; Al-Qahtani et al., 2019). Adoption of negative oral health behaviours such as smoking, excessive use of alcohol and illegal drug use have been widely known as major risk factors for oral cancer and periodontal diseases (Petersen, 2003).

The likelihood of performing oral health behaviour is influenced by numerous factors. At an individual level, these factors can be classified into predisposing and enabling factors, and needs. Predisposing factors are factors that existed prior to illness onset (Baker, 2009) such include age, education, knowledge, gender, employment status, social and peer support, location and culture. Enabling factors are the availability and accessibility of resources (Baker, 2009) such include income, dental fear and anxiety, nutrition choice, and waiting time for dental care. Needs are self-rated factors based on perception or clinical examination that include presence of oral diseases and oral pain, and the need for dental care. These factors can have a direct influence on the likelihood to perform oral health behaviour or were modifiers of behaviour by influencing oral health beliefs. The extended Health Belief Model (HBM) is one predictive model of preventive health behaviour (Buglar et al., 2010). The model which will be used in this thesis as a lens to explain oral health behaviour in the participants in the current study, has been discussed extensively in the Theoretical Framework Chapter. To summarize, the model draws on threat perception (susceptibility to and the severity of contracting) and behavioral evaluation (the benefits of performing health behaviours and barriers impeding performance). The influence of age and gender on oral health outcomes is well documented in literature. Age and gender are therefore discussed first.

Age and gender

Age and gender are significant factors that account for differences in health literacy, and oral health behaviour (Abu-Gharbieh et al., 2019). Studies conducted in the United Arabs Emirates (UAE) and India revealed that females are more knowledgeable about oral health than males (Francis et al., 2018; Abu-Gharbieh et al., 2019). In China, Saudi Arabia, Finland, South Africa and Greece, the tooth brushing and flossing habits of females were better and more regular than males (Pohjola et al., 2008; Mamai-Homata, Koletsi-Kounari & Margaritis, 2016; Hamasha et al., 2018; Motloba et al., 2018; Baskaradoss et al., 2019; Deng et al., 2019).This was attributed to females usually caring more about their body and look, and therefore they may be more worried about adopting behaviours and habits which promote their dental health.

Moreover, studies conducted in Saudi Arabia, Chile and China revealed older individuals had better mouth care regimens and increased utilization of dental services than younger individuals (Baskaradoss et al., 2019; Gao et al., 2020). The assumption was that older individuals had increased concern regarding oral health, were exposed to more risk factors to oral diseases and additionally due to the increased awareness on the significance of oral health as people get older. On the contrary, studies conducted in the USA, Chile and India revealed that participants who visited the dental clinic were of younger age (Dodd et al., 2014; Nagarjuna et al., 2016; Marino & Giacaman, 2017; Rota et al., 2019). Attendance for preventive dental care amongst this population group was due to perceived benefits, perceived threats or the negative outcomes most associated with dental disease. Barriers for the underutilization of oral health services amongst older adults were cost of care, shortage of professionals, location of facilities and lack of familiarly with services provided (Marino & Giacaman, 2017).

It was therefore important for the researcher to understand how age and gender influenced the likelihood of performing positive oral health behavior amongst Seychellois adults. The next section will discuss the influence of nutrition choices as a behaviour on oral health outcomes.

Nutrition choices

A two-way association exists between oral health and nutrition (ADA, 2021). Nutrition and diet are important influencers of oral health, and is capable to impact on the development and progress of oral diseases and conditions like periodontal diseases and dental caries (ADA, 2021). Sugar consumptions have been linked with increased risk of developing dental caries (WHO, 2020b; ADA, 2021) whilst the multifaceted characteristic of periodontal disease makes it challenging to ascertain its relationship with nutrition and diet (ADA, 2021). In the United Kingdom, Colorado, Taiwan, Libya India, and China respectively, studies showed that tooth loss and dental caries experience were significantly associated with daily consumption of sweet beverages and snacks (Whelton et al., 2018; Tiwari et al., 2016; Cheng et al., 2014; Huew et al., 2011; Shah & Sundaram, 2004; Yang et al., 2021). Studies have also shown that the consumption of sugar is dependent on taste preference and its availability (Jamel et al., 1996; Moynihan & Petersen, 2004; Ashi et al., 2017). In countries such as Iraq, the prevalence of dental caries increased or decreased based on the availability of sugar. The nutrition transition due to globalization in Seychelles has led to a change in nutrition choice. Understanding the

link between diet choice and risk for oral diseases was therefore imperative in the current study in order to grasp the factors contributing towards poorer oral health outcomes. The next section will highlight the influence of smoking and excessive alcohol consumption on oral health outcomes at the level of an individual.

Smoking and excessive alcohol consumption

Worldwide tobacco use among the adults is associated with a high risk of oral health problems (Ahsan et al., 2020). Tobacco has been established as a risk factor for the development of malignant disorders of oral mucosa, periodontal diseases and inevitably tooth loss (Bokhari, 2006; Antunes et al., 2013; Ahsan et al., 2020). Studies conducted in India, Japan, and the United States of America showed an increased prevalence of oral mucosal lesions, oral cancer, dental caries, periodontitis, and tooth wear in smokers compared to non-smokers (Petersen et al, 2005; Rajesh et al., 2017; Ide et al., 2008; Liu, 2014; Ahsan et al., 2020). Tobacco use in India was significantly associated with gender and cultural practices (Rajesh et al., 2017).

Alcohol has been recognized as an important risk factor for oral cancer (Moreno-Lopez et al., 2000; Ahmed et al., 2013). Moreover, data shows that the interaction between smoking and drinking has a statistically and clinically significant influence on oral cancer (Moreno-Lopez et al., 2000; Petersen, 2003; Ide et al., 2008; Ahmed et al., 2013; Antunes et al., 2013; Almoznino et al., 2015). This was apparent in studies conducted in Japan, Spain and Israel (Moreno-Lopez et al., 2000; Ide et al., 2008; Almoznino et al., 2015). It was therefore important for the researcher in the current study to review literature on smoking and excessive alcohol consumption. This is because the researcher wanted to consider all possible factors which may hinder good oral health outcomes amongst adults in Seychelles. Oral health knowledge and how it influences the individual's and by extension the family oral health outcomes is discussed next.

Oral health knowledge

Oral health knowledge is regarded as a fundamental requirement for health-related behaviour (Ansari et al., 2003; WHO, 2003; Bourgeois et al., 2014; Blaggana et al., 2016; Francis, Balasubramanian, Durga & Chandran, 2018; Al-Qahtani et al., 2019). Knowledge is an important element of oral health literacy (Abu-Gharbieh et al., 2019). Research have revealed that there is a link between increased knowledge and better oral health outcomes at an individual level (Ansari et al, 2003). For example, a study conducted in China revealed that

students with poor etiology of periodontal disease had a high prevalence of bleeding gums (Yao et al., 2019). Knowledge about oral disease is imperative as it can act as a key medium for upholding good oral health (Francis et al., 2018). Individuals who have understood oral health knowledge and develop a sense of self control over their dental health are more likely to assume positive self-care habits (Ansari et al., 2003; Blaggana et al., 2016; Rahmati-Najarkolei et al., 2016; Francis et al., 2017; Durga & Chandran, 2018).

Despite this, oral health knowledge does not always translate into positive oral health behaviour. For example, a study conducted by Ansari et al. (2003) in Kuwait concluded that even though a group of health sciences students were conscious about the most essential properties of oral health care, tooth brushing frequency of two times daily or more was not frequent. Just one third of the students were brushing as normally advised. Knowledge not having an influence on self-efficacy and perceived susceptibility could be the possible cause. Studies done in Iran, United States of America, Kuwait and Kenya respectively showed that individuals were more likely to perform positive oral health behaviour such as tooth brushing, flossing, and accessing preventive dental care only if they knew the risk to oral diseases (Hosseintalaei et al., 2017; Dodd et al., 2014; Ansari et al., 2003; Mudola et al., 2015; Aguire-Zero et al., 2016). The Health Belief Model (HBM) (Rosenstock et al., 1988) which will be discussed in the theoretical chapter lends itself as an appropriate model that can be used as a lens to understand the influence of perceived severity, susceptibility, barriers and benefits, cues to action and self-efficacy on oral health outcomes.

Oral health knowledge as a determinant for oral health outcomes was therefore fundamental to consider in the current study. There may be numerous factors which hinders or promote translation of oral health knowledge into positive oral health behavior in Seychelles, and it was crucial to understand them. Literature reviewed therefore provided guidance during the development of data collection tools and interpretation of results.

Education

The higher level of education, the lower the probability of losing teeth and the greater the chance of having 20 functional teeth when older (Petersen et al, 2003; Song, 2016). Educational level is a vital socioeconomic indicator that displays knowledge and skills for making health behaviour choices (Hooley, 2012). Studies have shown that individuals of higher education were more likely to brush their teeth two times a day compared to those with basic or secondary

school education (Pohjola et al., 2008; Abu-Gharbieh et al., 2019). Education as a person level factor was therefore important to consider in the context of Seychelles.

Perceived needs

Often pain or presence of oral diseases are crucial determinants that informs the need to access dental services. This was an important determinant to be considered in the context of Seychelles as a large number of adults were accessing dental services for the management of pain. It was crucial to therefore review literature on perceived needs and pain. According to the HBM this is related to perceived severity, and cues to action (Rosenstock et al., 1988). Studies conducted in India, UAE, USA, India and Iran revealed that dental service utilization was significantly higher amongst individuals experiencing dental problems (Aguire-Zero et al., 2016; Nagarjuna et al., 2016; Abu-Gharbieh et al., 2019; Baskaradoss & Geevarghese, 2020; Goodarzi et al., 2020). Moreover, individuals who self-evaluated their oral health as good/excellent were more probable to have consulted a dental professional within the past year, and to have brushed their teeth two times daily (Rota et al., 2019).

Attitude of individuals and culture also have an influence on perceived needs. For example, studies conducted in Malaysia, Iran and India revealed that mistaken beliefs about safety of dental care during pregnancy, (Saddki et al., 2010; Bahramian et al., 2018; Baskaradoss & Geevarghese, 2020) had an influence on the utilization of dental care. A study conducted in the USA concluded that Latina mothers with higher educational status, did not necessarily perceive dental caries as serious because in this case cultural factors played a bigger role in influencing oral health behaviour that education levels (Wilson et al., 2017).

In the next section income and employment status will be discussed in terms of how it influences access to care and the extent of choices individuals are confined to make.

Income and employment status

Income has an influence on oral health outcomes as it affects access to resources such as dental products and dental care. It was considered important to gain understanding on how income directly or indirectly influence oral health outcomes in order to compare with the Seychelles context. Studies conducted in Iran, Nigeria, Brazil, South Korea and United States of America showed an association between individuals' economic status and access to resources (Adegbulugbe & Agegbulugbe, 2007; Hosseintalaei et al., 2017; Song et al., 2016; Dodd, 2014;

Dutra et al., 2015; Aguire-Zero et al., 2016). In those studies, household income, lack of money to buy dental products or a sink, and the 'added cost' of dental care were identified as barriers. Added cost was due to high fuel price, long distance to commute, lack of public transport and not paid time away from work which often placed an extra burden on personal or household budget. Moreover, families with single parents appeared to influence the kind of care possible and provided for their children. In the United Kingdom, New Zealand, Nigeria and Germany respectively, studies found that single mothers were less likely to visit the dentists in comparison to those living with both parents (Folayan et al., 2017; Ola et al., 2012; Shearer et al., 2012; Brzoska et al., 2017). The lower socioeconomic capability of the single mother in contrast to the single father in a society where gender diversities are still important aspects relating to employment prospects and remuneration was identified as a possible cause.

Furthermore, the influence of employment status on income as a resource and inevitably its influence on oral health behaviour and outcomes is documented. In Malaysia and USA, individuals who were working were less likely to visit the dentist due to work nature and found it hard to brush their teeth (Saddki et al., 2010; Aguire-Zero et al., 2016; Rota et al., 2019). This was due to tight work schedules. In the next section dental fear and anxiety will be discussed as a factor that influences access to care.

Dental fear and anxiety

Less frequent dental visits associated with dental fear results in minimum oral health care and subsequently poorer oral health outcomes (Armfield et al., 2007; Slade et al., 2009; Rahmati-Najarkolaie et al., 2016). This is reflected in studies conducted in Malaysia, Australia, USA, Chile and India (Slade et al., 2009; Saddki et al., 2010; Aguire-Zero et al., 2016; Armfield et al., 2007; Dodd et al., 2014; Marino & Giacaman, 2017; Nagarjuna et al., 2016).

People with dental fear and anxiety also reported greater dental needs, and were less likely to adopt positive oral health behaviour (Pohjola et al., 2008; Slade et al., 2009). Studies conducted in Finland showed that people with dental fear were less likely to brush their teeth two times a day, use dental floss and were more likely to be smokers compared to those less afraid (Pohjola et al., 2008). Dental fear as a determinant of oral health was considered crucial in order to understand the likelihood that Seychellois adults perform positive oral health behavior. The final determinant discussed in this chapter is the influence of family on oral health outcomes.

2.4.2 Family influence on oral health within a household

Family structure and sociodemographic are key social factors that have a substantial impact on the oral health of youngsters (de Castiho et al., 2013; Mudola et al., 2013; Folayan et al., 2017; Goa et al., 2020; Goodarzi et al., 2020). Moreover, the job, education and finance of parents had an important impact on their children's access to oral health care (Folayan et al., 2017; Goa et al., 2020). The knowledge and belief of the family with regards to oral health is also crucial in determining oral health outcomes (Hooley et al., 2012; Aguire-Zero et al., 2016; Wilson et al., 2017).

Parents perform a pivotal task in the introduction and maintenance of health-related behaviours such as sugar snacking, and oral hygiene (Hooley et al., 2012; de Castilho et al., 2013; de Jong-Lenters et al., 2014; Rahmati-Najarkolei et al., 2016). This is because the parents influence their children's actions, attitudes and social norms via modelling, the use of particular childrearing routines and more broadly through interpersonal interactions within the household (de Jong-Lenters et al., 2014). Well educated parents have more positive attitudes and sturdier intents to control children's sugar consumption than low-educated parents. Carvalhoa et al. (2014) stated that low maternal education may head to negative habits, such as dental visits for emergency circumstances only, frequent bottle feeding at night, and inadequate support provided to a child with tooth brushing, all of which expands the likelihood of a disadvantaged youngster developing tooth decay. Attributes such as low maternal education level, household attendance patterns, and existence of a health care system are frequently mentioned as obstacles for children to visit the dental clinic (Goettems et al., 2012). A study in Iran revealed that mothers with a lower level of education were related to a higher consumption of sugared drinks between meals, and had lower toothbrushing frequency and dental attendance in children (Rahmati-Najarkolei et al., 2016). Moreover, Goettems et al (2012), added that children of mothers with low level of education are more likely to delay initial dental visit and less likely to obtain dental care after an initial encounter with a dental provider.

Furthermore, parental oral health status is a likely pointer of their oral health knowledge and attitudes which will impact on their choice of diet and the degree of preventive behaviours for their children (Hooley et al., 2012). For example, parents who stated to have poor oral health or prior dental problems and discontent with their own teeth or had missing teeth, had offspring with higher levels of tooth decay (Hooley et al., 2012). Oral health status of parents was often

related to their level of education. Bourgeois et al. (2014) gave the example of maternal level of education which has been closely linked with dental caries experience in their offspring.

Furthermore, low socio-economic position of the household, and parents' poor oral health practices have been shown to be part of the development of tooth decay (de Castilho et al., 2013; Gao et al., 2020). It is known that youngsters from low-income families are incline to have the highest needs and minimal utilization of oral health services (Goettems et al., 2012). For examples, large families tend to experience financial and social pressure and may need to reduce on expenses, including having to purchase inexpensive toothpaste, resulting to an increased risk of developing dental caries (Folayan et al., 2017). Children of parents who use a low monthly spending on discretionary carbohydrates due to financial constraints had significantly less early childhood caries (ECC) than those whose parents use high expenditure on discretionary carbohydrates (Hooley et al., 2012). The food children are subjected to in their early formative years impacts on their development of food preferences and taste; such include sweet preference (Hooley et al., 2012). Study findings also show higher prevalence of dental caries amongst youngsters staying in rural areas in comparison to those from urban areas (de Castilho et al., 2013). This was often related to location and the socioeconomic status of the family which resulted in a delay to access preventive care and afford transportation, difficulties to purchase dental products and healthier food option which support positive oral health.

Only relying on social and family network for advice to influence oral health care decisions can have a negative consequence on an individual's oral health outcomes. Studies conducted in the USA and India reported that participants used over the counter medications, home remedies such as oil of cloves, ice, alcohol, and salt water for pain relief as per the advice of family members or peers rather than seeking dental care (Cohen et al., 2009; Jaiswal et al., 2015). Other self-care methods include wrapping the face with fabric, putting on warm compresses and praying to God (Cohen et al., 2009; Jaiswal et al., 2015).

Family also had an influence on access to dental care. Studies conducted in the USA revealed that 71% of Mexican-American teens revealed that their decision to seek preventive care was influenced by others (Dodd, 2014; Aguire-Zero et al., 2016), primarily parents, and other family members. Children with higher level of dental caries are also more likely to have missed dental appointments, have fewer number of dental check-ups in a year, and attended the dental clinic for treatment rather than for a review of the oral health (Hooley et al., 2012). The

children's parents were also more afraid of the dentists and were not satisfied with the children's dentists. Again, education level of parents was crucial in determining access to dental care of children. Studies conducted in the USA and India concluded that children of parents of higher educational attainment accessed preventive dental care more often as the parents viewed their children as more susceptible to tooth decay (Nagarjuna et al., 2016; Wilson et al., 2017). An increasing trend in the usage of oral health services was detected with an increase in the education level of participants in a study conducted in Kerala, India (Baskaradoss & Geevarghese, 2020).

Family did not always have a negative influence on oral health outcomes. Parents or caregivers play an important role in preventing the incidence of dental caries, and the performance of preventive health care behaviour in children (Rahmati-Najarkolei et al., 2016). Past family tragedy or experience with oral disease had an influence on oral health behaviour. For example, a study conducted in the USA revealed that the family's knowledge on susceptibility to oral diseases was heightened by family members past oral disease experience and served as a preceptor to access care (Dodd et al., 2014). Dodd et al. (2014) gave the example of the perceptions of one participant who accessed dental care as he perceived himself to be susceptible to oral cancer because it was common n in his family. Clearly from the above literature, the influence of family on oral health outcomes is an important factor to be considered when discussing oral health behavior. Similarly, in Seychelles family influence could be a fundamental contributor for positive or negative oral health outcomes that needs understanding. It was therefore important to gain deeper understanding of what is happening in other countries and context through the review of literature.

2.5 Summary of the chapter

This chapter highlighted the influence of determinants on oral health outcomes. These determinants are operating at all levels of society and were classified into macro level, population and community level, and person level chapter. It was important to review literature in order to understand the complexities and interplay of these determinants in the Seychelles context. Moreover, lessons and strategies proposed and/or adopted by other countries or organizations such as WHO and FDI could be understood with a focus on the Seychelles context. The next chapter shifts focus on the Seychelles as a context for the study and foregrounds some of the known factors that influence oral health outcomes. The chapter sets

the scene as a backdrop to understanding how and why various determinants operating at different levels influences the oral health of the adult population of Seychelles.

CHAPTER 3: THE RESEARCH CONTEXT

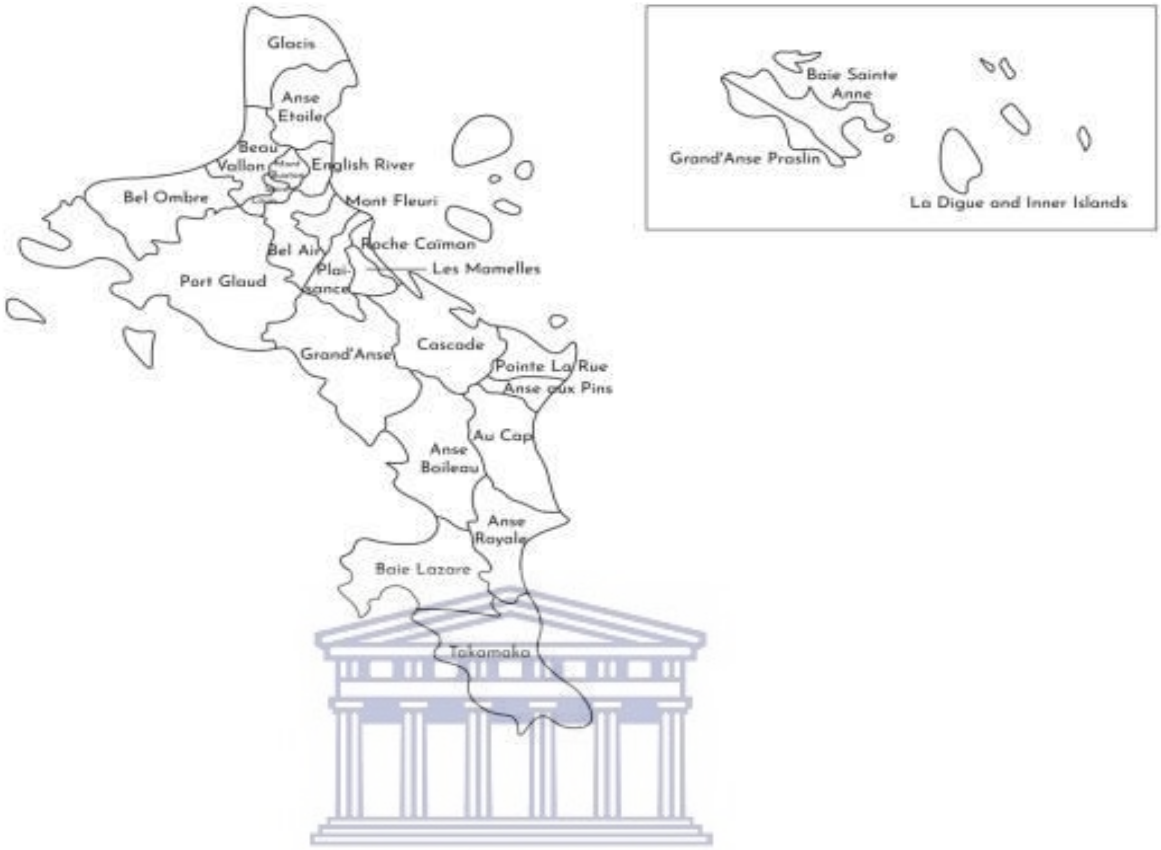
3.1 INTRODUCTION

This chapter serves to provide an insight to the research context. It foregrounds the socio-economic and health landscape of the Seychelles and its influence on oral health outcomes. Poorer oral health outcomes include difficulty in mastication, change in speech, daily life being impaired by dental pain, and loss of function in the case of oral cancer. The profile of Seychelles will be highlighted first followed by an overview and discussion about the health care system and oral health in Seychelles. Included, is a reflection of how different factors related to the macro-environmental and health system impact on oral health outcomes such as, various national regulations, policies and strategies that have been developed and implemented in Seychelles. Lastly, the impact of Seychelles' socioeconomic environment on oral health is discussed.

3.2 GEOGRAPHIC LOCATION AND POPULATION

The Republic of Seychelles consists of over 116 islands in the middle of the Western Indian Ocean. As at 31st December 2019, the total resident population was 98055 inhabitants with majority of individuals in the age group of 15 to 44 years old (National Bureau of Statistics, 2020). Residents in Seychelles comprise of different races. This is because in the past people of African, Asian and European origin had come to inhabit the islands, bringing with them their distinct traditions and customs that has contributed to the current multicultural lifestyle and by extension the Seychellois culture. The economy of Seychelles is focused mainly on tourism and fishing. Seychelles with a gross national income per capita of 14,766 US Dollars (2013) is classified as a high-middle-income country (Ministry of Foreign Affairs, 2013).

There are presently 26 districts in Seychelles. For the purpose of this research, the 26 districts are grouped into 3 regions. Region 1 and 2 comprises of districts on Mahe, whilst Region 3 grouped the districts of the two inner islands (Praslin and La Digue).



Source: Adobe Stock, 2021

Figure 3.1: The districts on the three main islands in the Seychelles archipelago. The biggest island of the archipelago (Mahe) was divided into two regions for sampling purposes in this research. The next section will discuss the organization of health care in Seychelles.

3.3 HEALTH CARE ORGANISATION IN SEYCHELLES

3.3.1 Burden of disease

The burden of disease in Seychelles has changed from communicable to non-communicable diseases (NCDs) such as diabetes, cardiovascular diseases, injuries and mental problems (Ministry of Health, 2016b). Non-communicable diseases have been the major causes of death of residents in Seychelles in recent years. These NCDs are a result of the changing lifestyle and diet, and have common risk factors as majority of oral diseases. Adopting a common risk factors approach to manage NCDs will therefore have an impact on numerous health problems, oral diseases included.

3.3.2 Organization and Management within public health sector

Since January 2014, the public health sector has put into effect a new structure that introduced delineation and division of roles comprising of the Health Ministry and three public bodies (Ministry of Health, 2016b). The Health Ministry is headed by the Minister alongside the Principal Secretary. The Ministry is accountable to create health sector policy, planning, monitoring and evaluation and to keep an eye on the operation of health strategies by the three public bodies for health care delivery and training in health care. The three public bodies for health care provision and training in health care are (i) the Health Care Agency (HCA) which is an independent agency to bring about the provision of primary, secondary and tertiary health care. The Oral Health Services is a division under the HCA, (ii) the Public Health Authority which is an autonomous entity to control the health sector and provide protection of the population's health, and lastly (iii) the National Institute of Health and Social Services (NIHSS) which is an autonomous academic institution which is the academic arm of the teaching hospital. The National AIDS Council is a later addition in the Ministry of Health structure (Ministry of Health, 2016b). The council is responsible for the management of the countrywide response against the HIV/AIDS epidemic, sexually transmitted infections and other related infections. The health system in Seychelles is guided by different pieces of policy and strategic plans as well as budget allocations. Financing for health is discussed next.

3.4.3 Financing for health

Financing for public health services in Seychelles is from the health budget which is a proportion of the national budget. In recent years, there has been a reduction in the budget allocated for health services. Reduction has been from 14.5% of the national budget in 2008 to 11.92% and 9.17% in 2012 and 2013 respectively (Republic of Seychelles, 2009; Republic of Seychelles, 2016). This reduction has been the result of the 2008 economic reform programme implemented in Seychelles whereby there has been increased emphasis on private markets and competition in health delivery. Public health care goals were often overlooked (Republic of Seychelles, 2009; Republic of Seychelles, 2016). The reduction in health budget has impacted on the type of services offered by the public health services. As the budget of the OHSD is dependent on the national health budget, the country experienced a reduction in the oral health budget. Reduction in budget has resulted in the country's focus shifting more on curative care for the management of pain or diseases rather than prevention. The emphasis was to prioritize

resources to manage diseases in order to prevent mortality or disability which impacts on the overall population health and country's economy. Henceforth, NCDs such as diabetes and cardiovascular problems which is a priority in Seychelles have been receiving the largest proportion of the health budget. Wang (2018) explained that with longer lifespan, chronic disease has become the major cause of death and accounts for an approximated 60% of all mortalities worldwide. Wang (2018) further added that health expenditure therefore focuses on health technologies where the focus is on disease treatment to reduce mortality and extend life expectancy. Likewise, this is observed in Seychelles despite the cheaper cost of prevention. The OHSD is spending majority of its budget on technologies for the management of oral diseases which are easily prevented and which are of increased cost on the oral health system. For example, a dental screening or dental fissure sealant is cheaper than an extraction. It is also far costlier to replace the extracted tooth with a prosthesis. The fact that the OHSD budget is primarily directed towards the management of oral diseases and restoring oral function, this has resulted in a reduction in oral health prevention programmes. This misplaced focus has led to a rise in oral diseases and poorer oral health outcomes for those accessing public dental services. The funding of the public oral health system is discussed further later in the chapter.

Apart from funding there are several public and health policies that have an influence on the governance and delivery of health services in Seychelles. Some have an indirect impact on oral health as will be discussed below.

3.3.4 Public and health policies influencing health and oral health in the Seychelles

There are numerous documents shaping the health and oral health situation in Seychelles. A common goal of these documents is to improve the health of the population by focusing on achieving the Sustainable Developmental Goals (SDGs), where the health-related goals and target areas are broad. There is minimal mention of oral health in the majority of these documents. Henceforth it can be argued that positive oral health is usually an indirect outcome of these policies. Lack of integration of oral health in public and health policies despite sharing common risk factors with numerous NCDs, implies minimum support from the government and lower priority for oral health in future health reform plans in the Seychelles. The documents are listed below for ease of reference.

(1) National Health Policy – 2016
(2) Seychelles National Health Strategic Plan, 2016 -2020
(3) Seychelles Strategy for the Prevention and Control of Non-Communicable Diseases, 2016-2025
(4) National School Nutrition Policy – 2008
(5) Seychelles National Alcohol Policy – 2014
(6) Licenses (Liquor and outdoor entertainment) regulations – 2013
(7) Tobacco Control Act – 2009 and Tobacco Control (Smoke-Free Notice) Regulations -2011
(8) The Goods and Service Tax Act Regulations – 2003
(9) Excise Tax (Imposition of Sugar Tax on Drinks) Regulations -2019
(10) Seychelles Trade Tax Schedule 2 – 2009

The content of these documents will be briefly discussed below. Documents that are overlapping or have similar focus areas will be grouped together for discussion. The inclusion of oral health in these policy and strategy plans will be highlighted. The National Health Policy (2016) and the Seychelles National Health Strategic Plan (2016-2020), will be discussed first and these are the overarching documents guiding health and the functioning of the health system in Seychelles.

National Health Policy – 2016

Seychelles National Health Strategic Plan, 2016-2020

The mission of the National Health Policy of Seychelles (2016) and the Seychelles National Health Strategic Plan 2016-2020 is to promote, safeguard and restore the health and quality of life and self-respect of all inhabitants in Seychelles (Ministry of Health, 2016b). This is to be done through the active involvement of all stakeholders, by means of establishment of an enabling environment for inhabitants to arrive at informed decisions regarding their health. The policy recognizes the need for consolidating integrated health care, monitoring and evaluation, research and human resources for health. The strategic plan provides direction, set goals and proposes suitable milestones to guide and improve investment in health. Also highlighted in these documents is the recognition and tackling of social determinants of health. That is, considering the life course approach by adopting evidence-based policies, programmes,

strategies, regulations and projects to address the prioritised communicable and non-communicable diseases by focusing on primary, secondary and tertiary prevention (Ministry of Health, 2016b).

The documents do not make specific mentions of oral health but some of the proposed approaches targets non-communicable diseases which have common risk factors as with oral diseases. In this way these documents, indirectly have an impact on oral health outcomes. Another document having an influence on oral health outcomes is the Seychelles Strategy for the Prevention and Control of Non-Communicable Diseases (2016-2025). This is discussed next.

Seychelles Strategy for the Prevention and Control of Non-Communicable Diseases, 2016-2025

A study done to assess 22-year nutrition trends using information from three research conducted in 1989, 2004 and 2011 revealed a nutrition transition in Seychelles (Cardoso et al., 2013). The use of traditional staple food (fish and rice) and beverages (tea) have decreased significantly. At the same time, the intake of salad, sweet snacks, salty snacks and home-made juices have increased. Moreover, the prevalence of wine, beer and spirit drinkers have also increased, especially in women. The nutrition transition has been associated with rapid socio-economic development and urbanization, with a significant distribution in supermarkets, increasingly diverse supply of food, and great offer of 'take away' business throughout the country (Cardoso et al., 2013). The nutrition change is one of the causes of increasing NCDs in Seychelles.

The increase in incidence of certain oral diseases which share common risk factors as other NCDs in Seychelles is also attributed to the result of the nutrition transition which is happening in the country. For example, sugar is crucial for the development of dental caries, and the transition to high sugar diet is a contributor for the rise in dmft and DMFT score amongst different population groups. The 1993 survey conducted on Seychellois adults showed that DMFS was 12.8 in the youngest age categories whereas it was 58.5 amongst adults aged 50 and above (Tillberg et al., 1993). Periodic surveys conducted on 6 and 12 years old also showed an increase in dental caries. DMFT increased from 3.6 in 2005 to 3.9 in 2010 amongst the 6 years old, whilst DMFT increased from 1.5 in 2005 to 2.1 in 2010 amongst the 12 years old. This is high in comparison to countries of similar economic development.

The Seychelles Strategy for the Prevention and Control of Non-Communicable Diseases (2016-2025) is a document which therefore targets four most prevalent NCDs in Seychelles (Ministry of Health, 2016a). These include cancer, diabetes, cardiovascular diseases and chronic respiratory diseases. This is done by addressing their four common behavioural risk factors – unhealthy diet, harmful use of alcohol, tobacco use and physical inactivity, with the former three having a direct influence on oral health. Strategies include tobacco control, promoting healthy diet, reducing harmful use of alcohol, strengthening health systems to tackle the prevention and control of NCDs by means of people-centered primary health care and universal health coverage, supporting and promoting research on NCDs, and monitoring the trends and determinants of NCDs (Ministry of Health, 2016a).

The document recognizes oral diseases as other NCDs affecting Seychelles but states that despite the close associations between numerous of these 'other NCDs' and the share of common risk factors with the major NCDs, one approach or action plan to tackle all NCDs in uniform aspect would be extremely heavy. The National School Nutrition Policy (2008) is another policy document identified in the current study to influence oral health outcomes as discussed in the next section.

National School Nutrition Policy – 2008

A National School Nutrition Policy (2008) has been implemented in Seychelles in 2008 and consist of a ban on sugar-sweetened beverages in schools, and it limits the sale of food of low nutritional value (Bovet et al., 2010). One of the document's goals is to reduce NCDs amongst school children. The policy is directed more towards creating a supportive environment, and developing personal skills and increasing knowledge on nutrition of primary and secondary school children, teachers, parents of students, individuals involved in school meals preparation and school tuck shop owners (Ministry of Health and Social Development, 2008; Ministry of Education, 2008). The assumption is that through the implementation of activities such as nutrition education, school tuck shops implementing nutrition guidelines, and encouraging students to drink water there will be a reduction in certain non-communicable diseases such as diabetes, obesity and dental caries amongst school children. Approaches in the policy encourage good habits such as the adoption of healthy food choices and sensitizes people to the harmful effects of poor diet etc.

Analysis of the document showed that a reduction in dental caries was mentioned as an outcome of the policy implementation. Despite, the policy document not including specific statements on oral health promotion related activities, there are components addressing risk factors for oral diseases. These components include implementing nutrition education in the school curriculum, and providing students with healthier, affordable choices of food. One of the members of the National School Nutrition Committee involved in this policy document implementation and whose agenda is to coordinate and monitor the policy implementation is a dental staff. This is significant as the staff can potentially push forward the oral health agenda at the level of policy makers to increase priority of oral health in schools. Despite this, the involvement of the dental staff to push forward oral health on policy makers' agenda remains unclear due to lack of reporting to the OHSD management.

Policy and regulations related to alcohol are discussed next. These documents had influence on oral health behaviour, risk of oral diseases and oro-facial trauma.

Licences (Liquor and outdoor entertainment) regulations – 2013

Seychelles National Alcohol Policy – 2014

Alcohol is a risk factor for oral cancer, facial trauma/injuries and enamel erosion. High level of sugar in alcohol is a risk factor for dental caries. Therefore, having regulation to reduce consumptions will indirectly reduce the incidence of these oral health problems worldwide, Seychelles alike.

High alcohol consumption per capita is a concern in Seychelles. In 2014, the WHO's Global Report on Alcohol and Health stated that in 2011 Seychelles had the third highest rate of alcohol consumption in Africa, and was placed third for beer consumption per capita in the world (WHO, 2014). The law governing the sale of alcohol in Seychelles came to force in 2013 (Licenses Act, 2013) to reduce alcohol related injuries, abuse and diseases. The law makes provision for alcoholic beverages to be retailed between 11.30am to 9pm local time from Monday to Thursday while on Friday alcohol can be bought from 11.30am to 11pm. During the weekend the sale of alcohol is different whereby the hours is a bit longer. The law also states that public holidays should be treated as Sundays. Data collected by the World Health Organization shows that despite the implementation of the laws regulating alcohol selling time in Seychelles, the level of alcohol consumption per capita is still increasing (WHO, 2018). In 2013, recorded alcohol consumption per capita in Seychelles was approximately 8 litres and in

2015 rose to approximately 12 litres per capita. The possible cause could be that consumers are purchasing alcohol during the selling time and storing for later consumption. Monitoring of the law is the responsibility of law enforcers such as police officers and public health officers. There are penalties for individuals not respecting the law. Moreover, the prohibition of alcohol sale for individuals under 18 years is clearly mention in the document.

The Liquor and outdoor entertainment regulations (2013) is supported by the Seychelles National Alcohol Policy (2014). The policy's goal is to prevent and reduce alcohol-related injury to people, families and societies with the aim of creating safer and healthy drinking culture in Seychelles (Drug and Alcohol Council, 2014). The policy has 8 priority areas for actions. These includes protecting children from the potential risks of alcohol, avoiding alcohol in the workplace, setting laws which ban drinking in public places and driving under the influence of alcohol, and controlling and limiting the number of home brews manufacturer and vendors.

The Licenses (Liquor and outdoor entertainment) regulations (2013) and Seychelles National Alcohol Policy (2014) do not mention oral health. Moreover, Oral Health Services Division (OHSD) was not consulted in the formulation of these policies. Tobacco related acts and regulations are discussed next.

Tobacco Control Act – 2009

Tobacco Control (Smoke-Free Notice) Regulations -2011

Smoking is a contributing factor to oral cancer and periodontal disease (Bokhari, 2006; Antunes et al., 2013; Liu, 2014; Ahsan et al., 2020). Periodontal diseases are one of the leading causes of tooth loss in adults. In Seychelles, statistics show that oral cancer is more common in men than women. Statistic shows that for the period of 2011/2012, 10% of newly diagnosed cancers were oral cancer amongst men (African Registry Network, 2020). Oral cancer remaining amongst the top five newly cancer diagnosis in men to date is still apparent in Seychelles and this may be due to the increase in cigarette (Seychelles Department of Health, 2019) and alcohol consumption. Currently in Seychelles there are no recent data on the incidence of periodontal diseases in the population. The only survey on adults in Seychelles was conducted in 1993 and showed that that periodontal disease is a concern in the population as highlighted later in the chapter. There are laws that regulate tobacco consumption in Seychelles. Despite these laws being formulated and implemented by a unit in the Department

of Health without the consultation of the OHSD, their implementation has an influence on oral health outcomes.

In summary the Tobacco Control Act (2009) and Tobacco Control (Smoke-Free Notice) regulations (2011) regulate the sales and advertisement of tobacco products in Seychelles. The laws make provision that restrict the sale of tobacco products through vending machines, and to individuals below the age of 18. Moreover, these laws state that smoking is prohibited in public places or enclosed work places. Tobacco advertising, promotion and sponsorship is also prohibited in Seychelles according to these documents.

Other documents that have guidelines with a possible influence on oral health outcomes in Seychelles are identified and discussed next. There was no involvement of the OHSD in document formulation.

Excise Tax (Imposition of Sugar Tax on Drinks) Regulations -2019
The Goods and Service Tax Act Regulations – 2003
Seychelles Trade Tax Schedule 2 – 2009

Numerous tax laws and regulations which influence health and oral health either directly or indirectly are implemented in Seychelles. Three documents (i) the Goods and Services Tax Act Regulations (2003), (ii) the Seychelles Trade Tax Schedule 2 (2009), and (iii) the Excise Tax, which have a direct impact on oral health outcomes have been selected and will be discussed below. The Goods and Services Tax Act Regulations (2003) and the Seychelles Trade Tax Schedule 2 (2009), identify products which are exempted, and not exempted in Seychelles. Tax exempted products include those used by government hospitals, dental and medical services; some specific fruits and vegetables. There is no tax exemption on alcohol (locally made or imported), and tobacco products. According to these legal documents, oral self-care products such as dentifrice, toothbrushes, and yarns to clean in between the teeth such as dental floss can have the maximum retail tax of 30%. This 30% tax on dental products have an influence on the affordability and purchasing power of these products. Moreover, the Excise Tax (Imposition of Sugar Tax on Drinks) Regulations (2019) stipulate that all drinks containing sugar content exceeding 5 grams per 100ml shall be subjected to a tax of SCR4 per litre. To date there are no reports/studies about the impact of the Imposition of Sugar Tax on Drinks, but observations shows that sugary drinks are generally cheaper than no sugar added alternatives.

These laws have an influence on numerous oral diseases, including the two most common oral problem in Seychelles which are dental caries and periodontal diseases. Dental services being exempted from tax signifies that the cost to procure dental materials and equipment is decreased, including the cost to access dental care. Tax exemption on some fruits and vegetables improves their affordability and consumption by the public, whereas a 30% tax on dental products may create barriers due to affordability and the purchasing power of the public.

The next section discusses the situation of oral health in Seychelles.

3.4 ORAL HEALTH IN SEYCHELLES

3.4.1 Oral Disease Prevalence

The results of the only survey conducted on adults in Seychelles shows that the mean Decayed Missing Filled Surfaces (DMFS) level was 12.8 amongst the youngest group included in the study and 58.4 in the 50+ years old. Moreover, data from that study revealed that clinically healthy gingiva (CPI 0) in all sextants was registered in 1- 4% of all persons. The survey results indicated that in 1993 tooth decay and periodontal diseases was of concern amongst adults in Seychelles. Despite the absence of recent oral health surveys in the adult population, empirical evidence shows dental caries is still of concern amongst adults in Seychelles. A high attendance amongst adults at public dental services remains as primarily for emergency treatments for the management of dental caries, as will be highlighted later in the chapter.

Compared to the adult population, there have been numerous smaller dental surveys conducted amongst the children population in Seychelles. Results of the above national and sub-national surveys conducted in 1993, 2005 and 2010 (Tillberg et al., 1993; Ernesta et al., 2007; Oral Health Directorate, 2010) show that dental caries is also a concern amongst the children population. Based on countries data on dental caries amongst 12 years old circulated by the World Health Organization (WHO, 2010), DMFT of 1.5 implied that Seychelles was categorised globally as a country with low DMFT level for that age category when compared to DMFT data from other countries for that same year. Despite, DMFT levels being classified low globally, the DMFT score of 1.5 was high in comparison to the African regions (AFRO) which was recorded as 1.4 in 2010.

3.4.2 Organization and Management of Oral Health in the Seychelles

Oral health care in Seychelles is provided both by public and private sectors. The practices of the private dental clinics are regulated by different bodies such as the Public Health Authority, Seychelles Medical and Dental Council (SMDC), the Health Professional Council (HPC) of Seychelles and in theory by the Principal Secretary (PS) of Health. To date there are no available data on the influence on private dental clinics on oral health outcomes in Seychelles. Moreover, the private dental clinics have not been submitting statistical data to the Ministry of Health in order to understand the extent of provision of services and to understand the burden of diseases at a national level. Governance of the public dental services is provided through the PS, and the Health Care Agency (HCA) through the Oral Health Services Division (OHSD). Services are provided free of charge to all residents as specified in the Constitution of Seychelles. Decisions within the public oral health system are also guided by related public policies as previously discussed in the chapter.

The oral health services provided by the OHSD are delivered in all three of the health care levels and is headed by a Director. The majority of the districts have a primary health care facility, which include dental services. At the time of data collection there were approximately 35 public dental surgeries offering primary oral health care services. These dental surgeries were distributed in district health centres and on school campuses on the three main islands of the Seychelles. The setting up of public dental surgeries were generally based on the need of the community, the demand of the community and/or dental staff, and the availability of the government funding. The setting-up of some dental surgeries based on demand of the community and/or staff has resulted in some areas having clusters of dental surgeries providing services for school children. The management of these dental surgeries is influenced primarily by the Ministry of Health through the OHSD and Biomedical Unit budget.

The majority of oral personnel in Seychelles are employed by the government. The ratio of dentist, dental hygienists and dental therapists in Seychelles is summarized in table 3.1 below.

Table 3.1: Showing the population to dental practitioner ratio for 2016, 2017 and 2018

Year	Population in Seychelles	Dentist to population	Dental Hygienist to population	Dental Therapist to population
2016	94205	1:4246	1:13457	1: 744
2017	95843	1:2785	1: 13457	1: 744
2018	97199	-	1:4966	1: 744

(National Bureau of Statistics, 2017a; National Bureau of Statistics, 2017b; National Bureau of Statistic, 2019; OHSD, 2019).

The decrease in dentist ratio was due to the recruitment of additional dentists in public dental clinics and the opening of new private dental clinics. The ratio of dentist to population in Seychelles in 2016 was lower compared to Africa where the ratio is 1:150000, but was higher than most industrialized countries with a ratio of 1:2000 (WHO, 2020). Seychelles is a small country in comparison to other African countries. Despite Seychelles having a similar ratio to industrialized countries in 2016, treatments delivered were oriented more towards emergency dental care rather preventive dental care. It was therefore important to understand what influenced provision of dental care to be oriented towards curative services rather than preventive in Seychelles.

A decrease in dental hygienist ratio was also observed in 2018. This was due to the training and recruitment of a cohort of dental hygienists at the National Institute of Health and Social Studies (NIHSS). Clearly, from Table 3.1 it can be argued that there should be an improvement in the population's oral health with the recruitment of additional oral health professionals who are more involved in prevention. This is not the case in the Seychelles as the number of individuals affected by oral diseases and who are accessing dental services on emergency basis is increasing. This suggests that promoting oral health should not be the sole responsibility of oral health professionals, but rather through the adoption of an interdisciplinary approach where there is the involvement of other health or non-health personnel (Alma Ata Declaration, 1978; Chidzonga et al., 2015; Astana Declaration, 2018). The inclusion of oral health in general primary health care, and the strengthening of community participation as stipulated in the Ottawa Charter (WHO:1986) are therefore crucial in Seychelles. Integration of oral health with the health system is recommended and is an attribute of an ideal oral health system (Tomar & Cohen, 2010; Adeniyi et al., 2012; Kandelman et al., 2012) as discussed in the previous chapter.

Prior to 2020, the scope of practice of dental therapists was limited to children, except for scaling and polishing which could be provided to all age groups. The restriction in the dental therapists' scope of practice was due to the level of qualification. Dental Therapists who have upgraded to a degree level qualification can now perform certain dental procedures on adults under the supervision of a dentist. Preventive oral health care is still a major component of the duties of dental therapists with a Bachelor's degree. Restrictions of duties for the dental hygienists and dental therapists due to their respective scope of practice often poses challenges in terms of optimal provision of dental services. Bureaucracies often resulted in unnecessary delay for adults to access preventive dental care, hence oral disease progression and poorer oral health outcomes. For example, to access clinical services from a dental hygienist, an individual has to obtain a referral from a dentist or dental specialist. Long waiting time due to this bureaucracy often deter patients to access periodontal therapy. The delay to manage periodontal diseases results in disease progression and inevitably tooth loss. In Seychelles dental hygienists and dental therapists have a similar scope of practice for preventive services, whereas the scope of practice for the provision of clinical services is different. For example, dental hygienists are not allowed to extract teeth or place permanent restorations whilst the dental therapists can. Some of the functions of dentists, dental hygienists and dental therapists are illustrated in Table 3.2 below to provide an understanding and comparison of the roles of each profession.

Table 3.2: Functions of dentist, dental hygienist and dental therapist at the OHSD

Dentist	**Dental Hygienist**	**Dental Therapist**
Extractions	-	Simple only
Restorations (filings)	Non- Invasive	Yes
Crown and Bridge	-	-
Endodontics (RCT)	-	-
Dentures	-	-
Orthodontics	Yes	Yes
Scaling and polishing	Yes	Yes
Local anaesthesia	Yes	Yes
Radiology	Yes	Yes

Fluoride therapy	Yes	Yes
Oral health promotion	Yes	Yes

(SMDC 2021; HPC 2021)

There are currently no universities in Seychelles to train dental professionals. The National Institute of Health and Social Studies (NIHSS) offer certificate and diploma programs only. Such include diploma in nursing, pharmaceutical science, environmental science, dental hygiene whereas certificate programs are in dental surgery assisting, and health care assistants (similar to nursing assistant). Training is based on the country's needs and demands. Selected degree courses are done at the NIHSS in collaboration with foreign universities, similar to the upgrading of dental therapists to degree level. All dentists, dental laboratory technologists and dental specialists working in Seychelles are trained overseas. This creates a work diversity based on training background which in turn appears to influence treatment preference. For example, dentists trained in more developed countries such as New Zealand are more oriented towards preventive dentistry compared to dentists trained in developing countries. Moreover, majority of the dentists and dental specialists working in Seychelles are foreigners. This at times creates language and cultural barriers in the dental clinic. Furthermore, the recruitment of foreign oral health workforce impacts on the provision of care. Majority of times foreign dental professionals recruited to work in Seychelles have been exposed to private practices where the focus is more on curative rather than preventive. Such choices of service provision are mostly adopted and delivered when they are employed in Seychelles. All allied dental staff such as dental therapists, dental laboratory staff, dental surgery assistants and dental hygienists are Seychellois.

Public oral health staff are distributed in the different state health facilities and state school campuses to provide oral health services. The community dental team consists of dentists, dental hygienists, dental therapists and dental surgery assistants. Despite preventive services such as oral health screening, fluoride therapy and oral prophylaxis being offered by public dental clinics, data shows that adults mostly utilized these facilities for dental emergencies or on a walk-in basis for the management of dental caries (Oral Health Services, 2020). This is partially due to factors operating at the level of the oral health system. For example, long waiting time to access preventive dental care results in the public coming to the dental clinic when there is an emergency or they are in pain. The presence of pain mostly signifies disease

progression associated with the delay to access preventive dental care. Booked patients in a minority of state dental facilities are seen around 11am whilst the remaining clinics see patients on an appointment basis in the afternoon. The time that appointments are booked is dependent on the staff and the average number of walk-in patients seen daily. On average dentists will see between 8 to 12 walk-in and 4 appointment patients daily. The appointed patients are usually booked for follow up treatments; such includes Root Canal Treatment (RCTs), prosthetic work, or placement of permanent restorations. The general perception amongst dental staff is that the workload due to walk-in patients is heavy resulting in the type of treatment offered being compromised. For example, a temporary dressing is placed in a tooth rather than a permanent restoration which is stronger and longer lasting in comparison to temporary restorations. Heavy workload often results in patients being turned away if they are not in unbearable pain. Moreover, there is an informal / implicit agreement that patients are expected to come early in the morning if they want to see the dentist without an appointment. Table 3.3 describes the attendance for adults attending public dental clinics in Seychelles in 2017 and 2018.

Table 3.3: Describing attendance at the OHSD in 2017 and 2018

	Attendances – Walk in	**Attendance – Appointment**
2017	25366	5714
2018	30090	7396

(OHSD, 2018; OHSD, 2019)

In 2017 and 2018, extractions, dental filings, Root Canal Treatments and fabrication of removable prosthesis accounted for approximately 75% of procedures performed on adults by dentists. Only 20% and 19% of routine dental check-ups were performed respectively on adults out of the total dental procedures/interventions done at public dental facilities. It is evident that the interventions are geared towards the management of dental caries aimed at treating and reversing dental conditions, and restoring functions. For example, extractions or dental fillings for the management of dental caries, or acrylic dentures to replace lost teeth. The overall goal is to improve quality of life such as mastication, speech or being absent from pain. Contrary to this, amongst the children population dental care was a combination of curative and preventive dental care in 2017 and 2018 in Seychelles (Oral Health Services Division, 2020). Despite this combination, dental caries is still increasing amongst the child population.

There are only 3 secondary health care facilities, and at least one tertiary health facility located near the main town in Seychelles. Most secondary care and tertiary care involve the treatment of oral disorders such as surgical management of oro-facial cysts, oral cancer and facial trauma which requires specialised care and is provided by dental specialists. The team consists of orthodontists and maxillo-facial surgeons. Private dental clinics are distributed mostly around the town areas where the majority of businesses are located. The distribution of public and private facilities in Seychelles is similar to worldwide trends where services are offered from regional or central hospitals of urban centres (WHO, 2020). There is currently no dental insurance or third-party payment in Seychelles. As per the constitution of Seychelles, public dental services are provided free to all residents. Individuals accessing private dental services have to pay cash. There is only one public dental laboratory in Seychelles but there are private dental laboratories.

The next section will discuss the different oral health programmes offered by the Oral Health Services Division.

3.4.3 Oral health programs

The Oral Health Services Division implements numerous oral health programs in the population aimed at improving the oral health of specific population groups as summarized in Table 3.4 below. These programs are mostly implemented by dental hygienists and dental therapists. The focus of these programs is not limited to oral health but rather improving quality of life through the adoption of a common risk factor approach. Interprofessional collaboration or referrals from other disciplines is mentioned in some of the programs. Despite this the involvement of other health disciplines is low during implementation. This could be due to the priority and importance of oral health amongst other health disciplines.

There are numerous policies or strategic documents which guide these oral health programs. Such includes the National Health Policy (2016), Seychelles National Health Strategic Plan (2016 -2020), Seychelles Strategy for the Prevention and Control of Non-Communicable Diseases (2016-2025) and the National School Nutrition Policy (2008). These documents have been discussed earlier in the chapter.

Table 3.4: Summary of oral health programs offered at the OHSD

Program	**Program activities**	**Target population**
Maternal Child Oral Health Program	- Oral health education - Dental checkups - Fluoride therapy - National Tooth brushing program targeting public Creche 2 children	- Children aged 0 to 6 years - Mothers with children aged 0 to 6 years
School Oral Health Program	- Oral health education - Dental checkups - Fluoride therapy - Fissure sealant	- Children aged 7 to 17 years
ANC program	- Oral health education - Dental checkups - Interventions according to oral health needs	- Pregnant women
Diabetes program		- Diabetics
Elderly program		- Elderly in institutional homes
Seychelles People Defence Forces program		- Army recruits - Soldiers

(OHSD, 2020)

There is no effective referral system for some of these programmes mentioned above. Moreover, the coverage is low. An individual can access the activities only in areas offering the services which is dependent on availability of dental staff, such as, dental therapists and dental hygienists, who are primarily responsible to run the oral health preventive part of the programmes. Hence oral health programmes are dependent on the ratio of dental therapists and dental hygienists to the population as shown in Table 3.1. These oral health professionals are involved in the provision of clinical and non-clinical care whereby their core function is to prevent oral diseases and the promotion of good oral hygiene practices. With the increase in number of periodontal diseases and dental caries as shown in past surveys results and empirical evidence, clearly the coverage of oral health programs is not adequate. Currently, there are

minimum to no records or evidence on the impact of oral health programmes in Seychelles. This is due to programmes rarely being evaluated. In order to meet the challenges associated with burden of oral diseases and the needs of the population effectively, public health care administrators and decision-makers need information to assess and monitor health needs, and choose intervention approaches (Petersen, 2003). Monitoring and evaluation of programs is therefore important. Therefore, in Seychelles, the lack of coverage, monitoring and evaluation of oral health programs are impacting on the occurrence and progression of certain oral diseases that can be easily prevented, and is a seminal factor for the increase in dental caries amongst children as highlighted earlier from survey data. Moreover, oral health promotion should not be limited to programs but strategies that create public policies and fostering community actions to improve self-efficacy and self-reliance.

In addition, low programme coverage is due to dental therapists focusing on clinical care rather than prevention. Despite a high percentage of the training and scope of dental therapists involving oral disease prevention, it is the dental hygienists who are involved in most oral health promotion activities in Seychelles. In order to scale up non-clinical prevention, the need to train more oral health personnel involved in oral diseases prevention and oral health promotion is therefore required and crucial in Seychelles. Moreover, there is also the need to strengthen the existing oral health professionals' roles and responsibilities towards prevention. As Bhayat and Chikte (2019) explained, an effective and efficient oral health care system needs the correct quantity and mix of dental workers who are delivering suitable quality care in areas of greatest requirement to the individuals who need them the most.

Furthermore, the lack of infrastructure to support oral health initiatives poses a significant obstacle. The lack of space in health facilities and insufficient interprofessional collaborations during programme implementation often results in the suspension of oral health promotion activities in numerous facilities. Allocation of rooms in facilities for health programmes is based on the country's priority. Vaccinations, Child health, Antenatal Care (ANC) and diabetes are usually top priority as these are some of the country's health priorities as discussed earlier in the chapter.

Furthermore, the visibility of oral health in Seychelles is low in comparison to other health units. Access to oral health messages is mostly limited to the dental clinics. Dissemination of media messages is dependent on the availability of funding from other health units as explained

earlier. The lack of oral health promotion activities/programmes therefore has an impact on the knowledge, belief and practices of the population, such as, development of personal skills to maintain good oral hygiene.

Often insufficient funding has an impact on these programs and how the OHSD is governed as will be discussed next.

3.4.4 Funding for oral health

In Seychelles, public dental services are financed by the government through the national health budget (Ministry of Health, 2016a). Despite securing a specific proportion of the Ministry of Health budget, the finance received by the OHSD is not adequate to ensure the proper functioning of the oral health services. The budget received is usually below the requested amount which has an impact on service delivery. The majority of the funds received are directed towards the purchasing of dental materials (consumables) for public health facilities. Most of the consumables and equipment needed for the provision of oral health care are not manufactured locally, and are therefore costly to buy. Materials or items which need to be procured and that are not classified as consumables have to be requested in a separate Health Care Agency (HCA) budget or funding in the form of donations is sought. Such includes funding for oral health promotion activities, printing of information education communication (IEC) materials or to support programs. This impacts on the sustainability of these activities and programs.

Salaries, funding and creation of job posts for the public dental staff are determined by the Department of Public Affairs (DPA). This is based on set criteria which focus on the country's employment priority and employment policies. Oral health often being low priority amongst policy makers and politicians often results in insufficient allocation of funding for the training and recruitment of dental professionals by the DPA. Moreover, low salaries compared to other countries impact on the retention of Seychelles dentists and dental specialists due to the migration of these professionals to more affluent countries. Overseas recruitment frequently results in the employment of dentists and dental specialists of different cultural and language background, and of lower attributes which poses challenges to the oral health system and for the patients. For instance, low salaries implied the recruitment of dentists or dental specialists who do not speak creole and with sub-standard clinical skills. This resulted in communication challenges, and the wastage of clinical resources due to staff inefficiency.

3.4.5 Oral health policy and strategic plan

At the time of this research there was no national oral health policy and strategic plan in Seychelles. In 1999 an oral health policy (2001-2010) was drafted and put on hold. The vision of the draft policy was that within the next 10 years there was the setting up of a comprehensive oral health care system completely integrated with general health and founded on the principles of primary health care, with importance placed on promotion of oral health and prevention of oral disease. Moreover, the policy stated that the oral health system shall also have accommodations for curative and rehabilitative care, within the existing resources, so that every people and all communities were guaranteed of improved levels of oral health and function. The reason for the lack of policy implementation is uncertain. Despite the lack of policy and strategic plan documents, the OHSD is guided by the HCA and Ministry of Health strategic plans and policies which have been discussed earlier. The next section will discuss how the socioeconomic environment influences the oral health outcomes of the Seychelles population.

3.5 Socioeconomic environment

The oral health burden in the Seychelles could be related to the socio-economic environment. International studies have shown that there is a difference in prevalence or incidence of oral health problems between people of higher and lower socio-economic status (Hobdell et al., 2002; Petersen, 2003; Timis & Danila, 2005; Chidzonga et al., 2015). The social class structure in Seychelles has not been formally documented but there is a distinctive gap between the high income and low income. This difference in wealth contributes towards the diverse social landscape that exists in Seychelles today creating access to better lifestyle for the higher income holders whilst depriving others. A survey conducted in 2017/2018 in Seychelles concluded that the top 10% of the population were receiving 21% of income whilst the bottom decile was receiving 3% of the total income in the group (National Bureau of statistics, 2019). Moreover, the IMF economic programme implemented in 2008 has been a contributor in widening the income gap in Seychelles. Loss of jobs and increased costs of living resulted in more segments of society being classified in the less economically privilege categories, whereby the majority of people were aged between 36 to 62 years and were unemployed females (Temsegen, 2018).

Moreover, the 2017/2018 survey also concluded that 25% of participants were experiencing either moderate or severe food insecurity in the 12 months preceding the survey (National

Bureau of Statistics, 2019). Low income and food insecurities implied difficulty to access paid dental services in cases where there is a delay to access free dental care due to long waiting time, barriers to purchase dental products and having limited power to buy healthier food options. Furthermore, studies have also shown that economic hardship predisposes the disadvantaged individual to indulge in risk behaviours, such as, tobacco and increased alcohol consumption which places them at greater risks of developing oral cancer (Boing et al., 2011).

Furthermore, the current increase of illegal drugs in Seychelles has also resulted in an increase in unemployment in the population from 3.3% in 2012 to 4.37% in 2017 (Ministry of Foreign Affairs, 2013; The Global Economy, 2018). A study commissioned by the Agency for the Prevention of Drug Abuse and Rehabilitation (APDAR) in 2017 also concluded that 5.6% of the Seychelles population were heroin users and were aged 15 years and above. The high number of drug users suggest poorer oral health outcomes for this group who are at a higher risk of oral diseases such as dental caries and periodontal diseases due to poor/insufficient mouth care practices, high consumption of sugary products, teeth grinding, and enamel erosion from the drug itself (Cawson, 2012).

The level of education is also an indicator for good oral health outcomes (Petersen et al., 2003; Bourgeois et al., 2014). These authors argued that the higher level of education, the lower the possibility of losing teeth and the greater the chance of having 20 functional teeth when older. In Seychelles, enrolment for primary and secondary education is nearly 100 percent. Public schools are completely subsidized until secondary school. This implies that the population ought to have a greater chance of good oral health outcomes in comparison to countries with lower educational levels. The high incidence of dental caries and periodontal diseases in adults and children concluded by the various surveys conducted in Seychelles shows that the level of education did not translate into better oral health outcomes. The causes of oral health problems in the Seychelles is multifactorial. Lack of inclusion of oral health in the school curriculum was a contributing factor. This absence together with lack of oral health programmes such as tooth brushing activities, smoking campaigns and dietary counselling in public schools resulted in the public being unware of positive behaviours that will lead to positive oral health outcomes.

Moreover, media advertising has the potential to influence the population's opinion and practices. Prohibition in the advertising of alcohol is limited to television, whilst there is no

prohibition on the advertising of unhealthy food and beverages. Loop holes in policies therefore creates opportunities for commercial companies or individuals to sell their products even though there may be a negative impact on oral health behaviour. The gap in policy is the result of insufficient or no consultations between stakeholders during policy development.

3.6 Summary of the chapter

This chapter portrayed the research context with a focus on the socio-economic and health landscape of the Seychelles and which seemingly has an influence on the oral health outcomes of the adults. Different factors related to the macro-environment such as integration of oral health in policies and regulations, political priority, funding, and socioeconomic status were found to contribute towards oral health disparities and poorer oral health outcomes among the Seychelles population. Furthermore, the nature and structure of the health system was also a key contributor towards poorer oral health outcomes in Seychelles through the organization of work distribution, service provision and management of oral health. The chapter highlights the importance of policies for good oral health outcomes, the need to adopt a primary health care approach to improve oral health, and the need to have an effective oral health care system. The next chapter presents the theoretical framework which is developed through an interrogation of particular concepts, existing theories and definitions and which will provide a lens for the rest of the study.

CHAPTER 4: THEORETICAL FRAMEWORK

4.1 Introduction

The chapter conceptualizes the themes of the research questions which are based on the following parameters: public health, oral health, and determinants of oral health. It starts out to describe these and other concepts that were used as lenses to comprehend and analyse particular subjects, in terms of how determinants influenced the oral health of adults in Seychelles. Lastly, the chapter proposes an evidence-based theoretical framework specific to the Seychelles context that would inform future policy and practice regarding oral health.

Public health, oral health and determinants of oral health will be explained in three sections. The initial section describes the term *public health*, with specific focus to the field of dentistry. The second section explains the term *oral health* in the context of public health, whilst the third section which is seminal to this study provides an understanding on *determinants of oral health*. The framework of Lee and Divaris (2014) is used as a lens to understand and explore the influence of determinants on the oral health of Seychellois adults. It was crucial to use other models to gain an in-depth understanding of how these determinants operated to influence oral health. The extended Health Belief Model (HBM) (Rosenstock et al., 1988) and the Oral Health Systems Evaluation model suggested by the World Health Organization (Petersen, 2003) were also used as lenses in the current study.

4.2 Public health in relation to dentistry

As mentioned in the introduction chapter (Chapter 1) public health is the discipline of guarding and improving the health of people and their communities where they learn, live, work and play (APHA, 2021). In the context of dentistry, public health orientates towards protecting and improving the oral health of the population by reducing oral health disparities. Public health is also aimed towards increasing control over one's health and increasing self-reliance (APHA, 2021). The current study is set in the public health field as it aims to identify oral health disparities which put adults in Seychelles at a disadvantage to achieve positive oral health outcomes. Moreover, it was important to understand the person-level factors which reduced self-reliance. It was therefore important for the researcher to understand and acknowledge the principles and policy guiding public health at the onset of the study.

4.3 Oral health in the context of public health

The definition of oral health varies amongst organizations and authors. Conventionally oral health was described as the absence of diseases which fails to account for a person's values, expectations and perceptions (Glick et al., 2016). In the recent years, this definition has changed in order to recognise determinants of oral health. In 2016, another definition of oral health was accepted by the FDI World Dental Federation General Assembly (Glick et al., 2016). Oral health was defined as multi-layered and comprises the capability to smile, speak, touch, taste, and express a range of emotions by means of facial expressions with confidence and without discomfort, pain, and disorder of the craniofacial complex. According to Glick et al. (2016) the new definition raises awareness of the different dimensions of oral health and highlights that oral health does not happen in separation but is fixed in the broader structure of general health. Other definitions highlight oral health as essential to good health and well-being (WHO, 2020b; Health People 2020; Peres et al., 2019). The FDI definition of oral health was deemed by the researcher to be relevant in the current study. This is because the researcher recognized that oral health was not merely the absent of diseases but was influenced by multi-layered determinants operating at macro level, community and population level, and person level. It was imperative for the researcher to therefore recognized and acknowledge the different dimensions of oral health at the start of the study. The next section will discuss in greater detail the determinants of oral health.

4.4. Determinants of oral health

4.4.1 Understanding determinants of oral health

Despite the many developments in the disciplines of oral health, including the advancement of diagnostic, preventive and therapeutic agents and approaches, oral health inequalities persist between population groups that are diverse (Lee & Divaris, 2014). Moyses (2012) adds that it is crucial to have a greater understanding of the reasons of people's actions, that is, the cause of the cause, to understand why people behave the way they do. Patrick et al. (2006) add that these are processes and mechanisms called *determinants* that function at all levels of society. These determinants of oral health inequalities signify a complex combination of cultural, biological, behavioural, economic, social and political factors. Moyses (2012) further states that there is interaction among behavioural, intrapersonal and environmental determinants. Moyses (2012) and Patrick et al. (2004) explain that behaviours are associated with the circumstances, in which people are born, work, live and age. Furthermore, even though people make choices about how to conduct themselves, these choices happen within historical, family,

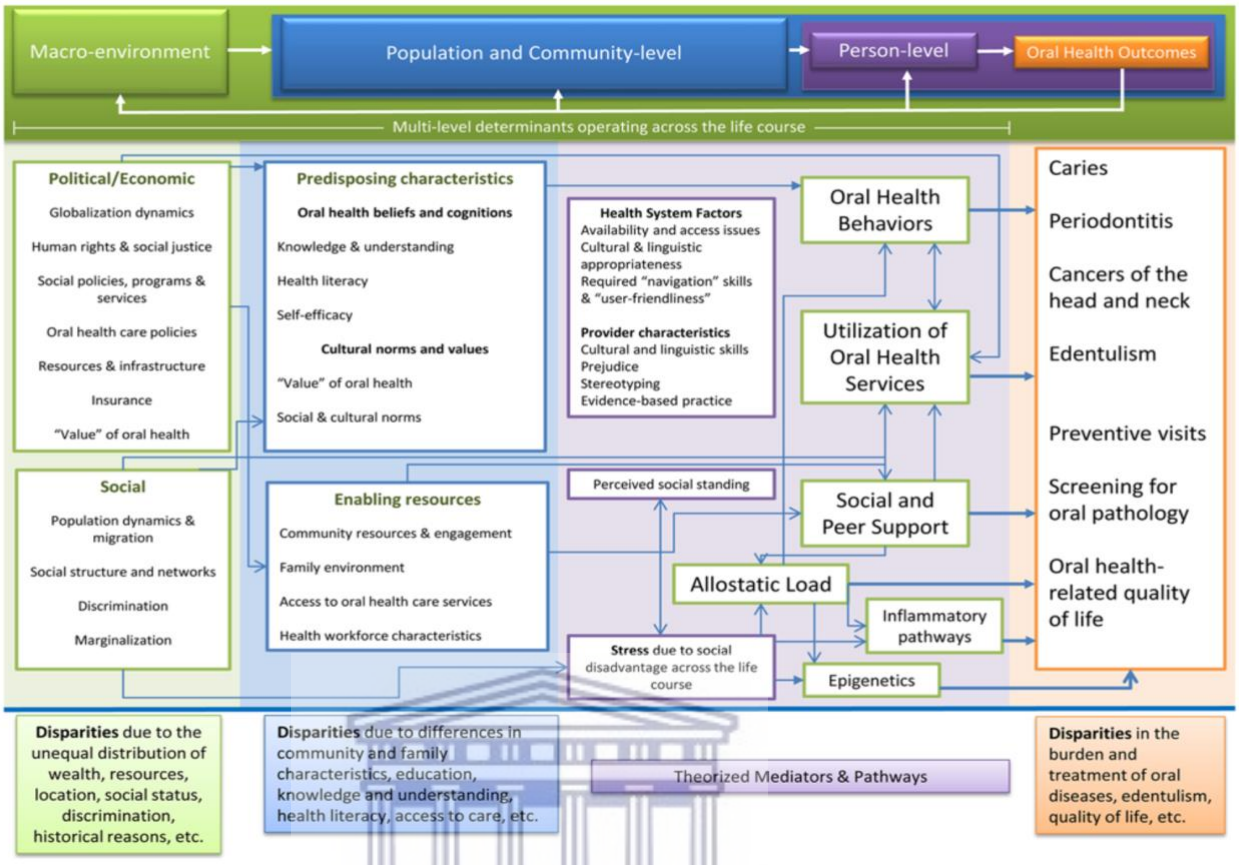
political, cultural and economic context. Actions to tackle oral health disparities will only be achieve if the underlying reasons of social disparities in society are addressed (Watt, Do & Newton, 2015). Moreover, recognizing and understanding these causes and their pathway of influencing oral health knowledge, behaviours, utilization of care and eventually oral health, are the fundamental steps towards attaining solutions to these disparities (Tiwari et al., 2017).

4.4.2 Conceptualizing oral health disparities

In the field of public health, several models or frameworks exist for conceptualizing oral health disparities. Such includes the framework by Patrick et al. (2004), and Lee and Divaris (2014). Health disparities has been defined as dissimilarities in health outcomes and their causes between sections of the population, as described by social, environmental, demographic and topographical attributes (US CDC, 2013).

In the current study, the framework by Lee and Divaris (2014) was used as a lens for guiding the identification and understanding of determinants of oral health in Seychelles. Concepts in the framework were used to guide the process of coding and generating 'a priori' codes and themes during the data analysis stage of the research. A 'priori codes' is defined prior to data collection (Gibson & Brown, 2011; Robson, 2011; Given, 2012). Through the data analysis process, concepts and themes that were not identified in the framework of Lee and Divaris (2014) were added. This resulted in a modification of the framework as analysis progressed resulting in a modified framework applicable to the Seychelles context. Modification of the framework is discussed during the data analysis chapters because it here that the concepts unfolded and shaped the adapted framework

Figure 4.1 Lee and Divaris's framework conceptualization of the sources of oral health disparities (Lee & Divaris, 2014).



The framework by Lee and Divaris (2014) is an amendment of Andersen's behavioral model and adds on earlier work on the multi-level impacts of oral health (Fisher-Owens et al., 2006), together with oral health inequalities (Patrick et al., 2006; Watt and Sheiham, 2012). This section highlights the essence of Lee and Divaris' framework (2014) which guides the identification of the determinants influencing oral health disparities in Seychelles. The framework conceptualizes the influence of determinants operating at 3 levels on oral health outcomes: macro-environment, population and community level, and person level. The framework also identifies mediators and pathways which have an influence on oral health outcomes. Although this was the most relevant framework identified, many aspects did not fit the Seychelles context. It was therefore crucial to amend the framework slightly in order to portray a better understanding of the determinants influencing the oral health of adults in Seychelles. The determinants and related concepts used by Lee and Divaris (2014) are discussed in below. Their relevance to the Seychelles context is also debated.

4.4.2.1 Macro-environment determinants

The framework proposed by Lee and Divaris (2014) recognizes that there is a bidirectional connection among macro-level characteristics and health statuses involving the function of economic growth, population and societal dynamic, resources and infrastructure amongst others. Similarly, the framework by Patrick et al. (2004) identifies macro level factors as the broadest level where inequalities are created and recreated by political, social, economic and cultural powers. Lee and Divaris (2014) further stated that socio-economic status is known to cause 3 major health determinants at a lower level – health behaviour, health care and environmental exposure.

In order to conceptualize macro-environment determinants, it is essential to frame an insight of other narrowly connected concepts. The concepts central to macro-environmental determinants according to the framework by Lee and Divaris were divided into two groups. Firstly, *political/economic* which includes globalization dynamics, human rights and social justice, oral health care, resources, infrastructure and social policies. Secondly, *social* which includes discrimination, marginalization, and population dynamics and migration. These concepts are debated next.

Political/economic

Globalization dynamics refers to the process by which goods and people move easily across borders (Goldman et al., 2008; Alsuraim & Han, 2020). Globalization processes such as economic development, urbanization, free trade liberalization and education has been linked to nutrition transition (Alsuraim & Han, 2020; Athavale et al., 2020). In the current study the processes of globalization were used to understand the influence of nutrition transition and marketing on population/community level factors, oral health behaviour, and oral health outcomes of the Seychellois population. Moreover, '*economic globalization'* was used to explain the uneven distribution of wealth and how it created disparities in the level of oral diseases amongst population groups.

Human right is another macro level factor identified in the framework by Lee and Divaris (2014) and was found useful in the current study. *'Human Rights'* are rights inherent to all human beings, irrespective of sex, race, ethnicity, nationality, religion, language or other status (United Nation. Human Rights). *Social justice* is not a term that can be easily described, but is linked with the belief that all people and groups should be treated with fairness and respect,

and that each and every one is entitled to the resources and benefits (Shriberg et al., 2008). Access to basic oral health is an urgent human rights issue. Patrick et al. (2004) stated that social groups with less resources may be less likely to query about the unfair sharing of wealth and power, therefore intensifying their susceptibility to discrimination and unfair treatment. The framework by Lee and Divaris (2014) recognizes *human rights* and *social justice* as important perspectives in order to address oral health disparities. Moreover, Patrick et al. (2004) added that to fight inequalities in oral health, members irrespective of social position should have rightful access to oral health care. In the current study, access to basic oral health as a human right and social justice in relation to sex, physical ability and gender was considered.

Moreover, according to Lee and Divaris (2014), the burden of oral disease is especially elevated among underprivileged and deprived population groups in both developed and developing countries signifying that social stratification plays a detrimental effect on oral health. *Marginalization,* and *discrimination* are concepts used in the framework by Lee and Divaris (2014) which are the result of the inequality in distribution of resources, wealth and health services amongst the population groups. This results in the disadvantaged and poor population group being marginalized and discriminated. According to Lee and Divaris (2014) some characteristics linked to *discrimination,* exclusion or *marginalization* include sexual orientation, gender identity, and physical disability. For example, older people visit the dental clinic less often than the general population, are in poorer oral health, and this results in them having a lower quality of life.

Social policies, programs and services

Social policies, programs and services are recognized as the most effective strategies to enhance health within the population, and to decrease health disparities (Watt, 2007; Moyses, 2012; Aguiar et al., 2018). There are numerous policies, programs and services which directly or indirectly influence oral health outcomes. In the current study, the focus was on regulations, legislation and programs pertinent to dental caries, periodontal diseases, oral cancer and facial injury/trauma as these are the oral diseases commonly observed amongst the Seychelles population. The effect on the oral health system at the population level, and inevitably the likelihood of behaviour at the level of the person was determined in order to answer the research questions.

Resources and infrastructure

The framework by Lee and Divaris (2014) also recognizes *resources and infrastructure* as a determinant for oral health disparities. According to the framework resources refers to economic, political, social and environmental resources, whilst infrastructure is related to the access to oral health care. Patrick et al. (2006) classifies environmental resources into three categories. Firstly, *physical environment* is the availability of artificial water fluoridation, location of dental services, and the presence of sugar in the environment. *Social environment* is the community education and practices, and the availability of oral health in school curricula. Lastly, *cultural environment* which encompass belief and values. In the current study, the same principles by Lee and Divaris (2014) were used to answer the research questions.

Insurance

Dental insurance is mostly thought as one of the key links to sustaining good oral health (Patrick et al., 2004; Lee & Divaris, 2014). Furthermore, empirical research has shown that insufficient access to dental insurance is a cause for the prevalent dental caries in youngsters (Patrick et al., 2004). Contrary to Lee and Divaris's framework (2014), the current study did not aim to understand how *dental insurance* contributed towards oral health disparities. This is because there are no dental insurance packages in Seychelles.

"Value" of oral health

"Value" of oral health is another determinant of oral health disparity in the framework by Lee and Divaris (2014). This is because opposing values may defer the acceptance of effective preventive behaviours. According to Patrick et al. (2004), poor teeth and poor oral health have diverse meanings to separate sections of society, and beliefs combined with perceived available options may impact on what people are keen to do to prevent oral problems. For instance, some individuals may think that tooth loss is unavoidable, irrespective of what they do. In current study, *"Value" of oral health* was integrated with culture at the level of the population, and belief at the level of the person. This is because values are related to belief, worth and benefits. As culture is a collective belief, and values are related to belief the researcher felt that they should be grouped under similar themes.

Social

The framework by Lee and Divaris (2014) recognizes *population dynamic and migration* as a contribution to differential access to oral health care. The influence of *population dynamic and*

migration on the Seychellois culture was considered in the current study. This was done to help understand the beliefs and practices of certain population groups.

The framework by Lee and Divaris (2014) acknowledge *social structure and networks* as a determinant of oral health disparities. *Social structure* is substantially composed of cultural constructs such as expectations, identities and categories (Fuhse, 2009). On the other hand, *social network* is based on the interactions and personal relations amongst a group of people which makes a network culture (Fuhse, 2009). In explaining their framework, Lee and Divaris (2014) used the terms social and economic position, religion, racial or ethnic group, education, age, and gender to describe disparities due to social structure and network. In the current study, social and economic position, education, age, and gender were used. Contrary to the framework by Lee and Divaris, *religion* was not considered in the current study. The next section will discuss population and community level concepts identified by Lee and Divaris (2014).

4.4.2.2 Population and community-level

Population and community level determinants are factors such as the physical, economic, social and cultural environment of a specific community (Patrick et al., 2004). The framework by Lee and Divaris (2014) classifies population and community level factors into 2 main concepts – Predisposing characteristics, and enabling factors. These two main concepts are discussed below.

According to Lee and Divaris (2014) *predisposing characteristics* are risk-increasing factors. Such include knowledge and understanding, health literacy, self-efficacy, "value" of oral health, and social and cultural norms. *Enabling resources* refers to protective factors (Lee & Divaris, 2014). Such include family environment, community resources and engagement, access to oral health care services and health care workforce characteristics. These are discussed below.

Knowledge and understanding, and Health literacy

Health literacy similar to oral health literacy is the process of obtaining and trusting information, understanding concepts, skill development and technique-intensive procedures, and utilizing them properly (Horowitz & Kleinman, 2012). Healthy People 2010 first defined oral health literacy as the *"degree to which individuals have the capacity to obtain, process and understand basic oral health information and services needed to make appropriate health*

decisions". Based on the two definitions, oral health literacy is partially linked to *knowledge and understanding*. *Oral health literacy* is accepted as a crucial determinant of health (Ueno et al., 2012; Baskaradoss, 2018). Inadequate health literacy is regarded as a contributor of poor oral health status in a person, poor health outcomes in a community and health disparities (Hongal et al., 2013). The framework by Lee and Divaris (2014) recognizes *health literacy,* and *knowledge and understanding* as determinants operating at the level of the population/community, but the mechanisms linking to individual health behaviour are not straightforward. Oral health literacy is an interplay between society and culture, the education system, health system and oral health outcomes (Horowitz & Kleinman, 2012; Sistani et al, 2013). In the current study, how culture, the education system, and health system impacted on oral health literacy was explored. Knowledge was grouped under person-level factors as it was recognized as a predisposing factor which influenced beliefs of individuals as discussed later in the chapter.

Self-Efficacy

Self-efficacy signifies an individual's belief in his or her ability to perform a particular action. The framework by Lee and Divaris (2014) recognizes self-efficacy as a population/community level factor which has an influence on person level factors and inevitably oral health outcomes. In the current study, self-efficacy was discussed as part of beliefs under person level factors. According to the extended health belief model (Rosenstock et al., 1988) self-efficacy is an important factor which determines an individual's likelihood of performing a particular behaviour. It was therefore imperative to group it under person level factor in the current study when discussing behaviour.

Value of oral health, and Social and cultural norms

Studies have shown that *social and cultural norms*, and the "*value" of oral health* have an influence on person level factors, and oral health outcome (Butani et al., 2008; Reddy & Anitha, 2015). Culture is reflected in faith and religious practices, language, social norms, health beliefs, family structure and social function (Butani et al., 2008; de Castilho et al., 2013). In addition, it is reflected in the manner in which preventive oral health services are utilized, and attention to mouth care practices (Fisher-Owens et al., 2007; Butani et al., 2008; de Castilho et al., 2013). The framework by Lee and Divaris (2014) recognizes the influence of social and cultural norms, and the "value" of oral health as a determinant operating at the level of the population/community. In the current study, the influence of cultural norms and values on the

oral health outcomes of Seychellois adults were explored in terms of (i) nutrition transition and dietary acculturation, and (ii) beliefs and practices. Nutrition transition and dietary acculturation are driven by globalization as previously mentioned in the chapter.

Community resources and engagement

Community resources and engagement has been identified by Lee and Divaris's framework (2014) as a contributor to oral health disparities. Communities with less resources may face greater environmental, psychosocial and social stressors (Patrick et al., 2004). Moreover, in affluent communities, people will be prone to have economic and political power to impact on the distribution of resources (Patrick et al., 2004). Similar to the framework by Lee and Divaris (2014), community resources and engagement was identified as a contributor to poor oral health outcomes. Unlike Lee and Divaris (2014), community resources and engagement were identified during the data analysis phase of this research as a predisposing factor as it increased the risk for poorer oral health outcomes.

Family environment

Family environment plays an important role in how individuals share experiences, and seek advice for symptoms (Patrick et al., 2004). The social network and dynamics may have a strong influence on individuals through collective lifestyles which is shaped by local values, customs, perceptions, and habitual practices (Patrick et al., 2004). For example, culturally specific food and personal hygiene practices are influenced by family, friends and relatives. Similarly to the framework by Lee and Divaris (2014) family environment was deemed as a contributor of oral health literacy. In the context of Seychelles, family environment was defined in terms of values, belief, financial status, and habitual practices such as tooth brushing, and use of home remedies.

Access to oral health care services, and *health workforce characteristics* have been identified in the framework by Lee and Divaris (2014) as enabling factors operating at the level of the population/community. These two factors are also recognized as pathways in their framework. These two factors will be discussed later in the chapter under the heading 'pathways'. Person level factors are discussed next.

4.4.2.3 Person-level factors

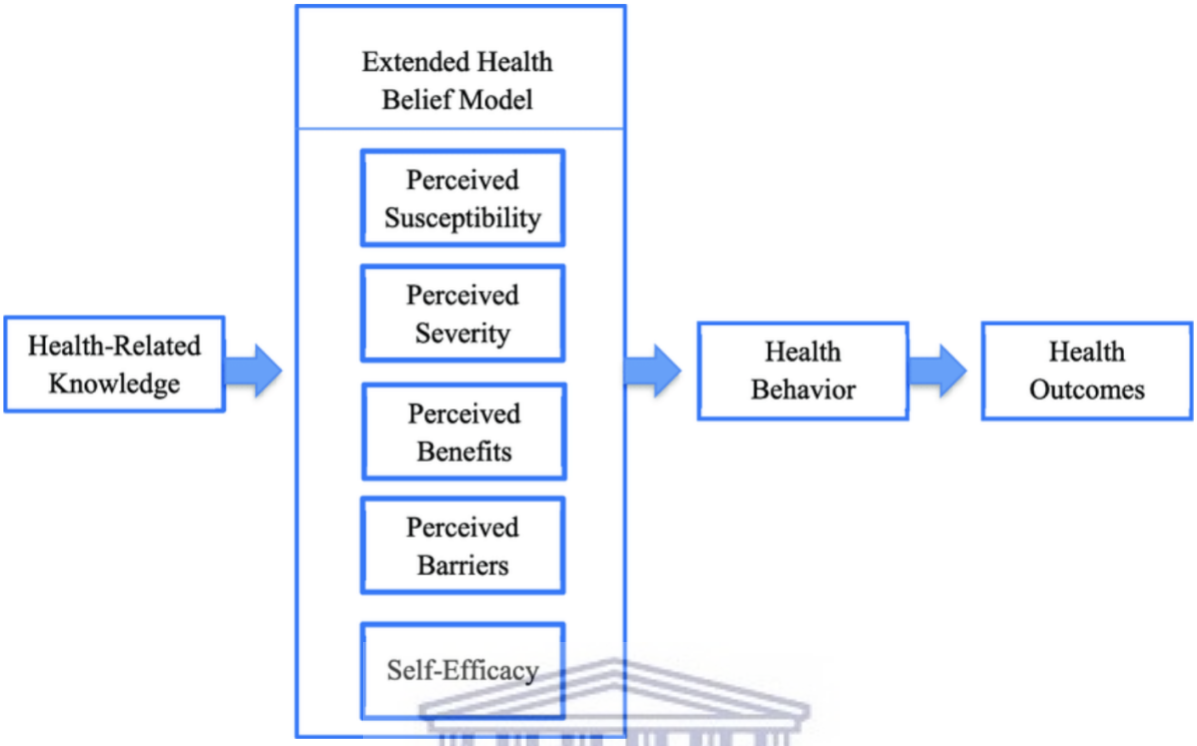
The framework by Lee and Divaris (2014) recognize the influence of person level factors on the oral health outcomes of the population. According to Lee and Divaris (2014) person-level

or ‘proximal’ factors are embedded within community and other ‘distal’ determinants in a tiered manner, which parallels their relative influence in inequalities. Patrick et al. (2004) further added that the emphasis at this point is the behaviours and beliefs of people who make up a community. Such include motivations, personality traits, personal preferences, values and health needs. Examples of the different concepts used by Lee and Divaris (2014) include oral health behavior, social and peer support, and utilization of oral health services. The manner in which the concepts are used in the current study is also debated.

Oral health behaviour

Oral health behaviour is recognized as crucial in determining the oral health outcomes of individuals. Health behaviour is described as the activities taken on by individuals to promote, safeguard or maintain health, to prevent health problems or to attain a positive body appearance (Cockerham, 2014). According to Lee and Divaris (2014), oral health behaviour encompassed the knowledge, attitudes (beliefs) and practices of individuals. In the current study, the term *oral health behaviour* reflected only the practices or activities undertaken by participants which had an influence on oral health outcomes. These include mouthcare regimens, the adoption of habits not conducive to oral health, and the utilization of oral health services. This was contrary to the manner in which Lee and Divaris defined oral health behaviour. Considering the above definition by Cockerham (2014), clearly oral health behaviour is about actions performed. As knowledge and beliefs are not actions, the present study did not categorize them as oral health behaviour, rather as factors which have an influence on the likelihood that actions are performed. The influence of belief on likelihood of oral health behaviour is discussed first, followed by knowledge.

Despite the framework by Lee and Divaris (2014) identifying oral health behaviour as a person level factor, the manner in which this determinant had an influence on oral health outcomes was unclear. The Extended Health Belief Model (Rosenstock et al., 1988) was therefore used as lenses in the current study to understand this influence. That is to understand the barriers influencing the adoption or likelihood of behaviour, and the factors influencing the cues to action. This was crucial so as to answer the research questions. The Extended health belief model (HBM) has been frequently used to predict individual health-related behaviours based on their beliefs (Rosenstock et al., 1988). Figure 4.2 illustrates the extended health belief model.



| Extended Health Belief Model.

Figure 4.2: Extended health belied model (Rosenstock et al., 1988).

According to the extended health belief model, a person must believe that s/he is susceptible to a condition (perceived susceptibility); that the condition is serious (perceived severity); that there is a successful intervention for the condition (perceived benefits); that they can overcome any barriers posed to using the intervention (perceived barriers); that they will have the self-efficacy required to execute positive oral health behaviours in spite of the barriers (self-efficacy); and if they are given guidance from the environment or themselves to perform these behaviours (cues to action).

Belief and knowledge

Belief was found to be influenced by predisposing and enabling factors, and perceived needs operating at the level of the person in the current study as explained later in the thesis. Knowledge was identified as a predisposing factor. *Knowledge* was classified as tacit and perceived in the current study. *Tacit knowledge* was defined as knowledge which is often derived from facts (Fugill, 2011; Jamshidi et al., 2018), and *Perceived knowledge* referred to knowledge based on opinion and prior experience (Liao et al., 2020).

Utilization of oral health services

Utilization of oral health services was identified by Lee and Divaris's (2014) framework as a determinant of oral health disparities. It refers to the number or percentage of the population who access dental services. Similarly, to family environment, *social and peer support* refers to the role of the family, friends and relatives on an individual's oral health behaviour and oral health outcomes. In the current study, these two terms had the same interpretation but differentiation was how they created oral health disparities at a population/community or person level. Pathways are discussed next.

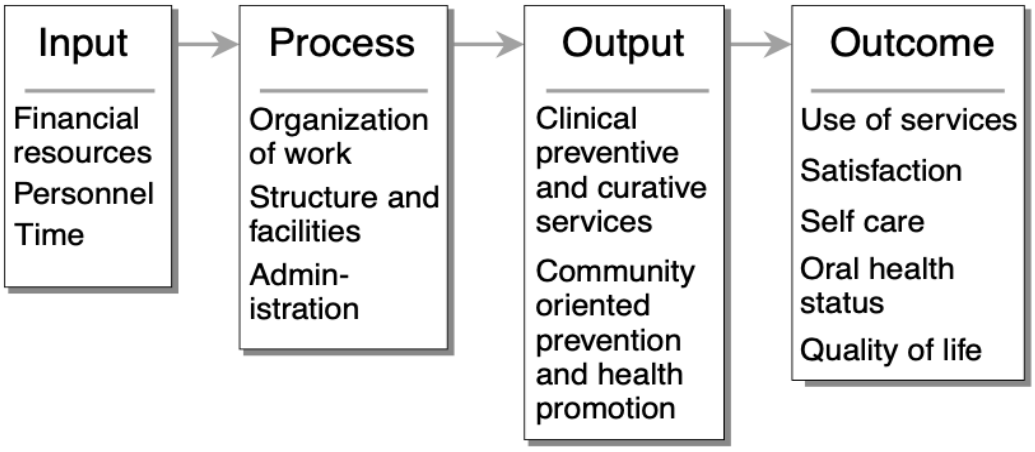
4.4.2.4 Theorized mediators and pathways

Pathways are mechanisms through which distal determinants affect oral health outcomes (Lee & Divaris, 2014). Health system and providers characteristics were identified in the framework by Lee and Divaris (2014) as pathways operating at the level of the population/community which affect oral health outcomes through person-level factors. Similarly, to the framework, the current study recognized the role of the oral health system and oral health providers in determining how population level factors such as oral health literacy, cultural norms and values, physical environment, and community resources and engagement influenced oral health disparities.

Oral health systems

Oral health systems are described as the combination of an organizations' flow of the finances, laws, workforce training and structure, and regulations which are intended at improving the oral health of people and communities (Klingenberger, 2008). According to Lee and Divaris (2014), health system factors are related to availability and access issues, cultural and linguistic appropriateness, and the required "navigation skills" and "user friendliness". Oral health systems that rely on public coverage demonstrated fewer disparities and were superior in their utilization compared with system which lacked public coverage (2014). As Tomar and Cohen (2010) explained an ideal oral health care system should be equitable, culturally competent, should place emphasis on oral health promotion amongst others in order to reduce disparities in oral health. In order to evaluate the oral health system in Seychelles, and understand its impact on the population/community level factors, a model proposed by the World Health Organization (Petersen, 2003) and the concepts by Tomar and Cohen (2010) as mentioned above were used to evaluate the oral health system. The Oral Health System Evaluation model by the WHO is shown in Figure 4.3 below.

Figure 4.3: Oral Health System Evaluation Model



Petersen 2002

The above WHO model has numerous categories. These include input, process, output and outcome. Analysis of the Oral Health System Evaluation model shows that "*Inputs*" are mostly evaluating macro level factors, whilst "*Outcomes*" are evaluating person level factors and oral health outcomes. "Process and Output" were felt by the researcher to evaluate the oral health system at the level of the population/community. "*Process and Output*" categories were operating beyond the level of the person, but not at the macro level. The focus of the current study was therefore on the processes and output to evaluate the oral health system.

Process is a set of interrelated health activities which transform input into output. Processes were therefore viewed as "*pathways"*. *Organization of work, structure and facilities and administration* were identified by the Oral Health System Evaluation Model (Petersen, 2003) as processes. In summary, these concepts refer to the coordination and distribution of oral health care which is based on the allocation of material resources and infrastructure, and the distribution of oral health providers (Petersen, 2003; Patrick et al., 2004; Lee & Divaris, 2014). *Provider characteristics* which is also recognized by Lee and Divaris (2014) as important determinants, forms part of the organization of work in the WHO model. Lee and Divaris (2014) stated that considerable barriers to positive oral health could be alleviated if there is a change in the characteristics of services providers. For example, the barrier of health literacy

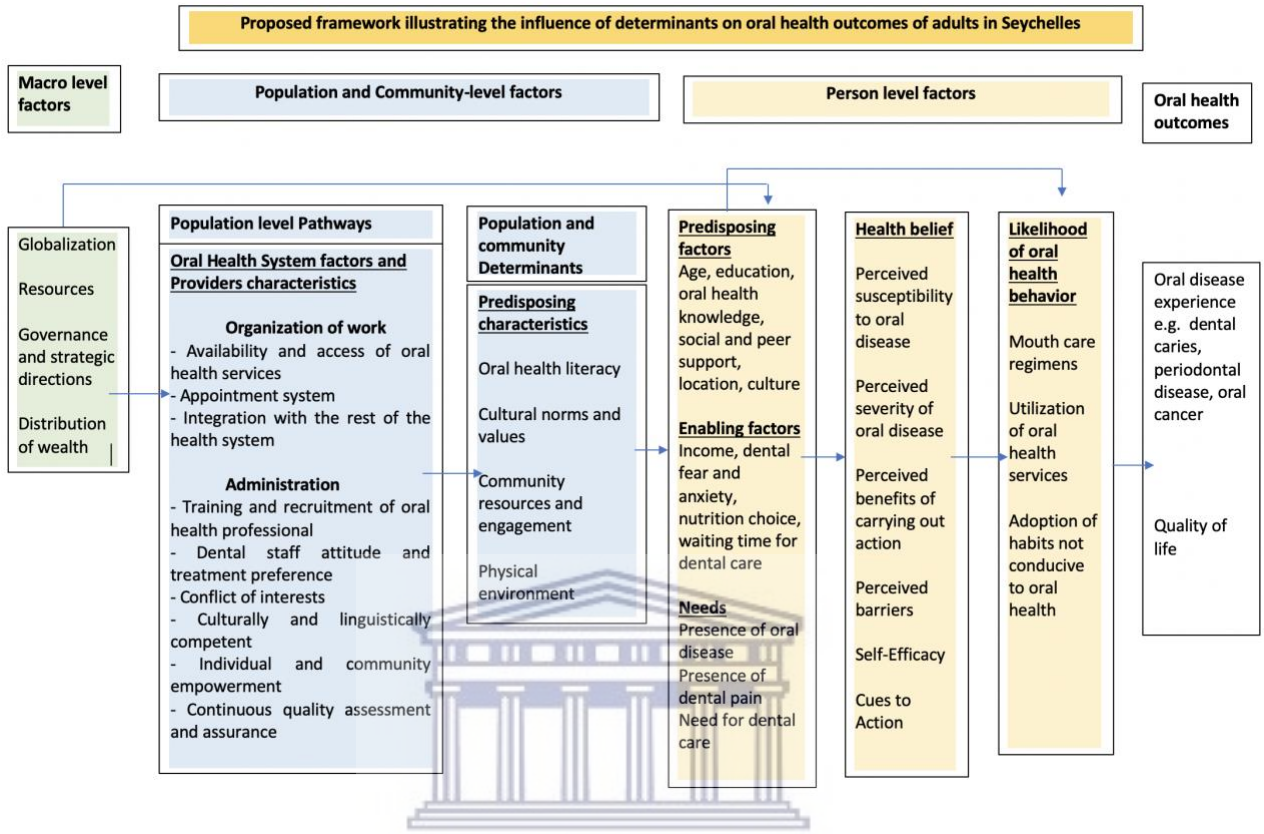
is certainly contextual and can be lessened if the requirements of navigating the oral health system, including language used by dental workers and the readability of health materials, are fitted to more culturally and literacy suitable levels. Cultural and linguistic skills, prejudice, and stereotyping are other concepts identified in the framework by Lee and Divaris (2014) which forms parts of processes in the Oral Health System Evaluation Model as they are related to administration, and the organization of work.

Lastly, *Allostatic load* or physiological consequences of *stress* and hardship is recognized as pathways in the framework by Lee and Divaris (2014). In addition, the framework recognizes high levels of chronic stress, and material hardship, and *inflammatory load* are associated with fair or poor oral health. *Epigenetics* refers to the imprint of one's genetic backbone to influence disease incidence (Lee & Divaris, 2014) and is also reflected in the framework. The current study did not set to explore the influence of allostatic load, stress, inflammatory load, and epigenetics as mechanisms to increase the prevalence of oral diseases. As the research was conducted to obtain as PhD, the researcher was time bound on the range of pathways to explore. This was therefore one limitation of the study.

4.3 Proposed framework for Seychelles

It was imperative in the current study to develop an evidence-based theoretical framework specific to the Seychelles context in order to understand the influence of determinants on oral health outcomes of adults in Seychelles. The unique context of Seychelles posed challenges to adopt an existing framework to understand oral health disparities among the population. As highlighted earlier, there were specific determinants and the manner in which they were operationalised in Seychelles that provided the impetus to propose an adapted framework. The framework below is therefore the proposed framework which illustrates the influence of determinants on the oral health outcomes of adults in Seychelles. This proposed framework reinforces and builds on the existing framework by Lee and Divaris (2014). The technique of 'Best fit" framework synthesis which was used starts by generating a model with a priori themes and coding information from a review including research against that thematic or conceptual framework (Carroll et al., 2013). Only information that cannot be inserted within the framework required the inductive thematic analysis technique (Carroll et al., 2013). The proposed framework illustrating the influence of determinants on oral health outcomes of adults in Seychelles is illustrated in Figure 4.4 below.

Figure 4.4: Illustrating the proposed framework of factors influencing the oral health outcomes of adults in Seychelles.



The proposed framework recognizes that there are numerous factors operating at different levels influencing the oral health outcomes of adults in Seychelles. These were classified into macro level, population and community level, and person level factors. The person level factors which are the downstream determinants were influenced by population and community level factors (the blocks on the left), and at times directly by macro level factors. Population and community level factors were in turn influenced by macro level factors (block on the left). The framework recognizes the oral health systems as pathways influencing population level factors. Moreover, physical environment is recognized as a determinant in this framework. The physical environment is not recognized in the framework by Lee and Divaris (2014).

4.5 Summary of the chapter

This theoretical framework chapter proposed an evidence-based theoretical framework to understand determinants of oral health in Seychelles. In order to develop the framework, numerous concepts relevant to the study were explored. Concepts used were (i) public health

in relation to dentistry, (ii) oral health in the context of public health, and (iii) determinants. The framework by Lee and Divaris (2014) was adapted and used as the lenses for this study and further supported by models such as the extended Health Belief Model (Rosenstock et al., 1988) and the Oral Health System Evaluation Model proposed by the World Health Organization (Petersen, 2003). The attributes of an ideal oral health system by Tomar and Cohen (2010) were used to evaluate the oral health system. Collectively they served to guide the development of an evidence-based theoretical framework for oral health specific to Seychelles. The next chapter discuss the research methodology and study design.

CHAPTER 5: RESEARCH METHODOLOGY AND STUDY DESIGN

5.1 Introduction

The aim of the study was to examine the determinants that contribute to poor oral health in the Seychelles through an exploration of the social, cultural, economic and environmental factors influencing the oral health of adults in Seychelles. The purpose of the study was to develop an evidence-based theoretical framework that would inform future policy and practice regarding oral health. This methodology chapter details how the study was conducted to answer the research questions. The study design, study population and sample, the data collection methods, the data analysis process, mechanisms to ensure rigour and ethical considerations are discussed below.

5.2 Study design

The mixed method approach was used to conduct the research. Because the study context is devoid of a current oral health policy and framework for service delivery, the nature of the study lent itself to a mixed methods approach. Combining both the quantitative and quantitative strategies best served the purpose for a deeper understanding of the research problem (Robson, 2011). This approach offered the possibility to balance the shortcomings of using one method only. It allowed for the achievement of a deeper, holistic perspective (Hafsa, 2019) and a complete analysis (Creswell, 2014) of the research problem. In addition, it afforded the opportunity to explain data that could not be counted as well as to verify data and so improved the validity of the results (Robson, 2011). The use of multiple data collection strategies also occurred within the qualitative approach, such as interviews and focus groups interviews, which allowed the researcher to analyze and draw interpretations from multiple sources during a single data collection period (Robson 2011; Creswell, 2014; Hafsa, 2019).

There are three general strategies used in mixed studies (Creswell, 2014), these include concurrent mixed methods, sequential mixed methods, and transformative mixed methods. In sequential designs, qualitative or quantitative data are collected in an initial stage followed by the other data collection method not used in the initial stage. Transformative mixed methods provide a philosophical framework that focuses on ethics related to the tensions that arise when there is unequal distribution of power resulting in social problems. In the current study, the concurrent mixed method was adopted. This is because the strategies for data collection in the concurrent mixed method are converged where there is the merging of qualitative and

quantitative data to provide a complete analysis of the research problem. Moreover, collection of both types of data is done during the same stage. This was important for the researcher as time was a crucial factor in completion of the thesis to be awarded a PhD degree.

The concurrent mixed method was therefore useful in the study to do the following: (i) describe the political economic, social and cultural factors which impacted on oral health outcomes (ii) to obtain an understanding of how societies and people within them understand oral diseases; and (iii) to study connections between adult patients, dental staff and health management who are pertinent to any given public health issue (Baum, 1995; 463; Creswell, 2014).

The value of using qualitative research method in the current study provided for complex textual accounts (Mack et al., 2005) of the adults' experience and perspective on accessing dental care and their attitudes, behaviour and practices regarding their oral health. Moreover, the qualitative research method ensured that elusive factors whose role in the research matter might have not been readily obvious be identified and explored (Mack et al., 2005). For example, the influence of socio-economic status, social norms, gender roles, and health system factors on oral health outcomes could be identified and explored by the researcher. On the other hand, the quantitative research paradigm which is typically concerned with aggregates (Robson, 2011) provided attributes and overall tendencies of the research participants. These include the socio-demographic characteristics, oral disease experience and mouth care practices of the adults.

The next sections will discuss the study population, sampling procedures and data collection tools used by the researcher in the current study. The study objectives will be used to guide the presentation of the sections.

5.3 Selecting the cohort

Obtaining a representative study sample was important in order to collect valid and reliable information to answer the research questions. The sampling approach in this study was purposive. Purposive sampling is an approach that allows the investigator to select participants that are likely to give rich information relevant to the project (Robson, 2011). Simply put, the investigator determines what requires to be known and sets off to get individuals who can and are prepared to give the information based on experience or knowledge (Tongco, 2007). The strength of purposive sampling is that it can provide reliable and robust data (Tongco, 2007).

Purposive sampling technique has the ability to generate rich information in a short period of time.

In the current study, information that needed to be collected was identified by the researcher prior to data collection. This informed the development of interview guides (See Appendices 1, 2, 3, 4). Based on the information that needed to be collected, the criteria for the selection of the participants were identified in order to collect rich data to answer the research questions. This was based on the inclusion criteria stated below. Potential participants were then purposively sought and invited to participate in the study.

5.3.1 Obtaining the adult patients

An objective of the study was to determine the perspectives of adult patients regarding opportunities and barriers to promoting good oral health. This implied having insider accounts of the adults' own experience of factors influencing their oral health to generate rich data and details in order to answer the research question. A total of 47 female and 37 male adult patients were purposively sampled to participate in the current study. Out of the total 84 adult patients, 60 participated in individual interviews whilst the remaining 24 participated in focus group interviews. The gender obtained was not deliberate but was based on random selection.

Samples for qualitative study are usually smaller in comparison to quantitative study. The aim of sampling in qualitative study is to attain a sample which is large enough to assure that most perspectives are collected but at the same time not too large for the data to be repetitive (Mason, 2010). The concept of data saturation is therefore the goal (Mason, 2020; Robson, 2011). In a literature review of PHD studies done by Mason (2010), it was concluded that the general accepted sample size of phenomenological research ranged from 5 to 25 participants to obtain data saturation. As the current study is a phenomenological study, this range was used as guidance to determine the sample size.

As the population of Seychelles was 98055 inhabitants, the researcher felt that Seychelles should be divided into regions whereby participants are then sampled. To define the region, the researcher took into considerations the size of the 26 districts on the three main islands in the Seychelles archipelago. Information about the estimated population size of a district was obtained from the National Bureau of Statistics, Seychelles (NBS, 2018). Mahe, the biggest island in the archipelago was divided into two regions. Districts on Mahe were grouped

together according to their proximity and population size. Each region had approximately the same population size but not similar number of districts. This is because the size of each district varied between 1000 to 5000 individuals. Praslin and La Digue were grouped together to make the third region. The three regions were created in order to get a good representation of the general population in order to answer the research questions. To obtain the sample of 60 adults for individual interviews, the researcher sampled 20 participants from each region. The sample size for the focus group interviews was 24 participants divided in 3 groups of 8.

Adult patients included in the study fulfilled the following criteria (i) adults who have been accessing the public services for more than 10 years so as to have had the experience and be knowledgeable about the services accessed (ii) needed to be a Seychellois, as foreigners pay for dental treatments if they attend public dental clinics. It was important to understand barriers to accessing free dental services and (iii) resided on one of the three islands in Seychelles that has public dental clinics. Adult patients for individual interviews were approached whilst in the waiting rooms of health facilities. Participants for the focus group interviews were accessed through organizations where people grouped for different activities.

5.3.2 Obtaining the dental staff and representative of upper health management

It was imperative to identify and understand the influence of factors beyond the level of adult patients which had an influence on oral health outcomes. It was important to gain the perspectives of health professionals on the research topic. The dental staff and representative from the upper management were individuals the researcher felt will be comfortable to talk about the situation of oral health in Seychelles. Selection of dental staff and representative of upper health management was therefore guided by the objectives below:

1. Understanding the influence of social, cultural, economic and environmental factors on the oral health of adult patients
2. To evaluate the oral health system in Seychelles and determine how it impacts on service delivery and subsequently the oral health outcomes of the adult population
3. To determine the factors influencing service delivery at the Oral Health Directorate and how these factors impact on oral health outcomes of adults in Seychelles.

5.3.2.1 Dental Staff

A total of 20 public dental staff were purposively sampled to participate in the study. Public dental staff were included in the study because of their experience and expertise on the issue

of oral health in Seychelles. Only dental staff with more than 5 years of continuous experience were interviewed individually with the exception of dental hygienists. Dental hygienists from the first training cohort were invited to participate in the study and had only 3 years' work experience at the time of data collection. Prior to 2015, there was only one dental hygienist employed at the Oral Health Services Division (OHSD).

To obtain the sample of 20 public dental staff, the researcher separated and grouped the staff according to cadres. The cadres include dentists, dental therapists, dental specialists (including those with dental public health qualification), dental hygienists, dental surgery assistants, and dental laboratory workers. Purposive sampling was subsequently done to obtain a representative sample population. These include 2 dental specialists, 4 dentists, 3 dental hygienists, 2 dental laboratory staff, 5 dental surgery assistants, 4 dental therapists. If a potential staff refused participation, then another staff from the same cadre was selected. The number of staffs selected per cadre was dependent on two factors. These were (1) the level of interaction with adult patients, and (2) the number of staffs in a cadre. The researcher subsequently identified and telephonically/physically contacted staff who was felt by the researcher to have expert knowledge on the topic, and was comfortable to talk about their perspective about the factors influencing the oral health outcomes of adults in Seychelles. Information sheet (See Appendix 6) was then given to the staff prior to the interviews.

5.3.2.2 Representative of the upper health management

One (1) representative of the upper management was included in the study. The representative from upper management included in the study needed to have more than 5 years in a managerial post at the Ministry of Health. The researcher felt that 5 years was adequate for a person to have expert knowledge and sufficient experience to answer the research questions. Involvement in policies, strategic documents and budgets was crucial. The researcher originally aimed to interview two representatives from the upper level management. Despite continuous contact with the office of one key representative, a response was never given, therefore only one representative from the upper management could be individually interviewed. No other higher-level representative was contacted as some of the dental staff interviewed were already involved in higher management meetings/decision-making and could provide rich information needed to answer the research questions.

After determining the study population and sample size, data was collected by adopting different methods of data collection as discussed below.

5.4 Data Collection

Data collection in the current study consisted of primary and secondary sources. The primary sources of the data consisted of individual interviews and focus group interviews. Reviewing of statistical records formed the secondary data collection. Secondary data are information collected in some other context rather than the present study (Robson, 2011). These modes of data collection are discussed below.

5.4.1 Reviewing of annual statistical report

In the current study, it was imperative for the researcher to identify and analyze documents that had relevance to the research objectives. This was in order to answer the research Objective 1. That is to evaluate the oral health system in Seychelles and determine how it impacts on service delivery and subsequently the oral health outcomes of the adult population

Annual statistical reports were obtained electronically from the Oral Health Services Division (OHSD). Emails were sent to the Health Care Agency (HCA) and the OHSD to seek permission to access the data. Statistical data was retrieved from the Annual Statistical Reports. Annual dental statistical reports were only available from 2017 onwards. Even though statistics were collected prior to 2017, the data were not compiled into reports and were unsorted in boxes in offices at the OHSD. The documents are listed below:

- Oral Health Services Division (OHSD) Annual Statistical Report – 2017
- Oral Health Services Division (OHSD) Annual Statistical Report – 2018
- Oral Health Services Division (OHSD) Annual Statistical Report – 2019

It was important for the researcher to determine the variables to be considered to guide data collection during the reviewing of the statistical report. These variables include attendance, interventions done, type of services offered, distribution and location of service providers. Quantitative data were collected around the different variables.

5.4.2 Semi-structured interviews with adult patients

Individual semi-structured interviews were conducted with 60 Seychellois adult patients. Twenty (20) adults were purposively selected in each of the Seychelles region as explained

earlier in the chapter. All of the interviews were conducted in Creole in private rooms on the premises of different state health facilities. The interviews were conducted between October 2018 to April 2019, and lasted from 25 minutes to 55 minutes. The interviews were audio recorded which allowed the researcher to concentrate on the interview rather than writing notes, which could have acted as a distraction to the interviewee and the researcher.

The adults purposively sampled had been accessing the government oral health services for more than 10 years and were viewed as having expert knowledge to answer the research questions. The questions that were utilized to direct the interviews were framed to align with the notion of the study (Refer to Appendix 1). The key focus was to generate data which would enable the researcher to make deductions about the determinants influencing the oral health outcomes of adults in Seychelles. Quantitative data collected were data that could be numerically expressed. This data included; participants' socio-demographic information, mouth care regimens, oral diseases experience, level of education and income. Qualitative data collected included oral health behavior, past experience at dental clinics, hindering and facilitating factors influencing the adult patients' oral health. An information sheet and consent form with adequate information about the study were given to the participants for them to decide on whether or not to enter the study (Refer to Appendices 5).

Pilot interviews were conducted with 3 adult patients. These individuals were not part of the sample population. Pilot interviews were done in order to identify inevitable problems (Robson, 2011) and to validate the data collection process. Moreover, piloting the interview guides ensured that refinement could be made to elicit information the researcher wanted to collect to contribute towards answering the research questions (Kielmann et al., 2012).

5.4.3 Focus group interviews with adults

In this research, focus group interviews were utilized in combination with and supplemental to the individual adult patient interviews. Conducting focus group interviews was important in the present study to obtain information on the social and cultural norms influencing on oral health outcomes of adults in Seychelles. In conducting focus groups over and above the individual interviews a variety of different perspectives and experiences as well as collective views could be revealed through the interactive discussions with the participants (Mack et al., 2005; Robson, 2011; Morgan & Hoffman, 2018). Diversity and consensus in factors influencing oral health outcomes such as individual and cultural beliefs, knowledge, and oral

service providers' characteristics could be obtained and compared with individual interviews to ensure data triangulation. Moreover, as the study was conducted for the researcher to obtain a PhD degree, focus group interviews were therefore useful to collect information in a relatively short time frame (Morgan & Hoffman, 2018).

Twenty-four (24) adults participated in the focus group interviews. These were individuals that the researcher felt will provide the best information to answer the research questions, and who were confident to share their experience in a group setting. To identify the participants, the researcher contacted organizations where people grouped for different activities. The researcher explained the purpose of the study and the inclusion criteria for the focus group interview. Age was an important marker for group composition. The 24 adults were divided into three groups, each comprising of 8 participants. One group consisted of elders, one group of young adults and the last group of middle age individuals. The group interviews were conducted on Mahe only and lasted from 40 minutes to 96 minutes. As the researcher resides on Mahe, challenges were encountered to group people from the two inner islands in one location to conduct the interview. Therefore, the researcher decided to limit group interviews to Mahe only. All interviews were done in Creole. Interviews were conducted between October and November 2018. One public health facility and two private facilities were used to conduct the interviews.

Questions asked during the focus group interviews were framed around the person-level and population/community factors influencing the oral health outcomes of adults in Seychelles (See Appendix 2). The participants in the focus group interviews were urged to talk to one another, asking questions and remarking on each other's point of view and experiences. This ensured clarification and data collected on beliefs and cultures for comparison (Morgan & Hoffman, 2018). The focus group interviews were organized in three groups according to individuals of similar age for the participants to feel comfortable to talk. The interviews were audio recorded. An information sheet and consent form with adequate information about the study were given to the participants for them to decide on whether or not to enter the study (Refer to Appendix 5).

5.4.4 Semi-structured interviews with public dental staff

Public dental staff were included in the study because of their knowledge and experience with adult patients. The experience of staff included in the study was not limited to the level of the

clinic. Apart from clinicians, there were staff providing support services (dental surgery assistants and dental laboratory workers), staff performing management duties, and staff involved in dental public health duties. Quantitative questions collected data on the staff cadre and years of experience working at the OHSD. Qualitative questions were oriented towards common oral diseases, perception of staff regarding the health system including oral health, and macro-level factor influencing adults' oral health outcomes (See Appendix 3).

Interviews were conducted with 20 public dental staff. Data was collected during January to May 2019. The interviews lasted from 31 to 106 minutes and were a mixture of English and Creole. All interviews were conducted in private rooms on the premises of the Ministry of Health. The venues selected were quiet and free from distractions and non-intimidating to the interviewees. Pilot interviews were conducted with 2 dental staff. The interviews were audio recorded. An information sheet and consent form with adequate information about the study were given to the participants for them to decide on whether or not to enter the study (Refer to Appendices 6).

5.4.5 Semi-structured interviews with representative of upper health management

One representative from the upper management at the Ministry of Health was included in the study. The representative was involved in managerial decisions, policies and budgeting for more than 5 years. Questions asked were framed around macro and health system factors influencing the oral health outcomes of adults in Seychelles (See Appendix 4). The interview was conducted partly in Creole and partly in English in a private room on the Ministry of Health premises and lasted 83 minutes. The interviews were audio recorded. An information sheet and consent form with adequate information about the study were sent via email for the participant to decide on whether or not to enter the study (Refer to Appendix 7).

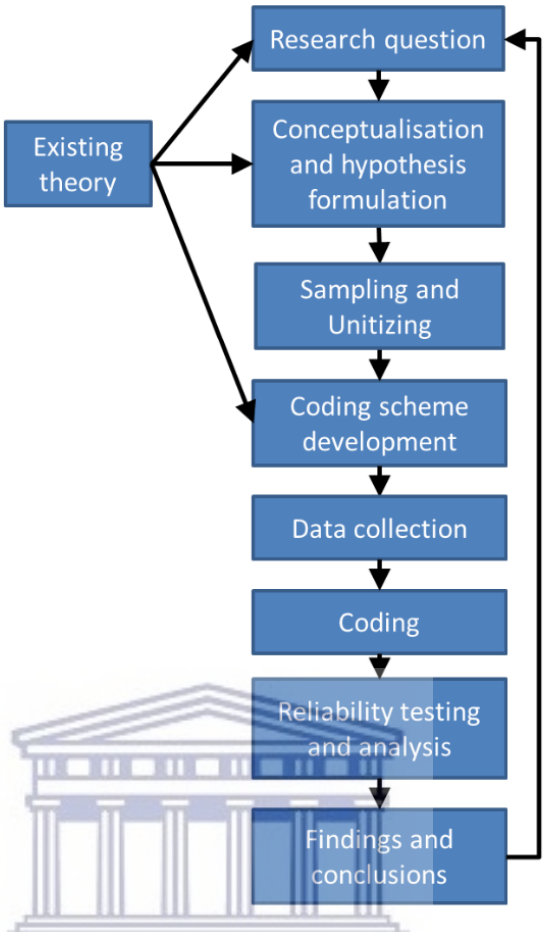
5.5 Data Analysis

In presenting large amounts of data especially if there is a mixed methods approach, it is important to have a sense of how the data and the analysis will be organized and presented in a meaningful way. Therefore, separate data analysis methods were required in the current study. Content analysis (Rose et al., 2015) and thematic analysis (Robson, 2011) were used in the current study. Content analysis was used for both, quantitative (which focused on counting and measuring) and qualitative data (which focused on interpreting and understanding). In both types of content analysis, codes, themes and concepts were categorized within the texts and

then analysed (Robson, 2011; Rose et al., 2015). This began with the identification of relevant concepts in response to the research objectives. Categories, themes and codes were then generated. Thematic analysis was used for qualitative data only.

5.5.1 Quantitative Analysis

There are numerous ways to analyze quantitative data in literature. Such includes, exploratory and confirmatory. In exploratory data analysis the researcher looks at the data to find out what they tell you, whilst confirmatory analysis aims to determine if one has achieved what was anticipated to be found (Robson, 2011). Frequency distributions and graphical display such as box plots and whiskers, can be used to analyze and present simple data, whilst relationships between more than one variable can be explored using cross-tabulation and chi-square tests (Robson, 2011). In the current study, quantitative content analysis was used to analyse the quantitative data. The approach by Rose et al. (2015) was used as a guide for the analysis process. This approach was appropriate in the current study as it provided guidance on how to conduct quantitative content analysis using an evidence-based approach. Figure 5.1 shows the key steps of quantitative content analysis proposed by Rose et al. (2015).



Source: Rose et al. (2015)

According to Rose et al. (2015) quantitative content analysis starts with the identification of pertinent concepts and where applicable formulate hypothesis in response to the research question. Sampling involves the identification and selection of materials intended to be analyze. This is followed by the development of coding scheme where numerical codes are assigned to particular categories or concepts. According to Rose et al. (2015) once the coding scheme is finalized, coding can begin. Computer software programmes can be used to support quantitative content analysis (Rose et al., 2015). The final stage of the analysis involves the application of quantitative techniques such as reliability testing, frequency counts and appropriate inferential statistics to test any hypothesis that have been formulated.

The advantages of quantitative content analysis are that a large amount of data can be analysed with the assistance of a computer, and the data can be re-subjected to analysis allowing reliability checks and replication studies (Robson, 2011; Rose et al., 2015). Disadvantages relates to document availability and sampling process which may introduce bias (Robson,

2011; Rose et al., 2015). The decisions of the researcher regarding materials of interest, and the accessibility of the materials direct the sampling process and subsequently analysis. Only documents available to the researcher were analyzed. Variables which the researcher felt as important were used to guide data collection. An example of a variable used was number and type of interventions performed. These variables informed the generation of concepts, categories, themes and codes as explained below. Quantitative data were collected based on the different variables.

Content analysis phase of quantitative data in the current study involved the generation of concept, categories, themes and codes based on variables. The focus points emanated from the research questions. Examples of concepts used included; oral health behavior, and service delivery.

An illustration of how these terms are utilized in this current research and how they relate to each other is shown in Table 5.2 below.

Table 5.1: An example of generating concept, category, themes and codes

Concept	**Category**	**Themes**	**Examples of codes**
Primary health care and prevention	Service delivery	Preventive services	- Availability and access to services - Interventions provided - Community oral health programs

The next step involved the development of a coding scheme. For example, during the content analysis of the secondary data, the researcher assigned the numerical code ‘0’ if community oral health programs were not implemented at a health facility, and ‘1’ if one or more community oral health programs were implemented at a health facility. Similarly, the participants socio-demographic information, mouth care regimens and oral diseases experience collected through the interviews were analysed using similar approach. For example, a numerical code ‘0’ was assigned to females, whilst ‘1’ to males. Level of education was numerically coded as follows; 1 Primary school, 2 Secondary school, 3 Post-secondary school,

and 4 University. The coding rules were documented in a code book which specified how and what to code. This ensured systematic and replicable coding of data (Rose et al., 2015).

The final part of the analysis involved the application of quantitative data analysis as the name suggest explores the information trying to find what they tell you (Robson, 2011). An easy way of exploring numerous data sets is to reorganize them in a way which counts the occurrence that certain things happen and to find manners of showing the data (Robson, 2011). Firstly, the data was entered into Microsoft Excel for analysis. Numerous headings were used to tabulate the data, such as, age, gender, education, income, mouth care practices and oral disease experience. Oral diseases experience and mouth care practices had sub-categories. For example, the sub-categories for mouth care practices include tooth brushing only, tooth brushing and flossing, and tooth brushing/flossing/use mouthwash. Secondly, the data entered was checked for errors possibly made during data entering. Lastly, the frequency for the occurrence of the categories and sub-categories were counted. The data was presented in tables.

Statistics from annual statistical reports were also entered into Microsoft Excel for analysis. The records collected included the number of attendances, utilization of services according to emergency and appointments, the number of oral health education done, and the number of curative interventions performed. Statistical data for fluoride mouth rinse, number of fissure sealant placed, and other community preventive programmes were collected. The results collected were compared for the three years – 2017, 2018 and 2019.The data was presented in tables.

5.5.2 Qualitative Analysis

Content analysis of secondary qualitative data was done in the current study. The content of documents mentioned in Table 5.1 were analyzed to determine the extent oral health was included in documents. Content analysis steps proposed by Robson (2011) were adopted for the analysis of the qualitative data in the research. These include the generation of codes, themes and categories; deciding on the sampling strategies; and carrying out the analysis.

In the current study, content analysis began with the generation of codes, themes, categories and concepts. The focus points emanated from the research questions. The electronic sampled documents were then reviewed. Words or sentences which directly or indirectly relate to oral health were coded and highlighted. To ensure that the documents had been thoroughly coded,

the researcher went through each document twice. Documents with no codes and highlighted wording or sentences were categorized as ‘no inclusion of oral health’, whilst those with codes and highlights were categorized as ‘inclusion of oral health’.

Thematic analysis was utilized to analyze the qualitative data in the current study. Thematic analysis is a method that reports on meanings and experiences, and the reality of participants (Robson, 2011), through the process of coding and generating themes making it useful in qualitative research. Gibson and Brown (2011) further defined thematic analysis as the process of analyzing data according to (i) commonalities, (ii) relationships and (iii) differences across a data set. According to Gibson and Brown (2011) these three processes are explained as follows. Examining relationship is searching for ways in which different codes categories connect to each other, or how specific individual characteristics or variations connect to general themes. Examining commonality involves looking for ways to pool together all examples within a data set that can be classified as ‘an example’ (Gibson & Brown, 2011). Scrutinizing differences aim at finding and analyzing the peculiarities and contrasts across a given data set, and to examine their possible relevance for the exact issue being investigated. Thematic analysis has been established useful for summarizing important features of a big data set, as it forces the investigator to take a well-structured strategy to managing data, assisting to produce an organized and well-defined final report written as a narrative (Nowell et al., 2017).

Thematic analysis involved the analysis of the transcripts obtained from the individual and group interviews. The audio taped interviews were transcribed using the exact words of the participants by the researcher. Translation of transcripts into English was done by the researcher in consultation with a translator. Coding of the data using ATLAS.ti, Version 8.1.3 (522) was subsequently done as described below.

In order to understand the analysis process, it is important to define the terminologies that were used which are characteristic features of the thematic analysis process. These are codes, categories, themes and concepts. An ‘a priori’ approach and ‘inductive’ approach was used to generate the codes, themes and categories. ‘A priori’ is defined prior to examination of the data, whilst ‘inductive’ is generated through the examination/exploration of the data itself (Gibson & Brown, 2011; Robson, 2011; Given, 2012). A priori codes or themes often arise from reading of the research literature and/or the research questions one is interested in (Robson, 2011). In the current study, the framework by Lee and Divaris (2014: 226) and the

extended Health Belief Model (Hochnaum, 1970, as cited in Hollister & Anema, 2004) were used to guide the process of coding and generating 'a priori' codes and themes. There are numerous debates about 'a priori' approach to thematic analysis. Some believe that the coding process should begin without the influence of current notions and concepts, however, this is often reported to be impossible given most investigators' knowledge in their field and of the specific areas they are researching (Given, 2012).

Codes denote the most fundamental section or element of the crude data or information that can be evaluated in a significant way concerning an occurrence (Boyatzis, 1998). Codes can be a word or a phrase that best describes a statement. The codes are then combined into a smaller number of themes (Robson, 2011). A theme denotes a mutual line of understanding taking place within the data (Hawkins, 2018). These themes are then assigned to broad categories to allow for better data management and reporting. Concepts are terms used to convey a notion. An example of how these terms are utilized in the current research and how they connect is illustrated in Table 5.3 below.

Table 5.2: An example of generating concept, category, themes and codes

Concept	**Category**	**Themes**	**Examples of codes**
Oral health behaviour	Oral health beliefs	Perceived barriers	- Dental anxiety or fear - Stressful life circumstances - Employment circumstances - Cost of dental products - Cost of healthy food options

To generate codes, themes and categories the researcher used the phases of thematic analysis outlined by Braun and Clarke (2006) when analyzing the data. These include (a) data familiarization, (b) generating initial codes, (c) searching, reviewing and defining themes and lastly (d) producing the report.

Familiarization with the data

Familiarization with the data involved the researcher immersing in the data to become conversant with the extent and depth of the content (Robson, 2011). To immerse in the data, the researcher actively and repeatedly read the transcripts searching for meanings and patterns.

Notes were taken to facilitate coding but this was done after the researcher had read each transcript at least once. Many investigators retain notes on understandings, patterns, ideas and associations that can occur to them as they read and read again the data (Given, 2012).

Generating initial codes

After the familiarization phase, the researcher subsequently started to generate an initial list of ideas about the data. Only one code list was used for all of the interviews. The framework by Lee and Divaris (2014) was used as a guide to generate the 'a priori' codes. For example, 'social and cultural norms' and 'health workforce characteristics' are codes Lee and Divaris (2014) used in their models to describe determinants operating at the population/community level. In this study, the codes by Lee and Divaris were used. 'Inductive' codes were generated through the examination of the data itself. These were newly discovered codes that were not captured by Lee and Divaris's model (2014) but which the researcher found to be interesting and valuable in answering the research questions. For example, 'employment condition' was not identified in the framework by Lee and Divaris as a possible influence on oral health but has been identified as a code by the researcher.

As the researcher read the transcripts, segments and phrases of the text in the transcripts were defined and allocated a code, which were frequently with words that best described the quotations. The same codes were attached to words, activities, meanings or phenomena that were similar. For example, the words 'mouth care regimens' grouped all words, descriptions and activities related to the participants accounts of 'tooth brushing', 'flossing and use of other interdental aids', and the 'use of mouthwash' including their frequency and pattern. Whilst, any descriptions or account related to the difficulties in practicing positive mouth care practices were coded as barriers in performing mouth care practices.

ATLAS.ti, Version 8.1.3 (522) was used to assist with the management of the data. ATLAS.ti is a qualitative computer software package that aids investigators in the handling of textual, audio, graphical and video data (Given, 2012). The use of ATLAS.ti was beneficial for the researcher as it ensured consistency, speed, rigor and access to analytic methods not accessible by hand (Given, 2012). When using ATLAS.ti to assist with coding and sorting of the data a code, a category and a theme were assigned next to each sentence or quotation as shown in the example Table 4.2 above. Memos and comments were often written if necessary to remind the

researcher of important elements that must be taken into account in the interpretation and reporting process which was used by the researcher in the report writing process.

Searching, reviewing and defining themes

This phase involves organizing all the potentially pertinent coded data extracts into themes (Braun & Clark, 2006). The framework by Lee and Divaris (2011), and the extended Health Belief Model (Hochnaum, 1970, as cited in Hollister & Anema, 2004) were used as a guide to generate themes. According to Braun and Clark (2006), researchers may use templates, code books, mind maps or tables to arrange codes and themes. In the current study, the researcher used a table to classify similar codes together as shown in Table 4.2. The researcher ensured that scope and content of each theme could be clearly and succinctly described, if not, further refinement was made (Braun & Clark, 2006). For example, perceived barrier was a theme used to classify all codes related to barriers experienced, perceived or expressed by the participants as shown in Table 4.2 above. Part of conveying the story was organizing the themes in a way that best displayed the data (Braun & Clark, 2006).

Producing the report

Once the final themes were established, similar themes were assigned into broad categories. Concepts were broad ideas which encompass the phenomenon being discussed. An example is shown in Table 4.2 of the next stage involved in interpreting the data. The interpreting and reporting of a thematic analysis must deliver a concise, logical, coherent, non-repetitive and fascinating interpretation of the information within and across the themes (Braun & Clark, 2006). This process guided the structure and reporting in the analysis chapter of the current study. Data was reported in a logical manner to tell 'a story' aimed at answering the research questions. Direct quotes from the participants were often used to assist in the comprehension of exact points of analysis. Moreover, all quotes were accompanied by a distinctive identifier to show that numerous participants were represented within the findings. Direct quotes from participants are a fundamental constituent of the final report as it aids in the grasping of precise points of analysis and establish prevalence of the themes (King, 2004). Quotations may also provide readers a taste of the primary texts, illustrating the multifaceted story of the data, going past a report of the data and persuading the reader of the validity and value of the interpretation (Braun & Clark, 2006). King (2004) argued that if investigators just report on codes and themes that emerged in the transcripts, the result will only provide a dull descriptive explanation with minimum depth and interpretation. Moreover, lack of adequate engagement with the data will

deprive the reporting of soundly collected evidence. Moving beyond just describing data to interpretation is important in the reporting phase. In order to ensure that the data analysed and the research process was credible, it was important for the researcher to make use of different mechanisms and procedures as discussed below.

5.6 Trustworthiness of qualitative data

The principle of qualitative research is to obtain meaning of and recognize patterns between texts so as to build up a significant portrait without compromising the wealth and dimensionality (Leung, 2015). Leung (2015) further added that like quantitative research, the qualitative research plans to find answers for questions of 'how, when, where and why' with a perspective to construct a theory or disprove a current theory. There are different criteria used for assessing the trustworthiness of qualitative research. These were validity, reliability, sampling and applicability will be discussed below in relation to the current study.

Internal validity

Internal validity refers to the internal consistency (Morrow, 2005). Validity in qualitative research denotes "appropriateness" of the processes, tools and information (Leung, 2015). Validity also denotes the extent to which studies measure what it intends to measure (Collingridge & Gantt, 2008). In the current study, the researcher used different strategies to ensure validity of the study. These were prolonged engagement, persistent observation, using thick, rich description; negative case analysis; peer review; triangulation and audit trail as discussed below.

Prolonged engagement and persistent observation are required to generate thick, rich data (Morse, 2015). This is in order to avoid "cherry picking in the data" which would result in superficial results, and also in turn to achieve data saturation where no new information was generated. In the current study, data saturation was achieved prior to the 60 individual and 3 group interviews. Despite this, the researcher decided not to stop as the sample size was small, and in order to ensure that no new angle of data was missed. Moreover, the researcher ensured that data saturation was achieved with each participants and group interviews, whereby no new information was generated. Furthermore, according to Morse (2015), the notion underlying these principles is that devoting time on data collection in a specific location gives time for trust to be formed with participants. With improved trust, the data collected will be richer. Therefore, as recommended by Morse (2015), prior to conducting the interviews the researcher

spent some time with the participants to explain the purpose of the study in addition to giving the information sheet. The minimum time spent for interviews was 25 minutes, which gave the participants enough time to develop a relationship of trust with the researcher (Morse, 2015).

Negative case analysis is a crucial way of disputing investigator bias (Robson, 2011). According to Robson (2011) as theories are developed, time and attention must be given to look for instances which will disconfirm the theory. In the current study, the researcher spent time to look at the data collected and compared it with the framework by Lee and Divaris (2014). Questioning the data collected thoroughly during the analysis phase was done to counter researcher bias.

Peer review can contribute towards guarding against investigator's bias via debriefing periods (Robson, 2011). Moreover, it helps new researchers to synthesize and to notice patterns in the data which contribute towards internal validity (Morse, 2015). In the current study, the researcher discussed the data collected with the PhD supervisor and at times with an individual in Seychelles with knowledge on the topic.

Triangulation is another useful and broadly used approach concerning the use of numerous sources to improve the validity of a study (Robson, 2011; Morse, 2015). Two types of triangulation were used in the study. Firstly, data triangulation is the utilization of more than one approach of data collection (Robson, 2011). Secondly, methodological triangulation is combining quantitative and qualitative approaches (Robson, 2011). In the current study, data was collected by using numerous sources. These were individual interviews, focus group interviews and by reviewing of documents. Moreover, data was collected from adult patients, dental staff and a representative of the upper management to obtain different perspective in order to answer the research questions. A mixed approach was used to conduct the study which increased the scope and depth of the study as each approach elicits different data and perspectives. The different lens for each data collection method therefore increased the validity of the data.

Audit trail is the notion of keeping a full record and providing a rich account of the activities carried out during the study (Robson, 2011), and to show to what extent a study can be replicated. Audit trail also helps researchers and readers to determine whether or not a study finding may be trusted as a platform for additional investigation and as a foundation for

decision making (Carcary, 2009). In the current study, the researcher has attempted to provide a detailed factual account of the research process. This approach is supported by Robson (2011), in that it allows for others to retrace the path followed in the research. In addition, the researcher also kept the transcripts of interviews, audio recording, notes and details of the data analysis as forms of audit trails and which will be required to be banked in the study Institution's repository.

Reliability

Reliability in qualitative research usually implies adopting research approaches that are accepted by the research community as the genuine modes of gathering and analyzing data (Collingridge & Gantt, 2008). In addition, reliability refers to whether the measurement tools or instruments produce consistent results (Robson, 2011). The essence of reliability for qualitative research lies with consistency (Leung, 2015). Specifically, reliable qualitative research methods should consistently produce rich and significant accounts of phenomena (Collingridge & Gantt, 2008). In the current study, the researcher applied the principles of reliability during the data collection phase through the development of a clear coding system, by conducting member checking, through piloting the interview guides and by making sure that there was overlapping of data as explained below.

In the current study, the researcher adopted a code list which stated and defined codes used. This is supported by Morse (2015) who recommended the development of a coding system where codes are clearly defined in a codebook so that another researcher can use and make the same coding decision is important. Identification and definition of codes were done in consultation (member checking) with the researcher's PhD supervisor to ensure that a similar coding decision was made throughout the coding process.

Piloting of the interview guides was done to ensure trustworthiness of the data. This was done to check if the measurement tools were collecting the information intended to be collected. Flaws could be identified and fixed henceforth improving the quality and efficiency of the interview guides.

When data are plentiful, data naturally overlap hence creating thick description to contribute to internal reliability (Morse, 2015). In the current study, there was overlapping of data. The overlapping of data resulted in similar data being assigned codes using similar wording or

phrases, and later being grouped into similar themes and subsequently categories. Triangulation of similar data from different sources also contributed towards the thickness of reliable data. For example, data overlapped when the adults spoke about their experiences at the clinics as reasons for not accessing preventive dental care, and which was confirmed in the interviews conducted with some of the dental staff.

Trustworthiness through Sampling

Trustworthiness of data is also dependent on sound sampling. An appropriate sample comprises of participants who best represent or have understandings of the research subject. Sampling of qualitative research participants should therefore obey a well-defined justification and fulfill a precise aim, and is the reason why qualitative sampling is often called purposive sampling (Collingridge & Gantt, 2008). That is choosing participants who serve a precise purpose coherent with a research's main objective. In this study, sampling of participants was based on specific criteria. The adult patients interviewed needed to be Seychellois, have accessed public dental clinics for a minimum of 10 years and should be residing on one of the islands in Seychelles that has public dental clinics. Dental staff needed to have more than 5 years' experience working in public dental clinics. These criteria were important as it ensured that the participants selected have had experienced the phenomenon of interest, that is, the factors influencing the oral health of adults in Seychelles thereby increasing the trustworthiness of the data

Applicability/generalizability/transferability/external validity

Extending the results of qualitative study in the similar way as quantitative results are generalized or transferrable, is a matter of on-going debate (Collingridge & Gantt, 2008). Some argue that purposive sampling cannot justify generalizations. Collingridge & Gantt (2008) added that there are numerous ways of comprehending generalizability. Another interpretation is the degree to which the results in one study can be utilized as a guide for what may happen in an alternative situation. In qualitative research the word 'applicability' is used. Applicability means being able to use results of the study in comparable contexts with similar participants (Myburgh & Poggenpoel, 2007). In the current study, the researcher made sure that the study context was comparable to the natural context of the phenomenon being investigated. This was achieved by (i) dividing Seychelles into regions and accessing participants in each region to ensure diversity. Such included socioeconomic, cultural, educational and household diversity. (ii) Interviewing participants in a specific time frame/period to ensure that participants were

experiencing the same conditions, such as political factors, impact of laws and regulation, work/living conditions and socioeconomic opportunities or constraints. (iii) Dental staff interviewed worked in the same organization and under similar conditions where the majority of the population access dental services.

Respondent validation is another technique used to verify the interview data from the respondents and which contributes to the validation of the data. This was done through summarization at intermittent points and at the end of each interview with the participants to omit misunderstanding of questions and answers.

External validity signifies the degree to which the investigator is able to generalize the results of the study to another context (Morrow, 2005). According to Morrow (2005) this is attained when the investigator gives sufficient information on the context and the methodology used to enable others to decide how the findings may be transferred to other populations or contexts. In the current study, the researcher provides adequate details on the methods adopted in the research and is detailed in this methodology chapter. In some cases, aspects of the research may be generalizable and this is referred to as selective generalizability (Mays & Pope, 1995).

5.7 "Insider as researcher"

I am a Seychellois woman, who was born in 1985, a period where the government was the main dental service provider in Seychelles. Accessing dental care was mostly on relief of pain basis, whereby there were long queues in the morning at public dental clinics. Dental checkups were the most common preventive activity done, and it targeted mostly the children population. Only 2 private dental facilities were available. Throughout my childhood, my family and I accessed dental services only when we were in pain. My mother took my sisters and I to the public dental clinic for a check-up and follow-up only if we were issued an appointment by the dental therapists. Furthermore, whilst growing up, I was informed that my mother had 'ledan koray' and that my sisters and I had inherited such bad teeth. 'Ledan Koray' is classified as weak and ugly teeth according to the Seychellois culture. When I was 12 years old, my negative experience at a public dental clinic with regards to the long waiting time and conflict with my mother's work schedules propelled us to access private dental clinics whenever we were in pain. Through my teenage years and adulthood, I therefore had minimum exposure to and knowledge of public dental services.

I left Seychelles in 2005 to complete a Bachelor in Oral Health in South Africa. Upon the completion of my degree, I was employed as a dental hygienist at the OHSD in 2008. It was at this point that I was exposed to knowledge on the public oral health system, oral health policy and its translation into practice, access and care. After 3 years working as a clinician at the OHSD, I was overwhelmed with the number of patients referred to me for dental hygiene services. Often, it was the same patients who were accessing the services each year. I also realized that the individual or group oral health education I was offering did not have a permanent impact in terms of behavioral changes, and that often it was difficult for the patients to follow the advice I was giving. This was due to numerous challenges such as the physical and family environment not being supportive for positive oral health behavior and outcomes, the lack of integration of oral health programmes in other health programmes, and the manner in which oral health services were being delivered to the public. Provision of curative dental care was favored by public dental staff rather than preventive oral health services.

Moreover, I saw that there were lots of bureaucracies in accessing care to see a dental hygienist, and conflict of interests regarding the scope of practice of the treatment a dental hygienist is able to provide. Age was used as an indicator of how treatments were provided by dentists and dental therapists. The adult population was the responsibility of dentists whilst the children population was being managed by the dental therapists. Dental therapists were calling themselves dental therapists/hygienists as they were performing scaling and polishing on the adult population or 'child dentist' which created concerns and division amongst some dental staff.

As a dental hygienist representing a minority of the staff at the OHSD, it was difficult for me to obtain funding for preventive activities as it was the dental therapists who were responsible for prevention whereas worldwide, dental hygienists are responsible for prevention and promotion. These bureaucracies and conflict often affected availability and access to dental care. Oral health programmes were few and lacked evidence-based interventions. Monitoring and evaluation of these programmes were rarely done. Whilst, attending high level meetings, I realized that there was a lack of integration of oral health in other national health initiatives and this impacted on oral health outcomes through securing of funding and gaining political support. I also noted that the lack of oral health policy and strategic directions resulted in the provision of oral health services without clear directions. It was at this point that I decided to pursue post-graduate studies in the area of public dental health. I needed to understand how

oral health could be addressed through interventions at the level of the population, community and macro-environmental. Moreover, I wanted to understand why was it difficult for individuals to access preventive care, the opportunities and barriers for individuals to perform good oral health behaviours, how the provision of dental care and different factors in the environment impacted on oral health outcomes. I chose to research about oral health determinants in Seychelles so that I could make a contribution to my country by proposing a framework for oral health to inform future policy development that would address the concerns raised.

At the time of data collection, I was employed as a dental hygienist with more than 10 years' experience at the Oral Health Services Division (OHSD). During this period, I had interacted with staff and patients, whereby relationships had been developed. Performing management responsibilities as the head of the dental hygienist unit, has also resulted in me gaining respect in the field, amongst OHSD staff and other health professionals. I therefore recognized at the outset that as an insider in the current study, there was the potential of researcher bias.

Insider as researcher is dependent on the proximity of the investigator to the aspect being researched (Breen, 2007; Fleming, 2018). A researcher may be studying segments of an organization previously unfamiliar to them and gathering data from complete strangers, although they are members of the same group (Fleming, 2018:311). Moreover, the researcher may be gathering data from their close coworkers or investigating their own practice. There are numerous advantages and disadvantages of "insider as researcher". Fleming (2018) explained an advantage of "insider as researcher" is that the 'pre-understanding' the investigator brings to the study, can develop study questions based on fruitful understanding of the matters requiring investigation. Breen (2007) further added that being an insider results in a superior understanding of the group culture, and the ability to interact naturally with the group under study.

Insiders need to be careful of 'researcher bias'. This is when the investigator's personal beliefs and experiences impact on the research questions, design and data collection processes and reporting (Fleming, 2018). In the current study, the researcher ensured that there was rigor and transparency in the strategies of data collection as discussed above. Moreover, the researcher was aware of the potential informant bias when interviewing dental staff. What participants impart in an interview can be affected by how the researcher is perceived and their relationship

with the investigator outside of the study context (Fleming, 2018). The interviewee may assume that the researcher already knows the answers (Breen, 2007). Therefore, in the present study, the researcher explained to the dental staff prior to data collection that the information being shared was confidential; they will not be judged or it will not impact on their ongoing relationships with the researcher. Moreover, during the interview the researcher remained in a neutral position and resisted the temptation to share her own experience.

Moreover, avoiding premature conclusion being reached due to preconceptions of the research outcomes and the need for positive outcomes (Fleming, 2018) during the data analysis phase was important to the researcher. In order to ensure this the researcher decided to stay objective throughout the data analysis process. Moreover, the PHD supervisor of the researcher constantly provided critics, interrogated and challenged my assumptions. During the writing of the findings, to ensure credibility, the researcher acknowledged that as staff of the OHSD there was a possibility of the research process being influenced (Fleming, 2018). The research intention is to provide sound scientific evidence for the betterment of oral health, hence the researcher tried to eliminate any potential bias by remaining objective. The researcher ensured that ethical issues such as privacy and confidentiality of the participants were protected so as to avoid recognition. This aspect is further discussed below in the ethics section.

The goal of the researcher in the current study was to undertake scientifically sound research, bring about change and to make a contribution with regards to this important study for her country. To achieve this, in the spirit of being a scholar and researcher, ethical practice was ensured throughout the research process as discussed next.

5.8 Ethical Considerations

5.8.1 Ethical Approval

Ethical approval was obtained prior to data collection from the Biomedical Science Research Ethics Committee of the University of the Western Cape, South Africa (BM18/3/13) (See Appendix 8). As the research was conducted in Seychelles, the research proposal was submitted to the Health Research and Ethics Committee (HREC) (1807) for ethical approval (See Appendix 9).

5.8.2 Informed Consent

An information sheet (See Appendices 5, 6 and 7) was given to all participants to provide them with sufficient information about the purpose of the research in either Creole or English, and in a language they could read and understand. Separate forms were used for patients, staff and representative of the upper management. Furthermore, at the start of the interview, the researcher took the responsibility to verbally explain what the research was about, the purpose of the research and its contribution to Seychelles and the research field. This process was done to enable the participants to make an informed decision on whether or not to participate in the study. Participants were also informed that the information collected was to be used to write up a thesis and for dissemination through meeting with government officials in Seychelles. Furthermore, the researcher explained that information collected will be published in journals as well as presented at conferences where similar matters are discussed. Participants were told of their right to retract from the study at any point throughout the research process without any negative consequences. Only one female participant chose to withdraw from the study after she felt uncomfortable with her voice being recorded mid-way through the interview. The segment of interview audio-recorded was deleted and the information/consent sheet was destroyed in her presence. Involvement in the study was grounded on the participants' informed consent, through the signing of a consent form.

5.8.3 Confidentiality

Informed consent was gained from all the participants in the study with the right to privacy and respect for persons. The manner of focus group interviews is such that privacy cannot be certain. Despite that, the participants were advised through the information sheet and verbally at the beginning of the interviews that total privacy could not be certain but that they should refrain from discussing what others in the group have discussed to others. To protect the participants' identities, all names were substituted with study identification numbers. Moreover, any words that may be related to the research participants that could lead to their recognition were substituted to ensure confidentiality. Audio recordings, participants consent forms and completed transcripts were stored securely in a sealed box in a private area only the researcher had access to. The translator who assisted with the translation of transcript from Creole to English was informed that confidentiality had to be guaranteed. The audio recordings will be deleted using appropriate measures and the participants consent forms and transcripts will be shredded five years after completion of the thesis. At the core, these ethical values stress the necessity to (a) do good (known as beneficence), (b) do no harm (known as non-

maleficence), and (c) respect privacy and confidentiality to not share personal information with anyone without the participants authorization.

5.9 Gatekeeper permission

Gatekeeper permission is obtaining of permission from rightful authorities responsible of institutions to perform research in such locations (Robson, 2011; Singh & Wassenaar, 2016). Singh and Wassenaar (2016) further added that investigators are morally and ethically obligated to engage in an open and transparent way when trying to access to a facility for the purpose of research. In the current study, permission was sought from the gatekeepers. Gatekeepers are defined as individuals who control access to institutions such a managing director or administrator (Singh & Wassenaar, 2016). The researcher in the present study therefore obtained permission from the CEO of the Health Care Agency (HCA) in the Seychelles, Director of OHSD and Nurse Managers (administrators) of different health facilities where interviews were conducted. Permission was sought via emails, telephone conversations, and verbal physical conversation with the appropriate individuals. Prior to obtaining gatekeeper permission, the had established that the research proposal adheres to applicable ethic guidance as discussed earlier in the chapter. The researcher also ensured that there was minimum disruption of services offered at the health facilities, or by the dental staff during the data collection phase. Data was also collected in the set timelines. Researchers should abide by the agreed timeline for data collection and make sure that there is minimum disruption of the functioning of institutions where data are being collected (Singh & Wassenaar, 2016).

In order to maximize the probability of being allowed access to an institution for research reasons, it is essential for the researcher to convince the gatekeeper of the social value of the research (Singh & Wassenaar, 2016). The researcher should also communicate the possible risks, and/or costs and advantages of the study, with particular reference to the contribution that the research may bring to the organization (Singh & Wassenaar, 2016). In the current study, full details of the research were furnished by providing the protocol, a letter outlining the intention as well as information of how the results would be used to the CEO of HCA and Director of OHSD. The value of the research to the OHSD and the MOH were clearly stated in the proposal. The gatekeeper permission comprised an obligation concerning the distribution of the findings. Report of the research results will be sent to HREC and HCA. There were no

conditions related to the restrictions on the publications of results, or accessing raw data set by the gatekeepers.

5.10 Dissemination of the Results

The results of the research will be distributed among relevant authorities, both at the district and national level through oral presentations and published journal articles both locally and internationally. Furthermore, the Oral Health Services Division of Seychelles will be given a written report of the findings. The University where the study is located will have the full thesis in its repository.

5.11 Summary of the chapter

The research methodology chapter started by locating the research paradigm. Comprehensive accounts of the study design, selection of study cohort, data collection strategies and data analysis were provided followed by ethical considerations for the study. The next three chapters will present the findings and discussion.

CHAPTER 6 - MACRO LEVEL DETERMINANTS

Introduction

This chapter and the subsequent two chapters, present the research findings in relation to the determinants influencing the oral health status of adults in Seychelles so as to develop an evidence-based theoretical framework that would inform future oral health strategic planning and policy. The qualitative and quantitative data are described and discussed in accordance with the study objectives. The relationship between these objectives will be demonstrated throughout the analysis.

6.1 Introduction – Macro level determinants

There is great support for a bi-directional connection between macro-level factors and health statuses of entire countries, involving the role of economic growth, population and societal characteristics, resources and infrastructure, and others (Lee & Divaris, 2014). The association and the impact of macro level factors on oral health outcomes is fore-grounded in the Lee and Divaris framework (2014) and is well documented in the literature (Patrick et al., 2006; Goldman et al., 2008; Alsuraim & Han, 2020). Similarly, in the current study context, Seychelles, the influence of macro-level factors such as economic development, resources and infrastructure amongst others is apparent. These macro factors influenced oral health outcomes of the Seychellois in two ways as illustrated in Figure 4.4 in the Theoretical Chapter. The first was through its influence on population-level factors, for example, in the way that oral health services were distributed and subsequent issues of access that impacted on the adults' behaviour and their oral health outcomes. The second is through having a direct influence on a person's oral health behaviour and subsequent oral health outcomes (Lee and Divaris, 2014), for example, in the way public policies impacted on the adults' utilization of oral health services and their oral health outcomes.

The current chapter, will therefore discuss in detail how macro- level factors which are the distal or structural and upstream determinants, such as, social and political environment, influence the oral health status and outcomes of adults in Seychelles. The presentation of the chapter was guided by the objectives:

1. To determine the extent existing policy and strategic documents influenced oral health outcomes of adults in Seychelles.

2. To understand the influence of social, cultural, economic and environmental factors on the oral health of Seychellois adult patients.

6.2 Governance and strategic directions

An objective of the current study was to determine the extent to which existing policy and strategic documents in Seychelles had an influence on the oral health outcomes of the adult population. This is discussed in the section below.

6.2.1 Oral health policy and strategic plan as an influence on oral health outcomes

At the time of the current study, there was no oral health policy and strategic plan in Seychelles. As previously mentioned in the earlier chapters, a policy was drafted in 1999 but was not implemented. The reason for the lack of implementation was unclear to the participants interviewed. It can therefore be argued that a lack of equitable access to oral health care in Seychelles is due to insufficient oral health policies that guide service delivery. Absence of policy is creating determinants that are operating at the various levels – macro, population and community, and person level and which impacts on oral health outcomes. Health agencies supporting oral health through the development and implementation of policies related to water fluoridation, dental sealants, and maternal and child health programs for oral disease prevention is therefore crucial (Mandal et al., 2014) in Seychelles. These policies will reach across sectors and produce and environment (social, cultural, economic, and physical) that encourages healthy living to advance oral health across the population and lessen oral health disparities.

Moreover, there is no water fluoridation programme in Seychelles which is decided on at a National level. The tap water has variable fluoride content depending on water source. Despite water fluoridation being a recommendation in numerous oral health policies worldwide, there were mixed feelings about its implementation in Seychelles amongst health professionals. The dilemma is similar to other countries, such as, Australia (Esfandiari et al., 2010). The current water system in Seychelles posed challenges as it increased the cost for the implementation of water fluoridation. Other fluoride alternatives were proposed and include milk and salt fluoridation. Some of the participants' responses on water fluoridation are captured below.

> I do not think we should put fluoride in the water yet. I think there are a lot of things that needs to be evaluated with our system, with our water sources because [in] Seychelles there are a lot

> of water sources that are not centralized and we need manpower and technical workforce and equipment [Staff 16].
>
> I will say remove the water fluoridation for kids put in milk, because in milk the calcium is good for the bones or maybe salt something which you know people will use [Staff 4].
>
> I think for the oral health it [water fluoridation] will be probably one of the best inputs that could be done but it is a political question… I think technically it would do a lot of positive impact for the population of Seychelles… and its easier because they [the population] have to accept… people do not have to do a decision and they do not have to think they just use the water with fluoride [Staff 6].

From a social equity perspective, community water fluoridation has the ability to decrease the prevalence of tooth decay in a whole population that has access to public water sources, regardless of socioeconomic status (Esfandiari et al., 2010). Recent data shows that in 2010, 93% of the Seychelles population had access to treated water supplied by a government owned utility company (National Bureau of Statistics, 2019). Implementing a community water fluoridation programme can be made accessible and contribute to effectively reducing the incidence of dental caries in Seychelles at a reduced cost to the government. Evidently, the current infrastructure, water sources and human resources is a challenge. This is similar to developing countries where community water fluoridation initiatives face substantial obstacles associated with cost, water treatment systems, trained personnel, and infrastructure needed to deliver optimally fluoridated water (Esfandiari et al., 2010). Other alternatives were considered by these countries, one of which is salt fluoridation.

Instituting an oral health policy for Seychelles that considers aspects like water fluoridation is crucial in addressing strategies that are delegated at National level but filters through engagement at all levels of society. This effort can serve to improve the quality of life and eradicate health inequalities by enabling partnerships among individuals, health service providers, communities, and policymakers at all levels of society and by taking advantage of current plans (Crall, 2009; Esfandiari et al., 2010).

6.2.2 Health policies and strategic plans

This section of the chapter reports on health policies. These are policies formulated by the Ministry of Health. Results of the current study also showed that oral health is seen as low priority for health policy makers in Seychelles. Moreover, there was poor understanding of oral health amongst those involved in policy making. One health professional who is involved in policy development expressed the following when asked about oral health in Seychelles.

> I think is mainly what I heard, through official sources and non-official sources, but what I gather is that even if the services are there, we are not seeing the importance as we should do [Staff 21].

Another health professional expressed:

> I have a feeling that dental is still not a topic where others take much care about what is a hole in the tooth. It is probably less important than a hole in your car tyre. That should somehow change… Dental is not on top of the list but rather at the bottom of the list. I mean general dental problem is not as important as a cardiac or whatsoever and that is how they are dealing with this. Dental somehow is somewhere at the end of the food chain [Staff 6].

The above accounts indicate that oral health is low on the health agenda and is usually an indirect outcome of many of the health policy documents. The health manager involved in health policies further explained:

> Oral diseases are considered as NCDs nowadays which is a priority for us [Department of Health] as the risk factors are the same. So, we are tackling oral health through strategies for NCDs so I think it is covering [Staff 21].

Moreover, the assumption amongst higher management was that the CEO of the Health Care Agency (HCA) represents the Oral Health Services Division (OHSD) at higher level meetings and should bring forward the agenda of the OHSD. A practice that was not always at the best interest of the OHSD due to the Ministry of Health organogram and as the CEO of HCA is representing numerous units offering clinical services in health. This is reflected in the participants' responses.

> Policy which involves NCDs at time we [Department of Health] forget to involve dental. We forget to involve all the specialties even eyes, but we expect the CEO of HCA to speak on behalf of dental and bring to meetings as dental falls under HCA [Staff 21].

> Directly, the way the Ministry of Health is structured… a lot of things which in the past fell under the department nowadays they do not. Policies falls under the secretariat. HCA provides the care… I think that there are some shortcomings when it comes to policies [Staff 16].

Clearly from the above, the focus of public health policies or guiding documents is therefore one of the contributing factors for the absence of appropriate oral health policies or strategic plans at a macro level in Seychelles. This was due to low priority and understanding of oral health on the political plan. As a consequence, oral diseases in Seychelles were frequently not included within the NCDs policy agenda at a national level and this lack of inclusion had an impact on how oral health care was accessible to the population, how visible oral health was in the Seychelles, the likelihood of oral health behaviour, and consequently on the oral health outcomes. For example, the lack of integration of oral health messages in school curriculum implied that children are not exposed with oral health messages at an early stage. This deficit will have an impact on how oral health behaviours of children are developed and in turn influence oral health outcomes of the Seychelles population. The inclusion of oral health in school education is crucial for the adoption of habits conducive for good oral health (da Fonseca & Avenetti, 2017; Dudovitz et al., 2018). At the moment, oral health is not integrated in school curriculum in Seychelles. Children are exposed to oral health messages when they access dental facilities or if dental professionals conduct oral health education sessions on the school premises.

Moreover, as oral health is seen as low priority for health policy makers, and being exacerbated by having non-dental professionals advocate on behalf of oral health professionals, this has resulted in oral health not being given due attention in Seychelles. Health policy making, like policy in other sectors, lies on the buildup and use of power by individuals implicated in the policy process (Lewis, 2012).

Therefore, Lewis (2012) argued that oral health will not advance as a plan item if it stays detached from the rest of health. On the contrary, health policies ought to be reoriented to include oral health using social and dental approaches to assess needs and the common risk

factor strategy for health promotion (Sheiham, 2005). Effective health policies can alleviate oral diseases and negative conditions, and enhance dental public health (Mandal et al., 2014). This is through the creation of a supportive environment by means of regulations and legislation significant to positive oral health outcomes. Health agencies supporting oral health through the development and implementation of policies is therefore important in Seychelles.

6.2.3 Public Policies and Regulations

This section reports on the influence of public policies and regulations on oral health outcomes. These are the policy documents which have an impact on oral health but were not formulated by the Ministry of Health to address oral health. Rather, other ministries or entities formulated these policies to address lifestyle diseases. The lack of support from the Seychelles government for oral health through public policies was voiced by some of the participants in the current study. One explained:

> We [Oral Health Services Division] need support from the government because when we look at a small country [like us] lots of things can be controlled for our people to prevent them from getting that [Participant 4].

Moreover, it was expressed that there was a gap in public policy content in Seychelles due to other ministries formulating health-related policies without consulting the Ministry of Health. One participant explained when discussing about the Alcohol Policy in Seychelles:

> It is a policy that they [the government] have put in place and then try to get a medical justification to support it [Staff 21].

The absence of mentioning oral health in these public policies and the lack of government support in providing guiding documents may be indicative that oral health will unlikely to be a priority nor included in future health reform in the Seychelles. This situation may be perpetuated unless evidence is furnished on the country's oral health status.

Furthermore, the loop holes in some of these public policies creates opportunities for commercial companies or individuals to push forward their agenda even though there may be a negative impact on oral health outcomes. For example, prohibition in the advertising of

alcohol is limited to television despite alcohol being a major risk factor for some of the most common health problems in Seychelles. Such include, cardiovascular diseases, injuries, mental problem and diabetes (Ministry of Health, 2016b). This results in the propagation of unhealthy items increasing the risk of audiences adopting behaviours not conducive to oral health and increasing the risk of oral diseases such as oral cancers and dental caries. Moreover, food companies selling their products through television advertisement, newspaper and internet due to a gap in policy content is well documented in literature (Ghimire & Rao, 2013). For example, studies have shown that children who watched television advertisement had greater dmft/DMFT score due to purchasing of advertised products which were high in fat and/or sugar content (Ghimire & Rao, 2013).

Tax on dental products

Currently, in Seychelles dental products including toothpastes are classified as cosmetic surgery. The 15% VAT placed on these products acted as barriers for the public to purchase and utilize them (Goldman, Yee, Holmgren & Benzian, 2008) as summarized in one participant's response:

> It (taxes on dental products) is exorbitant. It is like you say there are taxes on sanitary pads for women. It is the same way for dental products. All these dental products, a floss, a basic should not be costing that much because it is all about prevention. So, if you have a floss which is more affordable to a person who earns 5000 rupees he is definitely not going to be happy to spend 50 bucks on buying a dental floss and then you tell them to use the length of your arm so that there is not reuse between several teeth. So, it is not a question of if you want to make it more accessible to your people you reduce the taxes for these dental products. Women need sanitary pads. People need their floss, they need their fluoridated toothpaste, and they need their soft toothbrush. If all these things were affordable I think people would have a better oral hygiene care at least and because that is the basis for everything [Staff 9].

From the above account, several issues are foregrounded that influences the choices people make regarding the oral hygiene care: (i) costs of basic personal hygiene products, and (ii) the level of earning to support prevention initiatives. The inability to use appropriate and recommended dental products at the level of the person was therefore often a direct consequence of macro level policies which impacted on oral health behaviour and disease prevention. The need to have public policies which reduce oral health disparities through the

importation of low-cost fluoridated toothpastes is crucial to improve oral health outcomes of the population (WHO, 1994; FDI, 2000; Goldman et al., 2008; Esfandiari et al., 2010) of Seychelles.

The next section of this chapter will report on socioeconomic factors influence the oral health of adults in Seychelles.

6.3 Socioeconomic factors and the influence on oral health outcomes

Another objective of the study was to understand the influence of social, cultural, economic and environmental factors on the oral health of Seychellois adult patients. This section therefore reports on the socioeconomic factors influencing the oral health outcomes of adults in Seychelles as illustrated in Figure 4.4 For the purpose of this study and to ease discussion, socioeconomic factors were divided into sub-categories: (6.3.1) globalization, (6.3.2) resources, (6.3.3) distribution of wealth as discussed below.

6.3.1 Globalization and the influence on oral health outcomes

The influence of globalization on oral health is well documented in literature (Goldman et al., 2008; Alsuraim & Han, 2020). Similarly, in Seychelles, the effect of globalization on oral health outcomes is apparent as observed in the current study. The absence of public policies and/or the loop holes in some of the public policy documents as mentioned earlier in the chapter created opportunities for individuals to force their agenda which often had a negative influence on oral health outcomes. The influence of economic growth and urbanization on oral health outcomes of Seychellois adults was voiced by two participants who were health professionals:

> If you compare the way our country was living when we were poor as a country, we ate healthier than we are eating now [as] a little bit richer… country [Staff 21].

> It is as if we just discovered sugary things… I think free market I do not know how to call it… there are globalizations… we are free to bring. And they [importers, sellers] capitalize on quick money and you know kids love sugary things and they go for it, this is an abuse [Staff 4].

From the above accounts, it can be ascertained that the growth in the Seychelles economy has had a potential influence on the oral health outcomes of the population through the influx of imported foods. This trend is similar to other countries where economic development has

increased the prevalence of oral diseases such as tooth decay due to the increased consumption of sugar and refined sugar (Goldman et al., 2008; Cardoso et al., 2013; Alsuraim & Han, 2020). Therefore, it can be argued that the transition in nutrition in Seychelles has resulted in the acceptance and adoption of unhealthy or high energy dense food/beverages high in sugar concentration and as a consequence, a new cultural norm was developed within the population (population/community level). Moreover, the accessibility and affordability of these food products was easier in comparison to buying healthier options. Therefore, this cohort who have been part of this nutrition transition were affected through consumption at an individual level (oral health behaviour) and were inherently placed at an increased risk for dental caries as observed amongst Seychellois. The increase in dental caries in Seychelles is reflected in the results of periodic surveys conducted on 6 and 12 years old which shows that DMFT increased from 3.6 in 2005 to 3.9 in 2010 amongst the 6 years old, whilst DMFT increased from 1.5 in 2005 to 2.1 in 2010 amongst the 12 years old.

6.3.2 Resources and the influence on oral health outcomes

Access to and type of oral health services were determined by the available resources allocated to public dental services. Allocation of resources for the proper functioning of oral health services was partly influenced by the absence of an oral health policy to guide service delivery. Results of the study showed that the budget was largely used to purchase dental materials used in the management of oral diseases. This is indicative in the account from a participant who had been actively involved in the securing, distributing and controlling the OHSD budget for the past 3 years at the time of interview.

> Well dental… gets a budget for consumables of materials, I think over the past 20 years it has not change… Prevention is at the level of the Ministry or HCA [Health Care Agency]. There are departments that do prevention… dental does not form part of the different department [Staff 16].

Moreover, allocation of funding was often based on the priority of the project or the activity level of a unit at the Ministry of Health which often involved extensive paper work with justifications as captured in the following account:

> Money is allocated for those [units in health] that make more noises. Even in parliament those that makes more noises for their district get more money, which shows you the importance of

advocating. If you are not advocating and staying quiet and on the other side people are advocating more powerful, it is normal who gets the funds [Staff 21].

To secure the budget [Oral Health Services] has to work with the different units to bring forward projects… We [Oral Health Services Division] need to justify when we ask.... We get in the end. It is not easy but you get [Staff 16].

These bureaucracies to access funding for oral health prevention acted as barriers for dental staff. To avoid long paperwork staff often chose not to do oral health promotion activities but rather focus on clinical dentistry where funding and materials had already been secured. Also, the inadequate representation of dental staff on middle management committees or in departments involved in health promotion implied minimal focus and inclusion of oral health in media programmes that target the public. This therefore impacted on public access to media activities, and the dissemination and coverage of oral health interventions in the population. The insufficient amount of oral health messages or information reaching the public in turn influenced the tacit knowledge, beliefs and likelihood of performing oral health behaviour by individuals thus impacting on oral health outcomes as will be discussed in the person level chapter.

According to Watt (2007) preventive and oral health promotion programmes implemented in the population separately from other health plans often results in a repetition of effort and waste of useful resources. Integration between disciplines is stressed in the Primary Health Care (PHC) approach as requisite to promote health (Alma Ata Declaration, 1978). From the above participants account, clearly there is a lack of integration to promote health in Seychelles. This resulted in available resources being used to promote health problems which addresses the country's health priority such as diabetes, obesity and cancer. The low priority afforded to oral health has resulted in insufficient oral health messages being communicated to the public in comparison to the other health conditions. This approach was not in line with the PHC approach which emphasises the importance of mobilization of resources, and partnership to ensure health for all people regardless of circumstances.

In addition, funding for job posts often had an influence on service delivery in public dental facilities. High cost of overseas recruitment brought about dentists of lower attributes, and

different language background which often posed challenges to the oral health system and for patients. This view is captured in the accounts of two participants:

> Our [OHS] struggle is more on dentists because we are recruiting from overseas three quarter of the time and this cost a lot of money, a lot of procedures and in terms of quality we get what we can afford… Three quarters of dentists are not Seychellois so there is the communication. It is the love which I think is different from Seychellois who is treating his/her own nation and a foreigner, it is a pity that we do not have a lot [of Seychellois] [Staff 16].

> We [OHS] simply need enough staff and engaged staff motivated… if the salary is alright then you have motivated people and you can employ the dentists from well reputed universities which are trying to make a good job and fillings that last not only 6 months but maybe 5 years… Patients who comes in the district clinic for the same problem 10 times in 5 years, this is a waste of resources, money and whatsoever [Staff 6].

Recruiting dental professionals with low attributes had an impact on quality of care offered to the general public. Moreover, wastage of consumables used in the provision of care due to staff inefficiency in performing adequately clinical procedures had an impact on the budget allocated to oral health. For example, replacement of permanent restorations in less than 6 months after placement is additional cost to the OHSD. In addition, patients may not trust the oral health system as treatment services appeared to be compromised due to staff skills and ability. This lack of trust would have influenced the delay in accessing dental care and would have led to disease progression followed by tooth loss. Quality assessment mechanisms is therefore lacking at the OHSD, and quality assurance which are reflected as crucial by the principles of the primary health care approach.

Investment in Seychellois dentists and dental specialist has been the country's focus for the past few years. One manager explained:

> I think after so many years, at the moment I think we have like 5 Seychellois who are specializing [in dentistry]. Meaning we are developing very fast and what is going to happen in one year, two years, three years we [OHSD] will introduce specialty in dentistry in Seychelles that has never existed before. Meaning we will see quality of care improved drastically overnight when those people return [Staff 16].

Despite the long-term cost for training and recruiting Seychellois in comparison to foreigners being low, there are only few interested individuals who meet the criteria for a government scholarship or educational assistance. Moreover, there is a point system with a clear cut-off mark for students interested to study dentistry. The points required is high in comparison to studying/pursuing other career path such as physiotherapist, forensic science or agricultural science. There is no point system for Seychellois dentists specializing but often potential candidates have to partly contribute financially for their studies. These are often barriers for potential applicants wanting to study dentistry or a specialization. Moreover, salary and progression opportunities for dentistry graduates is less than for medical doctors or specialists in Seychelles, therefore potential candidates frequently opt for a career in medicine. This results in insufficient numbers of Seychellois dentists or dental specialists being trained which ultimately impacts on communication amongst staff and patients due to language barriers and oral health promotion as will be discussed in the two subsequent chapters.

Also, salary packages were often expressed to be inadequate for the number of duties being performed and this impacted on the retention of employees. The migration of Seychellois dentists to more affluent countries such as Australia and New Zealand in the past 10 years for higher salary has been a consequence of inadequate financing for public dental staff. A typical response to the salary package being offered to a dental staff is highlighted below.

> No… they [the government] do not give enough budget… salary wise… I stay because I love what I do [Staff 17].

Lack of an attractive salary packages for dental staff further implied that oral health services are compromised as Seychellois dentists tend to immigrate. Losing Seychellois dentists or specialists has an impact on the oral health services work culture and the ability of the staff to perform oral health education in a language understandable by the public. Cultural and linguistic appropriateness have also been identified by Lee and Divaris (2014) as factors influencing oral health outcomes at the level of the population. In the current study, cultural and linguistic appropriateness were the result a lack of available finance to retain and recruit dental professionals with qualities that embrace the culture and language of the Seychellois.

6.3.3 Distribution of wealth

Uneven distribution of wealth had an influence on the oral health outcomes of the Seychelles population. One participant explained:

> Socioeconomic problems that is happening… I recall when they did redundancy the people [adults] maybe they have three kids who are sick, each to take to the doctor and to the dentist and to bring to school. They will not come [to the dentist] at all unless that there is a problem because there is the risk of being fired from work [Staff 5].

Clearly the above account shows that economic hardship predisposed the disadvantaged individuals to indulge in risk behaviour which are greater risk factors for developing oral diseases (Boing et al., 2011). Studies have shown that patients who experience decline in their economic situation during economic downturns are incline to postpone dental consultations and treatments, may find difficulty to purchase dental products and will possess inadequate buying power to purchase sugar-free snacks (Glick, et al., 2012; Kahabuka et al., 2012; Chidzonga et al., 2015). Moreover, numerous studies have demonstrated that there is a difference in prevalence or incidence of oral health problems between individuals of upper and lesser socioeconomic status (Hobdell et al., 2002; Petersen, 2003; Timis & Danila, 2005; Chidzonga et al., 2015). The need for public policies in which support earning, employment and retirement is therefore important in order to reduce oral health disparities created by the uneven distribution of wealth in Seychelles.

6.4 Summary of the chapter

Macro level determinants are upstream factors which have an influence on oral health delivery at a population level with subsequent impact at a person level. Often, the manner through which these determinants influenced population level factors and consequently person level determinants was through a ripple effect. The study showed that in Seychelles there were numerous macro level determinants influencing the oral health status of the population. These were categorized into political, social and economic factors. These macro level factors created disparities in how resources were distributed and accessed at the level of the population/community which inevitably affect the likelihood of oral health behaviour at the level of the person. Result of this study also showed that macro level factors also had a direct influence on oral health behaviour at the level of the person. Reviewing and tackling these upstream determinants and their effects on oral health outcomes for the population as well as for the individual and their families are therefore crucial to reduce oral diseases in Seychelles.

The prioritization of oral health through its integration into important policies at different level is an area of much needed focus. The adoption of PHC objectives / principles is an important approach to tackle public health problems in Seychelles.

CHAPTER 7: COMMUNITY AND POPULATION LEVEL DETERMINANTS

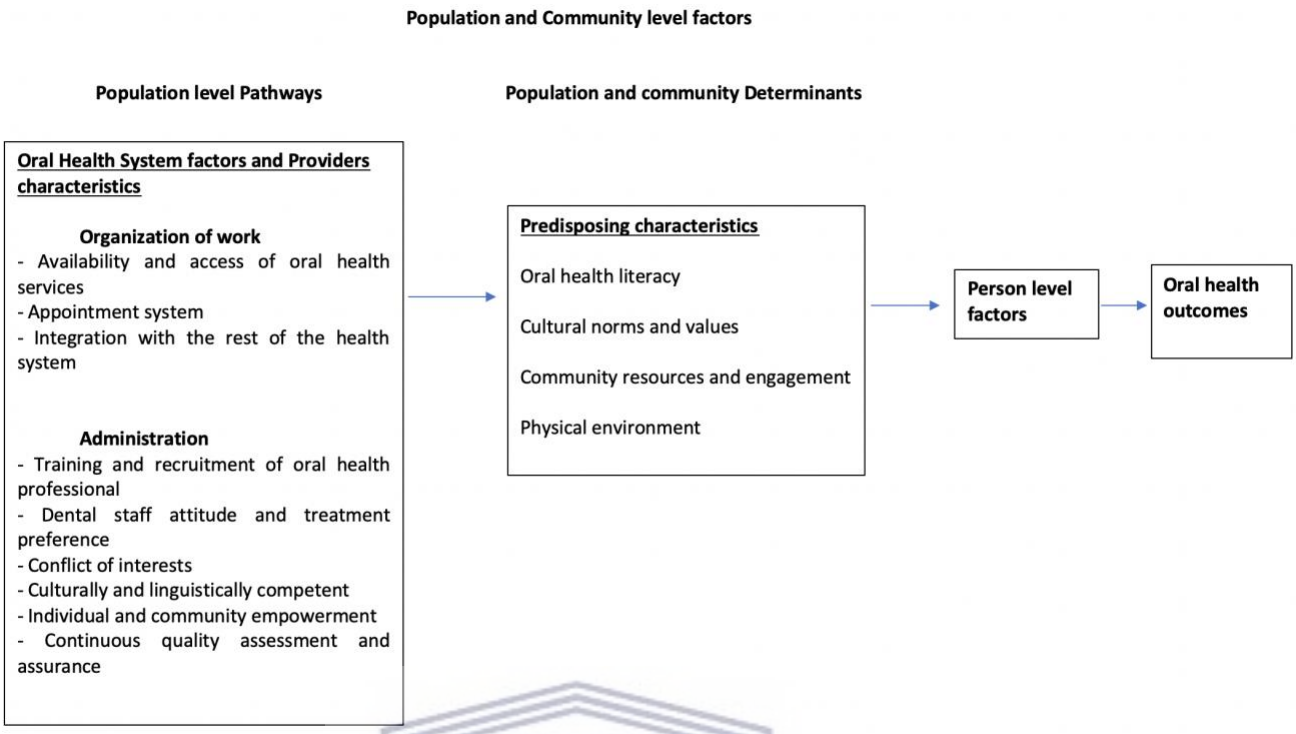
7.1 Introduction

Chapter 7 presents the perspective of the public dental staff and representative of the upper management on the community and population level determinants influencing the oral health outcomes of adults in Seychelles. The chapter is framed around the following objectives:

1. To evaluate the oral health system in Seychelles and determine how it impacts on service delivery and subsequently the oral health outcomes of the adult population.
2. To determine the factors influencing service delivery at the Oral Health Directorate and how these factors impact on oral health outcomes of adults in Seychelles
3. To understand the influence of social, cultural, economic and environmental factors on the oral health of Seychellois adult patients.

The theoretical framework specific to the Seychelles context (See Figure 4.4) was developed used to analyse population and community level determinants in the present study. As previously mentioned in the Theoretical Chapter, the framework is an adaptation of the framework by Lee and Divaris (2014). In summary, the current study classified population/community level factors into pathways, and predisposing characteristics. Pathways were the mechanisms through which predisposing characteristics influenced person level factors and inevitably oral health outcomes. Predisposing characteristics include (i) oral health literacy, (ii) cultural norms and values, (iii) community resources and engagement, and (iv) the physical environment. Physical environment was not identified by Lee and Divaris's framework (2014) as a determinant of oral health but has been acknowledged in the current study as a predisposing characteristic. Unlike the framework by Lee and Divaris (2014) which identified access to oral health care services, community resources and engagement, and health workforce characteristics as enabling resources, there were no enabling factors in the current study. The present study identified community resources and engagement, and health workforce characteristics as predisposing characteristics as they increased the risk to oral diseases. Oral health care services were identified as a pathway in the current study. Figure 7.1 illustrates the influence of pathways, and predisposing characteristics factors on person level factors and oral health outcomes.

Figure 7.1: Illustrating the influence of pathways, and predisposing characteristics on person level factors in Seychelles.



The different factors at the level of the population and community influencing oral health outcomes are discussed below in the chapter according to the study objectives.

7.2 The oral health system as an influence on oral health outcomes

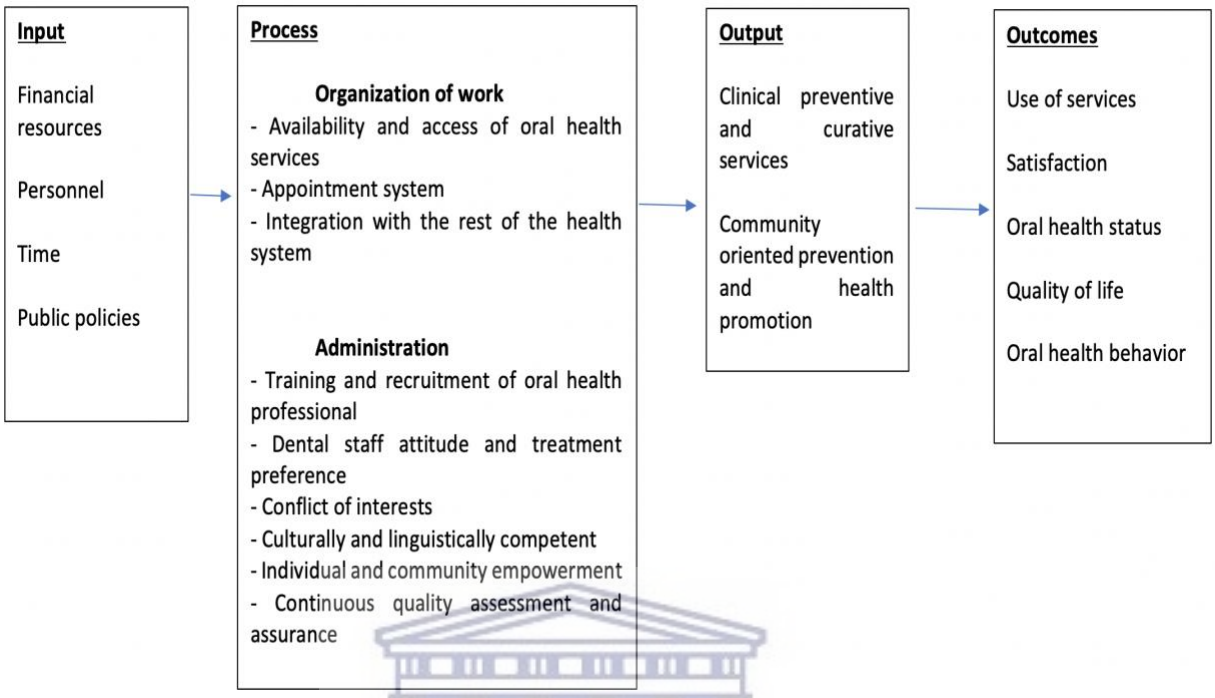
The section below reports on the first 2 objectives mentioned above (Objective 1 and 2). Results of the study revealed that the oral health system of Seychelles had an influence on the oral health outcomes of the population. The oral health system was recognized as a pathway. This is because the role of the oral health system and oral health providers were crucial in determining how population level factors such as cultural norms and values, oral health literacy, physical environment, and community resources and engagement influenced oral health outcomes. For example, lack of oral health promotion activities by the dental staff affected the population oral health literacy level.

In order to understand how the Seychelles oral health system and oral health providers acted as pathways, it was important to define the oral health system and evaluate its different components. Oral health systems are described as the combination of organizations' flow of the finances, laws, workforce training and structure, and regulations which are aimed at enhancing the oral health of individuals and community (Adeniyi et al., 2012). The final

outcome of any oral health systems is good oral health status which is associated with positive oral health behaviours (Adeniyi et al., 2012). This outcome is not derived from only the oral health care system, but are affected by other macro level factors such as public policies, economic resources and globalization as discussed in Chapter 5.

The public oral health system in Seychelles was evaluated by drawing on the model of WHO (Petersen, 2003), Tomar and Cohen (2013) - attributes of an ideal oral health system, and the framework by Lee and Divaris (2014). These attributes and models have been discussed in the Theoretical Chapter. The Oral Health System Evaluation Model by WHO (Petersen, 2003) was modified with input from Tomar and Cohen (2013), and Lee and Divaris (2014) as shown in Figure 7.2 below. Modification of the model was done during the data analysis phase as the researcher felt that the existing WHO model (Petersen, 2003) was limited, and there were other areas of importance that needed to be evaluated. The focus of the analysis will be on process and output as the chapter is addressing community and population level determinants. As mentioned in the theoretical chapter, 'process' is a set of interrelated health related activities which transform input into output. In the current study the process often acted as pathways which did not translate into good output for positive oral health outcomes as discussed below. The manner in which the public oral health system acted as a pathway will be highlighted.

Figure 7.2: Showing a modified model drawn from the Oral Health System Evaluation Model – WHO (Petersen, 2003), the attributes of Tomar and Cohen (2010) and the framework by Lee and Divaris (2014) as a lens to evaluate the oral health system in Seychelles. The modified model was proposed after data analysis.



The oral health system as a pathway influencing population and community level factors will be discussed below. Organization of work is discussed first.

7.2.1 Organization of work

In the current study, the organization of work was identified as an important pathway in influencing oral health literacy, and cultural norms and values. Organization of work revolved around the (i) availability and access to oral health services, (ii) appointment system, and (iii) integration of the oral health system with the rest of the health system as discussed below.

7.2.1.1 Availability and access to oral health services

Access to oral health coverage should be universal (Tomar & Cohen, 2010). In Seychelles there were mixed views about the distribution and location of oral health services. It was expressed by the participants operating at the population level that the uneven and unfair distribution of dental surgeries between adult and school dental services resulted in the clusters of services in regions which influenced access to oral health services. At the time of data collection twenty-two (22) dental surgeries were used by dental therapists, whilst only 18 dental surgeries were shared amongst dentists and dental hygienists. The challenges in regards to the access of oral

health services was due to poor management of resources in the past. A manager explained how the lack of evidence-based management resulted in unfair distribution of services.

> When we look at the service the way it is, for example we have dental services in most schools. There are no doctors in the schools. When I check the need for doctors are more than dentists. For example, children wake up with a flu, they get a disease s/he needs to go to the doctor. Dental needs to have a prevention programme so that the child does not have to go to the dentist so the situation is reverse. So, I think that people have different perspectives because when you provide something for a long time with the mindset you expect to have dentist next to our doorstep, when we get out [of our house] we walk in [the clinic] okay. But if you look at the evidence, the facts that exist it shows that it does not justify. I see our resources our biggest thing we do not have resources. We have misallocated [resources] over the years. Not because it has been done on purpose but because the people who did it did not know better than me. I think if I was sitting here a few years I would have done the same okay. I think the biggest issue for dental, HCA, ministry of health is we need training, we need training because the field medical the managers are not just like that, we need to know what we are dealing with [Staff 16].

Access to dental clinics was also dependent on the opening hours. In Seychelles, public dental services are provided Monday to Friday between 8am to 4pm, weekdays only. As the majority of the population are employed during this time period, this had an influence on accessing of dental care. In situations, where employment conditions acted as barriers for specific communities, this impacted on whether or not population groups will access preventive or emergency dental services.

Distance travelled to seek dental services was often felt to be a deterrent for patients who travelled far to access specific dental care. One dental staff involved in clinical care explained:

> On Praslin it's only recently that they have started to expand the [dental] services and break down the population. The Grand Anse population they were more pain oriented because it took them ages to get to Baie Ste Anne. It was accessibility. On La Digue [clinical services provided by dentist] is two days a week. School dental services is there three days a week. It is recently that they have added the hygienist [Staff 9].

Studies have shown that the location of oral health care services have an impact of their utilization (Patrick et al., 2006; Ann et al., 2011; Petersen, 2014; de Fonseca & Avenetti, 2017; Tiwari et al.,2017; Herkrath et al., 2018; Akbar et al., 2019). Results of the current research is similar to studies conducted in Riyadh city - Saudi Arabia, China, Indonesia and Brazil (Johara & Al-Hussyeen, 2010; Ahn et al., 2011; Herkrath et al., 2018; Akbar, Pasingiti & Awang, 2019; Gao et al., 2020) which showed that distance travelled had an influence on whether or not dental care will be accessed on a non-emergency basis. Communities or population groups who reside close to areas with a dental clinic were more inclined to access dental care, have less dental treatment needs and better oral health condition. Therefore, distance travelled discouraged population attendance and affected the process of enabling them to increase control over their oral health and to reduce the burden of oral diseases. The lack of an appointment system had also an influence on the likelihood for positive oral health behaviour such as utilization of oral health services as discussed next.

7.2.1.2 Appointment system

An increased workload resulted in the difficulty to implement an effective appointment system. At times dentist movement resulted in the inability to adequately follow-up patients or complete a treatment plan. Quality of clinical services and oral health education were often compromised as explained by the following participants.

> The appointment system at times does not work, because appointment they [patients] get in 2 months after they come [to the dental clinic] [Staff 3].

> Appointments are given far and people do not continue. Also, maybe the dentists are too mobile replacing, starting a work and not finishing [Staff 11].

> If you have a lot of ROPs [patients for relief of pain] you cannot do good treatment, if you have less you can take your time because it is quality [Staff 17].

> We [dental staff] do not have enough time with a patient individually to explain well, we are rushing to see the other patients outside waiting to be seen [Staff 18].

The lack of an effective appointment system in Seychelles resulted in treatment offered mostly being emergency procedures. Oral health education and clinical prevention were often compromised due to the high number of non-appointment patients waiting to be seen.

Moreover, the communities therefore accepted emergency dental services as a norm despite not in the best interest of positive oral health outcomes. Lack of an appointment system by dentists also resulted in less engagement with the public through oral health education, henceforth contributing towards low oral health literacy.

Oral health integration with the rest of the health system was another pathway identified in the current study as discussed next.

7.2.1.3 Integration with the rest of the health system

Working in silos often discouraged dental staff to advocate for oral health at a higher level in the current study. One dental professional explained the importance of inter-professional and inter-sectoral collaboration to increase tax on sugary products. Unknown to the staff, the Ministry of Health was working on a policy to impose tax on sugar sweetened beverages. The OHSD had not been consulted.

> It is a mammoth task and I wonder if dental can really do it. It has to be in collaboration with the nutritionist and eventually with tax authorities [Staff 6].

Others explained:

> We need the support of our shareholders, partners so that… everyone do their part and come together for us to see changes, because if we do only one bit we will not see the changes, we need to come together [Staff 14].

> We need all ministries. We need to have an environment which is conducive for prevention and all of that from tooth paste uhm tooth brush from accident on the road, trauma seat belt and so on. A lot is outside our control [Staff 16].

Clearly from the above account it can be argued that the integration of oral health services in the health system of the MOH is lacking in Seychelles. This was due to factors operating at the macro level and includes (i) the lack of effective health policies that can alleviate oral diseases and negative circumstances, and enhance dental public health, and (ii) oral health ranked low priority in public policy discussions. These two factors have been recognized as crucial obstacles in the incorporation of oral health into the health system (Mandal et al., 2014;

Harnagea et al., 2017). In Seychelles, policy makers do not consider oral health significant as the nation bears a higher burden of other diseases such as obesity, cardiovascular diseases and diabetes. This observation in Seychelles is similar to other countries such as Nigeria (Adeniyi et al., 2012). The lack of integration impacted on the comprehensive management of patients, coverage of oral health promotion activities, and visibility of oral health in the communities. Moreover, the lack of integration resulted in wastage in the utilization of useful resources allocated for health promotion and disease prevention by the Ministry of Health.

Based on the above evidence, the organization of work is foregrounded as an important factor under the oral health system pathway. Administration of oral health services was another contributor of poorer oral health outcomes in Seychelles; this is discussed next.

7.2.2 Administration

The manner the OHSD administered services was an important pathway in influencing community oral health outcomes. These were dependent on the characteristics of the oral health providers, and appropriateness of services offered as discussed below.

7.2.2.1 Training and recruitment of oral health professionals

The insufficient number of dental professionals working at the Oral Health Services Division (OHSD) was expressed by the majority of the staff cohort. The recruitment of certain cadres and the type of services offered to the public was influenced by the allocation of dental surgeries which was not governed by policies or strategic plans. This was felt to have an impact on the outcomes of the oral health system. Such include the timeliness and availability of clinical preventive and curative dental care, and the accessibility and coverage of community-oriented prevention and health promotion. Four participants explained:

> There are not enough trained individuals [for preventive dental services]. When more people have been trained you start to see people in different districts and they start to work on a program, go in the school, look for kids, send appointment and this reduces the number of patients in pain. You will notice it if you are doing your program well, it reduces all [Staff 5].

> I think there are not enough professionals for mouth health… It is quite easy to see a doctor but to see a dentist it is not as easy [Representative of Upper Management].

> I think our problem is that we do not have enough dentists we could have sorted out the ROP problem. I don't have to come and sit for hours, but because we do not have enough dentists, appointments will be really far like 3 months 4 months. So, if a patient is in pain we cannot ask them to come two months or three months they have to come see the dentist in the morning, that is why we have the ROP system. I do not see how we can stop that for now [Staff 12].

> I am overbooked because the way we [dental hygienist] get clinic. It is once a week. Patients do not like to come to town, they prefer in their district [Staff 3].

The training and recruitment of sufficient number of oral health professionals to compensate for the inefficient distribution of oral health services is crucial to reduce inequity in oral health outcomes (Jager et al., 2017). From the above, it can be argued that the uneven distribution of oral health professionals resulted in unfair access to certain services which had an impact on the oral health outcomes of the Seychelles population. Firstly, the unequal distribution of services posed a challenge for communities to access preventive oral health services (WHO, 2020b). Access restricts the utilization of care and aggravates an already unequal distribution of health (Jager et al., 2017). Secondly, communities not accessing clinical services in a timely manner resulted in disease progression amongst the Seychellois adults with the possibility of tooth loss. Lastly, lack of oral health education in the community resulted in a decreased tacit knowledge on the severity and susceptibility of oral diseases, and reduced self-efficacy in performing positive oral health behaviour.

The call for mid-level providers and new oral health cadres, competent of performing functions in health promotion and prevention is therefore crucial (Balasubramania et al., 2019) to reduce the burden of oral diseases. Studies have shown that dental hygienists and dental therapists are potentially well suited to play an important role in expanding the access to preventive oral services (National Governor Association, 2000). As Bhayat and Chikte (2019) explained, the right quantity and type of oral health professionals to deliver appropriate quality of care in areas of greatest needs is the characteristics of an effective and efficient oral health care system. The influence of dental staff attitude and treatment preference on person level factors is discussed next.

7.2.2.2 Dental staff attitude and treatment preference

The attitude and treatment preference of the public dental staff in the current study was also an important factor under the oral health system pathway. In the current study, providing clinical care was favored to preventive dental services especially amongst the staff. This is reflected in some of the participants' responses below.

> They [dental therapists] are helping but their role should be as an oral health educator. They are being more clinicians. They are working clinical a lot. I think status maybe they think the dental chair seeing patients gives them a higher status than going to the school… people will not see them [if not in the clinic] [staff 7].

> I think that as a dental therapist you learn both; you do the preventive part and curative part. For a while I have noticed that staff have become lazy. They tend to stay in the clinic and do not do prevention. The prevention that they say they are doing is based on individual or mouth or teeth whatever like that, but they are not doing enough in the school… they concentrate more on curative which I think needs to change the mind set [Staff 5].

At times it was difficult to change the staff mentality and gain support in regards to oral health promotion. One dental manager explained:

> In regards to support of staffs [for oral health promotion] any new ideas, any changes you expect resistant. It is human nature, the person when is in comfort zone [and] is used to doing something a lot of time, it is difficult to change. I think it also comes [to] training… education because people who understand what is happening you get their support, people who are not appreciative because it is you who are doing, it takes time and it is a process which takes a long time [Staff 16].

From the above, one can argue that staff attitude and treatment preference had an impact on (i) curative and clinical preventive services and (ii) community-oriented prevention and health promotion. Insufficient disease prevention and oral health promotion activities had an influence on community engagement and oral health literacy. Staff attitude and treatment preference were often related to the training curriculum. So far, the majority of the dental school programs have been dedicated towards restoration of tooth, alignment and replacement methods (Balasubramanian et al., 2019). The inadequate diversity and appropriate cultural training in dental training have an influence on the oral health status of the community (Hilton & Lester, 2010). Conflict of interest is discussed next.

7.2.2.3 Conflict of interests

In the current study, there was conflict of interest pertaining to the scope of practice. Despite the scope of practice stipulating that certain dental professionals were trained and capable of performing a range of dental procedures or interventions, there was resistance from dentists and dental specialists. Moreover, dental therapists whose scope of practice appeared to intersect dentists' functions were often seen as a threat to dentists. These phenomena are not restricted to the Seychelles but has been observed in other countries such as Australia and New Zealand (Balasubramania et al., 2019). Some participants explained:

> There is also a big problem in attitude of the [dental] therapists and dentists. Dentists feel that dental therapists are walking on the feet of dentists in doing certain functions. The dentists insult the cadre [Staff 5].

> There are fighting, not physical but fighting. Like there is no understanding. Dentists are for themselves, school dental is for itself. We [public dental staff] are not complementing each other. We will not achieve what we want to [Staff 15].

The health workforce (as a whole) is organized around professional interests and professional groups, instead of the population needs (Balasubramania et al., 2019). As professional groups acquire, and utilize, 'additional skills' governance becomes even more multifaceted with dental workers and within healthcare systems (Gallagher & Eaton, 2015). Clearly, evidence collected in the current study supports the statement made by Balasubramania et al. (2019). The restrictions in the scope of practice of dental therapists and dental hygienists imposed by dentists and dental specialists in Seychelles resulted in the delay for adults to access certain dental services. Furthermore, working in silos create inefficiencies to manage patients in a comprehensive and team approach. This creates barriers for high risk population groups as the bureaucracies create barriers for them to access and utilize oral health services, for example, there is a long waiting time to see a dental hygienist as patients have to wait for a referral from a dentist or dental specialist. Dental hygienists should be given more autonomy to increase access to oral health care (Langelier et al., 2016; Chen et al., 2020) in Seychelles. Moreover, independent practice of dental hygienists could lead to lower dental care prices and greater availability of providers in underserved areas (Chen et al., 2020) and amongst vulnerable population groups.

Apart from conflict of interests, the cultural and linguistic competency of the oral health professionals working in the public oral health system also had an influence on person level determinants such as likelihood of behaviour. This was due to numerous factors as discussed next.

7.2.2.4 Cultural and linguistic competence of oral health professionals

In Seychelles, as majority of the dentists and dental specialists are foreigners, and because of the language barriers and lack of cultural familiarity it resulted in minimum community engagement to promote positive oral health. Communication barrier was often expressed to impact on how oral health education was done. This is reflected in one dental manager's response.

> There are shortcomings. Three quarter of dentists are not Seychellois so there is the communication. It is the love which I think is different from Seychellois who is treating his/her own nation and a foreigner. It is a pity that we do not have a lot [of Seychellois dentist] but we have to make do with what we have [Staff 16].

Language barriers was not limited to the use of foreign languages but the use of technical language by dental staff which was not always culturally appropriate to the Seychellois population. Minimum patient-provider interactions due to workload and language barriers resulted in population groups having insufficient knowledge and skills to navigate through the complex oral health system, understand oral health messages, and develop personal skills (self-efficacy) to perform positive oral health behaviour. Difficulty to navigate through the oral health system due to low oral health literacy resulted in some population groups being unaware of preventive services offered by the OHSD. Referral to cadres such as dental hygienists was dependent on referred by a dentist. One participant explained:

> For the 19 years I have been working, I can count on my fingers how many dentists who when patients come in the morning even if in the past s/he has not come to the dentist will say we will refer you to the [dental] hygienists and then you can return to us. I can count on my fingers because most of the time there is no time they check your problem [Staff 13].

Moreover, in the current study oral health education done was often limited and lacked evidence. For example, the focus of dental therapists was on limiting sugar intake to reduce

dental caries. The influence of other contributing biological factors and other determinants of dental caries such as time, bacteria, family environment and availability of finances were often overlooked. Limitation in oral health education therefore contributed towards low tacit knowledge observed in certain communities. Two participants explained:

> Our focus should not only be on sugar causing the teeth to [become] rotten. Our focus should be on prevention which includes everything. You cannot focus just on sugar. There are lot of things that can make your teeth rot or before you use sugar. They [dental therapists] need to change their mind set [Staff 5].

> I do not see dental therapists saying to a child or a parent that the minute that that teeth start contacting each other there are food impaction… so gum problem starts. The dental therapists are not passing on the information at that point in time, how would they [children] know and proceed into your adult life? I think the dental therapists need to update themselves in a way which is what they are currently trying to do [Staff 9].

The oral health system should comprise of a set of behaviours, beliefs, and policies that allows it to function in cross-cultural situations (Tomar & Cohen, 2010). The authors further added that the way health promotion, oral health care, and community-based prevention are provided should take into considerations culture. In Seychelles, this was not always the case. Cultural competency of staff was related to the training curriculum and the cultural background. Insufficient diversity and lack of suitable cultural training in dental schools cause inadequate comprehension of cultural attitudes, beliefs and values (Hilton & Lester, 2010). Cultural and linguistic competency of care providers are therefore crucial determinants of oral health status and access to dental care (Gracia et al., 2008).

Despite Seychelles having no racial categories, the need for an oral health workforce comprising mostly of Seychellois is apparent. This insufficiency in Seychellois dental workers resulted in the inconsistent behaviours and attitudes of patients related to compliance with treatment regimens (Gracia et al., 2008). Cultural competency is intimately related to health literacy (Garcia et al., 2008). The lack of cultural and language competencies observed in the current study had an impact on individual and community empowerment as discussed next.

7.2.2.5 Individual and community empowerment

An ideal oral health care system should equip communities and individuals with the means to efficiently alleviate the risks to general health and oral health, and to promote an environment beneficial to health (Tomar & Cohen, 2010). Results collected in the current study showed that the OHSD was not empowering the Seychellois individuals and communities. Rather the culture of patient-staff dependency was observed. This started very early during the school years where dental therapists will call children from class to administer treatment or go in classes to give appointments. The expected norm that dental staff will contact a patient for an appointment was therefore carried over during adulthood. In the absence of dental professionals sending an appointment for dental check-ups, certain population groups would attend only emergency dental services. Some of the dental staff explained:

> I think that the problem is they [patients] are used to someone going after them. They are not used to taking their responsibility [staff 12].

> Parents need to have their fair share of responsibility. We cannot think that parents should do 50% and dental 50%. You have to care for your child's teeth. This is the responsibility of the parents not that of the ministry and like the slogan says, "your health your responsibility" [Staff 4].

> It may be a little bit of lack of education and lack of self-control. The young people are not really being made aware now you are a grown up you have to take care of yourself. It is a lack of responsibility towards its own body [Staff 6].

> Since a child is in school s/he sees a therapist. Therapists are sending appointment, going to call in the class to do treatments, but once you finish S5 there is nobody to call you for appointment. I think we are not teaching them [children] how to take their responsibilities… because they expect you to call them understand, if post-secondary you continue to send paper, we are not giving the parents a chance to take their responsibility [Staff 13].

The lack of community empowerment observed above is clearly not in line with the principles of health promotion. Health promotion is the means of enabling individuals to take power over their health (WHO, 1986). One of the Ottawa Charter's action area for health promotion is developing individual skills by allowing societies to learn during their life course to prepare themselves for all of its phases and handle chronic illness and injuries (WHO, 1986). According to the charter, this is done through providing information, education for health and improving

life skills. Clearly, in the current study there was a lack of developing personal skills which impacted on self-efficacy, and self- reliance at the level of the person. The next section will discuss continuous quality assessment and assurance.

7.2.2.6 Continuous quality assessment and assurance

The ideal oral health care system should contain a constant method for monitoring critical aspects of the structure, process and outcomes of care for populations and individuals (Tomar & Cohen, 2010). In Seychelles, oral health surveillance is lacking by the OHSD. National and sub-national oral health surveys are mostly conducted amongst the children population. In the adult population, the last oral health survey was conducted in 1999 (Tillberg et al., 1993). Regardless of the survey results, oral health programmes are continuously being implemented without proper monitoring, evaluation and cyclical quality assessment, and reporting to the necessary management. This is reflected in one participant's response below.

> Surveys have been done and research have shown that it [oral health programmes targeting children] is not working… our [Seychelles] oral health status of the children is very poor. School dental is a service that has been here a long time. A service that has been told to be a successful service in dental by people before me… without an evaluation [Staff 16].

Moreover, it was felt that the Oral Health Services Division (OHSD) was focusing more on structure rather than the process and outcomes which impacted on the oral health system. One participant used the example of a previous speech made by a Minister of Health to explain.

> The minister spoke about structures. He spoke about buildings. He spoke about equipment. He spoke about specialists. He doesn't talk about processes. He doesn't talk about outcomes. He doesn't talk about it but these are two very… important measurements of quality of care [Staff 10].

The inability of the OHSD to monitor the burden of oral disease through the use of an effective surveillance platform resulted in the lack of evidence-based oral health promotion activities to address common oral health problems. The lack of quality assurance and assessment resulted in the inability to provide early/timely interventions to minimize the complications/burden of oral diseases. Furthermore, investing mostly in structures rather than processes and outcomes resulted in the use of limited resources and the continuous increased cost to cope with

increasing burden of oral diseases in the Seychelles. The clustering of certain school dental services observed in the Seychelles is the result of focusing on the structures of the oral health system. Dental caries amongst children remains a public health concern in Seychelles despite investment in technologies and dental surgeries. The need for mechanisms in quality assessment and assurance through routine surveillance is therefore crucial. In order to meet the challenges associated with burden of oral diseases and the needs of the population effectively, decision-makers and public health care administrators require the tools, ability and information to evaluate and monitor health requirements, select intervention methods, develop policy options suitable to situations, and enhance the operation of the oral health system (Petersen, 2003).

To conclude, this section has highlighted the influence of oral health system as a pathway influencing oral health outcomes. The influence of the oral health system was crucial in determining how predisposing characteristics influenced oral health outcomes. The next section in this chapter focuses on the predisposing factors influencing oral health outcomes at the population level.

7.3 Social, cultural, economic and environmental factors as an influence on the oral health outcomes

The section below reports on the objective number 3 mentioned above which addressed the social, cultural, economic and environmental factors which had an influence on oral health outcomes. These factors were classified as predisposing factors. In the current study context, predisposing factors were health disparities increasing the risk of oral diseases amongst individuals but operating at a population level. These are broader issues affecting communities but have significant outcomes at the level of the individual. These factors include (i) oral health literacy, (ii) cultural norms and values, (iii) community resources and engagement, and (iv) physical environment. These predisposing factors are discussed below.

7.3.1 Oral health literacy

In the current study, oral health literacy had an influence on the oral health outcomes of the study cohort. The low level of oral health literacy observed was associated to numerous factors. These include the education system, culture and the oral health system. Except for the oral

health system which was discussed as a pathway to health outcomes educational system and culture are discussed below.

The lack of inclusion of oral health in school curriculum in Seychelles had an impact on oral health literacy and by extension oral health behaviour at the level of the person. Oral health education was only provided by dental staff through inconsistent classroom education sessions, or when children accessed public dental services. The lack of oral health education in the curriculum resulted in minimum exposure to oral health messages and services needed to inform oral health choices and the adoption of appropriate oral health related behaviour. One participant explained:

> I am thinking there is not enough follow up and also [no] program in the school. It is lacking because in the past we did a lot. There was health promotion, we went in the school, we went for talks to educate children on mouth health [and] on the way to brush but that has reduced. So, I think it plays a role [Staff 15].

Follow ups are important for positive oral health related behaviour. This is in order to ensure repetition and reinforcement which have been shown to be crucial in the sustainability of the effects of oral health education programs (Haleem et al., 2016). In the current study, a lack of repetition and reinforcement of oral health messages was therefore a contributor to poor oral health literacy and inevitably oral health behaviour at the level of the person. The limited oral health literacy skills therefore placed the children's oral health at risk (Rozier, 2011) and future risk into adulthood. Growing up with positive oral health knowledge, belief and practices will not be passed on through socialization which will result in a culture that is unsupportive of positive oral health behaviour and outcomes.

It can therefore be argued that the low oral health literacy observed amongst the Seychellois is contributing to the OHSD budget being allocated more toward curative dentistry rather than oral disease prevention. As previously discussed in the macro level chapter, the OHSD budget is largely used to purchase dental materials required for the management of progressed oral diseases.

Furthermore, populations with low health literacy skills often have worse health knowledge and health status, infrequent usage of preventive services, detrimental behaviour and ultimately

worse health outcomes compared to those with higher literacy level (Horowitz & Kleinman, 2008; Parker & Jamieson, 2010; Lee et al., 2012; Hongal et al., 2013; Guo et al., 2014). These population groups frequently have chronic conditions, and are less capable to effectively cope with those (Parker & Jamieson, 2010). Providing people with the required skills to get, comprehend, and act on oral health related information can increase their capability to deal with the demands of oral health maintenance and can eventually lead to enhanced oral health outcomes (Lee et al., 2012).

7.3.2 Cultural norms and values of communities

The Seychellois cultural norms and values had an influence on oral health outcomes. Moreover, social gradient was an important cultural determinant for the current study population's oral health outcomes. In the current study, communities experiencing the most disadvantaged social-gradient due to lower family income and lower oral health literacy were less likely to access preventive oral health services, less likely to purchase the required dental products such as dental floss, were more likely to consume high cariogenic food, and were more likely to neglect recommended oral hygiene practices. Single parents were often at lower social gradients. The disadvantage in social gradient was due to the inequality in distribution of resources at the macro level which impacted on access to community resources at the level of the population and by extension, to the individual. Some of the participants explained:

> Everything like toothpaste are being provided in the shop you can buy. Toothpaste, dental floss, toothbrush you can buy in the shop but some people choose not to buy these things because of a lot of factors. They can tell you they do not have money like that [Staff 3].

> Some people cannot afford floss. They just buy a toothbrush, a toothpaste and brush… some people know [about importance of mouthcare regimens] but they cannot afford it [Staff 12].

> If you are getting the basic minimum wages… you will have to choose the unhealthy options which are cheaper most time. I do not get the minimum wage and I find healthy food to be very expensive. Another aspect is the single parents… those single parents where they have two or three kids, maybe they are rushing in the morning so will make the big brother care for the others [Staff 4].

> On the small salary we are getting some people find it difficult… things are expensive, it is very expensive at times [cough] so it becomes a constraint for them in regards to support. We are explaining to them how to take care of their mouth but outside they cannot [Staff 11].

> The social issues that you have in Seychelles right now it's something that [we] really have to face that people are busier because they want to work more to make money because lifestyle in Seychelles is very much expensive. So, you may be educating them but to what extent they are applying them, that's another question and that can only be evaluated with the number of ROPs that turn up to the clinic and the number of people who keeps their appointment, that can only be evaluated [Staff 10].

This is a reality in many households with minimum income. Other life courses activities therefore take priority over oral health. The need to subsidize health products and healthy food options is therefore important to increase positive health actions.

The impact of westernized culture on the food preference and consumption in Seychelles was also apparent in the current study. Nutrition transition impacted on the oral health outcomes of the Seychelles population. Similarly, in developing countries the occurrence of tooth decay increased when the inhabitants changed from conventional diet to one that includes refined sugar and flour (Reddy & Anitha, 2015). This issue is reflected in the account of one of the participants:

> I have the impression that like so many other countries Seychelles is trying to copy western standards willingly or not willingly. If you take the food like the creole mama cooked food, it's very healthy stuff. It's orally good for the teeth. Now look in the shops what is there for the patients? Sugary, fancy fizzy drinks and look at the take-aways of the young dental nurse it is 80% chicken and chips… Some of them [Seychellois] do not even know how to cook a 'kari koko poul lokal' [local chicken curry with coconut milk]. This is the way nutrition has changed rapidly within the short time and it does not do any good for the general health especially for the oral health [staff 6].

Traditional local food was also associated with poverty or resulted in community members being looked down upon by others as highlighted in the following account:

> I think it is more than pride, it is peer pressure especially kids at school they bring bread to school. Their parents give them [bread and] they return with [the bread]. [They] prefer to hang at the tuck shop to get chocolate and cola because they see other kids buying. All of this is a lack of education. Parents lack education. Parents and their kids since small need to be told what is good and what is not good… Then there are people who will not eat an apple, will not eat an orange, will eat a chocolate, will eat a MARS will eat a SNEAKER [staff 7].

Certain food being highly prized and marking social position in population groups is well documented in literature (Reddy & Anitha, 2015). In the current study, food common to poorer communities were expressed to be rice, fish, bread and cassava. This is noted in the following account:

> There is evidence from overseas which shows that if a person is poor s/he will eat unhealthily. Poor health is associated with poverty. Poor health is associated with low socioeconomic status. It is an internationally recognized fact and I think in Seychelles it is not the case. So, if you compare the way our country was living when we were poor as a country, we ate healthier than we are eating now when we are supposed to a little bit richer as a country. So, all of these things that we are saying to eat turn to fivers in our food before we had, the cassava, the sweet potato, fish we were a poorer country but our diet was more healthier [Representative from upper management].

Furthermore, the fast-changing nutrition culture posed a challenge for the public oral health system to cope with the increase in oral diseases associated with poor nutrition. Such include dental caries and periodontal diseases. One participant explained:

> When we are looking at Seychelles not just dental disease but all diseases in general we are being influenced a lot by the western culture. There are tourists who come here and I think we have move forward. Fasten our diet and lifestyle. They have changed. We have lost our culture… we do not have the culture anymore. Our diet, lifestyle and habit have westernized… It is like we have adopted the bad side of the system but we cannot keep track of it. There are European countries like that but they have systems that are more advanced than us. They have prevention, they have education, people are more aware of the situation so there is a balance. I think we are in transition [Staff 16].

It was also felt that oral health was not valued highly amongst certain population groups. Often other life course activities were prioritized over oral health as reflected in the two participants' account:

> The attitude of people [is that] when they do not have pain, they do not have a problem. They see other things are more important than their mouth. 'I will not go to the dentist to remove my tooth, I will go do something else with my money' [Staff 11].

> In Seychelles nowadays, a child comes to my chair with a big mobile phone, there are things that are expensive and you yourself as a staff you do not have. I think they can afford dental floss [but choose not to buy]. Gadgets are good for your understanding but you have to make them understand that a dental floss is important because it is part of prevention of your oral health status. Even if they have put tax on sugar, if that person has the money they will buy. Kids do not eat at home. For example, fruits… patients say they are tired of eating imported fruits, so there is a problem somewhere [Staff 5].

This resulted in some communities accessing dental services for emergency purposes only, and not buying the required dental products. At times the failure to perform or adopt positive oral health behaviour was due to the lack of acceptance of oral health education or advice given by dental staff. One staff explained:

> It will remain a small percentage of people who will still do that [adopt behaviour not conducive to oral health]. Even if you say it is bad they will continue to do it but it is not on a high scale. We Seychellois we are not conscious of mouth health not only mouth health but the general health [Staff 14].

Lack of acceptance may be attributed to delay in educating the public about oral health problems at a younger age, or other cultural factors such as tooth loss being an acceptable norm amongst some population groups. It can therefore be argued that in Seychelles cultural factors such as social gradient, and the values placed on teeth had important implications for an individual's own health and that of other dependents. Social gradient influenced the ability to purchase health food options and dental products.

Available resources in the community, and promoting oral health through community engagement were other predisposing factors in the current study as discussed next.

7.3.3 Community resources and engagement

In the current study, available resources in the community had an influence on oral health outcomes. The absence of policies which support positive oral health at the macro level impacted on access to community resources at the level of the population and by extension, to the individual. For example, the absence of oral health in employment policies at the macro level, resulted in employers taking actions which often compromised the oral health outcomes of the Seychelles population.

Inability to get time off work to attend dental appointments was the common reason provided for missed or delayed dental visits. Two participants explained:

> I think it has something to do with work. When I ask parents of children who do not have pain why they come as ROP [Relief of Pain] which is a false picture of how the clinic is functioning, parents say 'miss if I am working here or there I rather come in the morning at 8am then I get my paper and I go straight to work. If I go to work and then take my child to school, then I have to leave work, go to school and then return and this is a day wasted and it bothers those people'. Those people are telling you that they will get problem at work so they come in the morning. This I understand but we are breaking the whole system [Dental Staff 15].

> ROPs [Relief of Pain patients], they do not want to come and sit for a long time so they tend to wait for when it is painful. Some of them complain about not being able to leave work. You get a lot of this excuse 'I cannot leave work. They will not allow me to leave work to just go for a checkup or I do not have time to come and sit here for two or three hours [Dental Staff 12].

Clearly from the above accounts, employment conditions influenced whether or not an individual will access preventive or emergency dental services. The lack of equitable policies to protect the oral health outcomes of Seychellois adults regardless of occupation resulted in poorer oral health status for the communities occupying lower paid jobs. Occupying lower paid jobs often resulted in the feeling of insecurity implied by the fear to lose work.

The possible financial impact due to work absenteeism was a deterrent especially in households struggling to make ends meet. This is reflected in the response of one participant:

> I recall when they did redundancy, the people maybe they have three kids who are sick, each to take to the doctor to the dentist to bring to school, they will not come at all [to the dentist] unless that there is a problem because there is the risk of being fired from work [Dental staff 5].

The priority amongst workers especially those occupying lower paid jobs was therefore monetary benefits. The workers occupation took priority over their oral health status as this was their source of income. This finding is similar to studies conducted in Canada and Japan where it was a norm for individuals occupying lower jobs to access emergency dental services due to employment insecurities (Quinonez & Figueiredo, 2010; Tsuboya et al., 2014). Possible explanation was that precarious employment resulted in job insecurities which creates disparities to access preventive oral health services (Tsuboya et al., 2014). The implementation of laws and policies at the level of the population was crucial in determining how communities engaged with resources. Poor implementation of governing regulations resulted in the environment not being supportive to achieve good oral health outcomes.

Moreover, results of the current study showed that community engagement amongst the various actors in the population such as health authorities and law enforcers to promote oral health in Seychelles was often lacking. The poor implementation of the National School Nutrition Policy (2008), the Excise Tax (Imposition of Sugar Tax on Drinks) regulations (2019) and the Seychelles Trade Tax Schedule 2 (2009) resulted in the availability of sugar in the environment which impacted on purchase and consumption by the population. Two participants explained:

> There are lots of sugars that are being imported for our consumption [staff 8].

> I look in school the amount of sweet being sold, that children buy in the tuck shops outside of school, it is a lot… there is no support outside when you look. Sweets are entering too much in the country. In the shops people are making money with sweets with those children, and it is the children who suffer [Staff 15].

Insufficient monitoring of public policies by law enforcers resulted in importers and shop owners selling sugary products in high amounts increasing its availability. This staff member's

account foregrounds that constant battle against the infiltration of sugar foods into the communities but with little success in attempts to curb this:

> They are saying that there is a policy in school but a lot of tuck shop are selling under the counter. It is a big problem, [in] our society… You see a pick up full of packets of sweets. Three tons with packets of sweets but I am telling you it is a bit too much. The government needs to know how we are fighting. It is a fight we are losing. When you check you do your bit but the authority is doing nothing [Staff 7].

The oral health system appeared to be strained with the increasing number of oral diseases associated with high consumption of sugar at the level of the person. This is resulting in the annual budget allocated to the OHSD being insufficient. Community engagement to promote oral health is therefore important for positive oral health outcomes.

The physical environment was the final predisposing factors identified that increases the risk of oral diseases amongst the study cohort. The influence on the physical environment on oral health outcomes is described next.

7.3.4 Physical environment

The physical environment in Seychelles was not always supportive to promote a positive oral health outcome. The absence of policies on fluoride in the Seychelles resulted in the lack of water fluoridation in the physical environment. This reduced the exposure of the population to fluoride which provides protection against dental caries. Furthermore, the increasing number of drug users in Seychelles due to easy access to illegal drugs in the physical environment had an impact on oral health outcomes. The drug user's community had an increased risk of oral diseases such as dental caries, periodontal diseases and dental trauma. Good oral health was not a norm by this population group, as the priority was getting the next 'drug high'. The poor oral health in drug users posed an extra burden on the oral health system, as more resources had to be invested in curative and rehabilitative dentistry. Some of the participants explained:

> Like at [name of a dental clinic] you have people [from] the ghetto. Like right outside. So, you know what type of people that are… so you… adapt to people to make a difference [Staff 9].

> There are lots of patients with bad hygiene… specific patients… its patients stuck with drug problems [Staff 12].

The availability of alcohol in the environment also had an influence on oral health outcomes. This was due to the poor implementation of the Seychelles National Alcohol Policy (2014), the Goods and Service Tax Act Regulations (2003), and the Licenses (Liquor and outdoor entertainment) regulations (2013). The upper management representative highlighted the minimum involvement of law enforcers in public policies implementation, and how people can buy alcohol during selling hours for storage anytime.

Moreover, communities experiencing more life course challenges often utilize alcohol in higher concentration in comparison to population groups doing better in life. This collective thinking is reflected in one participant's response.

> I think Seychelles with all these problems happening. A lot of social ills that are affecting people. The behaviour of people has changed like alcohol liquors things like that… it becomes frightening… Maybe their social problems, they take one and rest and pick up the next day they will return to the same problem and it becomes a habit, chronic that ends in a bad state [Staff 5].

From the above, clearly the Seychelles physical environment was not always supportive for communities to have positive oral health outcomes. This was often due to determinants operating at the macro level which influenced processes at the level of the population or community. For example, a lack of fluoride policy resulted in a lack of water fluoridation in the population.

Summary of the chapter

Chapter 7 presented an analysis of how determinants of oral health operated at the level of the population and community and its subsequent influence on person level factors and inevitably oral health outcomes. These population and community level factors stemmed from determinants operating at the macro level. These determinants were analysed using a modified Oral Health System Evaluation Model – WHO (Petersen, 2003). Analysis of the study findings showed that there were numerous determinants influencing the oral health of adults at the level

of the population. These were classified into predisposing factors and pathways. Predisposing factors include (i) oral health literacy, (ii) cultural norms and values, (iii) community resources and engagement, and the physical environment. The oral health system was identified as a pathway influencing predisposing factors to impact on oral health behaviour and inevitably oral health outcomes. These include (i) the organization of work, and (ii) administration factors.

These population and community level factors were very apparent in the current study, and were often interrelated. Moreover, the role of pathways as mechanisms to influence person level factors is very clear in the Seychelles population. For example, oral health literacy was at times related to cultural norms and values. The strong influence of pathways related to oral health system administration factors and/or organization of work was also highly evident. The contribution of these population and community level factors on person level factors and oral health outcomes should therefore not be overlooked when planning interventions or making recommendations aimed at improving oral health. Community engagement, effective use of resources, and implementation of policies supporting oral health should be considered. Lastly, strengthening the role of the existing oral health system is crucial. This is because the current challenges with the existing oral health system were putting the population at an increased risk of oral health problems and at a disadvantage to attain good oral health outcomes. The next chapter will discuss factors operating at the level of the person which influenced oral health outcomes.

CHAPTER 8: PERSON-LEVEL DETERMINANTS

8.1 Introduction

This 'person-level' chapter focuses on the individuals who make up a community (Patrick et al., 2006). The chapter reports on the following objectives (i) to determine the perspectives of Seychellois adult patients regarding opportunities and barriers to promoting good oral health, (ii) to understand the influence of social, cultural, economic and environmental factors on the oral health of Seychellois adult patients. It looks at how their circumstances, actions and beliefs influence the oral heath related choices they make. According to Patrick et al. (2006) these include personality traits, values, motivations and personal preferences along with health needs. The framework by Lee and Divaris (2014) recognizes person-level factors as determinants influencing oral health outcomes. The model explicitly demonstrates that person-level factors sometimes referred to as proximal factors are embedded within community characteristics and other 'distal' determinants, in a ranked fashion, which parallels their relative contribution to inequalities. Similarly, the proposed framework (Figure 4.4) for the Seychelles recognizes person-level factors as determinants influencing the oral health outcomes of adults.

The chapter therefore begins by introducing the socio-demographics of the adults followed by their reported oral disease experience, and oral health behaviour. Thereafter emanating person-level factors which had an apparent influence on their oral health will be discussed. The likelihood of oral health behaviour was influenced by health beliefs. The constructs of the extended Health Belief Model (HBM) was used to guide the discussion. These include perceived severity, susceptibility, barriers and benefits, cues to action and self-efficacy. Moreover, the different person-level factors influencing health beliefs are highlighted and how they are interrelated are discussed. The factors were classified into enabling factors, predisposing factors, and perceived needs. Such include age, gender, education, family support and perceived oral health needs. In addition, the influence of upstream determinants such as oral health literacy, oral health system factors and culture that impacts oral health outcomes at an individual level will also be highlighted in the chapter. The layout of this chapter will be the presentation of the results with an integrated discussion followed by a conclusion.

8.2 Describing the research participants

8.2.1 Socio-demographic characteristics of the adults

A group of 84 adults participated in the study. Table 8.1 summarizes the demographic profile of the adults.

Table 8.1: Participants socio-demographic profile

Participants	**(n=84)**
Gender of participants (M/F)	37M / 47 F
Number of individual interviews	60
Number of Focus Group interviews (number of participants in group)	3(8)
Number of participants according to regions	
Mahe – Region 1	36
Mahe – Region 2	28
Inner Islands (Praslin and La Digue) – Region 3	20
Mean age (years) (range)	42 (18-76)
Highest Level of education	
Primary School	7
Secondary school	18
Post-Secondary school	57
University	2
Monthly income of participant in Seychelles Rupees	
< 5500	24
5500- <10000	43
≥ 10000 - <15000	15
≥ 15000	2

Table 8.1 above shows that the cohort of adults that participated in the study was predominantly females (56%). Gender of participants was based on random selection.

The next section describes the oral disease experience of the participants at the time of interview which will be compared with the socio-demographic profile of the participants to establish if there was a pattern or relationship. A relationship between oral diseases/conditions and socio-demographic factors such as ethnicity, age, education, sex and wealth/family income

have been described in numerous studies (Petersen et al., 2003; Gomaa et al., 2016; WHO, 2016; Simangwa et al., 2018).

8.2.2 Oral diseases experience

The two most common oral diseases experienced by this group of participants were periodontal disease and dental caries. None of the participants reported to have suffered from other oral diseases such as oral cancer or TMJ disorder. Table 8.2 summarizes the participants' dental caries and periodontal disease experience.

Table 8.2: Participants' dental caries and periodontal disease experience at the time of the interview

Participants	**(n=84)**
Had dental fillings done due to tooth decay	80 (95%)
Had one or more teeth removed due to tooth decay	48 (57%)
Had dental treatment for periodontal disease	55 (65%)

Table 8.2 shows that a high number of adults had experienced dental caries (95%) and periodontal diseases (65%). Experience of these oral diseases could be associated with person-level factors or more upstream level determinants such as oral health literacy, culture, socio-economic factors and public policies as discussed in the previous chapters.

In the current study, determinants operating at the level of the person which were found to influence oral health outcomes include oral health behavior, beliefs, predisposing and enabling factors and perceived needs. These are discussed below.

8.2.3 Oral health behaviour

Health behaviour is defined as the actions undertaken by individuals to promote, protect or achieve health, to prevent health conditions or to maintain a positive body image (Cockerham, 2014). These include tooth brushing, flossing, use of interdental aids and antibacterial mouthwash, consumption of cariogenic food, and the extra use of fluoride. As the utilization of oral health services is also an activity an individual can adopt to promote good oral health and prevent oral diseases, it has been grouped under the 'oral health behaviour' category in the

current study. The adoption of habits such as smoking, and consumption of excess sugars and alcohol are also activities that can result in poorer oral health outcomes.

The adoption of oral health behaviour, according to the framework by Lee and Divaris (2014) is influenced by predisposing characteristics and enabling resources such as oral health beliefs and cognitions which are at the level of the population and community. According to Lee and Divaris (2014) differences in community and family characteristics such as socioeconomic conditions, health literacy and education can have an impact on an individual's oral health behavior. A person's health is therefore a result of the health-related decisions taken by them, which in turn is influenced by health literacy, modulated by the various socio-demographic factors (Baskaradoss, 2018). Furthermore, Lee and Divaris (2014) state that good oral health knowledge, beliefs and healthy lifestyle choices are crucial for positive oral health outcomes. Similarly, in the current study these were found to be relevant as illustrated in Figure 4.4.

In the current study, knowledge, beliefs and lifestyle practices will therefore be grouped and discussed under the 'oral health behaviour' category and discussed. The influence on these factors on the oral health outcomes of Seychellois adults is summarized in the Figure 8.1 below.

Figure 8.1: Illustrating person level factors influencing oral health behaviour of adults in Seychelles

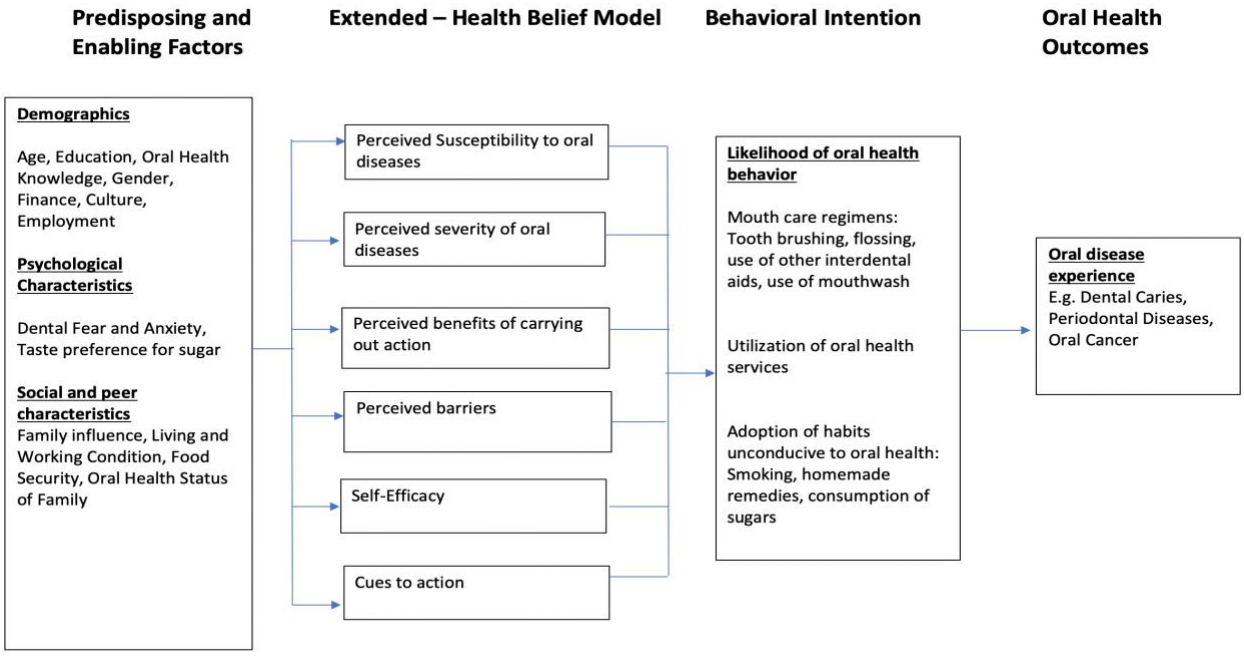


Figure 8.1 shows that the oral health outcomes (the oral disease experience and quality of life) of the participants were influenced by behavioral intentions as indicated in the block on the left side. These include mouthcare regimens, adoption of habits and utilization of oral health services. The likelihood of the oral health behavior (behavioral intention) was further influenced by the participants' beliefs which is reflected in the different blocks of the extended health belief model on the left-hand side. Furthermore, these beliefs were influenced by predisposing factors, enabling factors and perceived needs as shown by the third blocks on the left. At times predisposing factors had a direct influence on likelihood of oral health behavior as shown in Figure 8.1.

8.2.3.1 Likelihood of oral health behavior

The likelihood of oral health behavior is dependent on an individual's lifestyle. Lifestyle is a way of life, which is based on the interaction between personal patterns of behaviour and living conditions as determined by personal characteristics, and socio-cultural factors (Sakki et al.,1994 as cited in Baskaradoss et al., 2019). Unhealthy diet, harmful alcohol use, tobacco use, poor oral hygiene and accessing dental care for emergency purposes only are examples of poor lifestyle habits and are considered as risk factors for oral disease. These oral diseases can be prevented by adopting and maintaining healthy habits, and ensuring oral self-care. In this study the lifestyle practices were related to mouth care regimens, such as tooth brushing, flossing and use of mouthwash, the utilization of oral health services, and the adoption of habits not conducive to oral health such as consumption of sugar and smoking habits. These had an influence on the participants' oral health outcomes.

Mouth care regimens

Mouth care regimens are the activities performed by individuals to protect their mouth from oral diseases. These include tooth brushing, use of fluoridated toothpaste, use of mouthwash and the use of interdental aids. Tooth brushing was the most frequent mouth care regimens performed by the study participants. Flossing was occasionally performed. Table 8.3 summarize the mouth care practices of the study participants according to gender.

Table 8.3: Frequency of mouth care practices according to gender

Mouth Care practice description		**Male (n=37)**	**Female (n=47)**
Frequency of tooth brushing	Once a day	9 (24%)	4 (9%)

	Twice a day	25 (68%)	37 (79%)
	More than twice daily	3 (8%)	6 (13%)
Frequency of flossing	Daily flossing	2 (5%)	7 (15%)
	Infrequent flossing	4 (11%)	8 (17%)
Use mouthwash	Fluoridated	3 (8%)	4 (9%)
	Non-fluoridated	1 (3%)	1 (2%)
	Unsure	3 (8%)	7 (15%)
Use of interdental brushes		1 (1%)	6 (13%)

Table 8.3 shows that majority of the adults were brushing their teeth twice daily. Frequency of interdental products was low amongst this study cohort.

Studies have shown that tooth brushing and flossing are the most effective and affordable way of preventing dental caries and periodontal diseases (Herrera et al., 2013; Cepeda et al., 2017; Han & Park, 2017, Deng et al., 2019). Based on the findings of the current study, it would be assumed that the incidence and experience of periodontal disease and dental caries in Seychelles is low because of the good oral health habits practiced, but this was not reflected. This is because although overall 74% of the participants stated that they were brushing their teeth as recommended and 11% over the recommended frequency (See table 8.3) a high number of the participants had experienced tooth decay and/or periodontal diseases (See table 8.2). Moreover, flossing which reduces interdental plaque was occasionally performed by only 25% of the participants, which may also increase the risk of experiencing these two oral diseases. The high experience of these two oral diseases implies that the correct techniques were not being adopted or there were other factors influencing mouth-care practices at the level of the person such as beliefs or predisposing factors as indicated in Figure 8.1. The extended Health Belief Model (HBM) (Rosenstock et al., 1988) which has been frequently used to predict individual health-related behaviors according to their beliefs is used later in the chapter as a lens to understand the study cohort's oral health behavior. The influence of upstream factors such as income, public policies and family environment should also be considered as discussed in the two previous chapters.

A difference in tooth brushing and flossing behavior was observed between the males and females' participants included in this study. Despite the response rate amongst the two genders being based on random sample selection, the data collected was significant in answering the

research questions. That is in understanding factors influencing the oral health outcomes of Seychellois adults at the level of the person. In the current study 56% of the participants were females. Females (79%) were more likely to brush their teeth in the recommended frequency of twice daily (Refer to Table 8.3). Similarly, daily flossing (15%) was performed more often by the female participants. This outcome is similar to findings of numerous studies which showed that females were more willing to brush their teeth more frequently and utilize extra cleaning devices than males (Harada et al., 2004; Weiner et al., 2012; Song et al., 2016; Hamasha et al., 2018). Females having more positive mouth care practices than males may imply a gender imbalance/inequity in oral health outcomes. Having better oral hygiene may suggest less dental caries and periodontal disease experience amongst females. The difference in behavior in the current study and others could be due to women usually taking more care with their body and appearance, and therefore may be more concerned about adopting behavior and habits, which promote dental health (Mamai-Homata et al., 2016).

Utilization of oral health services

The framework by Lee and Divaris (2014) separates use of dental services and oral health behavior. Lee and Divaris (2014) do not explain their reason for this. As previously stated, health behavior is defined as the actions undertaken by individuals to promote, safeguard or maintain health, to prevent health conditions or to maintain a positive body image (Cockerham, 2014). As accessing oral health services is one activity that needs to be undertaken to protect and maintain oral health, the researcher therefore grouped 'utilization of oral health services' under the 'oral health behavior' category.

Utilization of oral health services amongst the study participants was mostly for the relief of pain and not for preventive purposes. The participants were not making significant use of the public dental services which is free of charge in Seychelles. The participants' reasons for accessing dental care are summarized in Table 8.4 below.

Table 8.4: Reasons for accessing dental care

	Male (n=37)	**Female (n=47)**
Access the dental clinic mostly for the relief of pain	37 (100%)	39 (83%)
Access the dental clinic mostly for routine dental check up	0	8 (17%)

Table 8.4 shows that accessing the dental clinic for the relief of pain was done by 90% of the participants. None of the male participants accessed preventive dental care. The habits of the participants are discussed next.

Habits

The adoption of habits not conducive to oral health was seen amongst some of the study participants. This is summarized in Table 8.5 below.

Table 8.5: Habits not conducive to oral health

	Male (n=37)	**Female (n=47)**
Smoke tobacco products	15 (40%)	4 (9%)
Use home remedies to cope with dental pain	14 (38%)	7(15%)

Table 8.5 shows that use of tobacco products and home remedies to cope with dental pain was more prominent in males than females.

Behavioral intentions amongst this study cohort were influenced by their health beliefs and factors which predisposed them in performing a particular behavior. The extended Health Belief Model (Rosenstock et al., 1988) is an example of a model used to explain the influence of beliefs on oral health behavior. The extended Health Belief Model which has been discussed extensively in the Theoretical Chapter will be used to explain the likelihood of behavior amongst the study cohort. The influence of predisposing factors (age, education, social and peer support, location, oral health knowledge, gender, employment), enabling factors (income, dental fear and anxiety, nutrition choice, waiting time for dental care), and needs (presence of oral diseases and dental pain, need for dental care) are incorporated in the discussion. This is crucial to show the interrelationship between the different determinants and how they often intertwined to influence oral health behavior.

Oral health knowledge a predisposing factor for health belief is well reported in literature. This is highlighted numerous times in the section. In order to understand this influence, it is important to have an understanding on the level of oral health knowledge of the current study cohort. That is how the participants' level of knowledge impacted on their beliefs which in turn

influenced the likelihood of oral health behavior and inevitably oral health outcomes. Knowledge is therefore discussed first followed by belief.

8.3 Oral health knowledge

Health knowledge denotes information, facts and skills obtained through experience or education, including theoretical or practical understanding of a health-related subject (Gellert & Tille, 1995). Oral health knowledge is thought to be important for developing healthy behaviours, and there is a connection between improved knowledge and better oral health (Blaggana et al., 2016). Blaggana et al. (2016) further added that optimum health related habits are more likely to be adopted if a person feels a sense of better control over their health with improve comprehension of diseases and their causes. Knowledge is therefore a contributor of self-care. The World Health Organization's (2021b) definition of self-care is the capacity of people, families and societies to promote health, prevent disease, uphold health, and to deal with illness and disability with or without the assistance of a healthcare provider. According to WHO the fundamental principles for self-care include self-reliance, autonomy and self-efficacy.

Knowledge, which is often presented as "TACIT" (derived from facts) (Fugill, 2011; Jamshidi et al., 2018) and "PERCEIVED" (refers to knowledge based on opinion and prior experience) (Liao et al., 2020) will be used to establish how the participants understood oral health information. In this study, oral health knowledge was analysed in terms of their causes and impact on the lives of the participants.

The knowledge of the causative factors for the most common oral diseases in Seychelles, that is, dental caries and periodontal diseases, was low among this group of adults and was one of the contributing factors to the poor oral health outcomes observed amongst the cohort. Table 8.2 shows that 95% of study cohort had experienced dental caries and 65% had received treatments for periodontal disease. The etiology of dental caries appeared to be vague and was predominantly (76% of participants) associated with sugary products such as sweets. In addition, for few participants (11%) dental caries was associated with cigarette smoking. One participant also expressed that diabetes caused dental caries. The role of bacteria in the causation of dental caries was expressed by only 7% of participants.

Tooth loss from oral diseases was mostly thought of as normal and a natural consequence of ageing or pregnancy. Accounts from participants show how it was perceived as norm to see elders without teeth in the mouth.

> I think it is normal [to not have teeth in the mouth when older] because I lost mostly all my teeth… [Participant 35, Male, 79 years old].

> Since young I have seen old people without teeth, I think it is normal not to have [Participant 50, Female, 46 years old].

> You are older, your age is increasing… maybe the gum is getting a bit weak and so all the teeth fall. [Participant 24, Female, 18 years old].

> I have these two teeth I removed, it was rotten in front when I was going to have my kids, that why I removed. [Participant 40, Female, 64 years old].

Some participants (13%) felt that getting older meant becoming a child again, hence the reason for no teeth, whilst others (6%) related tooth loss to the immune system deficiency. This collective view about tooth loss can be reflected in the following two accounts:

> … because your immune system becomes weak. [Participant 23, Female, 37 years old].

> … they say when you get older you become a child. [Participant 52, Female, 18 years old].

Bleeding whilst brushing the teeth was also thought to be normal and beneficial to some participants. A 72 years old male participant explained that bleeding whilst brushing was good because the blood removes bacteria, the dirty things in the mouth.

Contrary to the perceived knowledge mentioned above, a minority (11%) of the adults perceived the actions adopted through the years to care for the mouth to prevent oral diseases influenced their oral health outcomes, as expressed in the following accounts:

> If you are not taking care of your teeth they start to rot, you lose them… I see it not normal for when someone age [to lose their teeth], this was in the past when we did not have access to health. [Participant 13, Male, 58 years old].

> It is not normal [to lose teeth when get older], maybe it depends how s/he treats his/her mouth [Participant 57, Male, 39 years old].

> It all depends on… that person when young, how s/he took care of the teeth. It should not be, if you take good care of your teeth definitely you will not lose it. [Participant 59, Female, 26 years old].

From the above accounts of participants, it can be deduced that this cohort of adults had minimal tacit knowledge about the causative factors of common oral diseases. Their knowledge was mostly based on perceptions acquired through life experience (perceived knowledge). For example, because it was a norm to see aging elders without their natural teeth, tooth loss was associated with aging and accepted as a norm. This low level of tacit knowledge about the causative factors of dental caries and periodontal disease may account for the increased risk of oral diseases among the adults participating in the study. As the participants were not aware of the actual cause of these oral conditions, it could be assumed that they would also have a deficit in knowledge on how to prevent these conditions. For example, the low number of participants (25%) flossing their teeth as reflected in Table 8.3 was due to the insufficient knowledge of the dental caries and periodontal disease prevention. Furthermore, this lack of appropriate tacit knowledge is a contributing factor to the poor oral health outcomes reflected in the majority of the participants. Table 8.2 reflects the high percentage (95%) of study cohort having experienced dental caries and 65% having received treatments for periodontal disease. Shekar et al. (2011) argued that the awareness of the causative factors for dental diseases plays an important role in determining the oral health status of individuals. Knowledge about oral diseases is vital as it can act as a key medium for maintaining good oral health (Francis et al., 2018).

Low level of tacit knowledge was due to minimum exposure to oral health messages. This was confirmed by all (100%) of the participants who expressed that oral health was not visible in the community compared to other health disciplines. Acquiring of scientific oral health knowledge was therefore mostly during dental visits or from media programmes amongst this study group. Participants who only accessed emergency dental care were therefore exposed to less oral health messages at the dental clinics in comparison to those accessing preventive dental services. Some participants explained:

> [I hear oral health messages] more at the dentist… Honestly, I am not somebody who goes looking for information things… but when I am sitting at the dentist I do not have anything to do now I see and I will read all of the things the posters and so on [Participant 43, Female, 22 years old].

> I do not hear talking about dentist much. I hear more about high blood pressure, diabetes. Not dentist [Participant 38, Male, 56 years old].

> I have never heard of these things on teeth on the media [Participant 34, Female, 67 years old].

Dental professionals not disseminating oral health messages in the dental clinic and/or communication difficulties between staff and patients due to language barriers were also voiced out as reflected in the two quotations below.

> Like a Seychellois will explain and you will understand better compared to the others [non-Seychellois] who… you are trying to understand what they are saying. You feel more okay with a Seychellois than a foreigner [Participant 4, Female, 41 years old].

> There are dentists who explain whilst some just do their job [to] resolve the problem you [came with] [Participant 20, Male, 36 years old].

Clearly, the low level of tacit knowledge observed amongst this study cohort was influenced by their exposure to oral health education. Lack of oral health promotion activities in the community and minimum individual oral health education performed by dental professionals therefore resulted in a deficit in tacit knowledge. [Dental staff] occupies a position of power-the 'gatekeeper' who controls the manner information is exchange and the degree to which the patient is told of his/her dental needs and treatment choices (Patrick et al., 2006). Thus, the insufficient oral health promotion activities impacted on the participants' ability to perform positive oral health behavior (self-efficacy) which resulted in the high experience to oral diseases as reflected in Table 8.2. Self-efficacy will be discussed in details later in the chapter under the heading oral health beliefs.

To add on, Petersen et al. (2003) stated that the influence of educational level on oral health outcomes is significant. Petersen et al. (2003) argued that in numerous countries higher level of education implies reduced possibility of suffering from tooth loss and the greater the likelihood of keeping 20 functional teeth when older. In the current study, 70% of the

participants had completed post-secondary education. This is minimum 16 years of schooling starting at the level of crèche. The higher number of years of education observed amongst this group of adults would suggest that these participants will have good oral health knowledge. This assumption as based on other studies (Petersen et al., 2003; Bourgeois et al., 2014) was not observed in the current study. The high number of education years did not translate to high oral health knowledge and better oral health outcomes. Again, this suggested that there were other factors operating at other levels impacting on the participants' oral health knowledge. These again included oral health literacy, health workforce characteristics, and community resources and engagement at the population/community level. In addition, at a macro-environment level, policies had a direct influence on oral health behavior. The lack of policies impacting on oral health in Seychelles, therefore placed the population at a disadvantage for oral diseases. All of these determinants have been identified in the framework by Lee and Divaris (2014) as previously discussed.

From the above, clearly oral health knowledge had an influence on the perceived susceptibility, perceived severity, perceived barriers, cues to actions and the self-efficacy of the study cohort. These are the different components of oral health belief as stated in the extended Health Belief Model. Oral health beliefs are discussed next.

8.4 Oral health beliefs

The framework by Lee and Divaris (2014) recognizes oral health beliefs and cognitions as factors operating at the level of the population and community which have an influence on oral health behavior. Despite this, oral health beliefs are not mentioned at the level of the *person* in this framework. A possible explanation is how Lee and Divaris (2014) define oral health behaviour. In their framework, Lee and Divaris (2014) are acknowledging individual attitude as having an effect on certain oral health behavior. Therefore, it can be argued that Lee and Divaris (2014) are classifying individual beliefs under oral health behavior. Similarly, in the current study, oral health behavior was influenced by individual beliefs. The proposed framework for Seychelles (See Figure 4.4) illustrates the influence of oral health beliefs on the likelihood of behavior and subsequently oral health outcomes.

The extended Health Belief Model (HBM) (Rosenstock et al., 1988) has been frequently used to predict individual health-related behaviors based on their beliefs. To recap, according to this model, an person must think that s/he is susceptible to a condition (perceived susceptibility);

that the condition is serious (perceived severity); that there is a successful intervention for the condition (perceived benefits); that they can overcome any barriers posed to using the intervention (perceived barriers); that they will have the self-efficacy needed to carry out positive oral health behaviors in spite of the barriers (self-efficacy); and if they obtain guidance from the environment or themselves to perform these actions (cues to action). For example, the extended HBM can be used to explain an individual likelihood to floss the teeth regularly. An individual will perform daily flossing of the teeth if s/he feels susceptible to dental caries and periodontal diseases. The severity of the conditions to the person is also important, including the individual perceived benefits for using dental floss to prevent these two oral diseases. If there are minimum or no perceived barriers, and the individual has developed the skills to perform flossing, then the likelihood of flossing the teeth daily will be high. Cues to action for the individual could be observing other family members flossing and/or experience localized mouth pain when not flossing.

This section will therefore use the extended HBM as a lens to describe how beliefs influence the study participants' ability to perform oral health behaviors to result in positive oral health outcomes. The sub-scales of the extended HBM will be used to guide the discussion. The study cohort was asked questions about their oral health beliefs. Their responses (n=84) are summarized in the table 8.6 below.

Table 8.6: Participants oral health beliefs (n=84)

	Yes	**No**
View that primary teeth is more important than permanent teeth	11 (13%)	73 (87%)
Perceive that there are two types of teeth (i) porselen and (ii) koray	18 (21%)	66 (79%)
Perceive to be at risk of getting oral diseases	84 (100%)	0
Perceive that oral diseases are a problem in Seychelles	84 (100%)	0
Perceive that oral pain implies oral diseases	76 (90%)	8 (10%)

Table 8.6 shows that the study cohort had different beliefs about oral health.

(i) Perceived susceptibility

Perceived susceptibility is the level to which an individual knows about his/her risk of getting oral disease. In this study, susceptibility of developing oral diseases was expressed by all (100%) of the participants. Moreover, twenty-one (21) percent expressed that oral diseases

were associated with type of teeth. Teeth termed in creole as 'koray' were perceived as weak and more prone to oral diseases, whilst teeth termed as 'proselen' were perceived to be more beautiful, stronger, whiter and acceptable by society. Having teeth termed as 'koray' was believed by these adults to be the cause of them getting oral problems or losing their teeth early. This was due to increased susceptibility to oral diseases even though they were performing tooth brushing regimens. This belief was influenced by low tacit knowledge and the Seychellois culture as previously discussed. Figure 8.1 shows the influence of oral health knowledge and culture on belief. Two participants explained:

> There are 'porselen' and 'koray' [describing type of teeth], when you touch it [teeth termed as koray], it is weak, my teeth are 'koray' because even if I brush it is weak [FDG 3, Male, 72 years old].

> I lost my teeth when I was still young. I was 21 years old. [The teeth] just decay like they say 'ledan koray' [Participant 40, Female, 64 years old].

Moreover, some of the adults included in the study felt that primary teeth were more susceptible to dental caries than the permanent ones. It was perceived by these participants that more care such as dental check-up or regular tooth brushing were required to prevent these primary teeth from oral problems. Two participants explained:

> When I was an adolescent… I had milk teeth so I needed the check-up often. When I am adult I do not feel anything with my adult teeth [Participant 26, Female, 33 years old].

> As a parent, I make sure for my child but I find it strange why I cannot do for myself [FGD 1, Female, 39 years old].

Clearly some of the adults in this study were associating susceptibility to oral diseases to factors beyond oral health behavior. This could be due to a lack of tacit knowledge. Oral diseases were related to the biological make-up of the teeth rather than activities being performed to protect the mouth. This finding is similar to results of other international studies where study participants often related oral diseases to causes outside the individuals' control (Duijster et al., 2015). This include destiny, health problems and genetics. The lack of association of their current conditions with oral hygiene observed in the present study imply that these adults were

not performing the desirable behavior to protect their oral health. This explains the high percentage of dental caries (95%) and periodontal diseases (65%) as reflected in Table 8.2.

Furthermore, primary teeth were being valued more than permanent teeth by this group of adults. Parents were more likely to perform positive oral health behaviors with their children but found it difficult to perform similar actions to promote their own oral health. Despite this belief, dental caries is increasing in the children population in Seychelles. Surveys results showed that the dmft score increased from 3.6 to 3.9 in the 6 years age group, whereas the DMFT score in the 12 years age group increased from 1.5 to 2.1 in 2005 and 2010 respectively (Ernesta et al., 2007; Oral Health Directorate, 2010). This increase implies that despite the belief that primary teeth are more susceptible to oral diseases than permanent teeth, performing the correct oral health behavior such as consuming a low cariogenic diet, accessing preventive dental services and performing routine mouth care regimens is a challenge and/or there may be barriers to perform positive oral health actions. Barriers to performing positive oral health behaviors will be identified and discussed later in the chapter. Perceived severity will be discussed next.

(ii) Perceived severity

An individual may feel susceptible to developing oral diseases but may not choose to perform positive oral health behavior due to their perception of how severe a disease is. Perceived severity is an individual's belief about the extent of harm that can result from the acquired disease or particular behavior.

All the participants in the current study (refer to Table 8.6) perceived oral disease to be a problem. In addition, oral diseases were perceived to be life threatening. For some of the participants, oral diseases resulted in the government spending money to manage these oral health problems which are easily prevented. Often there was the belief that mouth problems may be oral cancer which needed to be checked by dental professionals before worsening.

> All of that [oral disease] is a problem, problem for the person itself, for the government [Participant 30, Male, 76 years old].

It is a problem when you have problem in your mouth… you are sick in your mouth, you can get cancer, you can get all of these things… You have to check… in case it is cancer because it is dangerous nowadays. [Participant 28, Female, 69 years old].

Nowadays there are cancers that comes in the mouth. We have to take care [brush the teeth] … I know one my family who had cancer… of the gum. Started by a small bruise… then came a lot more cancer in the mouth. [Participant 45, Female, 19 years old].

Apart from the belief and fear that oral problems may lead to cancer, at times perceived severity of oral problem was associated with pain. Ninety (90) percent of the participants expressed that the presence of pain implied oral diseases and the need to access dental services. For these participants some oral diseases such as dental caries and periodontal diseases were not considered severe until there was unbearable pain that disrupts their daily routine. Level of pain was therefore an important factor in defining perceived severity. Figure 7.1 shows that the presence of dental pain (perceived needs) has a possible influence on oral health belief. Moreover, for these individuals performing specific oral health behavior (cues to action) was dependent on this perceived severity. This included accessing dental care to relieve pain as some participants explained.

Like [when] your teeth are painful you have to go [to the dentist]… because it is a necessity. If your teeth are not painful there is nothing to do at the dentist… There are other personal things… which takes your time [FGD 2, Male, 19 years old].

When the teeth are painful, when it is necessary [you have to go to the dentist]… it is painful… I just went to remove my teeth. At night it broke in my gum, I had to go to the dentist to remove. It was painful… dentist we do not play with… [FGD 2, Male, 24 years old].

I do not have pain. There is no use to [go to the dentist]. I clean my teeth myself… when I feel that I have a painful tooth which is rare [then I go to the dentist] [Participant 38, Female, 56 years old].

Obviously, dental caries and periodontal disease were not perceived as threats amongst some of the study cohort unless there was unbearable pain which affected quality of life and required dental intervention. The fact that these two oral diseases were not a threat physically or socially, implies that there was an acceptance that it was a norm to have decayed teeth, gingival bleeding or to lose teeth at an early age.

Furthermore, ninety (90) percent of participants who claimed to access dental services only for the relief of pain also stated that the adults in their household accessed dental care for similar reasons. Pain was therefore an important factor in defining perceived severity amongst family members. This is refelected in some of the participants responses:

> No [my family do not go to the dentist]… well maybe they are not getting the problems too [Participant 10, Female, 25 years old].

> When they [my family] have pain [they go to the dentist]… they do not go for dental check up [Participant 42, Female, 68 years old].

> It seems [they go to the dentist when have pain] because my… son… is scared of the injection. They [my family] are scared of the dentist… but it seems when they have a small problem they go [Participant 44, Female, 62 years old].

This norm observed amongst family members was passed on to individuals of the same households through the process of socialization. For example, observing family members access only emergency dental services resulted in the participants adopting similar practices. The cues to actions to perform certain behaviors was therefore dependent on socialization and cultural practice. Moreover, delaying attendance at the dental clinic based on perceived severity resulted in disease progression where the outcomes was tooth extraction or the loss of an anatomical area in the case of oral cancer. Table 8.2 reflects the high percentage (57%) of extraction due to dental caries amongst this cohort.

At times perceived oral health needs did not translate into using oral health services but instead use of home remedies to cope with the pain. Twenty-seven percent (27%) of participants expressed that they used home remedies to cope with dental pain rather than seeking dental intervention. Some of the participants reflected:

> You take two pills… you crush the pills… put on a cotton… push in your [tooth]… it helps a small bit instead [of going to the dentist] … but if it [the pain] gets stronger… now you need to go [to the dentist] [Participant 9, Male, 61 years old].

> I use three types of things. First, I use Panadol I check how is the situation. If it continues secondly, I use a little 'l'eau de cologne' [perfume fragrance]. I check what it does. If [the pain is] not hearing me, I get a big bottle of whiskey or those strong drinks. I soak a small thing I put in it. I feel where it kills those things. In two three small minutes, I do not feel the pain. I make a glass for me and I drink. I am calm until the next day… [FGD 2, Male, 59 years old].

Moreover, family members influenced the use of home remedies thus delaying access of emergency dental services as reflected in the two quotations.

> I use cloves on my teeth… I just heard the elders talking about it and then I used. [Participant 54, Male, 42 years old].

> I have tried [using home remedies]. For example once I removed a wisdom tooth, when I left the dentist I did negligence it was on the 24th December… I had my activities. I went to enjoy and the tooth got painful. When I reached my home my grandfather told me to put whiskey. I put some and I did not feel that tooth again. That tooth healed on its own. He [grandpa] said that whiskey cooked that nerve [Participant 20, Male, 36 years old].

Clearly, the adults appear to have resolved to self-care practices to cope with dental pain. This outcome is similar to other studies (Cohen et al., 2009; Jaiswal et al., 2015). These remedies may be causing irreversible damages to the oral structure whereby there is loss of function due to permanent damage, edentulism or loss of hard or soft tissue. All of these impact on the quality of life of the individual and increases the burden of oral diseases. For some of these participants use of home remedies was due to dental fear, the long waiting time to see a dental professional or at the advice of family members.

The use of home remedies amongst the Seychellois families is a result of cultural factors at the level of the population as discussed in the previous chapter (Chapter 6: Population and Community Level). The Seychellois culture, which is influenced by a blend of different races (i.e. African, European and Asian Origins) had an impact on socialization and adoption of practices at the level of an individual. For example, conventional Chinese beliefs are linkedwith greater acceptance of tooth loss and other oral health problems in the old age (Smith et al., 2013; Ye & Chen, 2019). The authors further stated that chinese culture prefers traditional medicines for the ailments of the mouth and teeth in comparison to western dentistry. In Seychelles, some of the original natives came from China. This belief about tooth loss being a

norm in the old age and the advice to use home remedies rather than seeking dental care observed in the current study could therefore have been passed on through the generations through the process of socialization. This practice provides a rational explanation for the participants knowledge, beliefs and practices which contributed towards poorer oral health outcomes as observed in Table 8.2 where 95% and 65% of the study cohort had experienced dental caries and periodontal diseases respectively.

Interestingly, some of these participants were accessing preventive dental care when in school because they were given appointments by dental professionals for follow-up treatment. They stated that after leaving secondary school, accessing dental care was based on their perceived oral health needs. Two participants explained:

> [In school] they [dental professionals] gave us [appointment] because normally they came to the school and checked up all the kids teeth… Now I go when I have pain [Participant 49, Female, 22 years old].

> I have not been to the dentist since school… When I was in school… there were follow up at the dentist. After [school] the follow-up was finished. I did not go to the dentist. So the dentist, I look at them as the doctor… you need to go to the doctor when you are sick… For me to go to the dentist I need to be sick, my teeth [needs to be painful] [FGD2, Male, 33 years old].

In addition, oral diseases associated with tobacco consumption were not perceived as a threat for some of the participants. Twenty-two (22) percent (n=19) reported that they indulged in tobacco smoking which is a risk factor for oral cancer and periodontal diseases. For these participants smoking was a way to cope with life situations or a form of socialization. Of the 19 participants, 15 (79%) were males. Two participants explained:

> I smoke… for past time or reduce stress… since young when [I was] 18 years old. Not a lot but just when there is pressure… [Participant 3, Female, 49 years old].

> Cigarettes [I smoke]… it needs to be when I am using alcohol. I am not somebody who uses alcohol full time… it needs to be at a function… now I take a small alcohol and also one two cigarettes not more [Participant 29, Male, 39 years old].

Studies have shown that the risk of oral cancer and periodontal diseases are higher in smokers compared to non-smokers (Moreno-Lopez et al., 2000; Ide et al., 2008; Antunes et al, 2013; Ahsan et al., 2020). The 22% of the participants who were smokers (See Table 8.5) in the

current study were therefore increasing their risk of oral cancers and periodontal diseases. Moreover, ineffective tooth brushing technique, and low frequency of flossing as observed in Table 8.3 could accelerate the progress of periodontal diseases in smokers with poor mouth care practices.

Moreover, studies have shown that perceived severity has a well-built cognitive component, which is dependent on an individual's knowledge (Kasmaei et al., 2014). Thus, it can be argued that the lack of tacit knowledge about oral disease severity implied that the adults could not reason in a scientific and deductive manner to make decisions that will result in positive oral health outcomes. For example, the belief that oral problems could become cancer is subjective as it lacks scientific reasoning. Objective severity perceptions would have been that oral problem can affect performance of daily activities such as eating, sleeping or concentration at work or that oral diseases is life threatening.

Apart from perceived severity and susceptibility, the likelihood for individuals to perform oral health behavior is also dependent on their perceived benefits in performing the actions. How this belief influenced the ability of the current study cohort to perform specific oral health behavior is subsequently discussed.

(iii) Perceived benefits

Perceived benefits is the understanding about the advantages of doing preventive oral health behaviors. Individuals may be aware of their susceptibility to oral diseases, and may perceive oral diseases as a threat to their quality of life, but may not perceive the benefits in engaging in the positive behavior such as tooth brushing, flossing, use of fluoridated toothpaste or consuming less cariogenic food. Therefore, the beneficial behaviors may not be practiced, in spite of the possible negative consequences such as tooth loss. Hence, an individual must perceive the preventive measures or services as possible and effective such that it would decrease the perceived severity of dental conditions and would compensate the gains from the associated physiological, monetary, psychology, time and/or other types of costs (Patrick et al., 2006).

In the current study, there was a lack of association between clean mouth and risks for oral diseases. Participants were more worried if their mouth smells good and aesthetic rather than

being absent from oral diseases. Some participants expressed the relationship between good oral care and benefit to their well-being. At times this was based on perceived knowledge, subjective severity and subjective susceptibility as reflected in the following quotes:

> Mouth is one of the most important [body part] … because this is what we [use to] put food inside [our body], we use it to speak, to kiss or I can say it is something we use more [Participant 11, Female, 26 years old].

> It is very important I brush my teeth. At work, I have my toothbrush and toothpaste… After I eat, I brush my teeth lunch time… the fact that you are meeting people… I think that it is important that you do not have mouth smell, your mouth is clean… It removes the food and maybe I believe this is what makes the mouth smell [Participant 13, Male, 58 years old].

From the above, it can be argued that the adults perceived the absence of halitosis and having a clean mouth as benefits to performing oral health behaviors, such as, tooth brushing. Those participants who made the association between good oral health and disease prevention were more likely to adopt good oral health behavior.

Despite knowing the benefits of mouth care and the recommended frequency, some participants still chose not to adopt positive mouth care practices. Perceived benefits to perform the recommended oral health practices was low amongst these participants. Two participants explained how their choices influenced their mouth care routine.

> Well anyway I do not forget… you wake up [in the] morning… you brush [your teeth] … when [you] finish eating [in the] afternoon you brush [your teeth] because there are bacteria inside and then at night… you brush [your teeth] before you go to sleep. I know it is this way because this is what I learnt since small but growing up… there are things that you do not follow according to the rules. It is true, it is like that, but at least you make sure that you are brushing your teeth morning, me also I do [brush in the morning] but at night I also at times do not brush [FDG 3, Male, 31 years old]

> I brush only morning… [because of] negligence… just you do not want… I did not brush or floss … but my husband did floss, I did not bother. [Participant 2, Female, 30 years old]

For these participants their personal choices worked contrary to their acclaimed oral health knowledge. Personal choice could be related to the participants' perceived severity and susceptibility to oral diseases. For example, an individual may choose not to brush the teeth due to a lack of perceived susceptibility to oral disease. Oral disease may be perceived as not severe, hence mouth care regimens are not practised adequately.

In spite of some views that there are numerous benefits in performing oral health behaviors, some participants found barriers in performing actions that promote and protect oral health. These barriers will be discussed below.

(iv) Perceived barriers

Perceived barriers are problems or barriers which may be encountered by an individual that may have an impact on health behavior. A high percentage of the study cohort reported to have experienced dental caries (95%) and having received treatment for periodontal diseases (65%) (Refer to Table 8.2). Moreover, Table 8.2 reflects that the number of adults who had done fillings and extractions due to dental caries was high (95% and 57% respectively). The high oral disease experience was related to numerous perceived barriers. Ninety-two (92) percent of the study participants perceived barriers in performing positive oral health behaviors. These barriers were classified into (i) lack of time, (ii) long waiting time to see a dental professional, (iii) lack of sufficient finances, (iv) dental fear and anxiety. These barriers subsequently resulted in the adults (i) delaying utilization of dental services, (ii) using home remedies to cope with dental pain, (iii) adopting unhealthy eating habits, and (iv) performing insufficient mouth care practices, all which increased their risk to oral diseases and poor oral health outcomes. Some of these barriers as identified by the participants are illustrated in 8.7 below.

Table 8.7: Perceived barriers to oral health behavior

	Yes	No
Dental anxiety or fear deter the utilization of preventive dental services	33 (39%)	51 (61%)
Perceive that stressful life circumstances inhibit good oral health behavior	13 (15%)	71 (85%)
Perceive that employment creates difficulty in practices good oral health behavior	18 (21%)	66 (79%)
Perceive that dental products are expensive in Seychelles	37 (44%)	47 (56%)
Perceive that it is difficult to purchase healthy food options in Seychelles	59 (70%)	25 (30%)
Perceive difficulty to access dental care due to nature of employment	36 (43%)	48 (57%)

Table 8.7 shows that the participants experienced numerous barriers to perform food oral health behavior. These barriers will be grouped and discussed below.

Lack of time

In this study, lack of time had an influence on oral health behavior. Lack of time was due to living and employment situations/conditions. Fifteen (15) percent of the adults perceived a lack of time at night or in the morning to perform mouth care practices if they had to rush to work or do other things. 'Feeling tired' was also expressed to disrupt/inhibit mouth care routines. This is expressed by some participants below.

> Pressure of life… you have to get up early you cannot spend a lot of time brushing your teeth because you have to get to work early. When I wake up 5.30 I have one hour in front of me to do everything [Participant 20, Male, 36 years old].

> At times, I brush [at night] … I forget [Participant 60, Female, 29 years old].

> It [tooth brushing] is supposed to be something automatic but there are times you miss the pattern… [you] are tired, stressed, you know a lot of things to do at once… [FGD 1, Female, 32 years old].

Moreover, lack of time due to employment conditions resulted in time constraints to access preventive dental services or to perform mouth care practices which promoted good oral health for some of the participants. This arose because the participants' work nature resulted in limited time for the adults to access dental services. Employers' dissatisfaction and reduction in salary associated with absenteeism, or the possibility of getting work redundancy was reported on as reflected in the following quotations:

You go to the dentist you… get a paper and take it to work. They [employer] will start to complain. You will say rather when… I have the pain which is bothering me I will go to the dentist… Yes, private [work company] they complain a lot especially now you have this 13th salary everything they are basing on that… You get appointment and then they [dental staff] give you another, then another because they want follow up. The last time I could not go because I was getting too many inconveniences at work [Participant 20, Male, 36 years old].

It is difficult… when I look at my work… I… work with clients and an appointment comes. It depends if my workplace has someone to replace me. It is okay but at times it is not possible. And then if I have started with a client… I have bills I have started and… the person stop by in the afternoon, I have to finish. Someone else will not do it [Participant 29, Male, 39 years old].

I return [if I have to continue dental treatment] but after when I get an appointment just for check up I do not go. I do not like to miss work so unless I am in pain or something I will not go. When we arrive at work late our salary gets cut… even if we have [a certificate of] attendance [from the dental clinic] [Participant 22, Female, 35 years old].

At times the participants had to prioritize their work commitments, to the detriment that dental care was given lower priority as depicted in the following account by one participant:

At times it depends on how you work. Like the last time I remember I came from a place [an appointment]. When I remember I had a dental appointment the next day I realized it was too close. I did not attend [Participant 29, Male, 39 years old].

Long waiting time to see a dental professional

The lack of time to wait long hours at the dental clinic to access dental care was also perceived as a barrier by some of the participants and deterred their utilization of oral health services. Since most participants reported delaying visits until the pain was unbearable they only accessed care if they had a problem to resolve and hence did not mind waiting long hours at the dental clinic. Leaving the dental clinic due to the long waiting time was also reported as captured in the following accounts:

At times [I spend] too much time [waiting]. In the past, I came to the clinic. I waited and waited and then I just left… [Participant 12, Male, 27 years old]

I will waste a lot of time [coming to the dentist and waiting for treatment]… I think no matter what is your profession what we are doing sitting here [at the dentist] is a waste of state money [Participant 13, Male, 58 years old]

> When you think of the amount of time you sit [at the dentist], it is a constraint. You have to go to work… you are coming out midday [Participant 14, Female, 57 years old]

> I have to sit down a lot and wait. There are so many people in front of you that you have to wait, you do not have a choice [because you have a problem] [Participant 35, Female, 79 years old]

> There are days you have to sit down nearly a day because [there are] people who have appointments and those who do not have an appointment. They [dental staff] tell you come early morning but when you come there are a lot of people [Participant 44, Female, 62 years old]

The above explanations suggest that some of the participants had to continuously weigh their options regarding the choices they made between work and health and which should be given priority. The presence of pain implied the tendency was to weigh their choices in terms of perceived severity. Only if they had pain would they regard oral health as a priority over other life situations. In the absence of pain, the participants put aside their oral health need in order to ensure that their basic needs and expenses were met. The participants appeared to be sacrificing their own oral health needs over that of the family needs. This is because a loss of job or salary reduction due to long waiting times at the dental clinic would result in further food insecurity and economic hardship especially in households already facing socioeconomic problems. Food insecurities and economic hardship in Seychelles is reflected in surveys conducted in Seychelles in 2017/2018 which concluded that 25% of participants were experiencing either moderate or severe food insecurity in the 12 months preceding the Survey (National Bureau of Statistics, 2019). Results of that same survey also revealed that the bottom decile of the population was receiving 3% of the total income.

Whilst cost cutting measures, such as free dental services were an option, participants' ability to access these services was influenced by the long waiting time delay at these free service points. Attending paid oral services on the other hand could not be considered an option especially where there was a threat of salary reduction or job loss due to absenteeism from work. Long waiting time to access dental care was therefore classified as an enabling factor in the current study. The delay to access dental care impacted on disease progression resulting in poorer oral health outcomes. The impact is reflected in the current study whereby 57% of the

participants claimed to have one or more teeth removed due to dental caries (refer to Table 8.2).

Insufficient finances

Twenty-eight (28) percent of adults reported that their monthly income was below 5500 Seychelles Rupees (Refer to Table 8.1) which was less than the monthly minimum wage of 5804 Seychelles Rupees ($426) at the time of data collection. Monthly income is thus a crucial factor in determining ability to purchase dental products, access paid dental services and to purchase healthy food options. Income was therefore an enabling factor in the current study. Insufficient income acted as barriers to perform positive oral health behavior, consequently increasing the risk of poorer oral health outcomes. Furthermore, studies have shown that individuals with financial problems during economic recessions tend to delay dental consultations and treatments, may find difficulty to purchase dental products and will have restricted power to buy sugar-free food (Glick, et al., 2012; Kahabuka et al., 2012; Chidzonga et al., 2015). The framework by Lee and Divaris (2014) acknowledge that inequalities in oral health is associated with socio-economic factors at macro-environment, and population and community level. Lee and Divaris (2014) stated that socio-economic status at a macro level is known to underlie 3 major health determinants – environmental exposures, health behaviors and health care which are shown more downstream in their framework.

Seventy (70) percent of the study cohort expressed the inability to consume low cariogenic diet and 44% expressed difficulties to purchase dental products due to their affordability and lack of finance (Refer to Table 8.6). The low income was due to the inequalities in the distribution of economic resources at the macro level influenced by the structural adjustment programme in 2008 which resulted in difference in financial resources amongst families and individuals. The low income was often exacerbated by further salary reductions if participants had to be absent from work to attend health facilities. The long waiting time to access free services imposed further challenges and hence further loss of income. Studies have shown that there is a difference in prevalence or incidence of oral diseases between individuals of higher and lower socio-economic status (Hobdell et al., 2002; Petersen, 2003; Timis & Danila, 2005; Chidzonga et al., 2015). Disadvantaged individuals or households in the current study were trapped in the vicious cycle of poverty which prevented them in changing their oral health behavior leading to negative oral health outcomes. Moreover, price of food often influenced purchasing and consumption. Food that the adults felt as not good for their oral health was mostly bought due

to the low price even if it was against the advice of health professionals. Some participants' reflections are reported below.

> There are things… those that are healthy… they are pricey. Like those that are not too healthy are much cheaper. So, you will go on to those [that are cheaper] even if they are telling you not to eat [Participant 12, Male, 27 years old]

> In the clinic, they advise you [to eat healthy food] … when you go in the shops the places are not helpful enough… the price of life is a bit high… maybe for this reason that people cannot afford enough fruits, things for them to eat healthy you understand [Participant 10, Female, 25 years old]

> At times, they [health professionals] tell you to eat that [healthy food], you want to eat that but your means does not allow you. If I have my self alone, I can do it, but if I have a home, kids it is difficult [Participant 20, Male, 36 years old]

Studies have shown that food cost has a strong influence on food purchases (Mobley et al., 2010; Lee et al, 2013; Duijster, de Jong-Lenters, Verrips & van Loveren, 2015). Despite the imposed sugar tax on drinks, and the exempted tax on some healthy food options such as vegetables and fruits in Seychelles, 70% of the study cohort were finding it a challenge to buy healthy food options. The high cost of food was due to a lack of implementation and monitoring of regulations at the level of the community and population which was having an influence on oral health behavior of individuals. Therefore, in the current study, buying healthy food especially if costly resulted in additional strain on the household budget/finance. This was due to a low monthly income as expressed by 28% of participants, having a big family and being the only provider in the family. Prioritization of other household activities over oral health will therefore be apparent especially in household where oral health was not a prioritized/practiced norm. Henceforth, individuals trying to reduce food expenses will first select less pricey but more energy dense diets to sustain dietary energy, thus increasing risk for dental caries and periodontal diseases. This is because energy dense food is higher in sugar content and low in dietary fibres. The high experience of dental caries and periodontal diseases as reflected in Table 8.2 could be related to the food choices made and influenced by availability of sufficient finances.

Numerous studies have shown that the cost of oral hygiene products can be a barrier for individuals who wish to maintain good oral hygiene (Barros et al., 2015). Individuals from households experiencing economic hardship are therefore less likely to purchase some dental products despite the advice of dental professionals which increases their risk for poorer oral health outcomes. In the current study, the high cost of dental products was due to the 15% Value Added Tax (VAT) at the macro-level which increased their cost and poses as a potential barrier for individuals to access as discussed in the macro-level chapter. Again, the influence of upstream factors at the level of the person was apparent. This loss of buying power is reflected in the following accounts by a few of the participants who could not purchase certain dental products such as dental floss and interdental floss:

> Tooth brush for the kids are expensive, it is expensive a lot because I have a small girl she is still a baby but it has arrived the time for her to brush her teeth and it is expensive those tooth brush for her age… [FGD 1, Female, 36 years old]

> I see these ones [toothpaste] not expensive so I say my choice is these ones I will buy. [Participant 5, Female, 65 years old]

> I was not using these things in between my teeth because it was too tight… the [dentist] told me I need interdental [brush], I said I am trying… I did not use… those small things are expensive. [Participant 32, Female, 55 years old]

Moreover, despite the advice of the private dentists to return for preventive dental care such as regular dental screening or scaling, most of the participants reported that financial constraints posed as a barrier as reflected in the following quotes.

> I have a filling that had come out… on Friday [I am going to the dentist] because tomorrow I get pay… I need to have money. Now I make sure [to follow what they are] advising me to follow [FGD 1, Male, 38 years old]

> I am trying to find time for me to go private I need to find money… I cannot go anywhere without money even private…You are going private it is enormous. Take someone like me, a house keeper who is cleaning, the money that I am getting is just for me to give private [dentist]. This is what I am living in especially lately everybody is struggling with money… I say okay I want to put false teeth I need to do a sacrifice for me to go private to pay [Participant 14, Female, 52 years old]

> The last time I went to the [private] dentist they told me I have 4 small holes… when they did the bill it came to nearly 4 thousand rupees… I did not return at all. I told the dentist when I have money I will come [FGD 2, Male, 23 years old].

Delaying dental care due to financial issues implied disease progression with a worse outcome. For example, inability to pay for the continuation of a started Root Canal Treatment (RCT) for the management of dental caries can result in a dental extraction in future which in the long term will compromise eating and speech. Replacing lost teeth to correct function and aesthetics is an extremely costly intervention. For patients who cannot pay for treatments, they are compelled to arrive at a point where their oral health is so compromised that they just resign themselves to losing teeth as an alternative to treating the problem and adopting preventive actions (Tejo et al., 2016).

From the above accounts it can be argued that in the current study participants who were more financially stable were in better position to buy dental products, afford healthy food options and access private dental care if experiencing delays to access public dental clinics hence had better oral health outcomes.

Dental fear and anxiety

Dental fear and anxiety often posed as a deterrent or prevented some of the study cohort from accessing dental care. In the current study, dental fear and anxiety was an enabling factor. Delaying or not accessing dental care increased the participants' risks of oral diseases and inevitably contributed towards poorer oral health outcomes. Approximately a quarter of the adults (29%) reported that they did not seek dental treatment until they were experiencing dental pain because of dental fear/anxiety. The fear was mostly due to past childhood experience. Moreover, dental instruments or equipment such as needles or drills often triggered anxiety. Two of the participants also feared the possible medical complications caused by anxiety when they access dental care. Fear which resulted in a delay in accessing treatment often resulted in progression of oral diseases and deterioration of the mouth. Some of the participants explained.

> I had a small hole [in my tooth] that I did not bother because I am scared of the dentist. I did not go at all to the dentist… and so I saw it [the tooth] broke and it continued to deteriorate… it became black here in front and then I decided [that I had] to go to the dentist… [When] I went to take care of that tooth, they had to take care of one at the back that had a big hole in it… They

> [dental staff] told me to return… I did not go again. It is wrong because I have a lot of teeth that is not good that needs repair. I am scared… [The] position of the machine it makes zzzzzz it makes me angry… and then when they inject… like I am scared of the dentist [Participant 33, Female, 45 years old].

> I am scared of [the dentist], I do not know why but since I was small. I think those sounds… you are moving… they [dental staff] are shouting at you. So it made me scared. I am not going again [FGD 1, Female, 21 years old].

> I am scared, because of blood pressure. Every time I sit in the chair they tell me I have [high blood] pressure, [to] leave [and] go decrease the pressure. This is what makes me hesitate. This prevents me from coming to the dentist [Participant 35, Female, 79 years old].

In the current study it is clear that anxiety/fear had a negative influence on the participants' oral health behavior. Adults who feared going to the dentist tended to access emergency dental care and not preventive dental care. Similarly, findings of other published studies shows that high dental fear resulted in irregular dental attendance and accessing dental clinics for emergency treatments only (Armfield et al., 2007; Pohjola et al., 2008). Dental anxiety and fear therefore resulted in poorer oral health outcomes often due to extensive development and progression of oral diseases which resulted in tooth loss. Twenty-five (25) percent of the current study cohort delaying preventive dental care due to dental fear could account for the 57% of participants extracting their teeth due to the progession of unattended oral diseases, such as, dental caries (Refer to Table 8.2). If dental care was accessed early or more regularly, oral diseases would have been detected and managed early with mimimum negative consequences to the individuals. Prevention strategies could have also been adopted. High DMFT score associated with irregular dental visits due to dental fear has also been reported by other studies (Armfield et al., 2007; Pohjola et al., 2008; Armfield et al., 2009; Goettems et al., 2018).

Low dental attendance due to dental fear/anxiety implies inappropriate mouth care habits. When coupled with a low self-efficacy of the participants to prevent oral diseases poorer oral health outcomes is inevitable as seen in the study. The participants' lack of oral health knowledge can be associated with low dental attendance. The lack of exposure to oral health treatment or knowledge sets a context for these adults to have fewer positive attitudes and skills to take care of their teeth/mouth. This assumption is supported by published studies which also

found an association between dental fear/anxiety with mouth care practices (Pohjola et al., 2008; Zinke et al., 2018).

(v) Self-efficacy

Self-efficacy signifies the level of a person's confidence in his or her capacity to effectively perform an action. In order that individuals can handle with an action, they should feel that they have the capacity to conquer the obstacles of that action (Ashoori et al., 2020). Ashoori et al. (2020) further added that self-efficacy and perceived barriers constructs are important predictors of oral health behavior in majority of research. In the current study, self-efficacy was dependent on the behavior performed and barriers encountered. Moreover, how the participants rated their oral health was a crucial predictor for self-efficacy. That is, participants who rated their oral health status as being good, reported to have more self-efficacy to perform positive oral health behavior. Sixty-five (65) percent of the participants included in the study rated their oral health as good. Their rating was influenced by the presence of pain and ability to eat. The remaining participants rated their oral health as poor as they were experiencing oral pain, bleeding gingiva or bad breath.

Majority of the participants in the current study expressed the ability to care for their mouth effectively. Despite this, dental caries and periodontal diseases were high amongst this study cohort. Table 8.2 shows that 95% and 65% of the participants had experienced dental caries and periodontal diseases respectively. The result is contrary to other published studies done which showed that people who rated their oral health as good or rather good tended to have better oral health outcomes as they practiced better oral health behavior (Lee at el., 2012; Ohara et al., 2016). The high percentage of oral diseases despite the confidence expressed shows that in the current study, the participants were struggling to care for the mouth. This was due to low number of oral health promotion activities being implemented to develop personal skills and improve tacit knowledge. The participants confidence was therefore based on perceived knowledge such as the absence of pain implied good oral health.

Low self-efficacy in the selection of health snacks was expressed by some of the current study cohort. Despite knowing that sugary products are a contributor to dental caries, some of the participants stated that they lacked the assertiveness to limit the consumption of these products. This was often due to taste preference. Some of them expressed:

> Sweet things I eat a lot… I buy the chocolate I am with it that day. The next day you see me maybe with an ice cream… it makes me happy [Participant 54, Male, 42 years old].

> I eat too much sweets. I enjoy it but I know it is not good for the health. [I have] lots of holes… then in front decay it is broke have to adjust [Participant 31, Female, 36 years old].

The ability to restrict unhealthy food was often influenced by the environment. One participant explained:

> Yes [I eat lots of sweets] … because when you look in the shop this is what you see only. There is not a big variety [of health snacks to choose from] [Participant 46, Female, 38 years old].

Results of the study also revealed that the study cohort lacked the confidence, self-reliance and ability to navigate through the oral health system. This was due to low tacit knowledge associated with low exposure to oral health promotion activities which reduced their capacity to make good judgment and choices in regards to accessing preventive oral health services. The lack of self-reliance was not limited to factors directly related to the individuals but to the environment being unsupportive at home and most importantly at a population and macro level which hindered the development of self-reliance. A 56 years old male participant expressed that coming to the dentist for preventive services does not make sense to him due to absence of oral pain. In the current study, ninety (90) percent of the population accessed oral health services for the relief of pain as reflected in Table 8.3.

Moreover, the ability to navigate through the oral health system was influenced by the barriers experienced by the participants as previously explained. Such include long waiting time to see a dental professional, dental fear and anxiety.

(vi) Cues to action

Cues to action is the stimulus required to prompt the decision-making process to accept a recommended health behavior. Cues to action can act in two ways (Walker et al., 2015). Firstly, they can behave as internal cues such as sign of a tooth ache which results in an individual enacting a behavior to resolve it. Secondly, external cues which can originate from interpersonal contacts or from mass message and technology. Studies have shown that there are numerous cues for actions to perform specific oral health behaviors such as accessing dental care and performing mouth care regimens (Ashoori et al., 2020). These include toothache

experience, witnessing toothache in household members, learning materials on oral health, seeing white teeth in advertisings, and observing brushing by parents. In the current study, there were numerous internal and external cues to action.

The internal cues to action in the current study were experience of tooth ache and esthetic. The participants were more likely to perform positive oral health behavior if there were one or more triggering factors. For examples, the presence of pain resulted in participants accessing dental care. Wanting to have clean mouth and white teeth resulted in participants to brush their teeth regularly. Some participants explained:

> I love to keep my mouth clean for me not to get any smell. For me not to get hole… I love to keep my teeth clean because when I laugh, when I talk my teeth shows they are clean [Participant 1, Female, 62 years old].

> When I finished secondary [school] I just came to the dentist… because a big tooth was bothering me… I did not come [back] when he finished removing because I was not getting pain… Recently I had an epilepsy [attack] I fell… and I broke my teeth… a lot of damage in my mouth… Now I make sure I follow up well and then do my check up. I make sure that when they tell me come do check up every 3 months or every 6 months I come [Participant 2, Female, 30 years old].

> Like when your teeth are painful you have to go… because it is a necessity. If your teeth are not painful there is nothing to do at the dentists [FGD 2, Male, 28 years old].

Family members and dental professionals were external cues to actions. One participant who had been attending only emergency dental services explained how the dentist motivated her to attend the clinic more regularly:

> Yes, my dentist is very cooperative I really love her. She explains well. She has patience with me. Now I come for check-up regularly [Participant 2, Female, 30 years old].

Whilst another participant expressed that she was advised by a dentist to come when she had a problem in her mouth, rather than for preventive dental care. This influenced her to access dental care when in pain and losing a tooth. She reported:

> I was told [by the dentist] to come when I have pain… I came when I had pain and had a tooth that the dressing had come out and was broken. I had to remove that tooth [Participant 4, Female, 41 years old].

Giving unhealthy snacks as treats to children or grandchildren was also done by family members in the current study. This was a cue to action/reward to obtain a desirable behavior in children which increased their risk for oral diseases such as dental caries. One participant explained:

> Yes like you have a child for him/her to stay quiet you give a sweet or you give another thing or you make him/her drink squash [sweetened juice] [Participant 30, Male, 76 years old].

In addition, studies have shown that children living with single mothers or without parents were less likely to have visited the dental clinic (Folayan et al., 2017). Similarly in the current study some participants who expressed having poorer oral health outcomes reported that growing up their parent could not take them to the dental clinic as oral health was not a priority. The priority to their parents was that the children are fed and are healthy.

From the above, clearly cues to action was crucial for the participants to perform acceptable oral health behaviors. Expectations concerning the consequences of action change guided the decisions to initiate certain practices. For these participants included in the study, clean and aesthetically appealing mouth, absence of oral diseases and the relief of pain were the expectations of performing mouth care regimens or visiting the dentists. Therefore, it can be argued that adults with more expectations about the positive consequences of oral health behavior had better oral health outcomes. Such include less oral disease experience, and increased likelihood to access the dental services for preventive purposes.

Summary of the chapter

Chapter 8 concludes the influence of person-level determinants on oral health outcomes. These determinants were analysed using the proposed framework for Seychelles, the framework by Lee and Divaris (2014) and HBM (Rosenstock et al., 1988). Analysis of the study findings showed that there were numerous factors influencing the oral health of these adults. These include oral health behavior, beliefs as identified by the HBM, predisposing and enabling factors and perceived needs. The beliefs of the participants had a strong influence on the

likelihood of performing oral health behavior. Beliefs was determined (i) by the participants predisposing factors such as age, oral health knowledge and gender, (ii) by enabling factiors, such as income, dental fear and anxiety, and (iii) needs such as the presence of pain. This relationship between predisposing factors, enabling factors and needs was a crucial predictor on oral health beliefs and inevitably the participants' oral health outcomes such as oral disease experience or utilization of oral health services. Often some predisposing factors had a direct influence on the likelihood of oral health behavior.

The lack of tacit knowledge observed by majority of the participants signified that the adults were not aware of their perceived susceptibility to oral diseases. They were not aware of the risk/severity of oral diseases and the consequences of not accessing preventive dental services. The influence of family and peers was stronger in those participants who were not able to differentiate and make good judgments due to low education/tacit knowledge. Moreover, lack of tacit knowledge implied not knowing the advantages of performing preventive behavior (perceived benefits). This signifies that effective preventive oral self-care practices such as tooth brushing, flossing and use of fluoridated toothpaste were not adopted or may have been selectively adopted. For example, brushing the teeth once a day or not using dental floss as lack of knowledge of dental plaque. It can be argued that grasping concepts to enable skills development and proper application (self-efficacy) was lacking amongst the adults in the current study. The study also revealed that the participants encountered numerous barriers to perform positive oral health behaviors. Again, these barriers were related to the participants predisposing factors (e.g. employment, location, and social and peer support), and enabling factors (e.g. dental fear and anxiety, and income). This therefore translated to lesser adherence to recommended oral health behaviors and poor oral health outcomes.

CHAPTER NINE
CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

9.1 Introduction

This chapter consolidates the study that examined the determinants on the oral health of adults in Seychelles through an exploration of the health system organization, the social, cultural, economic and environmental factors influencing the oral health. The purpose of the study was to develop an evidence-based theoretical framework that would inform future policy and practice regarding oral health. This concluding chapter re-examines the purpose and aim of the research, and the questions guiding the research. Important results are then summarized as per the study objectives, and the implication of the findings, and the weaknesses of the study are then discussed. Recommendations are then proposed to the management of Oral Health Services Division (OHSD), Ministry of Health staff and relevant stakeholders involved in the provision of dental care and support, and strategic plan and policy development. The chapter ends with propositions for future research.

9.2 Important findings

The study revealed that there were numerous determinants operating at different levels which had an impact on the oral health outcomes of adults in Seychelles. These were classified into macro level, population and community level, and person level factors. The section below will report on those determinants in relation to the research objectives.

The first objective was to evaluate the oral health system in Seychelles and determine how it impacts on service delivery and subsequently the oral health outcomes of the adult population. The second objective was to determine the factors influencing service delivery at the Oral Health Directorate and how these factors impact on oral health outcomes of adults in Seychelles. The study revealed that the role of pathways which act as mechanisms to influence person level factors is very clear in the Seychelles population. The oral health system was identified as a pathway influencing predisposing factors that impact on oral health behavior and inevitably oral health outcomes. The strong influence of pathways related to oral health system administration and organization was also highly evident. The manner in which the mandates of the oral health system and oral health providers played out were crucial in determining how population level factors such as oral health literacy, cultural norms and values, and community resources and engagement influenced oral health outcomes in the Seychelles population.

The third objective was to determine the extent existing policy and strategic documents influenced oral health outcomes of adults in Seychelles. Results of the research showed that there was no oral health policy and strategic plan in Seychelles. Moreover, the findings showed that there was an absence or lack of representation of oral health in other health and public policies. These had an impact on the provision for and equitable access to oral health care in the Seychelles population.

The fourth objective was to determine the perspectives of Seychellois adult patients regarding opportunities and barriers to promoting good oral health. Analysis of the study findings showed that there were numerous factors influencing the oral health of these adults. These include oral health behavior, culture, beliefs as identified by the HBM, predisposing and enabling factors and perceived needs.

The fifth objective was to understand the influence of social, cultural, economic and environmental factors on the oral health of Seychellois adult patients. Findings of the study showed that there were numerous determinants influencing the oral health of adults at the level of the population. These were classified into predisposing factors and pathways. Predisposing factors include oral health literacy, cultural norms and values, community resources and engagement, and the physical environment.

The sixth objective was to develop a theoretical framework for oral health. An evidence-based theoretical framework specific to the Seychelles context was developed in the study. This proposed framework reinforces but builds on the existing framework by Lee and Divaris (2014).

9.3 Significance of the research

This study contributes to the understanding of the determinants influencing oral health of adults in Seychelles. Above all, it reinforces the call for institutions making decisions to understand determinants and how it influences the oral health outcomes of the population so as to mobilize government efforts from an evidence-based position. This study is relatively unexplored in Seychelles and to date there has been no research done aimed at understanding the influence of determinants on oral health outcomes nor was there research that developed and proposed a

framework for oral health in the Seychelles. This study will therefore add to the growing body of literature internationally, and shed light at the national level in Seychelles.

The study permits a qualitative understanding and rich account of factors associated with the determinants influencing the oral health of adults in Seychelles. This understanding could not have been determined by quantitative research. In this way the current research has satisfied its initial aim and purpose. The results foreground that not every individual can achieve good oral health outcomes due to the influence of determinants operating at the macro, population and community and person-level which affects their likelihood of performing positive oral health behavior. The type of determinants influencing oral health outcomes also vary amongst individuals, communities or population groups.

Lastly, the study makes significant contribution by proposing an evidence-based theoretical framework that would inform future policy and practice regarding oral health in Seychelles. The findings were an interrogation of the oral health situations in Seychelles. The absence of oral health policies or strategies, the service delivery burden, patients not receiving treatment on best practice, poor distribution of funding, and insufficient resources to address the burden of oral health problems were significant findings that have been foregrounded in this study. These aspects have been interrogated and provide information that can contribute to the planning of suitable context-specific strategies and policies for the improvement of oral health in Seychelles.

9.4 Recommendations

The results in this research demonstrate how determinants operating at different levels influence the oral health outcomes of adults in Seychelles. This section is outlined in terms of what the Oral Health Services Division (OHSD), the Ministry of Health and Seychelles government could do to improve the oral health of the Seychelles population. The recommendations are suggested as follows:

- There is an urgent need for the development of strategic plans and a policy to guide oral health care in Seychelles. The framework for oral health that has emanated from this study provides an evidence-based mapping of the determinants influencing oral health specific to the Seychelles and highlights the relationships between macro-level, population level and personal level factors. This framework identifies and foregrounds the modifiable mechanisms that must be considered in the development of strategic plans and policies to

reduce oral health disparities in Seychelles. This research provides the basis on which knowledge on the determinants of disparities can translate into action.

- Improving political and resource commitment to oral health, and strengthening leadership. Tackling oral health determinants needs strategic, rigorous and bold actions at local and national levels. Oral health should be recognized as a basic human right in Seychelles, where actions are taken at the national level through policies and/or programmes targeting determinants of oral health. The development of a national oral health policy for Seychelles is therefore crucial.

- There must be a formulation of national targets for oral health and establishment of information systems for surveillance of oral health

- Tax should be removed on all dental products to ensure availability, usage and increased exposure to topical fluoride. Fluoridated milk should be provided to high risk groups such as children and elders as part of programmes.

- The OHSD should align with inter-sectoral efforts and strategies intending to decrease poverty and marginalization.

- An oral health representative working at the level of the Principal Secretary (PS) secretariat to push forward the agenda of oral health at a national level is important.

- The integration or incorporation of oral health in schools and within the teaching curriculum should be a necessity to address oral health in the development years and as a nationwide strategy. OHSD should ensure the integration of oral health in the training curriculum at the National Institute of Health and Social Studies (NIHSS), and short trainings of government employed home caregivers.

- Oral health promotion activities implemented at upstream and downstream level should be implemented to enable people to achieve the best possible oral health, and to reduce determinants and risk factors. Activities should be done to create a supportive environment for positive oral health outcomes. Developing personal skills through oral health education

(OHE) should be at the forefront of primary oral health care providers in Seychelles. The aim should be to strengthen tacit knowledge to influence oral health beliefs and inevitably oral health outcomes. The coverage of OHE should be at the level of the population and not be limited to the dental clinic.

- Financial protection though expanded health insurance which includes oral health is recommended in Seychelles. This is one of the foundations of universal health coverage (WHO, 2021). Providing dental insurance can have a positive impact on oral health outcomes in Seychelles especially in population groups with marked disparities. The OHSD through the PS Secretariat should advocate for dental insurance in order to reduce oral health disparities in access to dental care in Seychelles. The OHSD should also consider the implementation of charges for services rendered according to set criteria that do not increase social disparities.

- The inclusion of oral health in primary health care is crucial in Seychelles. It is therefore important for the OHSD to review strategies to strengthen the inclusion of oral health in primary health care. This could be done through the integration of oral health within relevant health programmes across the life course, including pre-natal, infant, child, adolescent, working adult and older adult programmes (WHO, 2021). OHSD should strengthen the inclusion of oral health into the Road to Health Chart, and the Diabetes Health Chart. Moreover, the OHSD should ensure that 100% of public health facilities in Seychelles offer the primary oral health care package or appropriate referral to facilities with dental clinics. The training of nurses and doctors amongst other cadres can be done through Continuous Professional Development (CPD) to ensure the integration of oral health in other service delivery packages. The OHSD should also develop active programs which target the male population group, emerging diseases and risk factors such as illegal drugs and COVID 19.

- It is therefore important for the OHSD to develop the capacity of the OHSD staff in regards to oral disease prevention, and oral health promotion. This could be done through re-training of the current workforce. In addition, the current attrition rate of the dental therapists and dental hygienists due to resignation or job retirement should be monitored to ensure the training of additional staff to meet supply and demand. Training and recruitment

of these 2 allied dental professionals should be at degree level for increased knowledge and skills to work independently to promote oral health and prevent oral diseases.

- All foreign trained or non-Creole speaking oral health Professional must undergo induction programmes to help them understand the Creole language and Seychellois culture. This will minimize the patient-staff barriers.

- The current OHSD surveillance system should be strengthened and be included in the Ministry of Health's health information system (HIS) for the systematic collection of oral health status and risk factors. Monitoring systems should also be established by the OHSD to track the implementation and impact of existing policies and programmes related to oral health. At the national level, strengthening oral health information systems should include systematic collection of oral health status, risk factors, and resource spending data (WHO, 2021). Moreover, there should be clear mechanisms in place to ensure that private dental clinics are routinely reporting on essential indicators. This could be done through the PS Secretariat that has the mandate to monitor and report on the population health.

- A research led oral health plan should be developed in Seychelles which includes constant monitoring. Periodic situational analysis should be done. All programmes, especially the school-based ones should start from a needs assessment with clear monitoring and evaluation indicators for frequent reporting. Periodic oral health surveys (nationally and local) should be conducted to get new DMFT/dmft, periodontal and fluorosis scores for all age groups.

- The salaries of dental professionals should be reviewed in order to retain Seychellois and encourage youngsters to go and study dentistry.

- The four-level model (Ferdie & Shortell, 2001) should be used to direct service provision at the OHSD. Moreover, there needs to be clear mechanisms in place to ensure quality assurance.

- A shift system should be considered to maximize use of existing resources, and also to enable the population to access care outside of their working hours to avoid financial constraints.

9.5 Limitations of the study

Although this research was crucial in providing an understanding and provided explanation on the influence of determinants on the oral health of adults in Seychelles, there were certain limitations fundamental in this research:

- The cohort comprised of one representative from the upper management. The perspective of top-level management in some instances was therefore limited, for example, when describing budget allocation and strategic/policy documents.
- As there are no recent DMFT statistics in the Seychelles that provide information on the oral disease burden of adults, the health system data base therefore provided an indication of the burden of disease through records of treatments provided, numbers of patients frequenting public health facilities, and the mode dental services was accessed (emergency or appointment basis).
- Group interviews could be done on Mahe only, due to the inability to group patients from the other two inner islands in one location. Understanding the experience of these individuals was therefore limited to individual interviews. This posed challenges in regards to understanding issues related to consensus and diversity across the islands, including culture, family norms and oral health behaviour.
- As the research is part of a thesis, there were restrictions on the number of interviews that could be conducted, due to time constraints and resource availability.
- Transferability

  Despite the mixed paradigm of the current study, the qualitative approach was predominantly used to collect data. The nature of the qualitative nature and it being specific to a cohort in a bounded context and bounded timeframe, the investigator is not in a position to utter the transferability of the study findings. The ability and level to which aspects of the study method and findings can be utilized in other settings are dependent on (i) the similarity of the research setting to which it will be transferred, and (ii) the usefulness of the research findings to the individual researcher. The researcher has provided sufficient details in the methodology and in presenting the

results which could be used as an indication as to the extent to which applicability, transferability and generalizability could be made.

9.6 Future research

In the light of the significant results and weaknesses of the research, the following are possible areas for further research:

- A national oral health survey to obtain a comprehensive picture of the burden of oral diseases in the Seychelles population
- Conducting current needs assessment and situational analysis on oral health in Seychelles
- Evaluation of the different oral health programs on oral health outcomes of the population. This could be through an evaluation.
- Understanding the influence of the tobacco law, restrictions in alcohol selling time, and VAT of Sugar Sweetened Beverages on oral health of the population.
- The influence of socio-economic situations at different periods in time on the oral health outcomes of the population.
- The influence of the Covid-19 pandemic on the public oral health system in Seychelles, determinants of health, and oral health of the population.

9.7 Concluding comments

This chapter wraps up the study titled: The determinants influencing the oral health outcomes of adults in Seychelles. Numerous determinants operating at the macro level, population and community level, and person level were found to influence the oral health outcomes of Seychellois. It is important to recognize and tackle these determinants in order to improve the oral health outcomes of the entire population of Seychelles.

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APPENDIX 1

INTERVIEW GUIDE FOR PATIENTS – ENGLISH VERSION

(Researcher to record the following information on the audio-tape for transcription purposes)

Date of interview: (dd/mm/yyyy): _____

Duration (length of time taken) for interview (minutes/hour): _____

Participant study identifier number: _____

Seychelles region: _____

How long been attending public dental clinics: _____

1. Background information to ask of participant *(and to be recorded on audio tape for transcription purposes)*

Current age of participant: _____

Occupation of participant: _____

Gender: _____

What is your highest level of education?

School leaver	Secondary school	Post-secondary school	University

What is the category of your net salary (final salary after tax and pension removed?)

Below 5500	5500-10000	Above 10000 to 15000	Above 15000

2. Participant past dental visits and experience at the dental clinic

Question	**Probes**
Can you tell me about your last visit to the dentist?	- When? - Reason for attending? - Type of treatment done? - Where you told of all the problems in your mouth and given treatment options?

	- Was oral health education done? Explain a bit what you were told if yes. - Did you have to return? Where you given an appointment? Could you attend the appointment? Explain - How was the experience? (Staff treated you, waiting time, satisfied or unsatisfied) - Language barrier?
Can you tell me about what factor(s) influenced you to go to the dentist at a point in time?	- Pain? / Routine dental check up? / Getting dental clearance? - Under what circumstances do you usually seek dental care? Is there a reason for this choice? Are there any factors that influence how often you visit the dentist? - Easy access or difficulty to access dental care?
Can you talk about where you have done dental treatments in the past AND What influences your choice of where/when to go to the dentist?	- Public - Private - Barriers or hindering factors???? Explain in details - Facilitating factors
Can you talk a bit about the dental service offered by the dental services to the public?	- Enough or not? - How it can be improved? - Quality? - Should there a fee attached to treatments? Explain - Compare time attending school dental and now adult dental? Is there a change? Does it influence your access to public dental clinic? What do you like? What don't you like?

3. Participant talking about own oral health and past oral disease

Question	**Probes**
Can you describe to me how do you regard your own mouth?	- Healthy or unhealthy? Why/explain? - Is your description based on pain or no pain? Colour and alignment of teeth? Gum disease? Bad breath? …

	- If unhealthy why the delay in seeking treatment? - What influences your dental knowledge? Where do you learn about oral health?
Can you talk a bit about oral diseases that you have experienced in the past?	- Painful? How did the pain affect your daily life? - How did you manage? Any remedies you used? Do you know of any remedies? - What was the longest period you suffered with tooth ache before going to the dentist? - What influenced you to wait for that period of time before seeking dental care? - Who or where do you usually seek advice when you have an oral problem? (internet? Individual? Dental professional?)
Can you tell me how you take care of your mouth?	- What do you do? - How often? - What products do you use? - Do you experience any barriers that hinder you from maintaining good oral health and adopting good oral health habits/practices? - Do you get any barriers in accessing dental products to maintain good oral health? (price how do you find it, can you afford the products, availability on the market, accessibility e.t.c) - Fluoride products? - Have you ever tried illegal drugs?

Participant talking about diet

Question	**Probes**
Can you tell me a bit about your daily diet?	- What do you have for breakfast/lunch/supper/snacks? - How often do you snack in between meals? - What influences your selection of snacks? (money, availability, distance travelled to access?) - Do you find it easier and/or cheaper to purchase sugary products than healthy options? - Alcohol? How often?

Participant talking about family oral health

Question	Probes
Can you talk a bit about your family's oral health?	- Who do you stay with? - When do family members go to the dentists? - Do you know the type of treatments they usually do? If yes explain. - What dental products do they use? Do you share? - Who takes care of your children's teeth? (if applicable)

Participant talking about oral disease prevention and oral health promotion

Question	Probes
Can you tell me your view about oral disease in Seychelles?	- Is it a problem? Explain why you say that - How big of a problem is it? - Can it affect the quality of life of someone? - Does oral disease have an impact on the economy of the country?
What is your view about prevention of oral diseases?	- Is it important to keep your teeth for life? - Do you think that enough is being done to prevent oral diseases in the population? - Are you aware of any oral health promotion activities being done in the population? Can you explain those activities (media/clinic/newspaper/leaflets/TV/radio) - What is your view on fluoride to prevent oral diseases? And water fluoridation?
Can you talk to me a bit about your perception of who is responsible to take care of your oral health?	- Own self? Dental staff? Government? - Who should be ensuring that oral diseases are prevented in the population? (What do you think should be done to prevent oral diseases/ who should be involved?) - What are the roles of dental staffs? - Do you think the government and the MOH is doing enough to prevent oral diseases?

	- Have you ever been involved in decision making regarding prevention of oral diseases?

INTERVIEW GUIDE FOR PATIENTS -CREOLE VERSION

GID POU INTERVIEW BANN PASYAN

(Reserser pou rikord sa bann lenformasyon lo en audio-tape pou kapab transcribe apre)

Dat interview: (dd/mm/yyyy):_____
Dirasyon interview (minit/erdtan): _____
Nimero partisipan pou sa letid: _____
Rezyon sesel: _____
Konbyen letan pe vin kot klinik danter piblik: _____

1. Lenformasyon lo bann partisipan (pou ganny rikorde lo en audio tape pou kapab ganny transcribe apre)
Laz aktyel partisipan: _____
Lokipasyon partisipan: _____
Gender: _____
Ki nouvo ledikasyon pli o ou annan: _____

Kit lekol avan S5	Segonder	Post- segonder	Liversite

Ki kategori ou saler apre ki taks e pansyon in tire?

Anba 5500	5500-10000	Par lao 10000 to 15000	Par lao 15000

2. Partisipan vizit kot dantis dan le pase e lekspersyans kot klinik dantis

Kestyon	**Prob**
Eksi ou kapab dir mon enpe lo ou dernyen vizit kot dantis?	- Kan? - Rezon pou ale? - Kalite tretman fer? - Eski ou ti ganny dir tou sa ki ti pe pase dan ou labous e ki opsyon ou ti annan? - Eski ledikasyon danter ti ganny fer? Esplik enpe ki ou ti ganny dir si wi - Eski ou ti bezwen trounen? Eski ou ti ganny en apwentman? Eski ou ti kapab vin sa randevou? Esplike - Ki manyer sa leksperyans ti ete? (manyer travayer tret ou, letan espere, satisfe ou pa satisfe) - eski langaz ti en baryer?

Eski ou kapab dir mon enpe bann fakter ki ti enfliyans ou pou al kot dantis a sa pwen?	-Douler?/ check up regilye? / rod clearance danter? - Anba ki sirkonstans ki ou abitye al rod swen danter? Eski i annan en rezon pou sa swa? Eski i annan okenn fakter ki enfliyans kantite fwa ou al kot dantis? - Fasil pou akse or difisil pou akse swen danter?
Eski ou kapab koz lo kote oun fer tretman danter dan le pase E kwa ki'n enfliyans ou swa kot pou al kot dantis?	- piblik -prive - Baryer ki anpese???? Esplik an detay - Fakter ki ede
Eski ou kapab koz enpe lo servis danter ki ganny ofer ek piblik?	- Ase ou pa ase? - Ki manyer i kapab amelyore - Kalite - Eski i sipoze annan en pri atase avek? Esplike - Konpar letan ou ti pe al dantis marmay (terapis) e la kot adilt? Eski i annan sanzman? Kwa ki enfliyans ou pou akse servis danter piblik? Kwa ki ou kontan? Kwa ki ou pa kontan?

3. Partisipan i koz lo zot prop lasante labous e malady danter dan le pase

Kestyon	**Prob**
Eski ou kapab dekrir avek mon manyer ou war ou lasante labous?	- An bon santé or pa an bon santé? Akoz/Esplike? - Eski ou deskripsyon i baze lo douler ou napa douler? Kouler oubyen fason ou ledan i pozisyonen? Maladi zansiv? Lalenn pi?.. - Si pa an bonn santé akoz ou pe tarde pou rod tretman? - Kwa ki enfliyans sa ki ou konnen lo lasante labous? Ki bor ou aprann lo lasante labous?
Eski ou kapab koz enpe lo maladi labous ki oun eksperyanse dan le pase?	- Fermal? Ki manyer sa douler ti afekte ou lavi toulezour? -Ki ou ti fer? Any remed ou ti servi? Eski ou konn okenn remed?

	- Ki pli ganny period oun soufer ek ledan fermal avan oun al kot dantis? - Kwa ki enfliyans ou pou esper sa period avan al rod swen danter? - Lekel oubyen ki bor ou rod konsey lo problenm danter? (internet? Endividi? Profesyonel danter?)
Eski ou kapab dir mon manyer ou pran ka ek ou labous?	- Ki ou fer? - Konbyen fwa? -Ki prodwir ou servi? - Eski oy eksperyans okenn baryer ki anpes ou pran ka ek ou lasante labous e adopte bann bon praktik pou ou lasante labous? - Eski ou ganny oken baryer pou akse prodwir danter pou gard bon lasante labous? (pri manyer i ete? Eski ou kapab aste? Eski i annan lo marse? Aksesibilite?) - Prodwir Florid? - Eski oun deza sey drog ilegal?

Partisipan i koz lo ladyet

Kestyon	**Prob**
Eski ou kapab dir mon enpe lo ou ladyet toulezour?	- Ki ou manze pou breakfast/dezennen/dinen/snacks? - Kantite fwa ou snacks ant repa - Kwa ki enfliyans ou seleksyon snacks (Larzan, si i annan, distans pou akse) - Eski ou war li bon marse e pli fasil pou aste bann prodwir ki annan disik ladan? - Lalkol? Kan?

Partisipan i koz lo lasante labous fanmiy

Kestyon	**Prob**
Eski ou kapab koz enpe lo lasante labous ou fanmiy?	- Eski ou reste? - Kan ki manm ou fanmiy i al kot dantis?

	-Eski ou konnen ki kalite tretman zot abitye fer? Si wi esplike - Ki kalite prodwir danter zot servi? Eski zot servi ek kanmarad? - Lekel ki prank an avek ledan zot zanfan? (si i aplikab)

Partisipan i koz lo prevansyon maladi labous e promosyon lasante labous

Question	**Probes**
Eski ou kapab dir mon ou pwen vi lo maladi labous sesel?	- Eski i en problenm? Esplike akoz ou dir sa - Ki groser problenm i ete? - Eski i kapab afekte kalite lavi en dimoun? - Eski maladi labous i enpakte lo lekonomi pei?
Ki ou pwen vi lo prevansyon maladi labous?	- Eski i enportant pou kit ledan pou lavi? - Eski ou kwar ase pe ganny fer pou anpes maladi labous dan popilasyon? -Eski ou konn okenn aktivite ki pe promot lasante labous dan popilasyon? Eski ou kapab dekrir sa bann aktivite (medya, klinik, zournal, leaflets, televizyon, radio) - Kio u pwend vi lo florid pou anpes malady labous? Delo ki met florid ladan?
Eski ou kapab dir mon enpe lo lekel ki ou kwar i responsab pou pran ka ek ou lasante labous?	- Ou menm? Travayer danter? Gouvernman? - Lekel ki sipoze pe fer sir prevansyon maladi labous dan popilasyon? (Kwa ki ou kwar i sipoze ganny fer pou prevansyon malady labous/ lekel ki sipoze dan prevansyon) - Ki rol bann travayer danter? - Eski ou kwar governman e minister lasante pe fer ase pou prevansyon maladi labous? - Eski oun deza kontribye dan desizyon pou pravansyon maladi labous?

APPENDIX 2

INTERVIEW GUIDE FOR PATIENTS TO BE USE DURING FOCUS GROUP - ENGLISH VERSION

(Researcher to record the following information on the audio-tape for transcription purposes)

Date of interview: (dd/mm/yyyy): _____

Duration (length of time taken) for interview (minutes/hour): _____

Seychelles region: _____

Question	**Probes**
Can you talk a bit about what influences you to go the dentists?	- Pain/Check up/ dental clearance - How often that happens? - When was the last time? - What treatments are usually done? - If pain why do you wait for only when in pain? - If check up what influences you to do routine dental check up?
Can you describe your experience at public dental clinics?	- Waiting time - Staff - Satisfied or dissatisfied with treatment done? - What influences you to return if you have treatment to continue?
Can you talk a bit about barriers to access dental services in Seychelles?	- distance travelled - location of dental clinics - waiting time - staff attitude - release from work
Can you talk a bit about factors/barriers that prevent you from maintaining good oral health?	- socio-economic factors - price, availability and accessibility of dental products - culture e.g. norms and values, stigma - law, policies - do you think there are factors that influence oral health negatively in Seychelles?
Do you think that enough is being done to promote oral health and prevent oral diseases in Seychelles?	- What is your view on oral disease prevention and promoting oral health? - visibility of media activities or clinical programmes/activities - Who do you think is responsible to prevent oral diseases and promote oral health in the population?

	- Do you think that there is a link between oral health and the general health? - Do you think that oral health should be treated in isolation from other diseases? - What is your role in oral disease prevention and oral health promotion? Have you been involved in any such activities?

INTERVIEW GUIDE FOR PATIENTS TO BE USE DURING FOCUS GROUP - CREOLE VERSION

Gid interview ki pou ganny servi pandan focus group discussion

(Reserser pou rikord sa bann lenformasyon lo en audio-tape pou kapab transcribe apre)

Dat interview: (dd/mm/yyyy):_____
Dirasyon interview (minit/erdtan): _____
Rezyon sesel: _____

Question	**Probes**
Eski ou kapab koz enpe lo kwa ki enfliyans ou pou al kot dantis?	- douler/ check up/ rod clearance danter - eski i souvan arive - ki ti dernyen fwa - ki tretman i zeneralman ganny fer - si douler akoz esper zis ler dan douler - si check up kan ki enfliyans ou pou al regilye pou fer check up
Ki manyer ou pou dekrir ou leksperyans kot klinik danter piblik?	- letan espere - travayer - satisfe pubyen pa satisfe ek tretman gannyen - Kan ki'n enfliyans ou pou trounen pou kontiyen?
Eski ou kapab koz enpe lo baryer pou akse servis danter sesel?	- distans - lokasyon - letan espere - latitid travayer - kapab sorti kot travay
Eski ou kapab koz enpe lo baryer/ fakter ki pe anpes ou pratik bon lasante labous?	- fakter sosyal e ekonomik - pri, si prodwir danter i annan e aksesib - kiltir - lalwa, polisi - eski ou kwar i annan fakter ki enfliyans lasante labous negativ sesel?
Eski ou kwar ase pe ganny fer pou promot lasante labous sesel?	- Ki ou pwen vi lo prevansyon maladi labous e promosyon lasante labous? - Vizibilite lo medya oubyen progranm/aktivite dan klinik - Lekel ki ou kwar i responsab pou anpes maladi labous dan popilasyon? -Eski ou kwar i annan en lyen ant lasante labous e lasante zeneral?

	- Eski ou kwar lasante labous i devret ganny trete an izolasyon ek lezot maladi? - Ki ou rol dan prevansyon maladi labous e promosyon lasante labous? Eski oun partisip dan okenn aktivite?

APPENDIX 3

INTERVIEW GUIDE FOR STAFF- ENGLISH VERSION

(Researcher to record the following information on the audio-tape for transcription purposes)

Date of interview: (dd/mm/yyyy): _____

Duration (length of time taken) for interview (minutes/hour): _____

Participant study identifier number: _____

1. Background information to ask of participant *(and to be recorded on audio tape for transcription purposes)*

Current age of participant: _____

Occupation of participant: _____

What is your highest level of education?

School leaver	Secondary school	Post-secondary school	University

How long been working at the public dental clinics: _____

Participant talking about work experience, dental services and formal documents

Question	**Probes**
Can you talk a bit about your experience working in the public dental service?	- When you started to work at the public dental clinic, what were your plans and thoughts for the service? - After working with the public at the Oral Health Directorate, was there a change in your plans and thoughts? Explain. - How do you feel about your workload at the public dental clinic? - When you started to work at the public dental clinic, what were your plans and thoughts for the service? - After working with the public at the Oral Health Directorate, was there a change in your plans and thoughts? Explain. - How do you feel about your workload at the public dental clinic? - What do you think is the way forward to address this issue of increase workload of dental staff?

	- Do you think that you are getting all the resources you need to carry-out your work efficiently? What are the constraints? - Are you involved in decision making in your workplace? If yes state which ones? - Have you received any training since you started to work at the Oral Health Directorate? Please state. - Are you involved in any preventive or oral health promotion activities? If yes please state which ones.
Can you talk a bit about oral diseases in Seychelles?	- Do you think that oral diseases is increasing or decreasing in the population? Explain. What do you think are the possible causes? - What do you think is the way forward to address oral diseases in the population? - What are the most common oral diseases frequently seen at the public dental clinics? - What type of treatments do you frequently give to your patients? - Are there any cultural factors that impact on oral health that you encounter in the workplace? If yes explain. - Do you think there is a link between oral health and culture? Socioeconomic status? Policies/laws/governance? Health system?
Can you talk about the high number of adult patients coming as ROP in the morning for dental treatments?	- What do you think is the cause? - What is your view about patients attending clinics early morning without an appointment to relieve pain? And to continue treatment started a previous day? - How do you think it should be addressed? - What do you think is the cause of adults only attending dental clinics when in pain? - Why the increase in number of adults seeking treatment for pain when they had attended school dental whereby they were exposed to numerous oral disease preventive activities?

Can you talk a bit about giving appointments to patients?	- What do you think about an appointment system for patients? - Are you giving appointments to your patients? When do you give your patients appointment? If not explain why? - What influences waiting time for appointments? - Why is school dental giving more appointment than adult dental?
Can you talk a bit about the treatments you give your patients?	- Are you able to give you patients a comprehensive treatment suiting their oral health needs? What factors prevent you from doing that? - Do you spend time to educate patients after each dental treatment? How much time is allocated? What things are generally discussed? Explain.
Can you talk a bit about oral disease prevention and promotion in the population?	- In your view, who do you think are responsible to conduct preventive and oral health promotion programmes at the Oral Health Directorate? - What are your feelings towards oral health promotion and oral disease prevention activities done in the community? - Are you aware of oral health promotion activities being done at the oral health directorate? - Which oral health promotion activities being conducted in the communities that you are aware of? - Do you think that there are barriers and obstacles to promoting oral health and preventing oral diseases in the community? If yes explain - Do you believe that the current strategies to promote oral health are sufficient to improve community oral health? Explain what can be done if you do not think it is sufficient - Do you encounter problems in conducting oral health promotion activities? Explain (Transport, resources, funding and staff) - Do you think that the existing oral health services offered by the oral health directorate are sufficient in preventing oral diseases? Is enough being done by the oral health directorate? - Do you think there is a gap between school dental and adult dental? What influence this gap?

Can you talk a bit about the dental services offered to the public?	- What are your thoughts about dental services provided to the general public? Is it effective? Should there be a fee attached to it? - Do you feel that patients should be involved in their treatment plan? i.e decision. Explain.
Are you aware of any formal documents that direct the functions of the oral health directorate?	- Are you aware of any policy for oral health at the oral health directorate? If yes are you aware of its content? Explain. - Are you aware of any strategic plan at the oral health directorate? If yes are you aware of its content? - Are you aware of any local policies or laws that have an impact on oral health? Please state.

Questions for dental staff who are involved in management roles

(Researcher to record the following information on the audio-tape for transcription purposes)

Date of interview: (dd/mm/yyyy): _____

Duration (length of time taken) for interview (minutes/hour): _____

Participant study identifier number: _____

1. Background information to ask of participant *(and to be recorded on audio tape for transcription purposes)*

Current age of participant: _____

Occupation of participant: _____

What is your highest level of education?

School leaver	Secondary school	Post-secondary school	University

How long been working at the public dental clinics: _____

Question	**Probes**

Can you talk a bit about the budget dental receive from the MOH?	- Is there a budget for dental? Is it separate from the other unit at the MOH? - What are your thoughts about the budget the Oral Health Directorate receives annually? - Do you think that the budget received is enough? Is it the amount you originally asked for? If not is there is a large difference in the amount asked and the amount received? - Are there sufficient capital funds for buying dental equipment instruments and materials? - Is there regular transport available? How reliable are they? - Do you perceive the current treatment needs are causing a burden on the services?
Can you tell me a bit about how dental engage in oral disease prevention and oral health promotion activities?	- Are there constraints in producing mass media programmes? Explain. - To what extent do the programmes/strategies on oral health promotion and oral disease prevention work? - Do you believe that the current strategies/programmes/interventions are sufficient or adequate to contribute to improve the oral health of the community? Do these strategies/interventions have the capacity to deliver? - Which evaluation methods are used to evaluate the progress of oral health promotion activities? Please explain. - How would you describe the capacity of oral health promotion programmes conducted in your community to improve oral health? Please explain. - How does budget allocation impact on the implementation of oral health promotion programmes and activities? Please explain. - Do you think that there are enough infrastructure for staff so that they can conduct (1) clinical (2) preventive and (3) promotion activities effectively? - Do you think there are sufficient professionals to manage, monitor and evaluate interventions?

	- Why are more preventive oral health activities being done on children than adults? - Do you think that there is a gap between school dental and adult dental? (DT doing more preventive activities etc). How can this gap be addressed?
Are there strategic plans or policies that direct the actions of the oral health? Is there a strategic plan or policy that is operational?	- Can you describe them a bit? - Does your directorate liaise with other directorates during policy formulation and development? - Is the oral health directorate consulted for other health policy formulation and development? - How is oral health placed on the agenda of policymakers? Explain

INTERVIEW GUIDE FOR STAFF- CREOLE VERSION

Gid interview pou bann travayer danter

(Reserser pou rikord sa bann lenformasyon lo en audio-tape pou kapab transcribe apre)

Dat interview: (dd/mm/yyyy):_____
Dirasyon interview (minit/erdtan): _____
Nimero partisipan pou sa letid: _____

1. Lenformasyon lo bann partisipan (pou ganny rikorde lo en audio tape pou kapab ganny transcribe apre)
Laz aktyel partisipan: _____
Lokipasyon partisipan: _____
Gender: _____
Ki nouvo ledikasyon pli o ou annan: _____

Kit lekol avan S5	Segonder	Post- segonder	Liversite

Konbyen letan eski ou pe travay kot klinik danter piblik: _____

Partisipan pe koz lo zot leksperyans travay, servis danter e dokiman formel

Kestyon	**Prob**
Eski ou kapab koz lo ou leksperyans lerp e travay dan servis danter?	- Ler ou ti konmans travay kot servis danter piblik ki ti ou plan e panse pou servis? - Apre travay kot service danter piblik, eski ou plan e panse in sanze? esplike - Ki manyer ou santi lo kantite travay ou pe fer dan servis danter piblik? - Ki ou kwar sipoze ganny fer pou adres sa problenm ogmantasyon dan kantite travay pou travayer danter? - Eski ou kwar ou pe ganny tou resours ou nezwen pou fer ou travay byen? Ki difikilte ou gannyen? - Eski ou donn lanmen fer desizyon dan ou landrwa travay? Si wi ki kalite - Eski oun ganny okenn kour depi ki oun konmans travay kot servis danter piblik? Si wi ki kalite - Eski ou form par dan aktivite prevansyon oubyen aktivite pou promot lasante labous? Si wi ki kalite

Eski ou kapab kot enpe lo maladi labous isi sesel?	- Eski ou kwar maladi labous pe monte ou desann dan popilasyon? Esplike - Kan ki ou kwar pe fer sa? - Kio u kwar devret ganny fer pou adres maladi labous dan popilasyon? - Ki bann maladi labous pli komen ki ganny war souvan dan servis danter piblik? - Ki kalite tretman ou donn ou pasyan pli souvan? - Eski i annan okenn fakter kiltirel ki ou rankontrer dan ou travay ki enpakte lo lasante labous? Si wi dekrir - Eksi ou kwar i annan en lyen ant laante labous e kiltir? Fakter ekonomik sosyal? Polisi? Gouvernans/ sistenm lasante?
Eski ou kapab koz lo sa gran nonm adilt ki vin kot dantis konman ROP dan bomaten pou tretman danter?	- Kwa ki ou kwar i lakoz? - Ki ou panse lo pasyan pe vin kot klink granmaten san apwentman akoz douler? Oubyen pou kontinny tretman ki'n konmanse en zour avan? - Ki manyer ou kwar sa i kapab ganny adrese? - Kwa ki ou kwar i lakoz adilt vin klinik dantis zis ler dan douler? - Akoz sa kantite nonm dimoun pe rod tretman pou douler kan zot in al kot dantis manrmay kot zot ti sipoze ganny ekspoze ek en kantite aktivite ki anpes maladi labous?
Eski ou kapab koz enpe lo donn pasyan apwentman?	- Ki ou panse lo en sistenm apwentman pou pasyan? - Eski ou pe donn apwentman ou pasyan? Kan ki ou donn apwentman? Si non esplike - Kan ki enfliyans dele letan pou en apwentman? - Akoz ou kwar school dental i donn plis apwentman ki kot dantis adilt?

Eski ou kapab koz enpe lo tretman danter ou donn ou pasyan?	- Eski ou kapab donn ou pasyan en swen danter konpreansiv depan lo zot lasante labous? Ki bann fakter ki anpes ou fer sa? - Eski ou pas letan pou edik ou pasyan apre sak tretman danter? Konbyen letan i ganny donnen? Kwa ki zeneralman ganny diskite? esplike
Eski ou kapab koz enpe lo prevansyon problenm labous e promosyon lasante labous dan popilasyon?	- Lekel ki ou kwar i responsab pou fer prevansyon e aktivite promosyon lasante labous kot dantis? - Ki ou panse lo prevansyon e aktivite promosyon lasante labous dan kominote? Lekel ki ou konnen? - Eski ou konn okenn aktivite promosyon lasante labous ki pe fer kot dantis? - Eski ou kwar i annan baryer e lobstak pou aktivite promosyon lasante labous dan kominote? Si wi esplike - eski ou kwar ki sa stratezi aktyel pou promot bon lasante labous dan kominote i ase? - eski ou ganny problem pou promot aktivite pou bon lasante labous? Esplike (transport, resours, larzan e travayer) - Eski ou kwar sa kalite servis danter ki pe donnen an se moman i sifizan pou prevansyon maladi labous? Eski dental pe fer ase? - Eski ou kwar i annan en lespas ant school dental e adult dental? Kwa ki pe enfliyans sa?
Eski ou kapab koz enpe lo servis danter ki donn piblik?	- Ki ou panse lo servis danter ki donn piblik? Eski i efektiv? Eski i devret annan en pri atase avek? - Eski ou kwar pasyan i devret ganny enkli dan zot plan tretman? i.e. desizyon. Esplike
Eski ou konn okenn dokiman ki gouvern manyer servis danter piblik i opere?	- Eski ou konn okenn polisi pou lasante labous kot servis danter piblik? Si wi ki son konteni? Esplike - Eski ou konn okenn plan stratezi pou lasante labous kot servis danter piblik? Si wi ki son konteni? Esplike

	- Eski ou konn okenn polisi local ou lalwa ki annan en lenpak lo lasante labous? Lekel

Kestyon pou bann travayer danter ki dan management

(Reserser pou rikord sa bann lenformasyon lo en audio-tape pou kapab transcribe apre)

Dat interview: (dd/mm/yyyy):_____
Dirasyon interview (minit/erdtan): _____
Nimero partisipan pou sa letid: _____

1. Lenformasyon lo bann partisipan (pou ganny rikorde lo en audio tape pou kapab ganny transcribe apre)

Laz aktyel partisipan: _____
Lokipasyon partisipan: _____
Gender: _____
Ki nouvo ledikasyon pli o ou annan: _____

Kit lekol avan S5	Segonder	Post- segonder	Liversite

Konbyen letan eski ou pe travay kot klinik danter piblik: _____

Question	**Probes**
Eski ou kapab koz enpe lo bidze servis i gannyen ek minister lasante?	- Eski i annan en bidze pou servis danter? Eski i separe ek bann lezot brans dan minister lasante? - Ki ou panse lo sa bidze servis danter i gannyen tou le an? - Eski ou kwar sa bidze i ase? Eski sa i sa kantite ki ti ganny demande orizinalman? Si non eski i annan en gran diferans ant sa ki'n demande e gannyen? - Eski i annan ase larzan pou aste lekipman, materyo e lenstriman? - Eski i annan transport? Eski i kapab ganny depan lo la? - Eski ou kwar sa fason donn tretman pe met en krentif lo servis?
Eski ou kapab dir mon enpe lo ki manyer servis danter i angaz dan prevansyon maladi labous e promot lasante labous?	- Eski i annan konstren pou prodwir program pou media? - Eski bann program e stratezi pe marse? - Eski sa stratezi aktyel i sifizan pou kontribye pou ed lasante labous kominote? Eski i annan kapasite pou deliver?

	- Ki metod evalyasyon pe ganny servi mon evalye progre bann aktivite ki promot lasante labous? Esplike - Ki manyer ou pou dekrir kapasite bann progranm pou ed lasante labous kominote? - Ki manyer bidze i enpakte lo emplimantasyon bann aktivite e progranm pou promot lasante labous? - Eski ou kwar i annan ase lenfrastiktir pou travayer danter pou fer (1) aktivite klinik (2) prevansyon (3) promosyon efektivman? - Eski ou kwar i annan ase profesyonel pou bann evalye entervansyon? - Akoz plis prevansyon danter pe fer lo zanfan ki adilt? - Eski ou kwar i annan en lespas ant school dental e adult dental? Ki manyer sa i kapab ganny adrese
Eski i annan stratezi e polisi ki diriz aksyon servis danter? Eski i annan plan stratezik ki operasyonel?	- Eski ou kapab koz lo la enpe? - Eski servis danter i fer kontak ek lot brans dan minister lasante ler polisi pe ganny formile e devlope? - Eski servis danter i ganny konsilte ler bann lezot polisi lasante i ganny formile e devlope? - Eski lasante labous i ganny met lo azanda bann dimoun ki ekrir polisi? esplike

APPENDIX 4

INTERVIEW GUIDE FOR UPPER MANAGEMENT – ENGLISH VERSION

(Researcher to record the following information on the audio-tape for transcription purposes)

Date of interview: (dd/mm/yyyy): _____

Duration (length of time taken) for interview (minutes/hour): _____

Participant study identifier number: _____

1. Background information to ask of participant *(and to be recorded on audio tape for transcription purposes)*

Current age of participant: _____

Occupation of participant: _____

How long been working in present job: _____

Question	**Probes**
Can you explain to me a bit how budget is allocated at the MOH?	- What influences how budget is divided between all the units? - How is the budget for dental determined? Is it usually the amount dental asked? If not what influence this? - What percentage of the annual MOH budget is allocated towards oral health? - How priorities determined? - How does the identification of other health priorities impact on the provision of oral health? Explain.
Can you tell me a bit about how policies and strategic plans are formulated at the MOH?	- Does the national health policy statement mention improvements in oral health as one of programmes' health goals? If yes, explain. - Who designs national health policies and strategic plans? - Is the oral health directorate consulted for other health policy formulation and development?
What are your views on the oral health service provision?	- How would you describe the dental services offered to the general public? - Do you perceive any areas should be re-orientated?
What is your view about oral disease prevention and promotion?	- Is it important? - What are your views on water fluoridation? - Do you think enough is being done? - How is the MOH involved?

	- Transport for such activities? availability - What is your view on tax on dental products?
What is being done to improve the population health?	- What is the MOH doing to reduce the exposure of the population to unhealthy food or lifestyles? e.g. tax, laws, health promoting environment? Are there any challenges in doing that? - What is the view of the MOH regarding the common risk factor approach to reduce oral diseases and other health problems? - Does the MOH work with other ministries to improve health? Can you explain (e.g. reducing tax on products etc.)

INTERVIEW GUIDE FOR UPPER MANAGEMENT – CREOLE VERSION

Gid interview pou bann dimoun kid an 'upper management"

(Reserser pou rikord sa bann lenformasyon lo en audio-tape pou kapab transcribe apre)

Dat interview: (dd/mm/yyyy):_____
Dirasyon interview (minit/erdtan): _____
Nimero partisipan pou sa letid: _____

1. Lenformasyon lo bann partisipan (pou ganny rikorde lo en audio tape pou kapab ganny transcribe apre)

Laz aktyel partisipan: _____
Lokipasyon partisipan: _____
Ki nouvo ledikasyon pli o ou annan: _____

Kit lekol avan S5	Segonder	Post- segonder	Liversite

Question	**Probes**
Eski ou kapab esplik mon enpe manyer bidze dan minister lasante i ganny partaze?	- Kwa ki enfliyans bidze pou ganny divize ant bann diferan unit? - Ki manyer bidze pou servis danter i ganny determinen? Eski i sa kantite ki dental i demande? Si non kwa ki enfliyanse? - Ki poursantaz bidze i donn servis danter? - Ki manyer priorite i ganny determinen? - Ki manyer idantifikasyon bann lezot priorite lasante i enpakte lo lasante labous? Esplike
Eski ou kapab dir mon ki man plan stratezi e polisi i ganny formile dan minister lasante?	- Eski sa polisi nasyonal pou lasante i mansyonn lasante labous konman enn son gol dan progranm? - Lekel ki fer polisi e plan stratezi pou lasante? - Eski servis danter i ganny konsilte?
Ki ou panse lo servis danter?	- Ki manyer ou pou dekrir servis danter ki pe donn piblik? - Eski ou war okenn landrwa ki sipoze ganny re oriante?
Ki ou panse lo prevansyon maladi labous e promosyon lasante labous	- Eski i enportan? - Ki ou panse lo fluoride dan delo portab? - Ki manyer minister pe involve? - Transport pou aktivite? Kapab depan lo la? - Ki ou panse lo taks lo prodwir danter?
Ki pe ganny fer pou lasante popilasyon pli byen?	- Ki MOH pe fer poy redwir ekspozisyon popilasyon avek bann manze e fason viv ki pa an bon santé? E.g.

	taks, lalwa, lanvironman ki an bon santé? Eski i annan okenn difikilte? - Ki pwen vi minister lasante lo fakter komen pou redwir maladi labous e lezot problenm lasante? - Eski MOH i travay avek lezot miniter pou fer lasante popilasyon pli byen? Eski ou kapab esplike (e.g. redwir taks lo prodwir etc)

APPENDIX 5

Information Form for patients – English Version

Research Title: Determinants influencing oral health of adults in the Seychelles

Dear Participant

In recent years there has been a growing need for dental treatments which appears to be a burden and strain on public dental services. This is a concern for particularly a small country like Seychelles as the Government resources is being utilized on treating oral diseases that are preventable. This calls for research. You are therefore invited to participate in a research project which serves to understand the factors that influence the oral health of adults in Seychelles. The research will thereafter inform the development of a framework that will illustrate how these oral health inequalities relate to each other and influence in the bigger context of service delivery

Before you decide to take part in this study it is important for you to understand why this research is being conducted and what will be involved. Please take your time to read this information sheet carefully and discuss with others if you feel the need. You can contact me if you need any further information or if there is anything that is not clear. Do take your time to decide whether or not you wish to take part in this study.

Data for the research will be collected through the following:

- Individual interviews with adult patients, dental staff and representatives of upper managements
- Focus group interviews with adult patients
- Reviewing of documents

Ethical principles:

The research is designed with the following principles in mind:

- You have a right to decide whether or not to participate in the study, without being subject to any form of penalty.

- Information from the research will only be used only for academic purposes.

- Confidentiality will be ensured through a number of mechanisms:

All information from the research will be securely stored and will be accessible only to the researcher. It is to be used only for the purpose of the research. You will remain anonymous. No quotations will be used from the information you give. Feedback from the research will involve a brief verbal report which will be presented to the appropriate authorities on completion of the study and will be based on the above principles.

Researcher: Ms Cynthia Noshir: Email – 2540579@myuwc.ac.za

Research Ethics Committee Email - research-ethics@uwc.ac.za

Tell - 021 9594111

Tear of and submit the consent form only

Consent Form for Patients

I, (please print name) ……..,

understand the nature of the research and I am willing to take part in the research.

Signature of Participant: …….. Date:

……

Signature of Researcher:……..

Date:…….

Researcher: Ms Cynthia Noshir 2540579@myuwc.ac.za

Information Form for patients – Creole Version

Form lenformasyon pou pasyan

Tit resers: Determinan ki enfliyans lasante labous adilt sesel

Ser partisipan

Pandan sa bann dernyen lannen i annan en ogmantasyon dan demann tretman danter ki paret pe vin en pwa lo servis danter piblik. Sa i en konsern pou en pti pei parey Sesel vi ki resours gouvernman pe ganny servi pou tret bann maladi labous ki kapab ganny anpese. Sa i demann resers. Alors ou ganny envite pou partisip dan en resers ki pou ede konpran bann fakter ki enfliyans lasante labous bann adilt Sesel. Sa resers pou epi ede devlop en striktir ki pou montre manyer bann keksoz pa egal i rely eek kanmarad e enfliyans dan pli gro konteks manyer servis i ganny deliver.
Avan ki ou deside partisip dan sa letid i enportan ki ou konpran akoz sa resers pe ganny fer e kwa ki pou arive. Silvouple pran ou letan e lir sa paz lenformasyon byen e diskit avek lezot dimoun si ou bezwen. Ou kapab kontakte mon si ou bezwen plis lenformasyon oubyen si i annan okenn keksoz ki pa kler. Pran ou letan e deside si ou anvi partisip dan sa letid.

Lenformasyon pou ganny kolekte dan sa bann fason:
- Interview individyel avek adilt, travayer danter e represantan minister lasante
- Interview dan group avek adilt
- Revwar dokiman

Prensip etikal:
Sa resers in ganny fer par respekte sa bann prensip:
- Ou annan dwa pou deside lo si ou pou partisip dan sa letid, san ganny penalize okenn fason
- Leformasyon gannyen ek sa resers pou servi pou rezon akademik selman
- Ou konfidansyalite pou ganny respekte dan sa bann fason:

Tou lenformasyon sorti dan sa resers pou ganny anmase an sekirite e pou aksesib ek zis sa reseser. I pou ganny servi pou zis rezon resers. Personn pa pou konnen lekel ou. Napa okenn

kotasyon pou ganny servi. En rapor verbal pou ganny fer avek bann lotorite konsernen ler sa letid i konplete baze lo sa bann prensip.

Reseser: Ms Cynthia Noshir: Email – 2540579@myuwc.ac.za
Research Ethics Committee Email - research-ethics@uwc.ac.za
Tell - 021 9594111
Desire e anvoy form konsantman selman

Form konsantman pou pasyan

Mon, (ekrir non silvouple) ……..,
ganny en konpran sa resers e mon pare pou partisip dan sa resers.

Sinyatir partisipan: …….. Dat: ……

Sinyatir reserser:…….. Dat:…….

Reserser: Ms Cynthia Noshir 2540579@myuwc.ac.za

APPENDIX 6

Information form for staff and upper management– English Version

Research Title: Determinants influencing oral health of adults in Seychelles

Dear Staff

In recent years there has been a growing need for dental treatments which appears to be a burden and strain on public dental services. This is a concern for particularly a small country like Seychelles as the Government resources is being utilized on treating oral diseases that are preventable. This calls for research. You are therefore invited to participate in a research project which serves to understand the influence of health systems, social, cultural, economic and environmental factors on the oral health of adults in Seychelles. The research will thereafter inform the development of a framework that will illustrate how these oral health inequalities relate to each other and influence in the bigger context of service delivery.

Before you decide to take part in this study it is important for you to understand why this research is being conducted and what will be involved. Please take your time to read this information sheet carefully and discuss with others if you feel the need. You can contact me if you need any further information or if there is anything that is not clear. Do take your time to decide whether or not you wish to take part in this study.

The information that you provide will be used for research and study purposes. This means that the information may be presented at conferences and or academic journals. Your information will be confidential - this means that you will not be identified.

If you choose to participate you may choose to withdraw at any time (without needing to provide a reason) without any negative consequences for yourself.
Participation in this research will involve a researcher asking you some questions.

Researcher: Ms Cynthia Noshir - Email – 2540579@myuwc.ac.za
Research Ethics Committee Email - research-ethics@uwc.ac.za
Tell - 021 9594111

Tear off and submit the consent form only

Consent Form for staff and upper management

I, (please write name) ……..,
understand the nature of the research and I am willing to take part in the research.

Signature of participant: ……

Date: ……..

Signature of Researcher:……..

Date:…….

Researcher: Ms Cynthia Noshir 2540579@myuwc.ac.za

Information form for staff and upper management – Creole Version

Paz lenformasyon pou travayer lasante

Tit resers: Determinan ki enfliyans lasante labous adilt sesel

Ser Travayer

Pandan sa bann dernyen lannen i annan en ogmantasyon dan demann tretman danter ki paret pe vin en pwa lo servis danter piblik. Sa i en konsern pou en pti pei parey Sesel vi ki resours gouvernman pe ganny servi pou tret bann maladi labous ki kapab ganny anpese. Sa i demann resers. Alors ou ganny envite pou partisip dan en resers ki pou ede konpran bann fakter ki enfliyans lasante labous bann adilt Sesel. Sa resers pou epi ede devlop en striktir ki pou montre manyer bann keksoz pa egal i rely eek kanmarad e enfliyans dan pli gro konteks manyer servis i ganny deliver.

Avan ki ou deside partisip dan sa letid i enportan ki ou konpran akoz sa resers pe ganny fer e kwa ki pou arive. Silvouple pran ou letan e lir sa paz lenformasyon byen e diskit avek lezot dimoun si ou bezwen. Ou kapab kontakte mon si ou bezwen plis lenformasyon oubyen si i annan okenn keksoz ki pa kler. Pran ou letan e deside si ou anvi partisip dan sa letid.

Lenformasyon ki ou donnen pou servi pou resers e letid. Sa i vedir ki lenformasyon i kapab ganny prezante dan konferans avek/oubyen zournal akademik. Ou lenformasyon pou konfidansyel- savedir ou pa pou kapab ganny idantifye.

Si ou deside pou partisip dan sa letid ou kapab arête nenport ler (san bezwen donn en rezon) oubyen konsekans negative pou ou lekor. Pandan sa resers ou pou ganny demande detrwa kestyon.

Reserser: Ms Cynthia Noshir: Email – 2540579@myuwc.ac.za

Research Ethics Committee Email - research-ethics@uwc.ac.za

Tel - 021 9594111

Desire e anvoy form konsantman selman

Form konsantman pou travayer lasante

Mon, (ekrir non silvouple) ……..,
ganny en konpran sa resers e mon pare pou partisip dan sa resers.

Sinyatir partisipan: …….. Dat: ……

Sinyatir reserser:…….. Dat:…….

Reserser: Ms Cynthia Noshir 2540579@myuwc.ac.za

APPENDIX 7

Information Form for Focus Group Discussion– English Version

Research Title: Determinants influencing oral health of adults in the Seychelles

Dear Participant

In recent years there has been a growing need for dental treatments which appears to be a burden and strain on public dental services. This is a concern for particularly a small country like Seychelles as the Government resources is being utilized on treating oral diseases that are preventable. This calls for research. You are therefore invited to participate in a research project which serves to understand the factors that influence the oral health of adults in Seychelles. The research will thereafter inform the development of a framework that will illustrate how these oral health inequalities relate to each other and influence in the bigger context of service delivery. Reporting will be made to the Government sector on the findings and recommendations.

Before you decide to take part in this study it is important for you to understand why this research is being conducted and what will be involved. Please take your time to read this information sheet carefully and discuss with others if you feel the need. You can contact me if you need any further information or if there is anything that is not clear. The following information will provide further insight to guide your decision whether to participate in this study or not.

Data for the research will be collected through the following:

- Individual interviews with adult patients, dental staff and representatives of upper managements
- Focus group interviews with adult patients
- Reviewing of documents

Ethical principles:

The research is designed with the following principles in mind:

- You have a right to decide whether or not to participate in the study, without being subject to any form of penalty.

- Information from the research will only be used only for academic purposes.

- Confidentiality will be ensured through a number of mechanisms:

All information from the research will be securely stored and will be accessible only to the researcher. It is to be used only for the purpose of the research. You will remain anonymous. No quotations will be used from the information you give. Feedback from the research will involve a brief verbal report which will be presented to the appropriate authorities on completion of the study and will be based on the above principles.

Researcher: Ms Cynthia Noshir: Email – 2540579@myuwc.ac.za

Research Ethics Committee Email - research-ethics@uwc.ac.za

Tell - 021 9594111

Tear of and submit the consent form only

……

…...

Consent form for Focus Group Discussion

The study has been described to me in a language that I understand. My questions about the study have been answered. I also understand that my participation in the study will involve and I agree to participate of my own choice and free will. I understand that my identity will be protected and not be disclosed to anyone by the researcher. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences. I understand that confidentiality is dependent on participants' in the Focus Group maintaining confidentiality.

I, (please print name) ……..,
understand the nature of the research and I am willing to take part in the research. I hereby agree to uphold the confidentiality of the discussions in the focus group by not disclosing the identity of other participants or any aspects of their contributions to individuals outside of the group.

Signature of Participant: …….. Date: ……

Signature of Researcher:……..

Date:…….

Researcher: Ms Cynthia Noshir 2540579@myuwc.ac.za

Information Form for Focus Group Discussion– Creole Version

Form lenformasyon pou diskisyon dan group

Tit resers: Determinan ki enfliyans lasante labous adilt sesel

Ser partisipan

Pandan sa bann dernyen lannen i annan en ogmantasyon dan demann tretman danter ki paret pe vin en pwa lo servis danter piblik. Sa i en konsern pou en pti pei parey Sesel vi ki resours gouvernman pe ganny servi pou tret bann maladi labous ki kapab ganny anpese. Sa i demann resers. Alors ou ganny envite pou partisip dan en resers ki pou ede konpran bann fakter ki enfliyans lasante labous bann adilt Sesel. Sa resers pou epi ede devlop en striktir ki pou montre manyer bann keksoz pa egal i rely eek kanmarad e enfliyans dan pli gro konteks manyer servis i ganny deliver.

Avan ki ou deside partisip dan sa letid i enportan ki ou konpran akoz sa resers pe ganny fer e kwa ki pou arive. Silvouple pran ou letan e lir sa paz lenformasyon byen e diskit avek lezot dimoun si ou bezwen. Ou kapab kontakte mon si ou bezwen plis lenformasyon oubyen si i annan okenn keksoz ki pa kler. Pran ou letan e deside si ou anvi partisip dan sa letid.

Lenformasyon pou ganny kolekte dan sa bann fason:

- Interview individyel avek adilt, travayer danter e represantan minister lasante
- Interview dan group avek adilt
- Revwar dokiman

Prensip etikal:

Sa resers in ganny fer par respekte sa bann prensip:

- Ou annan dwa pou deside lo si ou pou partisip dan sa letid, san ganny penalize okenn fason
- Leformasyon gannyen ek sa resers pou servi pou rezon akademik selman
- Ou konfidansyalite pou ganny respekte dan sa bann fason:

Tou lenformasyon sorti dan sa resers pou ganny anmase an sekirite e pou aksesib ek zis sa reseser. I pou ganny servi pou zis rezon resers. Personn pa pou konnen lekel ou. Napa okenn

kotasyon pou ganny servi. En rapor verbal pou ganny fer avek bann lotorite konsernen ler sa letid i konplete baze lo sa bann prensip.

Reserser: Ms Cynthia Noshir: Email – 2540579@myuwc.ac.za
Research Ethics Committee Email - research-ethics@uwc.ac.za
Tell - 021 9594111
Desire e anvoy form konsantman selman

Form konsantman pou diskisyon dan group

Sa letid in ganny dekrir dan en langaz ki mon konpran. Mon bann kestyon in ganny reponn. Mon konpran ki mon partisipasyon dan sa letid e agree ki mon pe partisip par mon prop swa e liberte. Mon konpran ki mon idantite pou ganny proteze e pa pou ganny devwale ek person par sa reserser. Mon konpran ki mon kapab sorti dan sa resers nenport ler san donn okenn rezon oubyen lafreyer konsekans negative. Mon konpran ki konfidansyalite i depan lo partisipan dan sa group ki per fer diskisyon.
Mon, (ekrir non silvouple) ……..,
konpran natir sa letid e mon pare pou pran par dan sa letid. I agree pou gard konfidansyalite diskisyon dan group par pa dir idantite lezot partisipan e okenn lapse zot kontribisyon avek lezot dimoun andeor group.

Sinyatir partisipan: …….. Dat: ……

Sinyatir reserser:…….. Dat:…….

Reserser: Ms Cynthia Noshir 2540579@myuwc.ac.za

APPENDIX 8

Ethical approval – University of the Western Cape, South Africa

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DIRECTOR: RESEARCH
RESEARCH AND INNOVATION DIVISION

Private Bag X17, Bellville 7535
South Africa
T: +27 21 959 4111/2948
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11 May 2018

Dr CS Noshir
Faculty of Dentistry

Ethics Reference Number: BM18/3/13

Project Title: Determinants influencing oral health of adults in the Seychelles.

Approval Period: 8 May 2018 – 8 May 2019

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.

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

PROVISIONAL REC NUMBER -130416-050

APPENDIX 9

Ethical approval – Health Research and Ethics Committee

MINISTRY OF HEALTH
PUBLIC HEALTH AUTHORITY
P. O. Box 52, Victoria Hospital, Mahé, Republic of Seychelles
Tel:4388378, Fax:4225131, E-Mail: Jude.Gedeon@health.gov.sc

Please address all correspondence to the Public Health Commissioner

31st July, 2018

Ms Cynthia Noshir,
Oral Health
Seychelles Hospital

Dear Ms Noshir,

Research Proposal 1807: Determinants influencing oral health of adults in Seychelles

Based on the proposal re-submitted 18th July, 2018, the committee is satisfied that all issues addressed in reply letter dated 29th June 2018 have been adequately met.

Hence, the project is approved.

Please note that the committee requires a copy of the final report of this study.

Thanking you.

Yours sincerely,

Anna-Lisa Labiche
Chairperson
Health Research and Ethics Committee

HEALTH RESEARCH ETHICS COMMITTEE
06 AUG 2018

APPENDIX 10

LANGUAGE CLEARANCE CERTIFICATE

25 Maple Crescent
Circle Park
KLOOF
3610

Phone 031 – 7075912
0823757722
Fax 031 - 7110458
E-mail:
dr1govender@telkomsa.net
sathsgovender4@gmail.com

Dr Saths Govender

1 NOVEMBER 2021

TO WHOM IT MAY CONCERN

LANGUAGE CLEARANCE CERTIFICATE

This serves to inform that I have read the final version of the thesis titled:

DETERMINANTS INFLUENCING THE ORAL HEALTH OF ADULTS IN SEYCHELLES
by CYNTHIA YARA SHEELA NOSHIR.

To the best of my knowledge, all the proposed amendments have been effected and the work is free of spelling and grammatical errors. I am of the view that the quality of language used meets generally accepted academic standards.

Yours faithfully

DR S. GOVENDER
B Paed. (Arts), B.A. (Hons), B Ed.
Cambridge Certificate for English Medium Teachers
MPA, D Admin.

APPENDIX 11

TURNITIN REPORT

PhD Thesis

ORIGINALITY REPORT

10%	6%	5%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.fdiworlddental.org Internet Source	1%
2	Submitted to University of Wolverhampton Student Paper	<1%
3	www.health.gov.sc Internet Source	<1%
4	journals.sagepub.com Internet Source	<1%
5	Donald L Patrick. "Reducing Oral Health Disparities: A Focus on Social and Cultural Determinants", BMC Oral Health, 2006 Publication	<1%
6	Submitted to University of KwaZulu-Natal Student Paper	<1%
7	Adeniyi, Abiola A., Oyinkan O. Sofola, and Ricky V. Kalliecharan. "An appraisal of the oral health care system in Nigeria : Oral health care in Nigeria", International Dental Journal, 2012. Publication	<1%