EVALUATION OF THE USE OF THE ORAL HEALTH SECTION OF THE ROAD TO HEALTH CHART (RtHC)

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ABSTRACT

BACKGROUND: Dental caries in preschool children remains a major dental public health problem as it affects a significant number of preschool children in both developed and developing countries. Dental caries is a multifactorial disease caused by bacteria, sugar and carbohydrates which metabolize to form acids. These acids demineralize the tooth surface which results in dental caries. Cariogenic bacteria can pass from mother to child in the first two years of the child's life. Other causes of childhood caries result from poor feeding practices and dietary practices. The American Academy of Pediatrics (AAP) policy statement advises that screening should be conducted by the time of the first tooth appearance and at no later than 12 months of age (AAP, 2011).

AIM: To investigate use of the Road to Health Chart (RtHC) in monitoring child oral health.

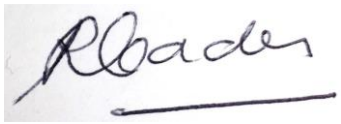
METHODOLOGY: The multistage cluster sampling technique was used to select the study participants for the review of RtHC use. Three primary healthcare clinics were selected randomly from each of the six sub-districts in the Cape metropolitan region. The districts were subdivided into: Cape Town Eastern Health sub-District, Cape Town Northern Health sub-District, Cape Town Southern Health sub-District, Cape Town Western Health sub-District, Khayelitsha Health sub-District, Klipfontein Health sub-District (DoH, 2016). The study was in three parts: (i) to determine completion of the RtHC, (ii) a questionnaire survey administered to the healthcare workers (including the dentist, hygienist and dental therapist); and (iii) a focus group discussion with the health professionals.

RESULTS: Seventy seven health professionals participated in the survey. Two hundred and forty three oral health sections of the RtHC were examined and reviewed. The study results indicated that the oral section was not adequately used by health professionals. Dentists and oral hygienists (5 and 16) reflected better knowledge and awareness of the oral health section (100%). Only 27% of children 0-6 years had had the oral health section of the RtHC completed or partially completed from the selected sample. Only three children had completed the first and second visit. Of the 243 in the study sample 34 children were between ages 0-12 months and only 3 children had the oral health section completed at this age. The highest number of children who had the oral health section partially completed was in the age category 48-60 months (64%). The age category 60-72 months had the highest number of charts reviewed (n=39).

CONCLUSION: The present study found that the oral health section of the RtHC was not adequately utilized and was often incomplete. Health professionals, including dentists, oral hygienists, nurses and community care workers who work in baby-wellness clinics, and who are supposed to complete the RtHC, are ill-informed and have a lack of knowledge of the relevance of the oral health section of the RtHC.

DECLARATION

I, Rugshana Cader (Student No. 300423), the undersigned, hereby declare that this dissertation is my own original work except where indicated in acknowledgements and references. It is being submitted in partial fulfilment for the degree (MSc) in Community Dentistry at the Faculty of Dentistry, University of the Western Cape. It has not been previously submitted in part or its entirety towards any other degree or examination at any other university.



Signature: _____ Date: November 2016

DEDICATION

I dedicate this work to:

God for providing me with the strength and endurance throughout my journey,

My parents, Abdurrazak and Sabera Cader, for their unconditional love and whose good example inspired me to work hard in whatever I wished to achieve,

My husband, Ashraf, for his unwavering love and encouragement, for always believing in me. Your emotional and practical support made this potentially arduous journey an enjoyable one,

My sons, Zaid and Adam, for being the inspiration in all that I do. Your willingness to assist, your ready smiles and words of reassurance, sustained me in my studies. Thank you for all the joy and love you bring to our family,

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My extended family and friends, for their friendship, guidance and encouragement.

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ACRONYMS

AAP: American Academy of Paediatrics

AAPD: American Academy of Paediatric Dentistry

ANC: African National Congress

CDC: Centres for Disease Control and Prevention & community day centre

CI: Confidence intervals

CHC: Community health clinic

CRFA: Common risk factor approach

DHS: District health services & district health system

DoH: Department of Health

ECC: Early Childhood Caries

PHC: Primary healthcare

NHANES: National Health and Nutrition Survey

NHI: National Health Insurance

NHS: National health system

NHP: National Health Plan

NPOH: National Policy for Oral Health

RtHC: Road to Health Chart

SANC: South African Nursing Council

Stats SA: Statistics South Africa

TALC: Teaching-aids at Low Cost

TB: Tuberculosis

UNICEF: United Nations Children's Fund

WHO: World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Background

The impact of oral diseases in communities in South Africa remains a major public health concern (Thema and Singh, 2013). For example, only 20% of carious lesions in children are treated, with 80% of caries going untreated (Van Wyk *et al.* 2004). The most recent National Children's Oral Health Survey (2003) conducted in the nine provinces between 1999 and 2002, reported that the results fell short of the 50% treatment goal set by the national Department of Health (DoH) in 2000. In South Africa, 80% of the population is dependent on state services for oral healthcare delivery and dental caries and oral diseases have become a public health concern (Singh, 2011).

The evidence in the literature indicates that early intervention strategies and oral health promotion can reduce this burden of disease (Singh and Myburgh, 2005). Given that such a large section of the population in South Africa is dependent on the state for oral health services, these preventive services are offered at healthcare facilities at primary level. The primary healthcare (PHC) philosophy, which has been best captured in the Declaration of Helsinki "Alma Ata", has as its goal developing a unified health system capable of delivering quality healthcare to all citizens efficiently and in a caring environment (Draper and Louw, 2007). It advocates for a multi-sectoral approach to oral health where healthcare workers across the continuum do not work in silos, but work on common themes for health improvements. The PHC philosophy advocates the integration of oral health services and the collaboration of oral healthcare workers with other PHC professionals. Oral health professionals should motivate, therefore, for better support from other health disciplines and strive to adopt an interdisciplinary and multidisciplinary approach to oral health (Carlisle, 2000).

The World Health Organization (WHO) has established global standards on child development specifically designed for developing countries. This policy identified best practice for child development monitoring in terms of measuring growth, feeding practices, the importance of nutrition and immunizations. It developed criteria for child monitoring that health services can align themselves to and was adopted by 140 countries by March 2011 (De Onis *et al*. 2011). The standards provide the opportunity to promote a good relationship between healthcare workers, the parent(s)/caregiver and the child, to detect problems early and to initiate intervention (DoH, 2011a). South Africa is aligned to global policy. Therefore, if South Africa has an effective chart to monitor child development, and this chart has an oral health component included, it is an ideal opportunity to incorporate and use this tool to effectively identify oral health problems early. Additionally, it is an opportunity for integration of health services.

The aim of this study is to investigate if the oral health section of the child development monitoring tool, the Road to Health Chart (RtHC) (DoH, 2015b), is being effectively used. Since 1995, the RtHC has been revised four times, with the second to last update in 2002. In 2011 a newly revised version of the RtHC was implemented and this new chart included an oral health section. The new RtHC was implemented in February 2011 with the new oral health section based on WHO standards (Cloete *et al*. 2012). In addition to this, no current study emphasizes the challenges faced by healthcare professions in monitoring the oral health section in the RtHC at PHC clinics. The study took place at conveniently selected state health clinics in the Cape metropolitan district of the Western Cape.

1.2 Global oral health burden

The WHO emphasizes that, despite improvements in the oral health status of populations across the world, the problem of oral disease persists (WHO, 2016c). The objectives of the

WHO Global Oral Health Programme, a technical programme within its Department of Prevention of Noncommunicable Diseases, have been re-oriented according to the new strategy on disease prevention and promotion of health (WHO, 2016c). Greater emphasis is being placed on developing policies on oral health promotion and oral disease prevention, coordinated more effectively with other priority programmes of the Department of Prevention of Noncommunicable Diseases, between other clusters and with external WHO partners.

The major challenge is to translate existing knowledge and sound experiences of disease prevention and health promotion into action programmes, which is particularly the case with developing countries that have not yet benefited from advances in oral health science to the fullest extent possible (Singh, 2004). The Global Oral Health Programme gives priority to research that addresses the 10/90 gap, i.e. that only 10% of funding for global health research is allocated to oral health problems that affect 90% of the world population (WHO, 2016c).

The WHO formulates policies and develops global goals to build healthy populations and communities and combat ill health (WHO, 2015c). Four strategic directions provide the framework for its global oral health policy (WHO, 2015b), which includes the work of the Global Oral Health Programme:

- Reducing oral disease burden and disability, especially in poor and marginalized populations.
- Promoting healthy lifestyles and reducing risk factors to oral health that arise from environmental, economic, social and behavioural causes.
- Develop oral health systems that equitably improve oral health outcomes, responding to people's legitimate demands, and being financially fair.

- Framing policies in oral health, based on integration of oral health into national and community health programmes, and promoting oral health as an effective dimension for development policy of society.

Knowledge and research are critical elements for health improvements. Strengthening the research capacity of South Africa's academics, academic institutions and public health institutions will help meet the country and its districts' own research needs (WHO, 2016b). Emphasis on public health, evidence-based health promotion and disease prevention, along with critical-thinking skills to evaluate new research information, are among the core competencies that lead the profession towards addressing population needs (World Dental Federation, 2015).

1.3 Oral health in South Africa

South Africa's policy of apartheid saw the white population benefitting disproportionately from healthcare services for decades. After 1994, transformation was inevitable. The new national government was faced with the challenge of developing a comprehensive healthcare system that would reverse the inequalities of apartheid. Due to the historical deprivation in healthcare services for poor and marginalized communities, oral health was much neglected. To redress this inequality, post 1994, the African National Congress (ANC) had to design a comprehensive programme that would address the social injustices and poverty that were created by the white minority government prior to 1994. The ANC undertook to ensure that all South Africans had access to healthcare. A healthcare delivery system that was equitable, fair and appropriate for the needs of the population was discussed and policies formulated over a period of time. The health policy was put out for public comment, thereafter, with the aim of making the necessary changes by end June 1994. This new legislative policy was enacted by August 1994 (ANC, 1994).

The challenge of the new National Health Plan was to be comprehensive in respect of all aspects of health, disease and health burdens. Oral health was to be included in the plan. Oral health was addressed at national level with oral health deemed a public health issue.

1.4 Economic disparities in South Africa

There is growing consensus that creating work, reducing inequality and defeating poverty can only happen through a new economic growth path founded on a restructuring of the South African economy to improve its performance in terms of labour absorption as well as the composition and rate of growth. To achieve that step, economic growth as well as transformation of the economy, requiring hard choices, is increasingly recognised as essential. “[The New Growth Path policy] is a roadmap to a South Africa where all will have water, electricity, sanitation, jobs, housing, public transport, adequate nutrition, education, social protection, quality healthcare, recreation and a clean environment" (Department of Economic Development, 2015).

Although impacted by the vicissitudes of the global economy the country increasingly became absorbed into, that understanding was prevalent from 1994 after the ANC came to power, and today many villages and communities have running water, improved sanitation and better living conditions. However, there are still many pockets of marginalized communities in which poverty exists, especially in rural and peri-urban areas. Inequities in health service provision and access to care abound, more so in rural access where the challenge of health delivery is even greater. The country is plagued by an overburdened health system that provides insufficient healthcare, particularly oral healthcare, to the population.

A healthy population must have enough food and access to healthcare and lead an active, healthy life. This includes the ability to procure and acquire food of good quality in a socially acceptable way. This means not resorting to starving or stealing food (Labadarios *et al*. 2011). South Africa is classified as a middle-income emerging market with a good supply of natural resources. According to the 2002 Cabinet-approved Integrated Food Security Strategy, South Africa is not food insecure. However, a study conducted by Labadarios *et al.* (2011) found that 3% of children go to bed hungry in South Africa. Meanwhile, 31.5% in urban informal areas and 30.2% in rural informal areas were found to be food insecure. In addition, each year the South African National Health and Nutrition Examination Survey finds that cholesterol, diabetes and hypertension are one of the highest globally, while Battersby (2013) found that obesity in children due to low dietary diversity, high fat and sugar intakes, and low consumption of fruit and vegetables, was on the increase.

These poor nutritional practices are due to ill affordability of fresh produce, limited food storage capacity and refrigeration deficits. Households are unable to store fresh produce or take advantage of cost-effective bulk buying, thus limiting dietary diversity. Limited cooking technology means that households tend to buy more processed and prepared foods (Battersby, 2013). It is cheaper to purchase foods that are high in carbohydrates or processed foods with less nutrients as they are quicker and cheaper to prepare. Accompanying this is often times outright inability to afford food.

Statistical data from 2001 to 2005 showed that the mean average income of low salaried persons rose from R568 in 2001 to R937 in 2005 (Hlekiso and Mahlo, 2006). Statistics South Africa (Stats SA) in 2010 showed that 5% earned R570 or less and the median salary for unskilled labour in South Africa was R2800 (Stats SA, 2010). Based on the figures above, considering an inflation rate of 5.6%, many people in South Africa live well below the poverty line.

Healthcare in South Africa is provided by the public and private sectors. Eighty-four percent of the population is dependent on public services for healthcare. The most recent National Children's Oral Health Survey (2003) revealed that children have high rates of dental decay, attributable to frequent sugar consumption, poor diets, poor oral hygiene practices, and probably the perception that primary teeth are not important. This has led to a situation where more than 80% of all dental caries go untreated (Van Wyk *et al*. 2004).

1.5 Problem statement

One of the strategies to improve the survival and development of children, as set out by the WHO and United Nations Children's Fund, is to monitor growth patterns, oral rehydration and the promotion of breastfeeding, food supply, family planning and female education (Mudau, 2010). The WHO framed a global strategy on child development specifically designed for developing countries. This policy identified best practice for child monitoring in terms of measuring of growth, feeding practices, the importance of nutrition, and immunizations. This policy developed criteria for child monitoring that health services can align themselves to. The child development monitoring tool, the RtHC, is a recommended method of growth monitoring. It is an aid for parent/s or caregivers and health professionals to improve discussion of health deviation and the progress of the child.

The RtHC is a document issued to all children that are born in South Africa and is required to be presented by the parent/s or caregiver at each visit to a clinic. Within the RtHC, a section on oral health exists. According to Kitenge (2011), among other benefits, anthropometric indicators such as milestone developments and teeth present in the mouth can be used as a guideline by health professionals when parents are not sure of the age of the child. An age estimation chart was developed by Nabarro in 1986 which is used globally as a guideline to determine child age estimation.

Table 1: Age estimation in a child, adapted from Nabarro

Child conditions	Age estimation
No teeth, cannot sit alone	0 -5 months
Presents with 1-6 teeth, can sit alone, cannot walk alone	6 -11 months
Presents with 6-18 teeth, can walk, knows a few words	12 – 23 months
Presents with 18-20 teeth, walks well, starting to talk well	24 – 35 months
Walks and runs well, talks well, has not yet lost baby teeth	36 – 59 months

Kitenge, 2011

Tarwa (2007) found that the RtHC was not requested by health professionals. In the same study she found that information on child development was recorded on hospital or state records and not in the RtHC monitoring chart. Additionally, she found that mothers were not informed of the usefulness of the RtHC and that the RtHC was not used to its full potential. A review of the literature shows that the oral health section is seldom used and very little information was available on the oral health section in the RtHC.

1.6 Rationale for the study

The RtHC is a convenient method of monitoring child health. If used properly, this home-based record has a significant and positive contribution towards improving child health. Growth monitoring is desirable throughout childhood, but is particularly useful for children under the age of five years. A study in Lesotho showed that mothers who were informed of the importance and had knowledge of the usefulness of the RtHC monitoring chart made sure they brought along the RtHC at each wellness and immunization visit (Kitenge, 2011).

Children had better compliance with vaccination, identified weight gain early, and had better nutritional and developmental knowledge compared with those who did not use the RtHC (Kitenge, 2011).

If South Africa used the RtHC effectively to monitor child dental development, it could be used to monitor, identify, prevent and combat the large burden of early childhood oral diseases. The rationale for the present study is to assess if the oral health component in the RtHC is being used effectively.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter aims to discuss child healthcare with special focus on child oral health in South Africa within the country's healthcare system. There will be regular reference to and emphasis on the Road to Health Chart (RtHC) with particular focus on the oral health section within the RtHC. A theoretical framework based on the literature will be used to produce research findings that identify the level of efficacy in the use of the oral health section in the RtHC.

Sources that have been consulted include textbooks; journal articles; Web-based sources; Department of Health (DoH), World Health Organisation (WHO), United Nations Children's Fund (UNICEF) and American Academy of Paediatric Dentistry (AAPD) documents and policies; City of Cape Town, Cape metropolitan and Statistics South Africa (Stats SA) data; and various other reports and guidelines.

The review encompasses the relevant literature from South African as well as global studies. In it, the researcher will compare different child monitoring systems used globally to that used in South Africa. Research material with a focus on child health and child oral health will be consulted.

The WHO and UNICEF have adopted strategies for improvement of child health, which South Africa as a member state, needs to adhere to, according to its constitution (Kitenge, 2011). Globally, numerous interventions, programmes and policies are improving the lives of children and the commitment in many countries starts with tracking health risks, vaccinations and other preventative health measures (Fuller and Turner, 2011). This tracking should include oral health at the time of each visit to a baby-wellness clinic.

The AAPD encourages oral healthcare providers and caregivers to implement preventive practices that can decrease a child's risk of developing early childhood caries (ECC), a devastating disease that impacts on the child's and family life (AAPD, 2014b). The AAPD in 1978 released a statement identifying bottle feeding as associated with dental caries in children. Over the years AAPD associated feeding and poor nutritional factors and prolonged bottle and breastfeeding practices with ECC. However, over two decades studies reflected that ECC was a multifactorial condition. ECC is not linked only to poor nutritional and feeding practices. It is also linked to chronic infectious transmittable diseases (AAPD, 2014b). Current best practice, according to the AAPD, includes twice-daily brushing with fluoridated toothpaste for all children in optimally fluoridated as well as fluoride-deficient communities. Bottle feeding should stop soon after the child's first birthday. It is also recommended that a child's first dental visit should occur soon after the eruption of the first tooth or by the first birthday (AAPD, 2014b).

In South Africa, the monitoring of child health to help track health risks, vaccinations and other preventative health measures is intended to be performed with the assistance of the internationally accepted RtHC child monitoring system, which is a patient-held record chart that combines essential health information, such as birth details, immunization, and notes of any baby wellness clinic visits, with a composite graph of boys' and girls' percentile charts of weight-for-age, to allow visual comparison of growth progress and development over time. RtHC surveillance of the growth of the child serves as an anthropometric reference based on inclusive data on infants and children of diverse ethnic backgrounds and cultures. The RtHC is in line with global standards and South Africa is aligned with 178 countries that have adopted child monitoring charts for interpretation in paediatric care (De Onis *et al*. 2012). Oral health is a component of the RtHC, but the question is how effectively is it being implemented, used and completed?

2.2 Healthcare systems in South Africa

Following democratic elections in South Africa in 1994, the healthcare system was transformed into a single national healthcare system. This consisted of a united system that focused on the national, provincial and local levels of government (Singh, 2005). Political transformation resulted in the re-demarcation of provincial boundaries, municipalities and districts in South Africa. Previously, the disparity in healthcare and oral healthcare was pervasive in urban cities with no or little oral health activities in rural settings. The new decentralized healthcare system allowed for local government to respond to the needs of the community, improving flexibility, efficiency and responsiveness (Singh, 2005).

Universal access to basic healthcare in South Africa is enshrined in South Africa National Health Act 2003. The National Act 2003 provides a framework of structured unified health systems, to improve the quality of life for all its citizens of the country. The national health act 2003 provides that all children under the age of six were entitled to receive primary and secondary level healthcare and oral healthcare free of charge at any state facility. These measures were aimed at the early prevention of dental caries. Treatments such as the removal of pain and sepsis, fluoride application, preventative techniques of fissure sealants, Atraumatic Restorative Treatment and Minimal Invasive Dentistry are offered free at primary state clinics (DoH, 2002).

In 2014, the DoH embarked on a three year project to develop a new national oral health policy, which is still under discussion. The present oral health interventions are not producing the desired outcomes resulting in the failure to reach the targets contained in the plan of the current national oral health in South Africa. Consequently, the caries burden in children has not been adequately addressed through policy and service delivery (Reddy and Singh, 2015).

2.3 Integrating health services

Public health is based on the principle of health for all, a concept coined in the 1978 Ottawa Charter. The basic principle is concerned with population health with a focus on wellness, prevention of disease or its deterioration, and the collection and analysis of information (Sutton and Long, 2014). Integration, in the context of oral healthcare, is the collaboration of oral healthcare workers with other primary healthcare (PHC) service providers in the provision of health services. Integrated oral health planning and service delivery has the potential to improve access to oral health services if implemented well. The idea of an integrated approach to health instead of professionals working in silos is to create a wider range of professionals speaking with one voice. Secondly, it can save time and costs if a project is functionally implemented to piggy back on existing projects (Singh, 2011).

If a people-centred and integrated health services approach is not adopted, healthcare will become increasingly fragmented, inefficient and unsustainable (WHO, 2015c). Implementing an integrated health service means people/communities receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation and palliative care services, at the different levels and sites of care within the health system, and according to their needs, throughout their whole life (WHO, 2015c).

Health service integration is the bringing together of different health activities that share common health goals. Globally, many health policies have relooked and reworked existing policies to incorporate the philosophy of an integrated health service. However, actual translation of these policy statements into implementable programmes is virtually nonexistent. This is due to many factors, such as a lack of support and guidance from health management, lack of resources and overburdened staff (Thema and Singh, 2013).

The common risk factor approach (CRFA) postulates that multiple disease presentations occur as a result of lifestyle practices (Thema and Singh, 2013). Oral diseases, especially dental caries, can co-exist with other chronic diseases such as obesity, diabetes and respiratory infections. The literature indicates that there is a definite inter-relationship between periodontal disease and diabetes, as oral diseases comorbid with general health conditions (Thema and Singh, 2013). It is therefore important for all healthcare providers to adopt the CRFA to health, as identified by Sheiham and Watt (2000). The CRFA provides a rational basis for promoting oral health in general health. Integration is encapsulated by Thema and Singh (2013:1).

'*Integration of services does not necessarily mean that all different services have to be integrated in one package or delivered at the same place. However, it does mean that services have to be provided in a manner that is not disjointed and is easy to navigate [for] the user'.*

2.4 South Africa's healthcare timeline: 1994-2015

South Africa's long history of inequalities in race and gender, most evident in social inequalities and injustices such as lack of access to health services, unequal education opportunities and destruction of family life, as well as vast income inequalities and violence, which date from South Africa's troubled past, continue to leave large sections of the population of South Africa marginalized and poor. It was predominantly black communities that were ostracized, taken away from their land and in many instances placed in rural settings with no infrastructure. Men were compelled to work on the mines, with poor living conditions, lack of sanitation and little or no healthcare facilities. Men's health deteriorated under these conditions, and when too sick to work, they were sent back to rural villages where they in turn affected their family or families. Illnesses such as HIV/AIDS, sexually

transmitted diseases, lung disorders, tuberculosis (TB) and noncommunicable diseases were and in many instances continue to be rife.

The discrepancy in health profiles and outcomes between the white and black populations is vast. A higher percentage of white people are affected by lifestyle diseases such as diabetes, cardiac conditions and hypertension, whereas in the black population, there is a higher percentage of poverty-related illnesses such as infectious diseases, maternal death, malnutrition, and a growing burden of noncommunicable diseases such as HIV/AIDS (Coovadia *et al*. 2009). Benatar (2013) conducted a survey on infant mortality rates with results showing 18/1 000 live births among white people to 74/1 000 among black people, which was much the same as rates in 1990. Health outcomes have not improved among the black population since 1990, he finds.

Whites and Indians in South Africa generally have better access to healthcare as historically these groups generally earn more, consequently having private healthcare. These social circumstances influencing population health are compounded by the unequal physical, mental and nutritional states of women during pregnancy and childbirth, and continue throughout life. Care of infants, education and nurturing of children, access to adequate nutrition, clean water, sanitation, housing and basic healthcare is essential for positive health outcomes (Coovadia *et al*. 2009). In short, it is not surprising that multidrug-resistant TB and HIV/AIDS became additional markers of the longstanding poor health of the black majority (Benatar, 2013).

With the history of South Africa informing the state of its people's health and health policy and services to the present day (Coovadia *et al.* 2009), the National Health Plan (NHP) post-1994 was aimed at restructuring and transformation to address the past inequalities in health. Health policies were designed according to the PHC philosophy which encompassed

community participation, an enabling environment, and re-orientating health services. From national level, the approach to health promotion is designed to filter to district level where managers are responsible for implementing policies. Oral health promotion strategies were to have been implemented in this way.

Harrison, cited in a discussion document commissioned by the Henry J. Kaiser Family Foundation (2009) argued that there have been some significant changes in the South African healthcare system since 1994. Restructuring of the public health sector achieved substantial improvements in terms of access, rationalisation of health management and more equitable health expenditure. Elsewhere, Harrison (2009) found that the ANC's health plan included policies which are successfully implemented to this day, including:

1. Free PHC for children and nursing mothers
2. An essential drugs programme
3. Choice on termination of pregnancy
4. Anti-tobacco legislation
5. Community service for graduating health professionals
6. Better equitable resources allocation per district
7. Clinic expansions and improvements
8. A hospital revitalization programme
9. An improved immunization programme
10. Improved malaria control

As successful as some health policies have been, South Africa has many challenges ahead in addressing inequality and injustice and to meet health needs. Such challenges include inter alia child mortality, HIV/AIDS, TB, poor nutrition and oral health diseases, which still remain a huge burden on the state. Lack of resources, poor management systems and not enough health personnel are the challenges.

Oral health is a serious public health threat and affects 90% of the population worldwide (World Dental Federation, 2015). In South Africa, 80% are dependent on the state to provide the service. State facilities are, however, under-resourced, under-staffed and there is unequitable distribution of funding in research and resources for oral health. For oral health, 10% of the health budget is allocated for diseases that affect 90% of the population (Singh, 2011). Oral diseases are silent epidemics that remain prevalent among the most vulnerable groups: children, the elderly and the poor. These affect almost every individual during his or her lifetime, resulting in pain and discomfort, expenditure on treatment, loss of school days, productivity and work hours, and some degree of social stigma (Singh, 2011).

While stringent oral health promotion strategies have been incorporated in South Africa's health policies, the finding that, globally, funding and research into targeting oral diseases and oral health is comparatively neglected (Singh, 2011) is mirrored in South Africa's experience. Based on the National Children's Oral Health Survey (2003) conducted between 1999 and 2002, which indicated that childhood dental caries are inadequately addressed, the DoH (2005a) allocated the following number of dental professionals to service the population of South Africa on a provincial basis:

1. Dentist/dental therapist to population: 1: 60 000
2. Oral hygienist to population: 1: 100 000

Aside from being grossly outdated, these numbers are inadequate to cope with the oral health needs of the increasing population of South Africa.

2.5 Decentralization

Many countries with large populations or large geographic areas identify a model that will result in healthcare being dispensed to its population in both urban and remote rural settings. A suitable model of decentralized local government, including smaller geographic and

administrative entities called districts, which may be administered by the local level of government, is often chosen (Naidoo, 2009). According to the PHC philosophy, provinces have to devolve responsibility for health to district level. By devolving responsibility to smaller districts, health resources are intended to be more equitably distributed.

In South Africa, a complication arose in that many health districts were established before local government boundaries were finalised and had to be re-established once the boundaries were set. The country was ultimately divided in 53 health districts as part of government's drive to decentralise health services and ensure that all citizens in every part of the country had access to a comprehensive package of PHC and district hospital services (Cullinan, 2006).

The health district is not a separate, completely autonomous unit as it forms an integral part of the national health system (NHS), which comprises three major levels:

1. The national DoH, responsible for the overall coordination and determination of policy for the country's health system, and for monitoring and support of the provinces.
2. The provincial health departments, responsible for the coordination of the health system within each province, for the provision of specialist health services, and for monitoring and support of the districts.
3. The district health authorities, responsible for the provision of nonspecialist health services within each district.

Each of the provincial health departments have set up regional sub-offices responsible for the establishment, monitoring, evaluation and support of the district health authorities. The regional sub-offices became progressively smaller as the districts became better established and more self-reliant (Abdel Rahim *et al*. 1992).

2.6 National level

In the health sector, the new democratic government's challenge was to completely transform the national healthcare delivery system and all relevant institutions (ANC, 1994). The National Act 2003 reflects elements of the African National Congress (ANC) Health Plan of 1994 as well as the 1997 White Paper on Health Systems Transformation.

Health services in South Africa are now delivered across three levels of government: national, provincial and local. In terms of the South African constitution, both national and provincial governments have concurrent jurisdiction over health as a service delivery area, i.e. both make decisions and have a duty to deliver services. In practice, as stipulated in the National Health Act No. 61 of 2003, the role of the national DoH focuses on legislation, policy, norms and standards, and ensuring equity, while the role of the provincial departments is focused on the planning, budgeting and delivery of health services at the coalface. Local government is responsible for the delivery of municipal health services. The NHS's national, provincial and district substructures are complemented by a fourth substructure, the community level.

The National Act 2003 is based on the PHC approach, which is set out to create an integrated and equitable single NHS. According to the NHP, a single governmental structure would deal with health, based on national guidelines, priorities norms and standards. It would coordinate all aspects of both public and private healthcare delivery, and would be accountable to the people of South Africa through democratic structures. Provision of healthcare would be coordinated among local, district, provincial and national authorities. These would, as far as possible, coincide with provincial and local government boundaries. Authority over, responsibility for, and control over funds was to be decentralised to the lowest level possible compatible with rational planning and the maintenance of good quality care (ANC, 1994).

The National Health Act 2003 provides, healthcare for pregnant women and children under the age of 6 years was provided free to users of public health facilities. This free care policy at PHC level officially came into effect in April 2006. Healthcare has improved for the under-served community. However, while more clinics have been established, it is nowhere near the needs of communities. Moreover, according to Harrison (2009), fifteen years later these early gains have been eroded by a greatly increased burden of disease related to weak health systems management, consequent low staff morale and inadequate resources. South Africa is a member state of the WHO and UNICEF. Therefore, global policy alignment is nominally imposed upon the South African NHS. The aim presently is for the development of a clear roadmap for a NHS that guides the national DoH from this current deficient healthcare provision status to an integrated and well-functioning national patient-based information system, based on scientific standards for interoperability, which improves the efficiency of clinical care, produces the indicators required by management, and facilitates patient mobility (DoH, 2013b). A single governmental structure will develop NHS guidelines in line with global policy. The NHS will coordinate all aspects of both public and private healthcare delivery, and will be accountable to the people of South Africa through democratic structures,

2.7 National oral health

The objectives of the National Policy for Oral Health (NPOH) of 2000 were to promote good oral health based on the PHC approach. This approach was guided by the principles of the 1978 Ottawa Charter, based on a community orientation (Sutton and Long, 2014). Oral health must be equitable, accessible and affordable and the accountability of the healthcare provider to the individual or community ensured.

Table 2: Five national oral health objectives in 2000 National Policy for Oral Health

Objective 1	Dental caries in children under 5 will decrease by 50%
Objective 2	To reduce the decayed/missing/filled teeth score of children of 12 years to >1.5
Objective 3	To ensure 60% of 20 year olds retain teeth, and 35% or more do not present with periodontal disease.
Objective 4	To reduce edentulous patients by 6.2% in age group 35 to 44 years.
Objective 5	To reduce level of edentulous population by 21.4% and improve periodontal status of adult patients.

These are the broad strokes of an oral health plan as tabled in the most recent NOHP (2000). Additional outputs regarding treatment and diagnosis of oral cancer, lymphoma and reduction of malocclusion of 12 year olds were identified as priorities for early diagnosis and the policy proposed screenings or surveys be conducted (DoH, 2002). With oral health services in South Africa having been traditionally fragmented, urban based and curative driven (Singh, 2005) a large proportion of the population is in poor oral health. Additionally, rapid urbanization resulted in unmet treatment needs particularly in the unserved community. The inequitable distribution of resources compounded the poor level of oral health (Friedman *et al*. 2008).

2.8 Provincial level

The health minister and the nine members of the executive council leading the health departments in their respective provinces made a decision in February 2001 regarding the implementation of district health services (DHS) and determined the role of provincial and local government in health service delivery.

Provincial health departments would be responsible for coordinating the planning and delivery of district health services within the district municipality and metropolitan council areas, in collaboration with local governments in these regions. Each of the nine provinces

has a provincial health authority responsible for coordinating the health system at this level. Meanwhile, district municipality and metropolitan council areas would be the focal point for the organisation and coordination of health services.

2.9 District health system

In South Africa, the district health services is the locus of delivery, having been identified as an appropriate building block for a national health services by the WHO - as a framework for the delivery of primary health care. The framework of the national health system is based on the approach of keeping people healthy. The concepts of 'caring', 'wellness', and being 'community-orientated' are key principles of the primary health care approach (ANC, 1994). Creating district health system substructures to provide tailored services for the community was meant to ensure equity and accountability. A single health service and health management team for each health district were established with each team accountable to a single authority, within a provincial and national framework. The health district is supposed to be part of a well-defined referral network both within the province and as part of the overall national health system (Abdel Rahim *et al*. 1992).

The district health system represents the national, provincial and local authorities by ensuring policy implementation. It ensures that healthcare is delivered close to the people within an urban or rural context and ensures inter-sectoral collaboration at homes, schools, workplaces and communities. A district health system is also responsible for planning services according to the local needs (Mudau, 2010).

The district health authority is directly responsible for the provision of all public sector non-specialist health services in the district, and serves as a mechanism through which links are established with other healthcare providers in the district and private healthcare providers, non-governmental organizations, etc. The national health plan for universal access to primary

health care envisaged a district health system based primarily on the public health sector but providing for contractual relationships between the district health authority and accredited private providers within the district. These private providers serve to complement the public sector service, provided directly by the district health authority (ANC, 1994 & Parliament, S.A, 2003).

2.10 Independent (private) sector and district health service

It is only possible to make optimal use of the relatively limited resources available for healthcare in South Africa if the combined resources of the public and private sectors are efficiently utilized and coordinated. According to the National Act 2003 (Berger *et.al,* 2013) plan for public health, independent practitioners were to be encouraged to form multidisciplinary group practices making an important contribution to comprehensive healthcare at the primary level, as independent practitioners play an important role in improving access to the healthcare system, especially in areas where services are difficult to provide. Equity in the distribution of independent practitioners was to be encouraged through incentives to work in underserved areas. Incorporating and encouraging community of practice enables health professionals to develop and share their expertise to the broader community. Healthcare students are also mandated within the education system to participate. Engaging students to make use of the real world situation creates an authentic learning platform (Hoadley, 2000).

2.11 Primary healthcare philosophy

South Africa's health policy is based on the PHC philosophy. The Declaration of Helsinki "Alma Ata" first espoused the policy in 1976. Supported by WHO and UNICEF, it was adopted and implemented globally. South Africa is a member state of UNICEF and WHO, and therefore must adhere to decisions made by these organizations.

Primary health care strategies include needs-based planning and decentralised management, education, inter-sectoral cooperation, multidisciplinary healthcare workers and a balance between health promotion, disease prevention and treatment (Veale *et al.* 2003).

Table 3: The principles of health service delivery

Maternal and child healthcare, including antenatal and delivery care, family planning and baby-wellness clinics.
Environmental healthcare including safe water supply and safe sanitation.
Health promotion and health education.
Access to health data and information.
Prevent and control communicable diseases, including access to immunisation services.
Access to primary curative services for treatment of minor ailments or communicable endemic conditions.
Rehabilitative services.
Services to persons in the community, including school health, workplace service and community development.

South Africa has based transformative healthcare post 1994 on the philosophy of primary health care. The National Health Act 2003 policy document is enshrined on the philosophy of the primary health care:

"Primary Health Care is essential healthcare based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination."

2.12 Integrated approach to oral health in South Africa

Adopting the primary health care philosophy at district, local and provincial level provides the platform for all healthcare workers to work collaboratively, improving health for all (Carlisle, 2000).

Despite the emphasis placed during the last decade on delivery of comprehensive and equitable primary health care to the entire population, coverage remains far from universal and the quality often poor. Users frequently patronize private providers, ranging from informal traditional practitioners to trained professionals. Oral health has a direct link to general health, and the literature indicates a relationship between poor oral health and a systemic link (Carlisle, 2000). Oral health professionals should advocate for better support from other health disciplines and strive to adopt an interdisciplinary and multidisciplinary approach to oral health. Incorporating a multidisciplinary approach to oral health and general health will widen expertise in identifying health and oral health related problems (Petersen *et al*. 2005).

The delivery of oral health services within the district health system, however, has been poorly defined (Naidoo *et al.* 2013). After the first democratic elections, oral health was integrated into the district health system with no separate oral health budget allocated. Managers at different facilities managed funding independently. As a result, at some facilities oral health suffered due to budget constraints and lack of knowledge regarding oral health needs for the facility and community. Compounding this issue, primary health care interventions suffered as oral hygienists who previously conducted preventive strategies such as oral hygiene education and oral health promotion at schools could not do so due to lack of transport and pooled transport facilities. In other instances, school children who used to be

bussed to the clinics for treatment by the Department of Health found the department arguing that this was now the responsibility of the Department of Education (DoH, 2005a).

Oral health is much neglected as it is not deemed to be a life threatening. This is a result of many factors such as the past history of health inequalities, lack of resources, mismanaged funding, and poor funding allocation for dental health. Dental caries remains the most common chronic disease in children. Dental caries is a multifactorial disease in which there is interplay of three principal factors: the host (saliva and teeth), the micro flora (plaque), and the substrate (diet), and a fourth factor, namely, time (Basavaraj *et al*. 2011). It is about five times as common as asthma and seven times as common as hay fever. The most common cause of tooth loss among adults is untreated periodontal disease. Fifty-three million people live with untreated tooth decay in their permanent teeth. Epidemiological studies have indicated that by age 65 years and older 60% of the world's population have lost all of their teeth due to untreated oral diseases (Batchelor, 2014).

The disparities in access to proper dental care adds to the complexity. The silent epidemic of oral diseases disproportionately affects disadvantaged communities, especially children, the elderly and marginalized communities. Unequal distribution of funds provincially exacerbates the silent epidemic of dental caries. It was for this reason the ANC (1994) argued that priority be given to a comprehensive preventive, promotive and curative primary health care. Identifying opportunities and limitations early can prevent diseases/oral diseases becoming public health issues. Identifying objectives with outcomes and setting implementation strategies can help identify health and health related problems early.

Primary health care workers are the first line of contact with individuals, parents and communities. These teams consist of doctors, nurses, PHC nurses, physiotherapists, occupational therapists, dietitians and many other healthcare members. The PHC team is

ideally placed to promote oral health within the context of general health (Watt *et al*. 1997). This philosophy was reiterated by Sheiham (2000) who stated that the trends of underlying risk factors associated with chronic diseases such as cardiac conditions, diabetes, and high blood pressure have a common link to oral diseases.

The risk of dental caries can be evaluated by analysing and integrating several causative factors. Many times the risk factors common to a number of chronic diseases, including initiation, and development related to microorganisms, diet, hygiene, smoking, alcohol use, stress and trauma, are key contributing factors. Adopting a collaborative approach is more rational than one disease specific profile, involving adopting an interdisciplinary approach to health and risk factors (Sheiham, 2000).

2.13 Economic impact of oral diseases

The high levels of poverty and unemployment in South Africa create a huge demand on state services for provision of healthcare. The Department of Health has the overall responsibility for all healthcare including oral health, with specific responsibility to the public sector. Of the South African population 80% are dependent on state health services for healthcare, including dental treatment. In 2000 the total expense for health services in South Africa was $9.5 billion, of which $4 billion was spent in public health services providing PHC (Van Wyk *et al*. 2004).

Compounding this issue is the ratio of dental practitioners per 100 000 of the population at 2.53 (Healthlink, 2015). To illustrate further, a document prepared for national government on norms and standards required for primary oral care in South Africa showed that at provincial level, the ratio of dentists to population was 1:60 000 (DoH, 2005a).

This shortfall results in unmet treatment needs and directly contributes to tooth loss, pain, sepsis and impact on quality of life. Globally 60% to 90% of children suffer with pain and sepsis due to dental caries (WHO, 2012). Curative dental care is a significant economic burden where 5% to 10% of public health expenditure relates to oral diseases.

By incorporating early prevention strategies, oral health promotion and a multidisciplinary approach, the chances of reducing the burden of oral diseases are better (Sheiham, 2000). Early interception can reduce the high cost of dental treatments (South African Dental Association, 2015). The Department of Health National Oral Health Policy (2000) sought to improve oral health services for all South Africans. This strategy was applicable to all oral healthcare at primary, level 2 and level 3 institutions, healthcare providers in the public sector and in collaboration with the private sector. Myburgh's critique of the draft national oral health policies 1-4 (DoH, 2000) suggested that the proposed oral health plan for South Africa embraced principles of the primary health care approach but provided little, if any direction, on how these policies were to be translated to a programmatic level (Singh *et al*. 2010). The improvement on this policy in the form of the newly revised National Oral Health Strategy aimed to promote oral health promotion, and respect for human rights, culture, religion, ethics and gender based on the philosophy of the PHC approach (NOHP, 2015).

2.14 Child health

According to the Centres for Disease Control and Prevention (CDC) (2015) the 'child health' grouping includes infants (birth-1 year), toddlers (2-3 years), preschool (3-5 years), middle childhood (6-11 years) and adolescents (11-17 years). Comprehensive healthcare is care directed towards ensuring the physical, mental, social and spiritual well-being of the child and parent/s or caregiver, with due consideration of personal, cultural and spiritual beliefs, values

and practices (Andrews and Pillay, 2005). This belief is in line with the definition of health as defined by WHO:

"*Health is a state of complete physical, mental and spiritual well-being, not merely the absence of disease or infirmity"* (WHO, 2003).

Comprehensive child health was a concept first developed by medical doctor Dr David Morley with the aim of early diagnosis, treatment and health education. A pioneer in child healthcare who first identified the need for improved healthcare in developing countries while working in Nigeria, he realized the importance of child monitoring and developed the Road to Health Chart (RtHC), a parent held growth chart for monitoring a child's weight in order to detect early signs of malnutrition. Facing the problem that innumerate mothers could not write down the weights of their children, he devised a mechanism attached to scales that could mark the weight directly onto a chart.

While in Nigeria, Morley started under-fives clinics run by local personnel and trained local women to immunise children. In the same year, he started the organisation Teaching-aids at Low Cost (TALC), which has distributed millions of teaching books, slides and accessories to health and community workers throughout the developing world. These charts were given to mothers to keep at home - a revolutionary notion at the time, but since copied all over the world (TALC, 2007). These charts have been revised numerous times with many adaptations. The latest WHO charts, based on breast-fed babies, are now part of the UK personal child-health record, an innovation Morley introduced more than 50 years ago. This tool is being adopted by countries globally in monitoring child health. South Africa has aligned itself to policies set out by the World Health Organization.

About a decade ago the National Health and Nutrition Survey (NHANES) carried out by the US National Centre for Health Statistics (2005), supported by Centres for Disease Control (CDC) and the US Department of Health and Human Services, and recognized the need to improve oral health. Dental caries and tooth loss remain significant problems affecting the nation's health. Although dental caries incidence for school-aged children have declined, nearly half of all children still have caries. The Centres for Disease Control revised the National Health and Nutrition Survey of 2005/2006 to include an oral health examination, to be conducted by non-dental professionals trained to administer the oral health screening assessments. A new assessment, the Basic Screening Exam for Oral Health, was added to the oral health component as part of assessments conducted on children (National Center for Health Statistics).

The American Academy of Paedatric Dentistry recognizes that patient records are an essential component of delivery of competent and quality oral healthcare. It serves as an information source for the healthcare provider and patient. In 2007, American Academy of Paedatric Dentistry revised its previous child health guidelines from 2004. In this revised document, it reinforced the idea of documenting oral health by dental professionals and baby-wellness clinics at US Department of Health and Human Services and City health clinics (AAPD, 2012a).

The American Academy of Paedatric Dentistry (2011) recognized the importance of education, prevention, diagnosis and treatment necessary to maintain the oral health of infants, children and adolescents through preventive and restorative care. Comprehensive healthcare was found to be lacking unless oral care was included in all health service programs.

The US Department of Health and Human Services documents that a perception exists that oral health is separate from general health and, therefore, less important. This perception is rapidly changing in the 21st century (Petersen, 2004; Mouradian *et al*. 2000), and supported by South Africa's DoH (2005a).

Raising oral health awareness, prevention, early detection and management of dental, oral and craniofacial issues should be integrated to community-based healthcare programs and social services as poor oral health can significantly impact on overall health and the well-being of a child (AAPD, 2011).

2.15 Child oral health in South Africa

Appropriate responses to South Africa's healthcare challenges are needed as well as addressing the social determinants of ill health (which lie outside the health system). All governments should formulate national policies, strategies and plans of action to launch and sustain primary health care as part of a comprehensive national health system and in coordination with other health sectors, viz oral health. As a national priority, strengthening the healthcare system, and facilitating universal coverage for healthcare, including oral healthcare, is a necessity.

To address the oral health needs of the South African population, three national studies have been conducted. The first, by Williams in 1984, identified the dental health status of 12-year olds. The second study determined the oral health status of adults and children in the (then) five main provinces of South Africa in 1988/89, and the third study from July 1999 to June 2002, focused on children between the ages of 4 and 15 years. The latter two studies were conducted by the National Department of Health (Reddy and Singh, 2015).

The National Oral Health Survey of 1988/9 engaged various age groups. The weighted national mean for children at age 6 without caries was 33.7%. At age 12 the weighted national mean for decayed, missing and filled teeth was 1.72, at age 20 the weighted national mean for people with all their teeth was 52.2% and at age 12, the weighted national mean for people that had at least three healthy sextants was 24.7% (Thema and Singh, 2013).

The 1999 to 2002 National Children's Oral Health Survey epidemiological data on oral disease rates in South Africa indicated that almost 80% of children under 5 suffered from dental decay. The greatest need was in the Western Cape, where almost 80% of children needed oral healthcare (Thema and Singh, 2013). There was little evidence to suggest that childhood caries were adequately addressed through policy and service provision efforts in South Africa (Singh, 2011). Thus, a need for capacity building in oral health in South Africa was identified. It was recommended that strategies and interventions on oral health promotion needed to be directed primarily at women receiving antenatal care. A comprehensive approach to maternal and child healthcare, involving efforts to encourage additional fluoride uptake, nutritional intake and safe breastfeeding practices, was found to be most appropriate in addressing early childhood caries (Singh, 2011).

2.16 Prevalence, aetiology and prevention of childhood caries

Tooth decay is regarded as the most common chronic disease in childhood, affecting 50% of children globally, and this figure is higher in developing countries (WHO, 2012). Dental caries is a multifactorial disease caused by bacteria, sugar and carbohydrates which metabolize to form acids. These acids demineralize the tooth surface causing dental caries. Cariogenic bacteria can pass from mother to child in the first two years of the child's life

(Mouradian *et al*. 2000). Other causes of childhood caries are poor feeding practices, nutrition and diet. It is recommended by the American Academy of Paediatrics (AAP) policy statement that dental caries risk assessment should be conducted by the time of the first tooth appearance and no later than 12 months of age (AAPD, 2011).

The rate of childhood caries in South Africa is high. The highest caries indices are recorded in children under five in the Western Cape (Van Wyk *et al.* 2004). With 80% of the population in South Africa dependent on public facilities for their healthcare needs, which includes oral healthcare, significant challenges exist. The limitations identified in the literature include economic resources, management, staff availability, low staff morale, social determinants, unemployment and lack of education as contributing factors to the high prevalence of dental caries. Health professionals do not have the capacity or time to adequately service the large population attending healthcare facilities. Further, health promoting programmes are not widely implemented in South African schools (Van Wyk *et al.* 2004; Harrison, 2009).

Fluoride, the most effective way to reduce dental caries, can be administered through water fluoridation, salt and milk fluoridation or applied topically and is not readily available for the population in South Africa**.** However, maintaining good oral hygiene through brushing and flossing teeth with fluoridated toothpaste is one of the most effective and economical means to prevent dental caries**.** Fluoride is the most important therapeutic substance used in toothpastes, adding to the effect of mechanical tooth brushing for dental caries control.

The use of fluoride toothpaste to reduce caries is evidence-based, and is dependent on the concentration (minimum of 1000 parts per million fluoride) and frequency of fluoride toothpaste use, with twice daily brushing being beneficial in reducing dental caries (Cury and Tenuta, 2014). It is recommended globally and supervised tooth brushing exercises are commonly implemented through schools. Constantly maintaining a low level of fluoride in

the mouth has been shown to be effective in decreasing dental caries levels in children and adults alike (Jürgensen and Petersen, 2013). This preventive effect has been acknowledged by four World Health Assembly resolutions, the first of which was endorsed over 40 years ago (Petersen and Lennon, 2004). The World Health Assembly is the decision-making body of the World Health Organization.

The American Academy of Paedatric Dentistry, the American Dental Association, and the American Association of Public Health Dentistry all recommend a dental visit for children by age 1. Prior to age 1 the health professionals who see the child most often are paediatricians or nurses at a primary health care facility, who have the opportunity to provide early assessment of risk for dental caries and anticipatory guidance to prevent disease. The American Academy of Paedatric Dentistry (2013) maintains that it is vital that mouth cleaning or tooth brushing be part of the daily routine for all infants, including those that are breastfed (AAPD, 2015).

Health promotion is regarded as an upstream approach. The upstream-downstream concept was identified by John McKinley, a medical sociologist. He told a tale of a man standing by a swiftly running river when a drowning person floats past. He jumps in the river and rescues the individual, continuing to save other drowning people. However, he is so involved saving people at the 'bottom'- downstream - that he overlooks what or who is pushing the people into the river from the 'top'- upstream. This analogy can be applied in health promotion and prevention strategies. Incorporating health promotion strategies early and focussing on the root causes of disease will have more sustainable long-term impact than utilising limited resources downstream to treat disease. Failure to change to a preventive approach is a dereliction of ethical and scientific integrity. A range of complementary public health actions may be implemented at local, national and international levels to promote sustainable oral

health improvements and reduce inequalities and promote oral health preventive strategies (Sheiham and Watt, 2007).

Oral health has become a public health problem in South Africa and there is concern due to its high prevalence and the consequent demand on public health services (DoH, 2013b). Therefore, those administering the National Health System have been encouraged to identify population-wide strategies that have been effective in other countries in reducing dental caries. Government has been encouraged to recognize the enormous benefits of fluoride toothpaste in oral health and to take the responsibility to consider price regulation for equitable availability of fluoridated toothpastes. Many of the marginalized community can ill afford toothpaste or do not have access to toothpaste (Ahuja, 2015).

2.17 Health disparities in South Africa

Apartheid resulted in health and health services inequity in South Africa. Grave race-related disparities, inequalities, fragmentation and discrimination led to divergent health outcomes in the health indices and health statuses of the different 'colour' groups (Van Rensburg and Benatar, 1993).

In the 21st century there remains huge disparities in health services for the population of South Africa. Fifty four percent of South Africans earn below the breadline, earning an income of $3 a day. The top 10% of South Africans accounted for 58% of annual national personal income, while 70% earned 16.9%. The Gini co-efficient, a measure of income inequality, increased from 0.6 in 1995 to 0.679 in 2009 (Benatar, 2013). Although South Africa is considered a middle-income country in terms of its economy, and despite its progressive taxation system with significant transfers to lower income groups through the taxation system, it has health outcomes that are worse than those in many lower income countries (Coovadia, 2009). This is due to many longstanding social determinants in South

Africa. The epidemiological figures indicate that these social circumstances influence and result in poor health outcomes, which are further exacerbated by inequitable distribution of resources towards oral health (Harrison, 2009 & Benatar, 2013).

In 2012, the Department of Health began improving health infrastructure at six major public hospitals and forming private-public partnerships. Minister of Health Dr Aaron Motsoaledi encouraged creative thinking to improve healthcare. Policy thinking has since moved towards the implementation of a National Health Insurance (NHI) system, as in many countries globally the system works. Dr Motsoaledi announced that this system may take up to 14 years to implement completely. The National Health Insurance is expected to create fairness in the sharing of healthcare finance and other resources, including skilled health professionals (DoH, 2015a).

Dental and oral healthcare service conditions are not being addressed at healthcare facilities because oral disease is not deemed an important or life threatening condition. It has been argued that a number of strategies can be considered in promoting oral health, such as incorporating the common risk factor approach (CFRA), which addresses risk factors common in general health and oral health (Sheiham and Watt, 2000). A multidimensional approach to addressing oral conditions within the scope of preventing heart disease, obesity, diabetes and stroke would thus be a viable strategy to influence health policy decisions rather than individual caries prevention strategies (Dharamsi and MacEntee, 2002 & Sheiham and Watt, 2000).

2.18 Oral health disparities

Oral health disparities are most pronounced among socio-economically disadvantaged and racial-minority groups in South Africa (Singh, 2011). Research supports that those of lower socio-economic status, affected by psychosocial determinants, poor living conditions and

inadequate access to healthcare disproportionately bear the burden of oral diseases (Finlayson *et al*. 2010). Children from marginalized communities have less access to dental care due to lack of private medical aid cover that affords access to private health provision. Communities are reliant on woefully under resourced and staffed public services to provide oral healthcare services, exacerbated by geographic location and the health professional to population ratio. Specifically, the ratio of oral health personnel to the general population in South Africa is compared in the table below (Thema & Singh, 2013).

Table 4: Ratio of oral health professionals: population in South Africa in 2010

Province	Population	Oral health professionals	Ratio
KwaZulu-Natal	10 645	685	1:15 560
Gauteng	11 191 700	1800	1:6 217
Limpopo	5 439 600	165	1:32 967
Western Cape	5 223 900	1 011	1:5 167
Northern Cape	1 105 900	55	1:20 070
Eastern Cape	6 745 300	221	1:30 514
North West	3 200 900	214	1:14 957
Free State	2 824 500	147	1:19 214
Mpumalanga	3 617 600	229	1:15 797

If there were adequate numbers of health professionals to service the population, diseases and oral diseases would be identified earlier by healthcare professionals who in turn could refer early, thereby ensuring early interventions to be implemented. This would reduce the

burden of diseases and oral diseases which would eventually place less demand on dental services in the public health sector. With governmental structures at national level encouraged to be innovative in improving access to health services for all, the Minister of Health's National Health Insurance (NHI) initiative may be on the cusp of introducing a method to address health and oral health inequalities.

2.19 Child health monitoring

Monitoring child health is widely accepted and strongly supported by health professionals, and is a standard component of community paediatric services throughout the world (Garner *et al.* 2000). It has twofold value; health professionals have a track record of child development and, secondly, it provides a source of accountability to the carer and continuity in care (Garner *et al.* 2000). Healthcare providers at primary health care centres are generally the 'first line' of healthcare workers confronting basic health needs. Parents of young children take the children to visit primary health care providers frequently for child monitoring for the following: weighing, growth monitoring, feeding practices and vaccinations. Many of the primary health care facilities have access to a dental professional in their setting, yet the young children are seldom referred to the dental clinic by the primary nurse. Therefore, an integrated approach to health that includes oral health should be adopted in the health service. In this, primary nurses should be trained to conduct a basic oral examination for early detection of oral diseases as with other health related abnormalities (Singh, 2011). While it is not at present the case that dental professionals are as widely available in South Africa as in some other contexts, where the National Health Insurance (NHI) to deliver on its promises, dental professionals would in time be more accessible and the suggestion regarding basic examination by primary nurses would find great relevance.

2.19.1 Purposes of parent-held child health records

Early childhood growth, development and health monitoring is widely accepted and considered an important indicator of future health outcomes (Garner *et al*. 2000). Growth monitoring throughout childhood is important, and monitors children under the age of 5 who attend baby-wellness clinics. It provides an opportunity for the primary health care (PHC) nurse to monitor normal growth patterns and milestone development. It records anthropometric measurements, weight and plots growth and developmental patterns.

It serves as a source of more precise information than just weighing the child at a particular point of time and accurate measurements can make the results more valid (Bhandari *et al*. 2013). This record can inform parents and healthcare workers of the child's nutritional status along with the early recognition of other health conditions which helps in decision making for corrective measures (Bhandari *et al*. 2013). The monitoring chart records, anthropometric data and contains relevant records of the child's important health events, including information such as identifying data, details of the mother's pregnancy and antenatal care, details of birth, size at birth, family and sibling history, immunisation history, infant feeding guidelines, family planning practices, growth weight plotting, developmental milestones and illnesses.

In developing countries and rural settings, it can be the only reliable source of information, particularly in a population with fragmented health services or migrating families, which is common in developing countries. The importance of child monitoring is that it serves as a mobile databank of information. The usefulness of this to parents who are illiterate and/or innumerate or who lead nomadic lifestyles, is that health information will be readily and easily available (TALC, 2007).

2.19.2 The Road to Health Chart

Growth and development need to be monitored closely in children so that early corrective steps can be taken to ensure normal growth, which has been of interest to the WHO since 1951 (Tarwa, 2007). The World Health Organization has conducted numerous surveys identifying common risks factors in child pattern growth. By identifying common risk factors, the World Health Organization compiled a tool that can be used globally to monitor child health. The World Health Organization child growth standards are global and for all children, in contrast to the previous international reference based on children from a single country, the US (De Onis, 2011).

South Africa has aligned itself to international standards and adopted the primary health care approach and a child monitoring tool. Child monitoring was the brainchild of Dr David Morley, the pioneer of the RtHC (TALC, 2007). The RtHC provides a simple, cheap, practical and convenient method to monitor child health. This home-based record makes a significant, positive contribution towards improving child health. In South Africa, the RtHC is used to record child development, monitoring growth patterns, immunizations, height and weight of the child development, nutritional and breastfeed practices as well as tooth eruption and visits to the dentist.

The American Academy of Paedatric Dentistry (AADP) (2014b) recognizes that prenatal oral health, along with infant oral health, is one of the foundations upon which preventive education and dental care must be built to enhance the opportunity for a child to have a lifetime free from preventable oral disease. Therefore, every effort must be made to promote and encourage good oral healthcare practices from an early age (Van Wyk *et al*. 2004). There should be integration between health services because comprehensive oral healthcare cannot be achieved unless oral care is included in all health service programs (AAPD, 2014b).

2.19.3 Description of RtHC

The booklets are colour coded; pink for girls and blue for boys. It is compulsory that the parent(s)/carer present the booklet at the health facility(s) that the child visits. As the RtHC is a monitoring system of the child's development, it is compulsory that healthcare professionals record the correct information in this booklet (DoH, 2012). Within this booklet, besides records of growth, immunization, breastfeeding and nutritional practices, is an oral health section.

2.19.4 Benefits of the RtHC

This RtHC booklet promotes the relationship between healthcare workers and the parent(s)/caregiver of the child. The Department of Health directorate of nutrition points to the document identifying children needing extra care (DoH, 2015d). Healthcare workers are to record the following information at each visit at the clinic: weight of the baby, plotting, interpretation, and feedback that is recommended monthly during the first two years of life, and regularly thereafter at three-month intervals. This amounts to 36 visits or consultations in the first five years of the child's life. This provides an opportunity to promote a good relationship between healthcare workers with the parent(s)/caregiver and child, to detect problems early and to initiate intervention (DoH, 2015d).

Since 1995, the RtHC has been revised four times. In 2011 a newly revised version of the RtHC was implemented, with this new chart including an oral health section. The new RtHC was implemented in February 2011 with the new oral health section based on global WHO standards (Cloete *et al*. 2012). In this section, dental professionals record the number of teeth present in the child's mouth. Thereafter, yearly visits are to record that examinations for oral cavities have occurred until the age of five.

The RtHC can be seen as a mobile databank. In some circumstances, it may be the only reliable source of information, particularly in a population with fragmented health services or migrating families, which are common in developing countries (Tarwa, 2007).

Every healthcare worker should consider all clinical encounters with children as opportunities to screen for needed vaccines and, when indicated, to immunise children or refer them to dental professionals (Tarwa, 2007). Similarly, when visiting the primary health care clinic for vaccines or weighing, an oral health examination should be included. The parent should be referred to the dental clinic on site. If there is no dental clinic, the primary health care nurse should ideally ask routine questions on oral health or ask the parent if the child has any painful teeth. This is not necessarily only conducted by a dental professional. By incorporating an integrated approach to health and wellness, the primary nurse must convey a message of the importance of oral health and refer appropriately. Failure to recommend or refer for oral and facial cranial conditions contributes to delayed interception, which leads to the increase in the global oral health disease, in the form of early childhood caries.

2.20 Breastfeeding and nutritional practices

The American Academy of Paedatric Dentistry recognizes the role of breastfeeding of infants in promoting well-balanced, low caries-risk, and nutrient-dense diets for infants, children, adolescents and persons with special healthcare needs. Epidemiological research indicates that it promotes general health, nutritional developmental, psychological, social, economic and environmental advantages while significantly decreasing risk for a large number of acute and chronic diseases (AAPD, 2012a). The literature indicates that frequent night time bottle-feeding with milk is associated with, but not consistently implicated in, early childhood caries (ECC). The American Academy of Paedatric Dentistry (2012a) also recommends children one to six years of age consume no more than four to six ounces of fruit juice per day, from a

cup (i.e., not a bottle or covered cup) and as part of a meal or snack. Night time bottle-feeding with juice, repeated use of a sippy or no-spill cup, and frequent in-between-meal consumption of sugar-containing snacks or drinks (e.g. juice, formula, and soda) increase the risk of ECCs. Breastfeeding is supported by the DoH, although breastfeeding in South Africa, and especially exclusive breastfeeding, remains very low. Obstacles to exclusive and continued breastfeeding include the perception of insufficient milk, compounded by fears of HIV transmission, marketing of breastmilk substitutes, misinformation, breastfeeding problems, returning to full time employment without supportive structures and lack of guidance and encouragement from healthcare personnel, among other factors (DoH, 2011b).

Table 5: Benefits of breastfeeding practices in child health

It protects integrity of intestinal mucosa which hinders the passage of HIV.
Breast milk improves immunity of the baby as antibodies will be transferred from mother to the baby, thus protecting against infection.
Contains all nutrients; energy, proteins and minerals.
Stabilises intestinal mucosa.
It is cost effective.
It is always available.
Contraceptive benefit to the mother called lactation amenorrhoeal method.

Mudau, 2010

Sugar intake is an important risk factor for dental caries. Paediatricians can incorporate anticipatory guidance associated with preventing dental caries into discussions with families about dietary habits and nutritional intake. Paediatricians/primary nurses and professional midwife nurses should also counsel parents and caregivers on the importance of reducing the frequency of exposure to sugars in foods and drinks in order to decrease the risk of dental caries and ensure the best possible health and developmental outcomes. This is an excellent platform for collaborative relationship between health professionals which is essential for

increasing access to dental care for all children and improving their oral and overall health (AAPD, 2015).

Nutritional preferences of the mother should be indicated on the RtHC. It is important to note that primary socialization starts at home. If the parent(s)/carer have poor nutritional practices, these behaviours or habits are introduced to the child. Therefore, early intervention should take place with the expectant mother. Health promotion messages must include the importance of oral health, diet during and after pregnancy, educational messages on the importance of breastfeeding and introduction of solid foods and, most importantly, education on good nutritional feeding habits.

The American Academy of Paedatric Dentistry recommends that parent(s) be counselled on or informed of the importance of introducing solid foods at the right time in the child(s) development (AAPD, 2015).

CHAPTER 3: AIMS AND OBJECTIVES

3.1 Background

There is growing evidence that health systems are not responding adequately to the needs and challenges of diverse populations, as well as economic imperatives to reduce the burden of disease (Mackey *et al*. 2013). Integrated health planning and service delivery have the potential to improve access to health services and redress the historical inequities in health care (Thema and Singh, 2013). Post 1994 South Africa adopted the Declaration of Helsinki "Alma Ata" philosophy of '*Health for all'*. With government's providing free health services for children under six and pregnant and nursing women, and 80% reliant on the state for health services, there is a huge burden on the state to provide healthcare compounded by a lack of resources and manpower and inequitable distribution of resources.

Growth monitoring charts have been proposed as educational tools to make the child's growth visible to both healthcare workers and parent/caregivers and to enhance communication. In South Africa the growth monitoring chart is the World Health Organisation-endorsed Road to Health Chart (RtHC). The fourth edition (2011) of the RtHC included an oral section. Oral diseases are highly prevalent among children in South Africa. A survey conducted in the Western Cape at the turn of the century recorded that 80% of children have unmet oral health treatment needs (Van Wyk *et al.* 2004; Singh, 2011). Fifteen years later a study conducted by Reddy (2015) in KwaZulu-Natal indicated that oral health treatment needs of children had increased in the province, with the burden of oral diseases and early childhood caries (ECC) on the increase. There is a growing need to identify high caries risk groups accurately to commence prevention from an early age. The significance of early intervention and anticipatory guidance approaches can reduce the incidence of early childhood dental decay and obesity (Arrow *et al.* 2013).

This has been proven in New Zealand and the UK which managed to reduce dental caries in young children by introducing early intervention and health promotion strategies (Ministry of Health, 2008). In New Zealand all children are to have an enrolment and oral risk assessment process undertaken between 9 and 12 months of age by non-oral health providers, with the resulting documents sent to the community oral health services. By age two and half children must have had contact with oral health personnel before entering pre-school. If a child is unable to attend an oral risk assessment examination, a prevention programme must be issued to the parent for them to follow (Ministry of Health, 2008).

Similarly in the UK, community-based oral health promotion programmes aimed at reducing ECC have reported that children attending baby-wellness clinics for their eight-month developmental check-ups must have a dental consultation. Australian research into early childhood oral health has confirmed that with children having numerous contacts with primary healthcare providers in the first 12 months of life, that provide an opportunity for anticipatory guidance for oral health where parents are provided with oral health promotion messages, early dental caries have been reduced (Ministry of Health, 2008).

In South Africa children attend baby-wellness clinics from birth till six years of age. Compulsory visits for immunizations are at birth, 6 weeks, 10 weeks, 14 weeks, 9 months, 18 months and 6 years. In between these visits the parents can attend the baby-wellness clinic for routine monitoring for weighing and measuring the baby's development. In 2011 the revised version of the RtHC included an oral section. The visits create an ideal opportunity for oral health promotion and dental consultations to occur.

3.2 Aim

To determine to what extent in its current form the oral health section in the RtHC is effective in monitoring oral health in children between the ages of 1 and 5 years old.

3.3 Objectives

To determine:

- the completeness of data recorded in the oral health section of the RtHC.
- which health professional completes the oral health section in RtHC.
- the views of health professionals on the oral health section in RtHC.

CHAPTER 4: METHODOLOGY

4.1 Definition of health professionals

Professional nurse: has the prescribed education and is registered.

Staff nurse/primary health carer: provide elementary nursing care.

Certified/community nurse: must be supervised while providing elementary nursing care.

Community Health Workers (CHWs): are trusted, knowledgeable frontline health personnel who come from the communities they serve. CHWs bridge cultural and linguistic barriers, expand access to coverage and care, and improve health outcomes.

Community service: health care practitioners who provide health care services at primary healthcare level, it is an internship which health care providers are paid for. This internship is occurs immediately after graduating from university. Health professionals are placed at primary health care settings to provide health care services.

Dentist: registered and qualified to treat diseases and other conditions that affect the teeth and gums and repair and relieve pain.

Dental therapist: a licensed member of the dental team who provides preventative and restorative dental care, for the community.

Oral hygienist: licensed dental professional who is registered to promote oral health and provide therapeutic services.

Dental assistant: works closely with and under the supervision of a dentist. Works with patients by performing tasks before and after the dentist meets with the patient as well as assists the dentist during certain dental procedures.

Health educator: Community care workers that are trained to deliver a health message to the community.

Health workers: are people whose job it is to protect and improve the health of their communities. Together these health workers, in all their diversity, make up the global health workforce.

4.2 Background to the study

The most common oral diseases among children are gingivitis and dental caries, affecting 60% to 90% of children globally (Petersen and Lennon, 2004; WHO, 2012). Dental caries is progressive and cumulative in nature and becomes more complex over time. If untreated, it can affect children's quality of life, e.g. ability to eat and chew, the food they choose, their appearance and the way they communicate. Pain from teeth or the mouth can compromise their concentration and school participation, thereby hampering not only their play and development, but also denying them the full benefit of schooling (Jürgensen and Petersen, 2013). The American Academy of Paediatric Dentistry (AAPD) proposes recommendations for preventive strategies, oral health risk assessment, anticipatory guidance, and therapeutic interventions to be followed by dental, medical, nursing, and allied health professional programs (AAPD, 2014b).

South Africa's National Children's Oral Health Survey (2003) indicated that 82.3% of six-year olds presented with dental caries in the Western Cape. Comparison of results for six-year olds in the Northern Cape showed similar results. In the same survey unmet treatment needs were 75% for six-year olds in the Western Cape and 82.7% in the Northern Cape. The epidemiological data indicated a high rate of dental caries, which was also reflected in the other provinces.

The Department of Health (DoH) and the national health system administers interceptive oral health programmes and policies however, these have not been successfully implemented as yet in South Africa, according to Singh (2005).

Early childhood caries need to be addressed when mothers are visiting antenatal clinics. The oral health message that must start here and be followed up at primary healthcare (PHC) baby-wellness clinics. The literature indicated repeatedly the need for early intervention, health promotion messages, school-based programmes with integrated services and an evidence-based approach, contextualised in response to local oral health needs, to address dental caries prevalence rates in children (Singh, 2011).

The Road to Health Chart (RtHC) child health monitoring aid is currently used across the world by health staff to monitor and record the health and development of children, enabling health providers to detect and treat disease at a very early stage, which will be less costly than the treatment of serious diseases at a later stage. Similarly, monitoring and encouraging regular oral health visits ensures early detection of oral diseases (DoH, 2014).

4.3 Study design

The study design was descriptive cross sectional mixed method study design. Cross sectional designs are studies that are practical ways of determining and studying various problems e.g. the aetiology of a problem (Mann, 2003). Descriptive cross sectional studies or observations can be monitored at a point in time or over a period. Mixed method includes a qualitative aspect to the study to achieve more depth or understanding from the interviews that were conducted to the health professionals.

4.4 Study site

The research was conducted in the Cape metropolitan area's six districts with a total population of 3 882 662 (Stats SA, 2014). The sub-districts were: Cape Town Eastern Health, Cape Town Northern Health, Cape Town Southern Health, Cape Town Western Health sub-District, Khayelitsha Health sub-District, and Klipfontein Health sub-District (DoH, 2016).

The Department of Social Development has estimated that the Cape metropolitan district will increase its population by 2.4% by 2017, bringing the projected population total to 4 014 765 people (Stats SA, 2014). The city's population age distribution for 2013, identified by the Stats SA national census, is: children (aged 0 - 14 years) 25.3%, working age population (aged 15 - 64 years) 68.9% and the aged (aged 65 years and above) 5.8% (Stats SA, 2014). Even though the Western Cape has relatively low reported births, delivery by public health facilities for child health in the province is under pressure because of migration from the neighbouring provinces and rural areas to the cities.

4.5 Study population

A cluster sampling method was used to determine the number of primary health care facilities needed for the study. The population was divided into a number of non-overlapping groups, thereby making the strata smaller, still getting the same information (Brink *et al*. 2008). At the selected primary health care clinics, healthcare professionals working with the RtHC were selected to take part in the study. A duty register or facility manager guided the researcher on the number of health professionals working in the primary health care clinic on the days the researcher went to the clinic. A convenient sample was extrapolated from the parent(s)/caregivers who attended the clinic on the day the researcher went to that clinic.

Participants for the study included any parent who was willing and gave informed consent for the researcher to collect the information needed. The study sample was selected from the following districts: Cape Town Eastern Health sub-District; Cape Town Northern Health sub-

District; Cape Town Southern Health sub-District; Cape Town Western Health sub-District; Khayelitsha Health sub-District; and Klipfontein Health sub-District. The study was conducted at the following primary health care facilities selected by cluster sampling technique: Gustrouw Oral Health Service, Macassar community day centre (CDC), Ikhwezi CDC, Scottsdene CDC, Durbanville CDC, Kraaifontein community health clinic (CHC), False Bay Hospital Oral Health Service, Grassy Park CDC, Retreat CHC, Maitland CDC, Khayelitsha Oral Health Service, Guguletu CHC), Dr Abdurrahman CDC, Guguletu CHC and Mitchell's Plain Oral Health Center clinics. Sites were selected according to multistage cluster sampling, and presence of a dental clinic was not known until the day the researcher went to the identified PHC clinic (ANNEXURE 2).

4.6 Sampling method

The multistage cluster sampling technique was used to select the study participants for the review of their RtHC. Firstly, three PHC clinics were selected randomly from each of the six sub-districts in the Cape metropolitan region. Each clinic that included children was considered a cluster. The second sampling stage was the selection of subjects within each of the eighteen clinics. The study sample was selected as the parent(s)/caregivers came into the nurses' station for weighing or immunization. The researcher explained the study to the participants and this was supported by an information sheet as well as informed consent (APPENDICES 1 and 2) which had to be signed by the parent. This allowed the researcher access to the RtHC to extract the information needed.

4.7 Sampling size

The sample size calculation was based on the assumption that 50% of the RtHC's reviewed in PHC clinics would have incomplete or inaccurate information.

The formula used for estimating the sample size was:

$n = \{p\ (100-p)\ (1.96)^2/d^2\}$

p=50%; d=10% the precision required on either side of the proportion, estimated around the 95% confidence interval.

Since this study utilised the multistage cluster sampling method, the sample size was multiplied by the design effect *(d=2),* plus a non-response rate of 10%. Hence the minimum sample size required for this study was 212. In order to gain sufficient statistical power to explore possible factors that may be associated with the level of completeness of the RtHC, a sample of n=250 was considered adequate for this study (Lwanga *et al.* 1991).

4.8 Data collection tool

This study aimed to obtain baseline information to assist with an evidence-based investigation of oral health service completeness in the RtHC. An administered, structured check-list and questionnaire was used for collecting the data (Appendices 4 and 5). The research was conducted in three parts: (i) a structured check-list to determine completeness of the RtHC, (ii) a questionnaire survey that was administered by the healthcare workers (including the dentist, oral hygienist and dental therapist), and (iii) a focus group discussion with the health professionals. The check-list data was designed to investigate the demographic attributes, breastfeeding and nutritional habits and the completeness of the oral health section in the RtHC. The healthcare professional questionnaire was designed to identify which health professional uses the RtHC, and identify knowledge of the oral health section in the RtHC booklet. In addition, focus group interviews with selected health professionals were carried out. This was audio-taped and transcribed by the researcher. All participants had given consent (Appendix 3) to be audiotaped and for the information to be used for the study and for recommendations towards the improvement of the oral health section of RtHC.

4.9 Data collection

The data was collected by the principal researcher (RC). The health professional questionnaire was given to the health professional to self-administer. In some instances, the principal researcher asked the questions which the health professional answered and the information was entered by the researcher on the questionnaire. The principal researcher collected the data therefore it was standardized and no sampling error occurred.

4.10 Inclusion criteria

Participants selected to take part in the study were parents who accompanied their children to clinics and who gave permission for the researcher to extrapolate the information needed from the RtHC booklet. Professional nurses, community nurses, certified nurses who worked with the RtHC, dentists, dental therapists and oral hygienists, and other healthcare workers which included the medical doctors on duty on the day the researcher visited PHC clinic were used for the study. Children had to have the latest version of the RtHC (2011), which includes the oral health section. Children from birth to age 5-6 were included in the study. Only parents who signed informed consent allowing the researcher access to the RtHC booklet were included in the study. All staff agreeing to take part in the study signed informed consent allowing the researcher to conduct the questionnaire. Parents signed informed consent allowing the researcher access to their child's RtHC. Additionally informed consent forms were signed to conduct the interview with health professionals.

Exclusion criteria

Some selected Primary healthcare clinics in the sampling frame were not suitable for this study, for example all clinics did not have a baby wellness program or the clinic which treated only adults were excluded from the initial sampling frame.

4.11 Pilot study

A pilot study was conducted with five participants to determine whether the questionnaire was measurable, valid and reliable. The pilot study was carried out to:

(i) Test the suitability of the method of collecting the data

(ii) Test how long each examination would take to complete

(iii) Check the adequacy of the data capture sheet

(iv) Check that all the parameter measurements were clear and unambiguous

(v) Ensure that no major item had been omitted, and

(vi) Remove any items that did not yield usable data.

Participation in the pilot study was voluntary and informed consent was signed regarding the research aim and objectives provided to the participants. The final questionnaire was concise, easy to understand and ensured minimum participant error. The five pilot questionnaires obtained were not included in the final sample.

4.12 Study bias

The term bias refers to any influence that produces a distortion in the results of a study or that strongly favours a particular finding of a research study (Brink *et al*. 2008).

Sampling bias: This bias may be introduced when potential members of the study population do not each have an equal chance of selection in the study. To minimize this bias, the researcher used a convenient study population of parents attending the clinic with their child/children. The children had to be in possession of the RtHC and be under the age of six years of age.

Observer bias: The researcher ensured that during the check-list recording of the information about the RtHC, the researcher did not influence or interfere during the parent/nurse consultation.

This study was conducted at public state primary health care facilities only and no private clinics or private practices were included in this study. By excluding these additional service institutions could have introduced some bias results.

4.13 Data analysis

The RtHC data was captured in the Microsoft Excel 2013 framework. The data was entered into Microsoft Excel 2013 using a unique indexing system. Descriptive results are presented as one-way and two-way frequency distribution tables. The main outcomes are presented as percentages with 95% confidence intervals (CI). A p-value of less than 0.05 and a 95% CI that does not span unity were considered as thresholds of statistical significance. Quantitative data was analysed by inferential statistics and descriptive statistics to provide an overview of the different clusters. The results were summarized using, tables, figures and graphs (for example, bar charts and pie charts).

The focus group interviews provided the researcher to explore and gain a better understanding of the health professional's perception and understanding of the RtHC, and⁄ or generate hypotheses. This mixed method of data collection was needed for the researcher to gain a better understanding from the health professionals understanding of the RtHC. To use qualitative findings of a primarily quantitative study added the depth required for this study. This involved a hands-on process where the researcher conducted an administered check-list followed by an audio-taped interview. The researcher independently transcribed the focus interviews. The interview formulated more in-depth answers than the check-list. The check-

lists and audio-tape recording was coded and themed. The researcher grouped common themes and organized the data. The researcher used multiple data sources, all indicating in a similar direction, and in this manner a pattern of results was triangulated.

4.14 Ethical considerations

The study protocol was approved by the Senate Research Committee of the University of the Western Cape (APPENDIX 7) and the Health Research Ethics Committee of the Western Cape. Healthcare professionals who signed informed consent were included in the study. The focus group interviews were conducted at a conveniently selected clinic where health professionals were invited. Before being audio-taped, the purpose of the interview was explained to all participants, including the fact they would remain anonymous (no names were included in the transcribed audio interviews). It was emphasized that strict confidentiality would be maintained at all times and that the participants could withdraw from the study at any time without being penalized. Informed consent was signed before audio taping.

4.15 Limitations of the study

The researcher encountered the following limitations:

1. Not all the selected clinics had baby-wellness clinics. Some of the community health clinics treated only adults or they were after-hours clinics that dealt with emergencies.
2. Parents did not bring the RtHC when visiting the clinic and this was more prevalent at clinics that had a dental facility, since parents did not realise that the oral health section in RtHC needed to be completed.
3. Biased results could have occurred as parents often lost the child's clinic card and was replaced. The researcher found in her study that the old information was never transferred to the replaced card.

CHAPTER 5: RESULTS

The study was conducted in three parts. For clarity, the results are presented as Parts A, B and C. Part A investigated the demographic data pertaining to the Road to Health Chart (RtHC) and the health professional survey data. Part B presents the results pertaining to the oral health section of the RtHC and Part C the views and opinions of oral health professionals on the oral health section in the RtHC.

PART A: Demographic data

5.1 Demography

The purpose of collecting patient's information is to guide research toward 'universalism', allowing grouping and the identification of similarity in demographic patterns e.g. age, race, gender etc. It allows the researcher to see if there is generalizability of the study participants. It can provide information for secondary data analyses (Hammer, 2011).

5.1.1 RtHC demography

Two hundred and forty three RtHC charts were examined at 24 primary healthcare (PHC) facilities (Figure 1). Two hundred and thirty seven RtHC had the child's name filled in on the RtHC booklet. Six RtHC had no child's name filled in. Of the 243 RtHC the fathers name was the least completed (Figure 1).

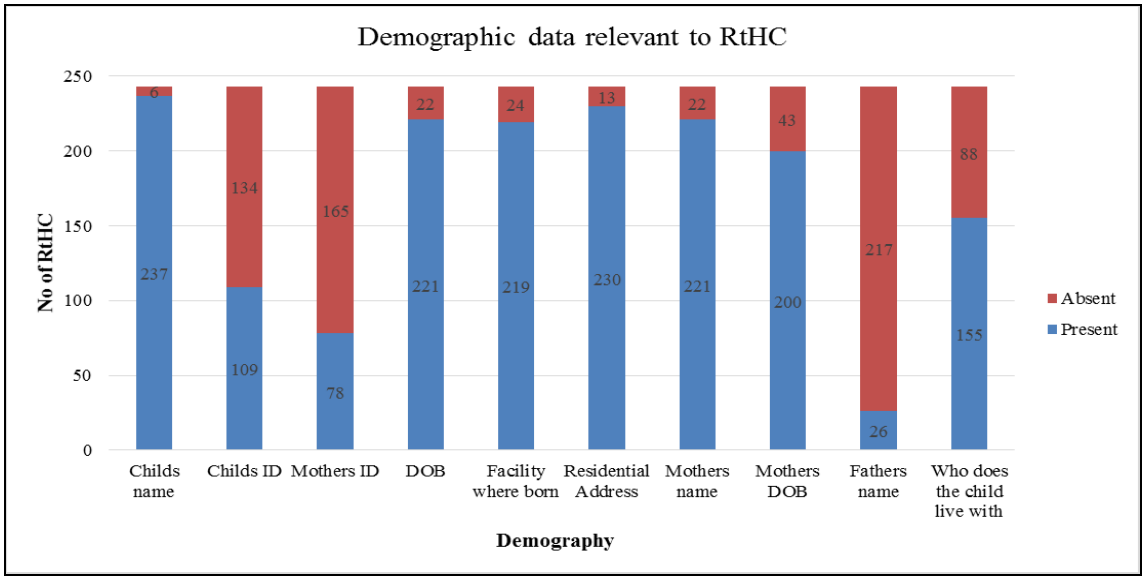


Figure 1: Demographic data pertaining to the reviewed RtHC's

5.1.2 Health professional demography

Seventy-seven health professionals participated in the survey (Figure 2).

This presents the demographic data pertaining to the health professionals who participated in this study. There were 10 different health professional categories. The professional nurse category was the highest number (20) that participated in the survey. The least number of professionals who participated in this study was two medical doctors. The majority of the health professionals are employed full-time however, community service and other health professional types are employed on a sessional basis. Khayelitsha community health clinic and Retreat CHC had the most health professionals that participated in the survey (Figure 2).

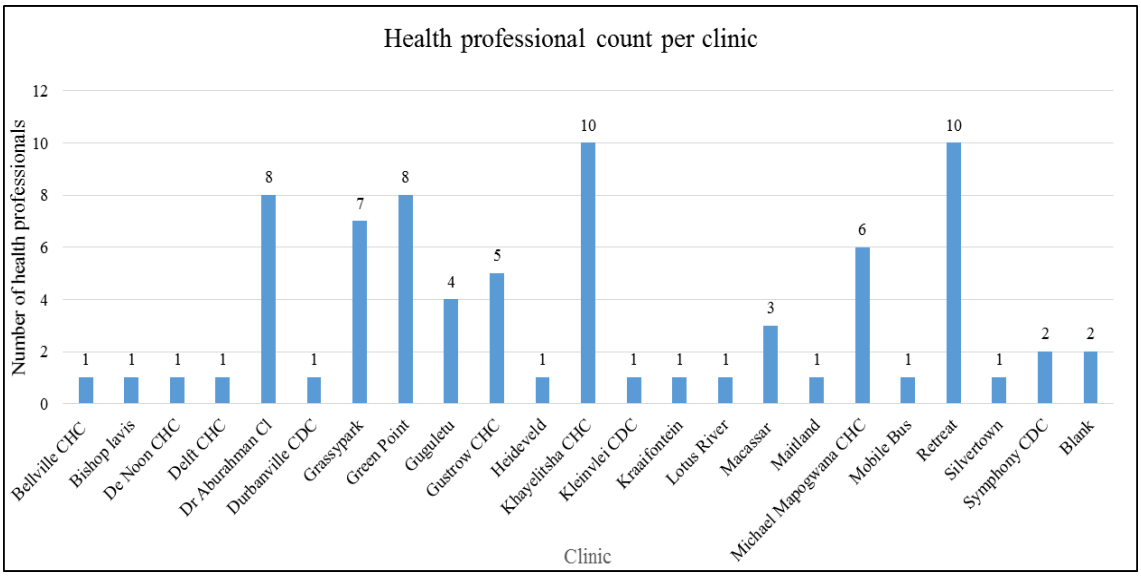


Figure 2: Demographic data showing the number of health professionals per clinic (blank- health professional did not state their clinic)

The number of health professionals per health professional category as well as their employment record is depicted in Figure 3. The highest number of participants in the study sample was professional nurses, while the lowest were medical doctors (Figure 3).

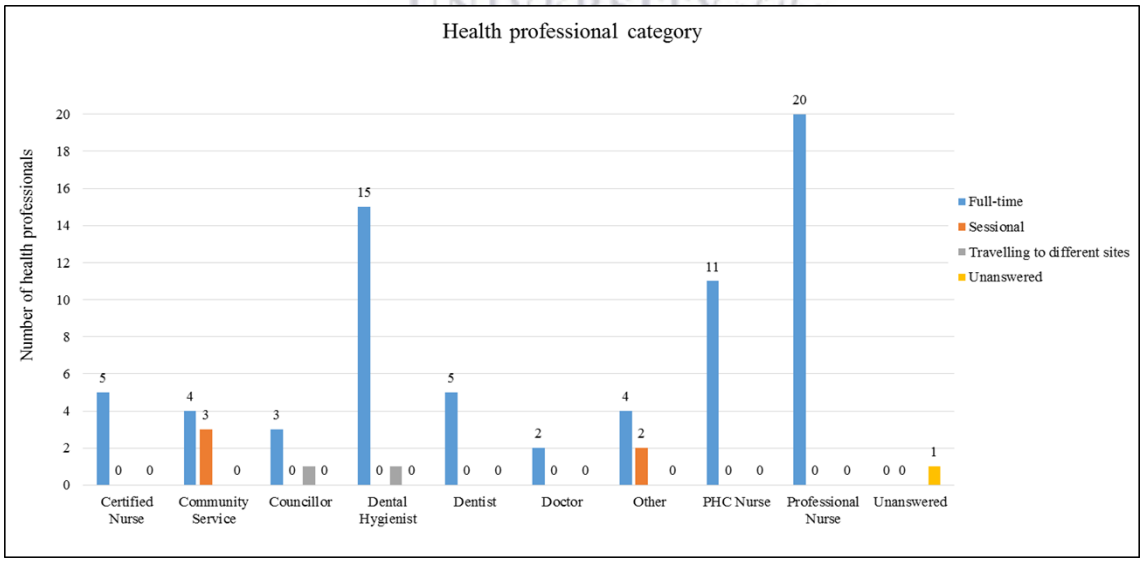


Figure 3: Demographic data showing the number of health professionals per health professional category

PART B: Effectiveness of the RtHC

This section of the results depicts the children from age 0-72 months (n=66, 27%) that had the oral health section completed (Table 7).

5.2 RtHC data analysis

The table below, Table 6, summarises the number of children in a particular age group for the varying visiting periods.

Table 6: Completed Oral Health Visits recorded in RtHC (n=243)

	Visiting period							
Age	**0-12 months**	**12-24 months**	**24-36 months**	**36-48 months**	**48-60 months**	**60-72 months**	**Incomplete**	**Total**
0-12 month	3	0	0	0	0	0	31	**34**
12-24 month	3	9	0	0	0	0	56	**68**
24-36 month	1	1	11	0	0	0	35	**48**
36-48 month	0	0	2	14	0	0	16	**32**
48-60 month	0	0	2	3	14	0	3	**22**
60-72 month	0	1	1	1	0	0	36	**39**

Table 7: Completion of the oral health section of the RtHC

Age group: 0-12 months (n=34)	FILLED IN	% Filled in
0-12 month	3	
Total	**3**	9%
Age group: 12-24 months (n=68)		
0-12 month	3	
12-24 month	9	
Total	**12**	13%
Age group: 24-36 months (n=48)		
0-12 month	1	
12-24 month	1	
24-36 month	11	
Total	**13**	23%
Age group: 36-48 months (n=32)		
0-12 month	0	
12-24 month	0	
24-36 month	2	
36-48 month	14	
Total	**16**	44%
Age group: 48-60 months (n=22)		
0-12 month	0	
12-24 month	0	
24-36 month	2	
36-48 month	3	
48-60 month	14	
Total	**19**	64%
Age group: 60-72 months (n=39)		
0-12 month	0	
12-24 month	1	
24-36 month	1	
36-48 month	1	
48-60 month	0	
60-72 month	0	
Total	**3**	9%
Grand Total (n=243)	**66**	**27%**

The summary of the completion of the oral health section in the RtHC is depicted in Table 7 above. It shows that just over a quarter (27%) had the oral health section of the RtHC filled in. The largest group consisted of children 12-24 months, the smallest of children 48-60 months.

5.3 Frequency of oral health visits

The age of children who most frequently had the oral health section of the RtHC completed was 36-48 months and 48-60 months (19% and 23%), (Figure 4).

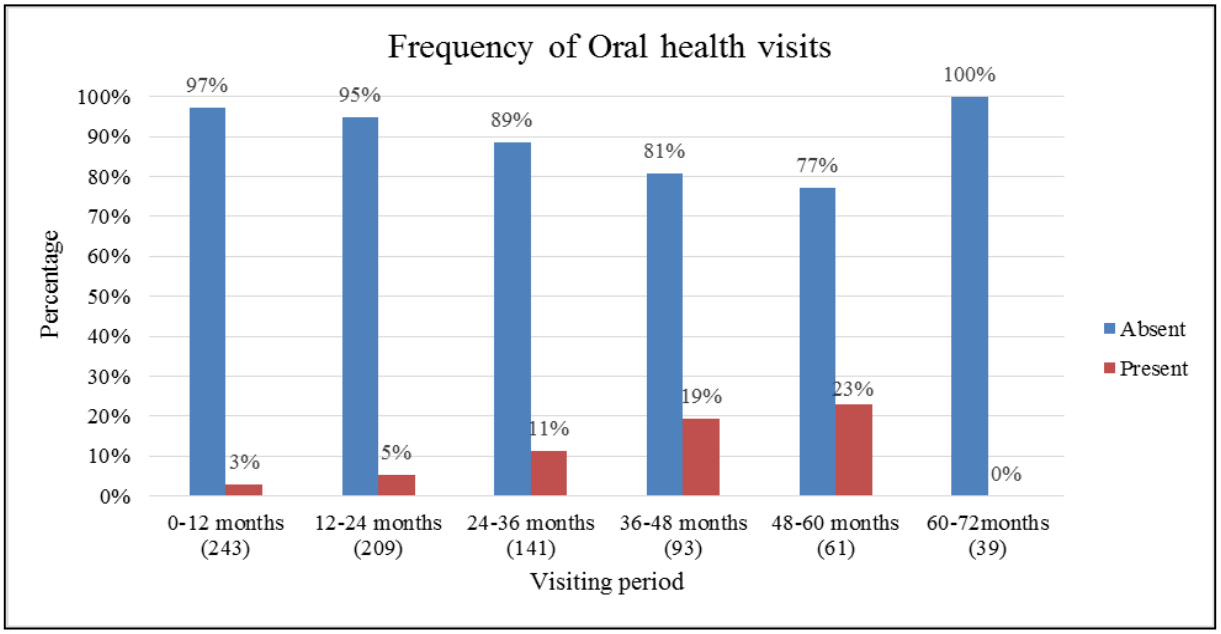


Figure 4: Presence and absence of children's annual oral health visits

5.4 Nutrition and diet section in the RtHC

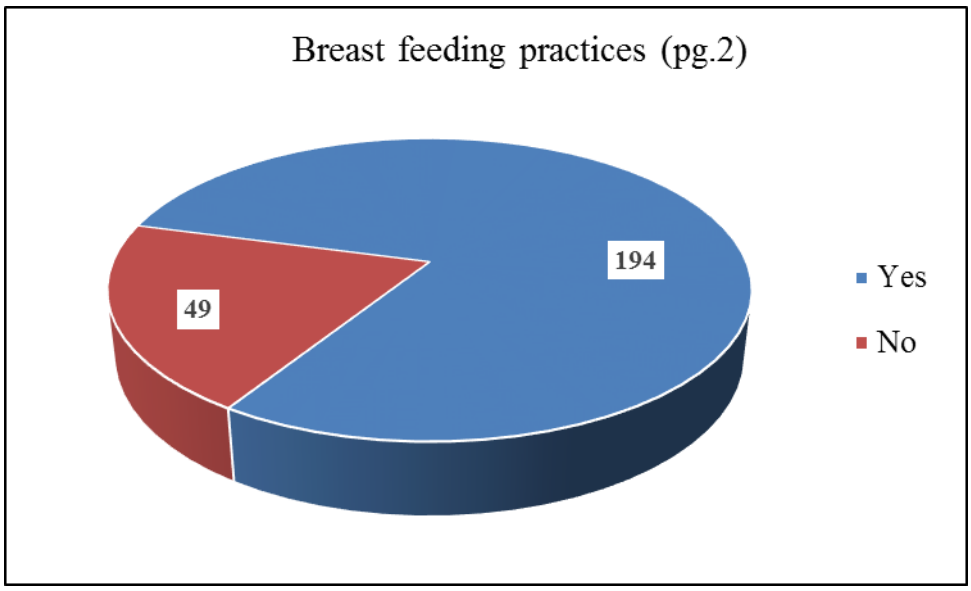


Figure 5: Number of children that are breastfed in comparison to those that are not among whole sample size (243)

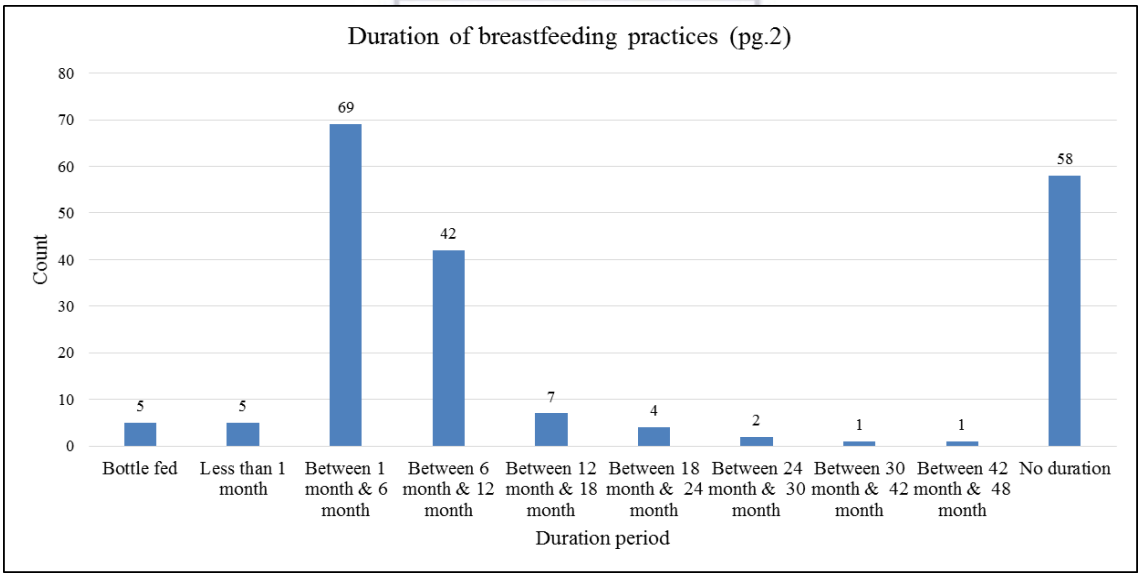


Figure 6: Duration of breastfeeding practices recorded in RtHC page 2

The majority of children (n=194, 80%) were breastfed based on the information recorded on page 2 in the RtHC. Sixty nine children were breastfed between 1 and 6 months and 42 children between 6 and 12 months. Fifty eight children were recorded as breastfed but an indication of how long the children were breastfed for was lacking. One hundred and twenty eight children (53%) were not breastfed according to the records taken from the RtHC in the present study.

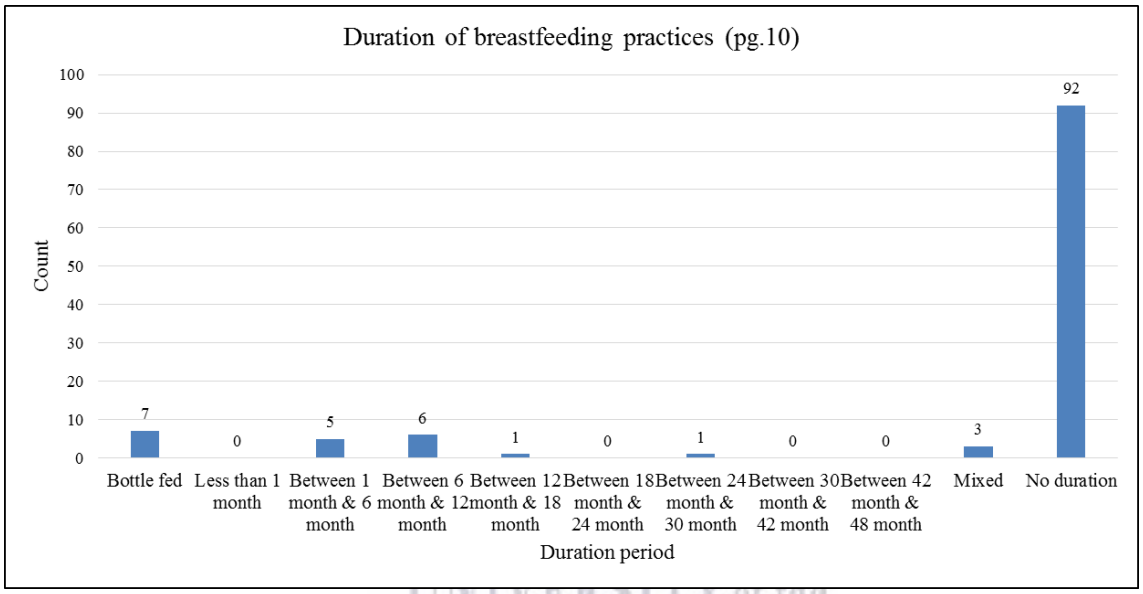


Figure 7: Duration of breastfeeding practices recorded in RtHC page 10

Ninety-two children were breastfed in the RtHC but duration of feeding practice was not indicated. Fifty nine percent of children were not fed using the infant feeding guidelines in the RtHCand seven children were exclusively bottlefed.

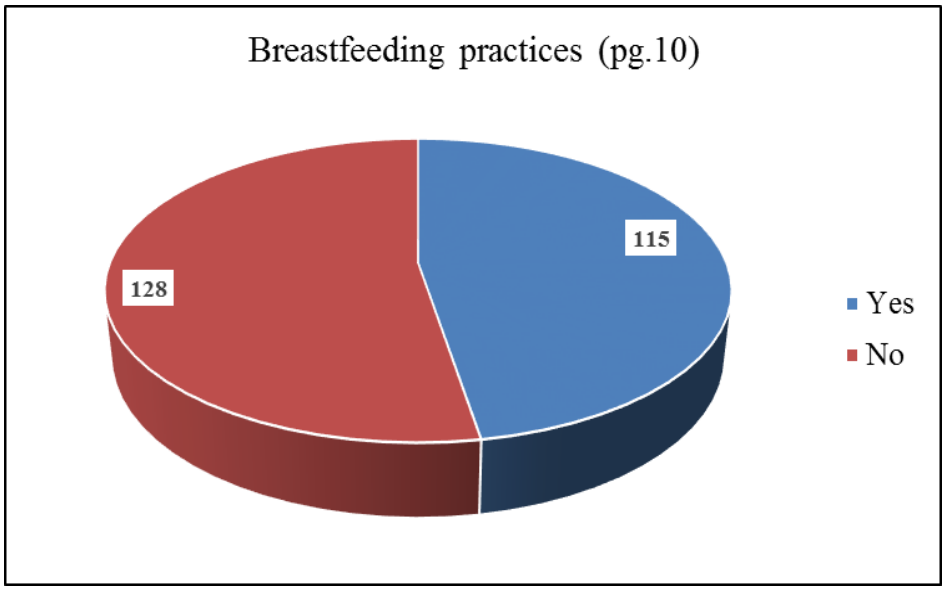


Figure 8: Number of children that are breastfed in comparison to those that are not

One Hundred and twenty eight children had not the Breastfeeding chart completed on page 10 in RtHC (Figure 8).

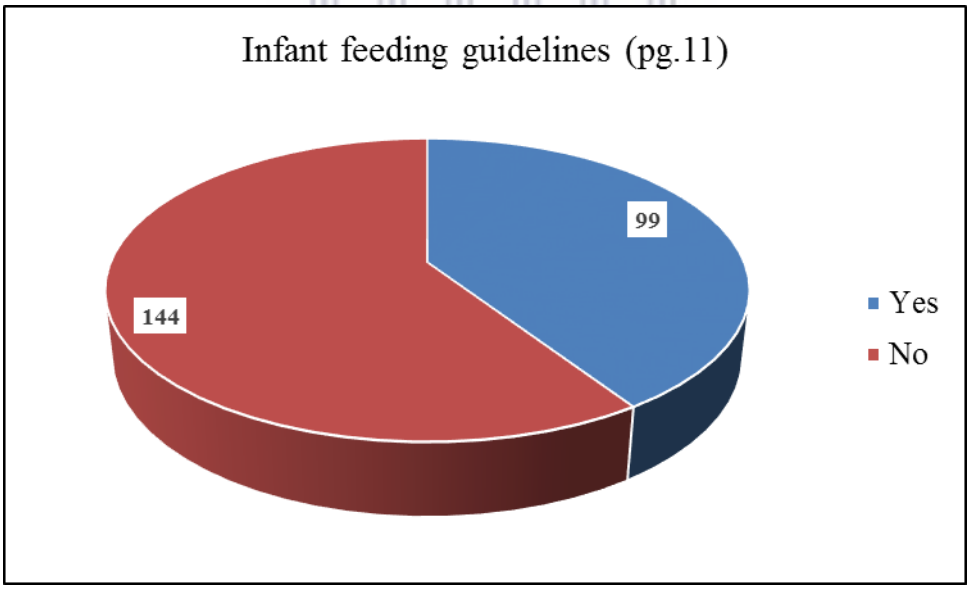


Figure 9: Number of children that are fed using the infant feeding guidelines in comparison to those that are not

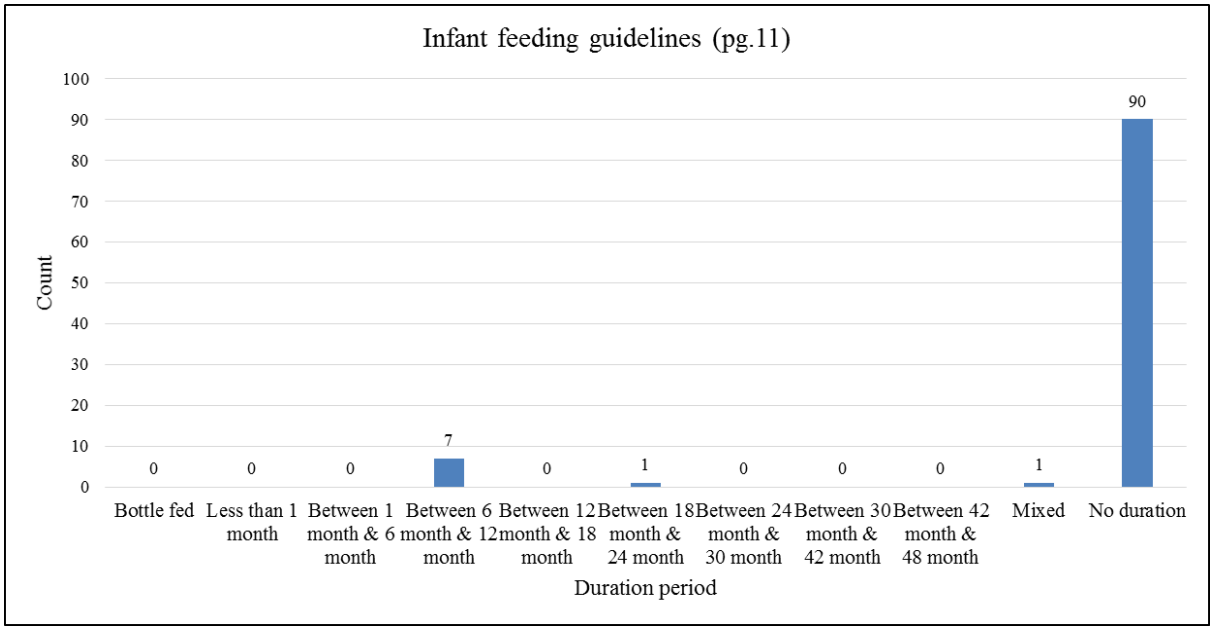


Figure 10: Number of children that are fed using the infant feeding guidelines in comparison to those that are not

5.5 Health professional data analysis

Health professionals' perceptions of the oral health section in the RtHC were investigated by means of a questionnaire and for more in-depth information a focus group discussion was conducted. The questions used to identify the health professionals' perceptions were as follows:

- Awareness of the oral health section of the RtHC
- Ease of use of the oral charting table in RtHC
- Confidence in oral health section of RtHC, and
- Age at which children should visit their first dental professional.

5.5.1 Awareness of the oral health section of the RtHC

Professions related to the oral health field such as dental hygienists and dentists had the highest awareness (100%) of the oral health section, while professional nurses had a 70%

awareness of the oral health section. Meanwhile, 80% of certified nurses (5) and 100% of doctors (2) were not aware of the oral health section in the RtHC (Figure 11).

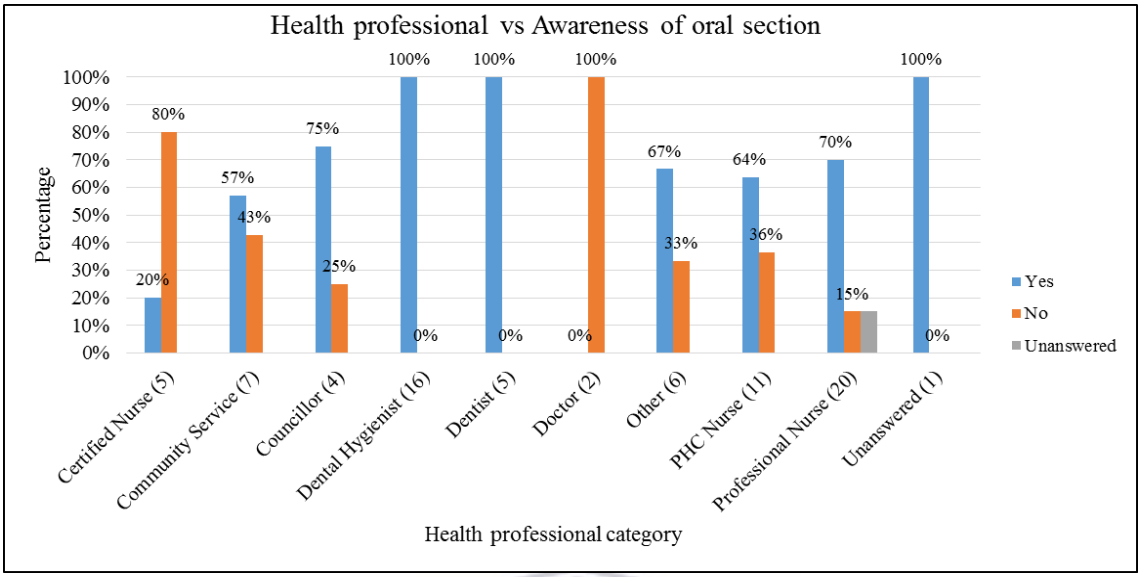


Figure 11: Health professional types' awareness of the oral health section

5.5.2 Ease of use of the oral health section of the RtHC

Health professionals' opinions regarding the ease of use of the oral health section of the RtHC. Dental hygienists and dentists found the oral chart easy to use (63% and 80% respectively), while health professionals not related to the dental field, such as all the nursing professionals, councillors and those who are involved in community service, did not find the oral health charting table easy to use (Figure 12).

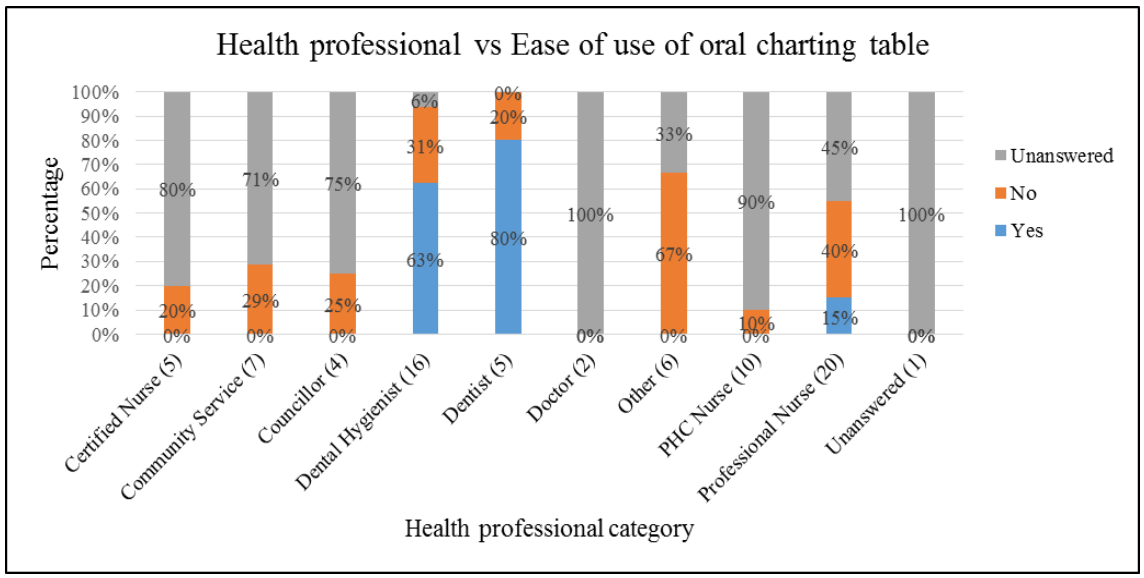


Figure 12: Health professionals' ease of use of the oral charting table in RtHC

5.5.3 Confidence in oral health section of the RtHC

The health professionals in the dental profession were the most confident (75%), the least confident are certified nurses (20%), (Figure 13).

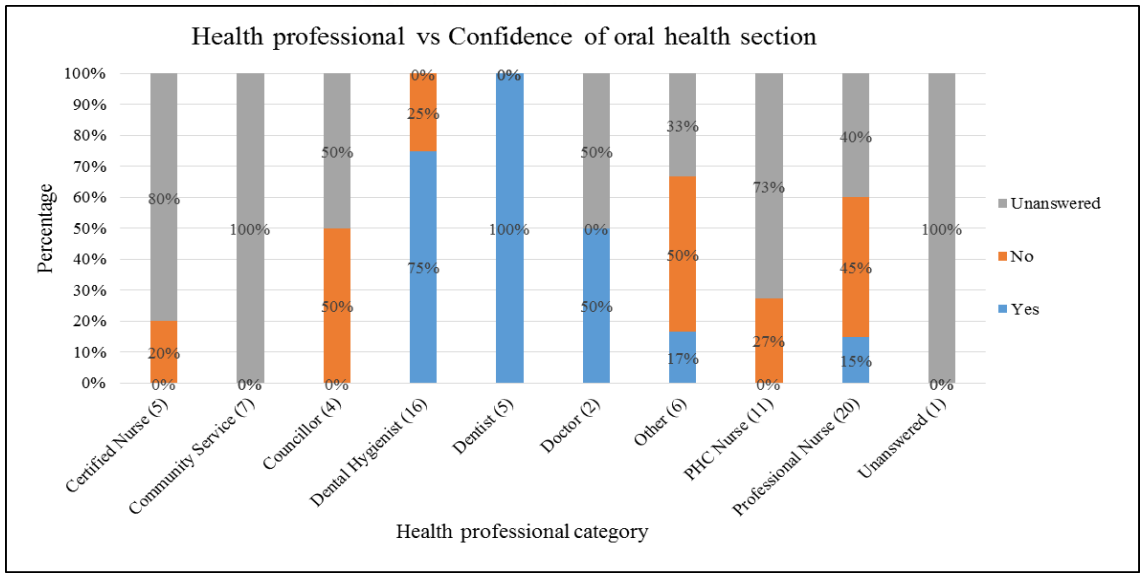


Figure 13: Health professionals' confidence in oral health section of RtHC

5.5.4 Age at which children should visit their first dental professional

Health professionals' opinions on when children should first visit a dental professional. Majority of health professionals indicated that first visit must occur 0-1 and 1-2 years which is depicted in the blue and orange colouring, respectively, on the chart.

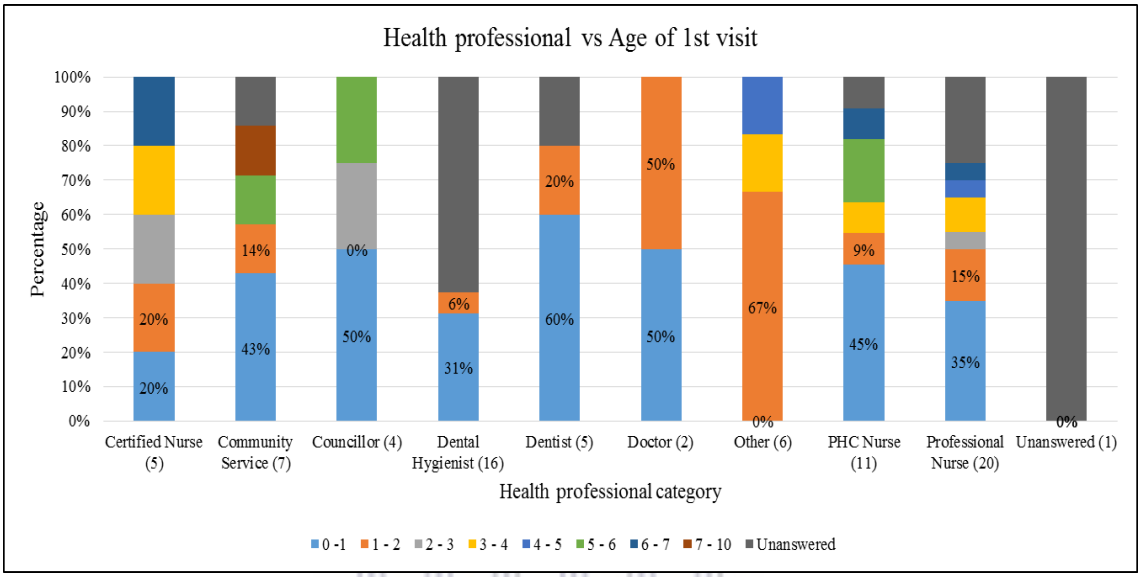


Figure 14: Health professionals' opinion on the age at which a child should undertake first dental visit

PART C: Focus group interviews

5.6 Introduction

Ten health professionals were interviewed to determine their views and opinions on the oral health section in the RtHC. The focus group comprised a dentist, four oral hygienists, a dental assistant, a professional nurse, a certified nurse and a community care worker (breastfeeding counsellor). In this section, the data obtained from the focus group discussions is presented. Three broad themes emerged from the discussions: lack of orientation to the RtHC, lack of structure to the RtHC and lack of accountability and responsibility of the parents. The results are presented under these themes.

5.7 Lack of orientation to the RtHC

The focus group discussion clearly illustrated that health professionals are not orientated towards the oral health section of the RtHC. Research has found that successful implementation of such quality measures depends on the interaction of multiple factors, including measurement characteristics, promotional messages, implementation strategies and resources (Shi, 2012).

The oral health section was included in the 4th edition of the RtHC which was adopted in 2010-2011. The inclusion of an oral health section in the RtHC was requested by oral hygienists from the Department of Health (DoH) in the Western Cape in 2009. Discussions with the Department of Health facility manager and Oral Hygienists working for the DoH in the Western Cape occurred in early 2009. At this forum hygienist indicated the need to monitor oral health from an early age and made suggestions to include oral health examinations at baby well visits. It was then said that this would be tabled at on National level in Pretoria. No further consultation with the oral hygienists or dental professionals in the Western Cape took place and the information to be included in the oral health section of the

RtHC was never discussed or tabled again at Western Cape provincial DoH level. The South African National Oral Health Strategy (2005) developed a framework in oral health, this framework identifies the importance of monitoring and evaluation of oral health from early age. This framework for early monitoring is implemented at different levels – national, provincial, and local. In 2011 the new version of RtHC was implemented the oral section was included. It was assumed by the hygienist in the focus group discussion that the decision to implement the new version of RtHC was sanctioned either Department of Health in Pretoria or National Health Government. She continued to say that no directive or communication came to the Western Cape DoH to her knowledge.

The dental professionals surveyed in the present study indicated the inadequacy of the oral section. There was general consensus that the oral health section of the RtHC was poorly implemented. All health professionals indicated they were not orientated, made aware nor informed of the implementation of the oral health section in the RtHC. Dental professionals indicated that they are the primary workers that have to complete this section and they were not informed of the inclusion of the oral section in the latest version of RtHC. Discussion around the purpose of the oral health section was initiated by the dental professionals. The dental professionals indicated that in its present state the oral health section was of no benefit to parents or other health professionals as it lacked in clarity and guidance. Nursing professionals indicated they were not as aware of the oral health section in the RtHC therefore could not comment on its purpose. However, one nurse commented: “Is it not for monitoring the oral health, as we the nurses monitor the weight of the baby”. It was apparent that there was a lack of understanding regarding the oral health section, and who was responsible for and had to complete the oral health section of the RtHC. Some of the nurses indicated that they were allowed to fill in the oral health section, however, no-one had shown them how to complete this section. The dental professionals indicated that there were no guidelines on how

to complete the oral health section. They as dental professionals had better knowledge of teeth and know the sequence of eruption of the teeth therefore they were more capable of completing the oral health section. But they were not informed of the oral health section in the RtHC, therefore, were not aware that it needed to be completed.

Some of the contradictory findings are illustrated in the following comments:

"We, the nurses fill out the clinic charts all the time, why should we not fill in the oral health section as we see the child; but we do not know how and nobody told us of the oral health section in the book" (community nurse and certified nurse).

"It's written in bold that only dental professionals complete the oral health section" (professional nurse).

"We all do our own thing, I cannot understand what the previous dentist or hygienist filled in, until I look in the mouth" (dentist).

"The oral health section has no guidelines for me to follow, and I can't see the usefulness of this chart for me. It is confusing and the blocks which we as dental professionals are to fill in are meaningless" (dentist).

5.8 Structure of the RtHC

There was a general consensus among the health professionals that the planning, layout and structure of the newly implemented RtHC was poorly designed. A senior oral hygienist reflected on her contribution to the input in 2009 of the oral health section. She indicated that she, among other dental colleagues, in a workshop in the Western Cape, contributed to the information that should be included in the chart. After their workshop on the development of the oral health section for the planned RtHC, it was decided that the discussion would be referred to national level in Pretoria. Subsequently, the DoH dental employees in the Western

Cape had no further communication regarding the inclusion of the oral health section in the RtHC. They were surprised to see what information was in the RtHC, with nothing from their discussion that occurred in 2009 included. The senior oral hygienist indicated she was surprised in 2010 when the new RtHC included the oral health section.

"We were not informed of the oral health section, nor were we consulted after our initial meeting, we got no feedback" (oral hygienist).

"*There was a 'top – down' implementation and we were not informed of the inclusion of the oral health section in the RtHC, we were not consulted in the decision-making on the final information that was included in the RtHC"* (oral hygienist).

The hygienist indicated that the oral health section was poorly designed, the information required to be completed was of no value to another health professional or parent, and similarly the information was not educational or informative. Due to the poor structure, design and layout, dental professionals have used their own judgement in the completion of the oral section on page 20 (Appendix 6), which requires the dental professional to complete the charting form. This form has no charting legend or guidelines on whether she/he has to fill in which teeth are missing/absent or present. This has resulted in inconsistencies, and own interpretation among professionals on the information being completed in the oral health section in the RtHC.

"There was no consultation on the final information that was to be included. This resulted in the current section on oral health in the RtHC being inadequate" (oral hygienist).

"Dental professionals indicate it is not a useful tool, the information in the oral health section is too small, [there is] no clarity, the set-out is poor and because we were are unaware of this page 20, it gets missed by parents and health professionals" (dentist).

"I, as a dental professional became aware of the oral health section in the RtHC last year for the first time, and the actual use of the RtHC in its present state is not user-friendly, if I have to chart for the dentist , I am not sure exactly how [because]no one showed me" (dental assistant).

Dental professionals indicated that the oral health section in the RtHC could not be viewed seriously, as not one of the dental professionals present in this forum had any knowledge of its implementation. The Department of Health endorsed the idea of the oral health section being included in the present RtHC, however, clearly took no accountability for how the oral health section was to be implemented or used.

"It's like a joke what information is required in the book. I as a dental professional do not think the information that I complete will be useful for anyone but myself, the way it is structured at the moment, a parent will definitely not understand, let alone fellow colleagues" (dentist).

"*How are you supposed to fill the information in, when we are not even aware of this section; we have been made aware only recently"* (dental assistant, dentist).

5.9 Lack of knowledge on the existence of the chart as a monitoring chart

Overall the discussion showed a lack of knowledge and awareness of the oral health section in the RtHC. The health professionals, including dental professionals, indicated that they felt disempowered and incompetent to use the oral health section of the RtHC as no training was conducted prior to implementation of the new RtHC.

Nursing staff reported being trained about the RtHC in breastfeeding, weighing and immunization but were never informed of the oral health section in the RtHC. Additionally, during the interview, nurses, community care workers and councillors indicated their knowledge of oral health and oral health problems in children was sadly lacking.

All categories of health professionals were of the opinion that they needed to be educated on this tool in order to take the process forward to create awareness among parents and all the healthcare team workers.

"We look after and have access to young children; yet, we ourselves are not trained for new tools that must be used, that are supposed to improve oral health in children" (professional nurse).

"We need training - what to look for in the mouth, we just refer all our patients to Hope Street clinic, as we do not have a dentist here [to who] we can send our children who have rotten teeth" (professional nurse).

"We were never consulted, never told, the oral health section just appeared, yet we had made the request for this" (oral hygienist).

5.10 Lack of accountability of health professionals

There was concern that no health professional took responsibility for the implementation and administration of the oral health section of the RtHC. Dental professionals were not forthcoming in taking ownership for the oral health section. There was no accountability from the nursing professionals as to who was responsible for referrals to the dental professional if a child presented with toothache, which was also noted amongst certified nurses.

"*We are working as an interdisciplinary health team and all have the responsibility of administration of this section. Yes, non-dental staff should fill in the chart"* (professional nurse).

"*When I came to work for DoH, I was not informed of the RtHC and of the oral health section, and I am a new staff member. No-one has informed me or any of my colleagues who I work with"* (nurse and echoed by an oral hygienist).

"We see the children when it is already too late; the dental caries is already present" (oral hygienist).

"*It's the doctor's responsibility; if a child has a bad tooth we send to the doctor"* (professional nurse, community nurse).

"We at our clinic have a problem when children come with bad teeth, we do not have a dentist at our clinic, where must these children be sent to" (a common complaint by nursing staff).

There was a general indication from dental professionals that there must be more accountability from nurses in making themselves and parents aware of the importance of oral health. The nurses acknowledged that they should make parents aware of the importance of oral health. However, the nurses indicated that during baby-wellness visits there was much to do. The nurses said they had to weigh, measure and administer vaccinations, dispense Vitamin A supplements, deworm and discuss child development with the mother during the consultation. This motivated a nurse to say, "Nursing staff have much to do and conduct during the babies consultation and as nursing staff we do not have time during the babies consultation to conduct dental examinations. Clearly it's the dental professional's duty to complete the oral health section." One professional nurse showed interest in wanting to improve her knowledge on oral health so that she could improve the knowledge of her staff.

"*Nurses are the first line of communication"* (professional nurse).

"After all the mouth is part of the body" (community nurse echoed by others).

"Should the nurses be burdened with an additional task to do during the child well visit?" (oral hygienist).

5.11 Accountability and responsibility of the parents

The general feeling of the health professionals was that parents needed to be more accountable for their children's health, including oral health. Dental professionals indicated that there must be an awareness created by all healthcare workers of the importance of oral health. Education on oral prevention will grow knowledge and inform, which will in turn lead to more responsibility and accountability from the parents to take children to the dental professional.

"Parents just do not know of oral health, they wait till the child has an abscess then seek help from the clinic" (professional nurse, community nurse and breastfeeding councillor).

"*It just shows parents do not look and read the book, they are unaware of oral health, they only bring children to the dentist when they have toothache, and parents are not educated on preventive strategies of oral health"* (oral hygienist echoed by nurses).

"*Parents need to be aware that information in the RtHC is looked at when the child starts school. Crèches before taking children in must also be educated to look to see if a child has had an oral examination"* (oral hygienist).

"*We [oral hygienists] are also at fault, we do not ask for the book when they do come for their [oral hygienist] appointments. It is not part of our training to do so"* (oral hygienist).

"We as dental professionals should also take some responsibility for the information not being filled in. I am only aware of the oral health section in the last year" (dentist).

5.12 Is the oral health section of the RtHC any value?

In its present form and structure the answer to whether the oral health section of the RtHC has any value is a resounding 'no'. The chart does not add much in terms of prevention or educate parents. Nurses indicated that illustrations work well as educational messages.

"*A picture/graphics convey a far better message than lots of words"* (breastfeeding councillor and nurses).

"There are no pictures in the oral health section, just blocks, and no health message as in, say, diarrhoea, which graphically shows the mother what to do. The only problem is that some parents do not read, let alone page through the book" (nurse).

"I have only seen an English version, what about Afrikaans?" (oral hygienist).

Unanimously, it was the contention of all health professionals interviewed that the oral health section in the RtHC was not an educational tool in its present form. The conversation around this question was often animated and emotional. There was agreement that the RtHC could indeed be an educational tool but there were many suggestions as to how it could be made to be such. "Mothers need to be educated on the importance of prevention and looking after their children's teeth, that's why we have so many children with 'rotten teeth' and the 'oral' nurse comes to the clinic to speak to parents but it is not enough", were responses by a professional nurse.

The way the book is at the moment, it is not an educational tool nor informative in the oral health section, with little value to the professional and the parent.

"What about us the nurses? We need training on what to look for. If we do not have a dental clinic at our facility we just refer to Hope Street clinic. It is so far to travel for some of our

parents. If a child does come with a sore tooth they go to the doctor as he is the only one that gives the antibiotic" (community nurse).

"*Our people need prevention and educational messages, all day and every day, they need to hear the health message from all health professionals"* (councillors, oral hygienist).

"We can do all the training, education with health professionals and parents, however, they must want to make the change of behaviour patterns" (oral hygienist and professional nurse).

Professional nurses, community nurses, breastfeeding councillors these health care workers have the knowledge of anthropometric and nutritional practices that exists in the RtHC. In this present study the information on page 11(Appendix 9) which is the health promotion message of referring parents to the milestones and feeding practices was 49% completed. Therefore there is a lack of correlation of knowledge to implementation.

One Hundred percent of dentist and oral hygienist are aware of the oral section of the RtHC. In the survey 31% (oral hygienist) and 20% (dentist) reflected that they were comfortable with the use of the oral section.

CHAPTER 6: DISCUSSION

6.1 Introduction

In this chapter, the findings and results of the present study on the oral health section in the Road to Health Chart (RtHC) are discussed and any limitations will be presented.

The main purpose of the present study has been to identify the implementation and efficacy of the oral health section in the RtHC for children between age 1 and 6.

6.2 The value of the RtHC

Child monitoring is a globally accepted tool and is endorsed by the WHO and the United Nations Children's Fund (UNICEF) (De Onis, 2011). The RtHC is a good source of documented information that is used by public healthcare (PHC) and community-based healthcare workers for the diagnostic recording of children at risk of health-related illness (Kitenge, 2011).

The RtHC provides a convenient method in the monitoring of child health and assists in improving health outcomes, through vaccination compliance and early identification of growth patterns. Similarly, the oral health section in the RtHC can be used for early detection of oral diseases and mouth problems. The RtHC is a tool that should be used for motivation, education and encouraging parents to have knowledge of the documented record of the development of their child. It is important that health professionals and parent/s understand the value and importance child monitoring.

6.3 Demography completeness in the RtHC

According to the National Health Amendment Act (Republic of South Africa, 2013), patient demographic information is important for a number of reasons. Patients providing their

personal information when visiting a health facility is a means of gaining accountability from the patient, aided by the patients feeling more engaged. Patients providing their details offers an opportunity to identify any risks or barriers the patient may face. Good records identify who is the next of kin in case of emergencies. Having updated records provides the health professional with contact details of the person for further follow-up or communication if needed. The health facility has a record of the patient in case of emergency or death identification. Most importantly the signed informed consent provides the health facility proof of registration to proceed with treatment or examination.

The findings of the present study indicated that information was well documented and the child's name, date of birth, facility where born, residential address, mother's name and mother's date of birth were recorded. The father's name was least completed. This study indicates that demographic auditing should be more stringent as we need to develop a culture of including both parents in the involvement of their children.

6.4 Knowledge of oral health section of the RtHC

In the present study health professionals working with the RtHC at baby-wellness clinics and dental clinics were selected as participants. Seventy seven health professionals participated in the study. The largest sample of the study was represented by nursing professionals. Professional nurses in PHC facilities are responsible for auditing and signing the information that the certified, community nurse documents in the RtHC e.g. the weight, immunization needed and head circumference. According to the South African Nursing Council (SANC), the other duties of a professional nurse are to oversee and to take responsibility for day-to-day nursing operations, including supervising student and community nurses and breastfeeding counsellors, who are employed part-time.

In the present study it was found that not only was the oral health section of the RtHC poorly completed, infant feeding and nutritional practices were also badly recorded. This was contrary to what they were taught at nursing college as their curriculum included the importance monitoring of anthropometric measures and child wellness development. Health professionals, excluding the dental professional category, had limited knowledge of oral health, or had major gaps in their knowledge. There were also inconstancies between knowledge and practice. According to a study by Smadi and Nasser (2016), there is a knowledge gap among nurses regarding oral health and integration and structured education and training of the treatment of oral diseases in the nursing curriculum. What knowledge the nurses did display in the present study was not implemented. Most health professionals did not translate their knowledge into practice.

Of professional nurses surveyed in the present study, 70% knew of the existence of the oral health section of the RtHC. The majority of health professionals believed the first visit to a dental professional should occur between ages 1 and 2, and 2.9% of children by age 1 had the oral health section completed. Almost all health professionals did not answer the question addressing their confidence in and use of the oral health section in RtHC. During the focus group interview there was a clear indication from nurses, that they were not confident to complete the oral health section, confirmed by the 80% that did not answer the question in the questionnaire on confidence in and use of the oral health section. The health professionals, including dental professionals, were insistent that they were never informed or trained on the oral health section in the RtHC. Nurses echoed this, saying very little training at nursing colleges focusses on the importance and link of oral health to general health.

Surveillance of oral health on community level should be conducted at regular intervals, to assess the health status and needs of the community, through collation and interpretation of reliable health information. However, surveillance systems can be expensive and time

consuming. Dental professionals do not have the resources, number of health professionals to singly tackle this burden of dental caries alone. There needs to be a paradigm shift where we should have an inter-collaborative approach to health and oral health. Support from all health workers in the identification of oral conditions, using common risk factors, be able to respond to and influence international developments in health, healthcare, and oral health (Pitts *et.al,* 2011).The South African RtHC identifies that only dental professionals are able to complete the oral section in the RtHC. The researcher identified in her study when on questioning health workers on the oral section of RtHC they felt grossly inadequate to complete this section. This is very much in line with international standards where examiners/health workers were not confident in conducting oral health examinations as they felt inadequately trained (Skeie & Klock, 2014).

6.5 Nutrition, breastfeeding and oral health

The WHO and UNICEF recommend exclusive breastfeeding from birth for the first 6 months of a child's life, and sustained breastfeeding together with adequate complementary foods up to 2 years of age or beyond (WHO, 2016). Healthcare workers and councillors can help the mothers to breastfeed successfully. Breastfeeding councillors have contact with mothers at almost all baby-wellness visits and their purpose at the clinic is to educate and inform of preventive health measures while mothers are in the waiting area. Thus, breastfeeding councillors should be trained appropriately on the importance and value of good feeding practices and the link of good nutrition to oral health and general health. This statement above is the recommendation from WHO and UNICEF (2016).

In the study the results indicated that breastfeeding councillors exhibited a good knowledge of oral health during the interview, though this was not translated into practice. It is indicated in the RtHC that the first visit to the dentist must occur by the eruption of the first tooth

(Appendix 6). Breast feeding councillors and nurses had good knowledge of the importance of breastfeeding, however could not link breastfeeding and oral health. Fifty percent of breast feeding councillors were not confident to use the RtHC. However, what was highlighted that much of their knowledge was self-taught or from literature provided to them from the organization to which they belonged. The main source of information for self-education was the Internet. These findings indicate that there is a need for in-service training, and prepared modules that counsellors and nurses can follow. This will prevent ill-informed information and miscommunication being transferred to parents attending the baby-wellness clinics.

The oral health section in the RtHC was inadequately utilized or completed by the health professionals in the present study. As expected, dental professionals had the best knowledge and use of knowledge associated with the oral health section in the booklet. The medical doctor had no knowledge of the oral health section being part of the RtHC. The certified nurses indicated that they were never taught or shown the oral health section of the RtHC, as the focus was predominately on immunization, breastfeeding, measuring and weighing. This statement reinforces the need to incorporate some interceptive strategy in either the nursing curriculum or in-service training.

Optimal nutrition during infancy and childhood is critical to ensuring optimal child health, growth and development. Studies have shown that infant and young child feeding is enhanced when women receive skilled support from healthcare personnel during antenatal, intra-partum, postnatal and follow-up care (DoH, 2013a). Breastfeeding and nutrition play a vital role in the development of a child. Breastfeeding promotes healthy jaw development and studies have shown that children who are breastfed are less likely to develop malocclusion or overcrowding of the teeth (Palmer, 1998). However, few nurses were aware of the link between oral health, poor eating and feeding practices, therefore, very rarely educate parents on oral health. Very few nurses directed mothers to health promotion messages in the RtHC,

informed parents of milestone development or information on when to start solid foods. The health promotion messages as to when children should start solid foods was poorly administered, as most mothers used their own initiative as to when to start their child on solid foods or stop breast- and bottle-feeding.

In the present study nursing staff reported being trained in anthropometric measures, in breastfeeding, weighing and immunization, but were never informed of the oral health section in the RtHC. Sixty nine children were breastfed exclusively for six months, while one-fifth of children were breastfed with no duration stated. According to a survey conducted by the DoH (2013a), mothers indicated that they could not breastfeed for the following reasons: they had to return to work, fears of HIV transmission and marketing of breastmilk substitutes.

This echoes a study conducted by Li *et al*. (2008) which found that parents stop breastfeeding within the first year. Nurses are informed via policy (DoH, 2005a) and were trained at nursing colleges on the importance of nutrition, breastfeeding and anthropometric measures in the RtHC. In the present study 59% of nurses completed the well-child visit and oral health promotion message on page 10 and 11 of the RtHC.

6.6 Lack of orientation to the RtHC

The purpose of the oral health section of the RtHC is monitoring of oral health for the detection, prevention and treatment of early disease. In the present RtHC the information that is recorded on page 20 (Appendix 6) records teeth that are present or absent in deciduous dentition. In the researchers opinion the present chart is left much to interpretation for the dental professional. There are no guidelines and criteria regarding the use of the oral health section in the RtHC. Crucially, there was no in-service training and no workshops for health professionals, oral health professionals included, were held prior to the implementation of the RtHC fourth edition.

The failure to provide criteria and training in the implementation of the oral health section in the RtHC has led to immense frustration and disillusionment among the health professionals. According to the present study the oral health section was not being used effectively, and thus its preventative and promotional benefits were lost. By incorporating a better structured page with appropriate guidelines for the dental professional to complete will make this section more useful. The researcher's recommendation is to have a dental chart and charting legend on which dmft is recorded and a section to indicate the amounts of plaque present, brushing habits and nursing practices recorded. This can be identified as a tick list, then anyone health professional can fill in the information and not restricted to just the dental professional.

The philosophy on the outlook of oral health needs to change; we need to stop treating the symptoms and should focus on the causes. The causes of dental caries is multifactorial which are stemmed from bad behavioural feeding practices to poor lifestyle, poor oral hygiene and beliefs of the parents, a lack of education in oral health and poverty. If these basic conditions are not addressed the plight of dental caries will never deter. Additionally, there must be a paradigm shift inter-disciplinary approach to health and oral health. The support from all health professionals, community engagement, change agents and one voice, one belief in the promotion of the importance of oral health.

The efficacy and intended success of the RtHC was to a large extent determined by the advocacy of health professionals. If those charged with the implementation of the oral section in RtHC failed to successfully drive the implementation process, then what chance of success can there possibly be? According to many health professionals in the present study who indicated that they were unaware of the oral section being included in the RtHC and many were surprized that an oral section was included in the 2011 version of the RtHC. This indicated to the researcher that there was a huge miscommunication with National Department of Health, Provincial and local level Department of Health.

The absence of guidelines and/or criteria may well lead to inconsistent practices, the inability to enforce accountability and to a lack of knowledge. Managers and all other stakeholders must be held accountable for filtering new information to employees working at ground level. If this is not the case, it will fail and not be sustainable (Rispel and Moorman, 2010).

It is crucial that health professionals are kept up to date with legislation and changes in guidelines, new protocols or tools. Staff should be informed by managers, through induction programmes, continuous development workshops, workshops and in-service training. When creating new tools for health professionals, there must be collaboration between all stakeholders for them to be utilised effectively. If for instance there is a lack of knowledge regarding the importance of oral health being part of general health, training in the importance of oral health must first be implemented. In this way applying new preventative tools will be more successful. Information can be useful only if there is an understanding of what the information is for and its purpose (Rispel and Moorman, 2010).

In the present study, participants, including a senior oral hygienist, clearly indicated that no further consultation was undertaken on the development of the oral health section in the present RtHC with the group of dentists and hygienists who had initiated initial input. As Makanyeza *et al.* (2013) and Balfour (2007) indicated, success of new policies occurs if there is consultation with the relevant health professionals on the policy structure and design. The lack of consultation on the structure and implementation of the oral health section in the RtHC has resulted in a lack of accountability among health professionals regarding its use.

The district health system is responsible for disseminating PHC services in an efficient and coordinated manner that links people with other components of the health system whenever needed. When new policies are implemented the information is filtered to provincial and local levels which are responsible for delivery and implementation of new strategies and tools at

the coal face. This delivery system can lead to difficulties in coordination across health services delivered by local and provincial levels (Balfour, 2007). At the provincial and local level, authorities need to manage change, and managers have to incorporate capacity building and resources for successful implementation. For a new policy or tool to be effective, goals and objectives must be clearly identified. Facility managers must provide guidance, training and education, which will promote partnerships and accountability among staff who need to implement change (Makanyeza *et al*. 2013).

Oral disease is a major public health problem, it impacts on health on individuals, communities, impairs function and quality of life. Research has shown that social inequalities, lack of knowledge education, lack of access to health care and resources are key elements in the cause of this disease. According to Pitts *et al*, 2011 the reason for the dental caries burden is the lack of oral health promotion, preventative strategies and non-surgical intervention. Therefore, the researcher recommends that stronger and more stringent oral health promotion programs be implemented. There must be monitoring, accountability and evaluation of implemented programs.

6.7 Accountability, including responsibility of the parents

Giving children the best start to life means ensuring their good health, proper nutrition and early learning, with early childhood development a collaborative initiative by parents, health services and communities (UNICEF, 2006). It is an integrated approach by all stakeholders for best practice of child development. Mothers should have access to resources, health promotion material and other support that will encourage parent-child involvement.

The vision of Dr David Morley who recognised the importance of child monitoring in the context of developing nations is noble and it proved to be very successful in the documenting of child illness and development (TALC, 2007). However, the glaring disparities and

inequalities which exist within the South African population, make RtHC efficacy problematic. To contextualize the above statement as to why RtHC cannot be as effective and efficient are due to parent's lose clinic charts due to factors such as nomadic lifestyles, informal settlement living, homelessness and more. As a result clinics do not have adequate long standing record of the child's growth and monitoring? The ideal would for electronic record systems. South Africa has PHC facilities in rural, peri urban and urban areas. The cost to National Government would be a huge financial strain, additionally, training to use computer generated systems would be an additional factor to consider. A limitation of this study which the researcher should have perhaps included was to include the private sector; private wellness clinics in the study. By including additional variables could have resulted in a different result.

Although much oral health promotion strategies are existing within communities, we have large pockets of marginalized communities that do not have access to care. As a researcher in this study I found that enough community engagement does not happen, the community need to be included in the decision making process. By including private health sectors in becoming involved in community engagement, offering health services for the much needed community, a sort of asocial responsibility, this can ease the burden of the state. According to United Nations Children Fund (UNICEF) (2015), governments need to be innovative and make access to health, education and better living conditions for all and not only those who can afford to. Innovations must engage users for active community participation, regarding orientating health services. Incorporating engagement with the community will develop into accountability. This engagement of community participation, leading to an increase in accountability will lead to better health outcomes. Greater social accountability can allow for society to engage meaningfully in public policy.

This initiative is a powerful approach to enable the engagement of communities in planning, monitoring and assistance in marginalized societies, which has been shown to increase opportunities for children, and thus advance equity and accountability. It is said that such engagements do exists within our communities, part of the problem according to Singh (2004) that programs are often not translated into practice or there is a lack of evaluation and monitoring of such initiatives.

Health professionals indicated during the interview for the present study that parents did not value the RtHC and were not orientated towards it. This was supported by the nurses, who explained during the focus group interview that *parents were irresponsible and did not value the information in the RtHC, as they often attended the clinics with their children but did not bring the RtHC. Charts often have to be replaced because they are damaged or lost. The nurses indicated that it created a problem in that there was no follow-through or documented evidence of health problems or baby-wellness visits and, therefore, nurses or health professionals did not have a point of reference to work from.* In the researchers considered opinion is that there is no education given to the parents at antenatal and postnatal clinics of the importance and value of the information within the RtHC. In the present study it was found that no particular health professional was responsible for the implementation of the oral health section in the RtHC. Nor had engagement with health officials taken place on the inclusion and, finally, the implementation of the oral health section in the present RtHC. Good governance to the degree it existed, therefore, relied on health professionals creating an awareness platform.

Health professionals working with the RtHC had to take responsibility for creating awareness, educating themselves and the parents on the new oral health section in the RtHC. Ideally, the information present in the RtHC and best practice concerning it should be reinforced prior to delivery or at antenatal visits to create an awareness of the value of the child health

monitoring tool. Successful implementation of a new strategy involves a range of people, from those who communicate or implement the strategy to the systems or mechanisms that are in place for co-ordination and control (Munyoroku, 2012). Implementation of new editions of child monitoring systems is a daunting task as it affects all levels of the country's health system, not only clinicians and health practitioners but also all auxiliary healthcare workers and parents (De Onis, 2011). By creating a supportive environment and an interface between different levels of governance, key stakeholders and organisations in other sectors, working together with shared responsibility will have better outcomes of implementing new tools (Kickbusch and Buckett, 2010).

Health professionals across the spectrum were never orientated to the new oral health section in the booklet, therefore felt disempowered, ill-informed and unappreciated.

6.8 Record of entry of oral health visit

The present study revealed a clear lack of knowledge on the importance of the first oral health visit and establishing a dental home for children. Health professionals did know of the importance of dental visits for children, however did know the importance of good nutrition and feeding practices.

Of the 243 records that were reviewed 2.9% children had had their teeth examined and RtHC signed by the time the first tooth appeared in the mouth. Two hundred and forty three, Road to Health Charts were reviewed in the study, 27% of the complete data set had an oral section completed. The full complement of results identified very poor and inadequate completeness of the oral health section of the RtHC.

The new revised RtHC includes health promotion messages which the health professional can refer the parent too (Appendix 9). In the present study these pages were inadequately completed and very few nurses made reference to the health promotion messages in the book.

According to the SANC, nurses were informed of, and trained on how to complete and refer caregiver/parent(s) to the health promotion messages. If nurses are trained and informed on the health promotion messages, this study found the information was still incomplete.

Very few health professionals took the time to complete the oral chart of the oral health section on page 20 (Appendix 6). During the interview nurses indicated that they had much to do and only if the mother indicates that the child has teeth problems do they refer the child to the dentist or medical doctor. Further, nurses indicated they never routinely look in the oral cavity or refer patients to a dentist for a dental check-up. Most did not take the time to familiarise themselves with the RtHC including the oral health section of RtHC. During the interviews, all health professionals expressed their lack of knowledge of the oral health section in the RtHC. Awareness of the RtHC in some instances occurred when the researcher came to the clinic.

6.9 Conclusion

This study showed that data recorded on the RtHC was incomplete and much of the information that was completed did not comply with the norms and standards prescribed in the Department of Health (RtHC) guidelines. It was also found that the oral health section in the RtHC was not utilised effectively by health professionals because information was recorded inadequately and/or not effectively and efficiently utilised. Registered nurses have been empowered by the Department of Health to render comprehensive healthcare and oversee the primary health care team. This objective of the completion of information within the RtHC was not fully implemented, there are incomplete nutritional and breastfeeding practices and oral health sections were poorly documented.

The hypothesis that the oral health section is not utilized and inadequate is proven.

6.10 Limitations of the study

In compiling the results of this study it became apparent that the researcher should have administered the health professional questionnaire as opposed to a self-administered questionnaire. In this way more detail from the questionnaire could have been extrapolated. What the researcher found that when health professionals administered their own questionnaire, many completed the questionnaire with little detail. If administered the researcher could have probed for deeper answers. In hindsight the researcher should have administered and collected her sample of the record base information of the RtHC directly, while the parent was sitting in the waiting room to be seen by the nurses. Parents not bringing the RtHC along when attending the clinic negatively impacted on the sample size, additionally parents losing the RtHC and having to be issued with new charts affected sample size and information collected.

This, nonetheless, goes some way to confirming one of the study's findings, which is that there is a lack of sufficient value placed on the RtHC tool, proving at an intuitive level that it is inadequately utilised by health professionals. The reasons for that have been explored as part of the discussion of the surveys.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

The compartmentalization involved in viewing the mouth separately from the rest of the body must cease because oral health affects general health by causing considerable pain and suffering and by identifying risk factors early as health professionals we can improve the quality of life of the community (Sheiham, 2005). Oral health services in South Africa have been traditionally fragmented, urban based and curative driven. This has resulted in an inadequate service to the broader part of the community. Providing curative care does not empower nor source the course of the dental disease burden. Evidence has shown that early interception, prevention and health promotion has worked in many countries globally to reduce this burden of disease. A decline in the prevalence and the severity of dental caries is particularly observed in countries having established public health programmes using fluoride for dental caries prevention, coupled with changing living conditions, healthier lifestyles, and improved self-care practices.

In Eastern Europe and Central Asia, there has been a reduction in dental caries. This has been largely attributed to intervention programmes and administration of fluoride to the community. Globally South Africa is compared to Brazil, our countries are regarded as very similar. Brazil has managed to reduce dental caries in their country by the introduction of low levels of fluoride, this is administered via subsidized toothpaste to the underserved communities in Brazil. With that said in other countries in Eastern Europe where the implementation of fluoride, oral health promotion strategies and tackling the identifiable risk factors such as: education, lifestyle practices, nutrition and behavioural patterns has helped and educate and reduced dental caries Petersen et al, 2016). Globally in Europe child monitoring are much more stringent and adhered to. Compulsory dental examinations of a child by non-dental professional can be conducted. By age 2 a child must have had a dental

consult, if not a preventive program is given to the parent to adhere to. Therefore, if we in South Africa want to be on the playing fields and be aligned to global standards South Africa has to come on board with more stringent intervention and child monitoring programmes.

The National Children's Oral Health Survey's (2003) epidemiological indices of oral disease in South Africa indicate that almost 80% of children suffer from dental decay. Dental caries affects quality of life, and impacts on nutrition, growth and weight gain (Sheiham, 2005). The World Health Organisation's (WHO) (2012) response to this global disease burden is to integrate oral health with national public health programmes and develop oral health promotion and oral disease prevention policies.

In order to redress dental neglect, the Department of Health (DoH) and City of Cape Town have strategized to re-engineer the primary healthcare (PHC) team to work as an interdisciplinary team. There is much talk of integration of healthcare delivery (Watt, 1997). Primary health care includes all areas of health, such as access to health services, environment and lifestyle. Challenges facing PHC include inadequate political, financial, human and material commitments; suboptimal use of available resources; changing management techniques including decentralization; and ensuring effective community participation and intersectoral collaboration (Dookie and Singh, 2012).

Primary health care (PHC) is oriented towards disease prevention and focuses on individuals and families. This level of care allows for early diagnosis and treatment management, and referral to secondary and tertiary care, thereby providing the potential for continuity of care (Singh, 2012).

Primary health care (PHC) workers are the first line contact for individuals, parent/s and communities at primary health care facilities. The Primary health care team is ideally placed to promote oral health within the context of general health (Watt and Fuller, 1997). This is

reiterated by Sheiham and Watt (2000), who report that by incorporating early prevention strategies in oral health promotion and incorporating a multidisciplinary approach, the chances of identifying and reducing the burden of oral disease are better.

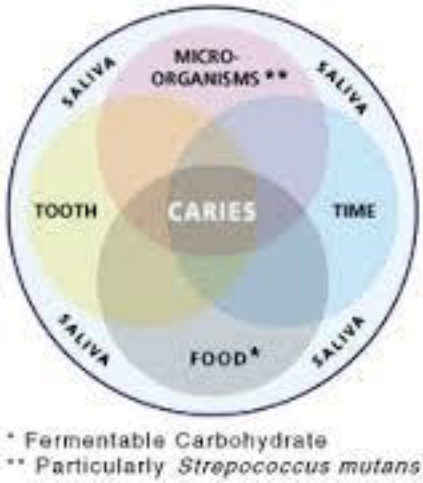
Comprehensive healthcare cannot be achieved unless oral care is included in all health service programmes (AAPD, 2011). In undertaking effective primary health care, child growth monitoring charts are expected to function as educational tools whereby mothers gain knowledge of growth, nutrition and the consequence of illness on growth. The WHO and the United Nations Children's Emergency Fund (UNICEF) have identified policies for alignment and ease of child monitoring. Child monitoring charts are endorsed and guided by WHO and UNICEF policies. South Africa is a member state of WHO and UNICEF and is therefore aligned to these policies.

Oral health is a critical component of health and well-being. Poor oral health is related to a range of diseases in adults and children. Routine oral healthcare examinations and services can help to prevent disease and also identify other conditions. To provide an integrated health system, health service needs to mobilize partnerships with all stakeholders: this includes doctors, dental professionals, allied health professionals, community and all PHC health care workers. The present study identifies a tool that can be used as an effective monitoring tool for early identification of early childhood caries.

The rationale for the above study is threefold. One was to address if South Africa has a child monitoring tool which includes the monitoring of oral health. Secondly was to identify how well it is utilized and who utilizes the chart. Thirdly, was to identify how well was the chart completed in demographics, nutritional practices and oral health.

Problem statement

Dental caries affects 80% of our population globally, Oral diseases remain a major public health problem in South Africa because of their high prevalence, severity, and impact on individual quality of life. The resultant effect of persistent oral health inequalities in access to care suggests that a greater burden is placed on the public sector to deliver equitable, cost-effective primary oral preventive services (Singh, 2011).Dental caries caused by multi factorial factors:



(Reference https://www.googleimages: accessed [online] 2 November 2106.

Child Monitoring

According to UNCEF and WHO (2003) growth monitoring and promotion are one of the most useful tools available in child health. Routine and regular growth monitoring and promotion is the easiest and quickest method available for the early detection of disease, developmental and nutritional problems, and for the positive reinforcement of behaviours that promote growth in children. This card provides clinics with useful information on children of parents who have to move frequently, such as up-to-date child health information like immunisation procedures and developmental charts (Harrison, 2009).

Nature of data recorded

The audits of the demographic data was well represented and administered. The researcher was pleasantly surprized that this information was well documented. It would be interesting to conduct further studies as to identify the role of fathers in child health and why the father's information was missing from the RtHC in this present study. There is the perception that administration at public health facilities are poor. The ideal would be if all primary health care facilities can become computer based and interlinked system are applied. This system will give the parents access to any clinic of convenience to them. The data will be interlinked and therefore health professionals will have the updated information required, it would accommodate for lost data of misplaced or lost RtHC.

Which health professional completes the oral health section in RtHC?

This objective is to identify who is responsible for completing the information required to be completed on page 20 (Appendix 6). Not to discuss the results again, I have to reiterate that the oral section was poorly completed (27%). There was no consensus as to who is responsible for completing this information. According to DoH protocol, dental professionals are responsible for the completion of this section. There was a lack of understanding from both dental professionals and health care professionals who were not sure why either parties could not complete the chart. This reinforces the fact that not one health professional was familiar with the outcomes and rules of the oral section in the present RtHC.

Nutritional and breastfeeding practices data

Similarly, breastfeeding, nutritional practices and health promotion messages were equally poorly completed, despite nursing staff indicating that they knew how to complete these sections. Therefore, the researcher questions if health professionals are armed with the

knowledge that must be completed in the RtHC, why is it not completed. From the information collated during the research it was clearly stated by dental professionals no one health professional was orientated to the oral section of RtHC. However, nursing professionals clearly indicated of being well aware of health promotion messages and nutritional information that must be completed. This reiterates the need for management to have continuous educational programs to reinforce and update the health care team.

Clearly, the rationale for the introduction and implementation of the oral health section in the RtHC cannot be faulted. Early detection of oral disease would result in early treatment, leading to an increase in the quality of life. As a monitoring tool, the RtHC has enormous merit. It aims to identify health issues at an early age. The tool is effective in theory as it promotes accountability if allied to self-education by caregivers and administered conscientiously by health professionals, but those who wield the tool have been shown to be lacking for a number of reasons. Further, while growth monitoring of infants and young children is accepted as one of the universal health pillars (Garner *et al.* 2000), this has been questioned over the years, with the purpose of assessing the growth patterns of children using growth charts found to have limited effectiveness in environments of low levels of literacy, where there is a minimum understanding of growth charts by mothers (Akram *et al.* 2000).

These findings were similar to a study conducted by Lotfi (1998) who determined that neither parents nor nurses used the child monitoring charts effectively. In this same study it was determined that the benefits as part of PHC services became evident through increasing contact and attendance, decreasing the prevalence of malnutrition, and establishing better nutritional practice for child development.

These findings reinforce the results found in the present study, where nurses and dental professionals were found to have received little or no in-service training on the effective use

and implementation of the oral section in the RtHC, which prolongs a systemic undervaluing of the monitoring tool in promoting effective primary health care. This failure, compounded by a lack of accountability at management level, greatly reduced the efficacy of the RtHC as a monitoring tool.

Health care professionals views on the RtHC

As noble and far-reaching as the aims of the oral health section in the RtHC may be, it needs to be asked if it has been effective in achieving its stated aims. Ideals are praiseworthy. Ambitious plans are to be supported. Both of these though need to be tested against their stated aims. The oral health section of the RtHC has failed as an effective monitoring tool because of inter alia poor management, a lack of training and breakdown in the accountability system, and until these issues are addressed the efficacy of the oral health component of the RtHC, and the broader tool itself quite possibly, will remain only a noble ideal.

The present study results indicated health professionals' knowledge of oral health was generally poor, meaning utilization of the oral health section of the RtHC was almost non-existent. Clearly, there was little or no emphasis by health professionals on the importance and value of the RtHC, and there was a lack of knowledge and importance of oral health promotion generally, including through healthy nutritional and breastfeeding practices.

Based on the information gained from the present study it was concluded that the oral health section of the RtHC was poorly implemented. There was a severe lack of knowledge on its inclusion in the RtHC. There was no clarity as to who is responsible for the completion of the oral health section. Further, there was no accountability or training for the health

professionals expected to implement and complete the oral health section. Dental professionals also needed to be accountable and responsible for the lack of information being recorded in the oral health section of the RtHC.

7.2 General recommendations

The findings of this study have documented an aspect of clinical practice but have also provided preliminary guidance on the nature of steps that are worth considering to assist health professionals in achieving optimum use of the oral health section of the RtHC tool, thereby providing more comprehensive child healthcare.

More specific recommendations applicable to the National Health Systems, Department of Health, health professionals and parents who have access to their child's RtHC include:

1. An index page directing the health professional and parent to specific information, this will prevent the parties wading unnecessarily through the book. For example, if a child has toothache, direct the parent or nurse to the relevant page.
2. Health messages such as:
    - The importance of the baby teeth,
    - Dangers of sweet sugar contents in a bottle,
    - Graphic images of dangers of sweets or sleeping with sugar contents in a bottle,
    - Positive health message of fruit intake,
    - Educational message of importance of brushing babies' teeth,
    - A picture of a dental professional with a child in a dental chair, and
    - Picture of a tooth brush with smear layer of toothpaste.
3. Protocol or emergency care guidelines if a tooth is knocked out of the child's mouth or if a tooth fractures, including referral guidelines for parents and health

professionals in the case of dental emergencies such as dental abscess and toothache.

4. Additional training for health professionals on the oral health section of the RtHC, which can be offered via continuous education programmes.
5. Capacity building of oral health education for other health disciplines especially nurses as they work most with the RtHC.
6. Guidelines for the health professional on how to complete the caries charting, this is a diagrammatic representation of the teeth showing all the surfaces of the teeth commonly called a "tooth numbering system" or "a universal charting legend".

The present study showed that nurses and dental professionals were not fully aware of norms and standards, as described in the Road to Health chart document published by DoH on the website, of the importance of monitoring nutritional and breastfeeding practice records and the oral health section in the RtHC. Health policy decision makers in South Africa, whose decisions filter from the National Department of Health to the local and district levels, have aligned with the WHO and UNICEF in adopting a global strategy for infant and young child feeding (WHO, 2014), which reinforces oral health, amongst other health benefits. The Department of Health wants to achieve early prevention and interception of oral diseases in the primary health care system and further recognises that this will be advanced through best practice child development monitoring. The most recent version of the child health monitoring RtHC implemented in 2011, therefore, included an explicit oral health section, which aimed to realise this aspect of effective disease prevention. This study, however, discovered that this initiative was being ineffectually implemented for the reasons discussed, though reform is possible.

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Office of the Deputy Dean
Research
Faculty of Dentistry & WHO Collaborating Centre for Oral Health

UNIVERSITY OF THE WESTERN CAPE
Private Bag X1, Tygerberg 7505
Cape Town
SOUTH AFRICA

Date: 29th August 2014

For Attention: Ms R Cader
Department of Oral Hygiene
Faculty of Dentistry
Tygerberg Campus

Dear Ms Cader

STUDY PROJECT: Evaluation of the use of the oral health section of the Road to Health Chart

PROJECT REGISTRATION NUMBER: 14/7/16

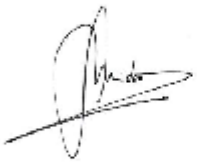
ETHICS: **Approved**

At a meeting of the Senate Research Committee held on Friday 29th August 2014 the above-mentioned project was approved. This project is therefore now registered and you can proceed with the study. Please quote the above-mentioned project title and registration number in all further correspondence. Please carefully read the Standards and Guidance for Researchers below before carrying out your study.

Patients participating in a research project at the Tygerberg and Mitchells Plain Oral Health Centres will not be treated free of charge as the Provincial Administration of the Western Cape does not support research financially.

Due to the heavy workload auxiliary staff of the Oral Health Centres cannot offer assistance with research projects.

Yours sincerely



Professor Sudeshni Naidoo

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For official use:
Research proposal number
WC_2015RP42_786

ANNEXURE 2 PROPOSAL SUMMARY

ANNEXURE 2 PROPOSAL SUMMARY	
Name of Institution/organisation conducting research	**UWC**
Name of Investigators	**Rugshana Cader**
Postal Address	**18 Reids Way** **Simonstown** **7975**
Telephone Number	0219373162/ 021 7862544
Fax number	**021 7864786**
Mobile Number	**0827107103**
Email Address	**rcader@uwc.ac.za** or **rcader123@gmail.com**
Institution which gave ethical approval	**UWC**
Date of Ethical approval	**Friday 29th August**
Date research expected to commence	**20 April 2015**
Proposed data collection dates at requested facilities	**4th May- 21 May**
Date research expected to end	**September 2015**
Date research reports should be expected	**October 2015**
Western Cape Districts where research will be done: **(Please mark with an X)**	**Metro ×** **Westcoast** **Cape Winelands** **Overberg** **Central Karoo** **Eden**
WC DOH Facilities where research will be done: **(Please list the name of the facility under appropriate category)**	**Tertiary Hospitals:** **District Hospitals:** **Community Health Centres:** **Clinics:** Cape Town Eastern Health sub-District: **Gustrouw Oral Health Service** **Macassar CDC** **Ikhwezi CDC**

Other facilities in the WC DOH where research will be done (Please specify)	Psychiatric Hospitals: TB Hospitals Other: Databases :
Research title	**The use of Road to Health Chart (RtHC) in monitoring children's oral health**
Research aim	How effective is the RtHC in monitoring oral health of children?
Research objectives	To determine if the oral health section is being completed To determine which health professional completes the form To determine the nature of data recorded in the oral health section of the RtHC
Key Words	Oral Health, Monitoring, Road to Health Chart
Brief description of methodology **(Please specify estimated sample size and duration of contact with each participant e.g. interview length, clinical exams)**	Probability sampling method, clinics will be chosen from the Cape Metropolitan area. Every member working with the RtHC stand a chance of being selected to take part in this study. A duty register will guide the researcher of the number of health professionals working in the child care clinic on the day the researcher goes to the clinic. A convenient sample will be extrapolated from the parent(s)/ caregiver who

	bring the children to the clinic. a questionnaire survey that will be administered to the healthcare workers (including the dentist, hygienist and dental therapist); (ii) a focus group discussion with the health professionals and (iii) a structured check-list to determine completion of the RtHC. The questionnaire should take 10 minutes and Focus group interviews will be conducted between 15-20 mins which will be recorded. The researcher will be the only person transcribing the focus interviews.	
Type of Study Design: e.g. Case Control, RCT, Survey	**Cross sectional, Descriptive study**	
Budget for research	**R30 000**	
Source of funding for the research	Self-funded	
The research will have implications for the requested facilities regarding:	**Yes or NO**	**If Yes what are these implications and how does your project plan to mitigate the impact**
1. Additional load on nursing		
2. Support services		
3. Consumables		
4. Laboratory tests		

5. Equipment		
6. Space	×	I will be present at the clinics possibly from 9am-12pm. Or I will accommodate a convenient time for the clinic on the understanding that the children's clinic should be operational during my presence. The reason being I need access to the clinic chart
7. Communications	×	I will have to communicate and engage with the health professional
8. Additional OPD visits		
9. Admission of patients		Permission to access the child patient Road to Health Chart for the quality assurance of information recorded on the chart

How will the sites be prepared to participate in your research?	The facility manager will be informed. I have prepared informed consent letters which will be given each health professional given them the option to partake in the study. The parents will be given a letter informing them the purpose of the study and that we require permission to access their children's clinical charts. The health professional will be informed about the 15-20 mins focus group discussion on the road to health chart×
Results dissemination plan **1. Tick which groups will be affected by your research findings**	Provincial managers ☐ District Directors ☐ Facility manager and staff ☐ Patients Community ☐ Other: My recommendation will be: if the Road to health is found not to be as user friendly, suggest changes in the design and details on the chart that need to be recorded. Therefore it may have an impact on printing a different oral health page. (please specify) _____
2. What is the earliest date or time frame from the end of research collection that the feedback (at least the minimum requirements*) will be expected? *** Minimum research findings feedback template**	Within one month □ Within one to three months □ Within three to six months ××□ Longer than six months □

Appendix 1: INFORMATON SHEET FOR CLINIC STAFF

PROJECT TITLE: Evaluation of the use of the oral health section of the Road to Health Chart

I am a registered student at University of the Western Cape studying my Master's Degree in Dental Public Health. The proposed study involves research on the evaluation of the use of the oral health section of the Road to Health Chart (RtHC). The literature indicates that this chart identifies best practice for child monitoring in terms of measuring of growth, feeding practices, importance of nutrition, immunizations. I will be evaluating how effectively utilised the oral health component of this chart is.

I would like to invite you to participate in this study and hope that you will be forthcoming with any information that we need. I am cognisant of the fact that you may have time restraints; however your participation will take no longer than 15-20 minutes of your time. The study will be conducted in three parts: (i) a questionnaire survey; (ii) a focus group discussion (at another time convenient to you) and (iii) a structured check-list to determine completion of the oral health section of the RtHC (done by me).

The study will help us to determine how effective is the RtHC in monitoring child oral health and identify any challenges, to see how we can improve the use of the chart more effective for both the parents and the health care professional

Your participation is voluntary and you can withdraw from the study at any time without penalty. All information you provide will be kept strictly confidential.

If you require any further information concerning the study please do not hesitate to contact me Ms R Cader on 021 9373162 (w) or e-mail: rcader@uwc.ac.za OR my Supervisor Prof S Naidoo suenaido@uwc.ac.za

Thanking you in anticipation

Ms R Cader

Appendix 1a: INFORMATON SHEET FOR PARENTS/CARERS

PROJECT TITLE: Evaluation of the use of the oral health section of the Road to Health Chart

I am a registered student at University of the Western Cape studying my Master's Degree in Dental Public Health. The proposed study involves research on the evaluation of the use of the oral health section of the Road to Health Chart (RtHC). As you know, this chart is a card that your need to regularly bring to the clinic to monitor how well you child is growing, your feeding practices, nutrition and records the immunisations that your child receive. I will be evaluating how the dental part of this chart is being filled in.

If you agree to participate in this study, we would require your permission to use your child's RtHC to evaluate the oral health section. All information from the card will be kept strictly confidential and your identity will be protected at all times. You also have the option to refuse to participate in this study and nothing will be held against you or your child. Your participation is voluntary and you can withdraw from the study at any time without penalty. All information you provide will be kept strictly confidential.

If you require any further information concerning the study please do not hesitate to contact me Ms R Cader on 021 9373162 (w) or e-mail: rcader@uwc.ac.za OR my Supervisor Prof S Naidoo suenaido@uwc.ac.za

Thanking you in anticipation

Ms R Cader

', Bellville 7535, South Africa
000 . F: +27 21 000 0000

Appendix 2: Informed Consent Form (HCW)

PROJECT TITLE: Evaluation of the use of the oral health section of the Road to Health Chart

Name of Researcher:

➢ I confirm that I have read and understood the information sheet for the above study and what my contribution will be	**Yes**	**No**
➢ I have been given the opportunity to ask questions (face to face, via telephone and e-mail)	**Yes**	**No**
➢ I agree to take part in the interview	**Yes**	**No**
➢ I agree to the interview being voice recorded	**Yes**	**No**
➢ I agree to the researcher disseminating the information collected in the following formats: thesis, conference presentations, published articles (journals and electronically)	**Yes**	**No**
➢ I understand that my participation is voluntary and that I can withdraw from the research at any time **without giving any reason**	**Yes**	**No**
➢ **I agree to take part in the above study**	**Yes**	**No**

Name of participant ……

Signature ……

Date ……

Appendix 2a: Informed Consent Form (Parent)

PROJECT TITLE: Evaluation of the use of the oral health section of the Road to Health Chart

REC Ref No:

Name of Researcher:

➢ I confirm that I have read and understood the information sheet for the above study and what my contribution will be	**Yes**	**No**
➢ I have been given the opportunity to ask questions (face to face, via telephone and e-mail)	**Yes**	**No**
➢ I agree to make my child's RtHC available for the research	**Yes**	**No**
➢ I agree to the researcher disseminating the information collected in the following formats: thesis, conference presentations, published articles (journals and electronically)	**Yes**	**No**
➢ I understand that my participation is voluntary and that I can withdraw from the research at any time **without any reason**	**Yes**	**No**
➢ **I agree to take part in the above study**	**Yes**	**No**

Name of participant ……

Signature ……

Date …….

Appendix 3: INFORMED CONSENT for Focus Group Discussion

RESEARCH PROJECT TITLE: Evaluation of the use of the oral health section of the Road to Health Chart

The focus group discussion will be a structured 10-15 minute interview with the researcher. The researcher, will audio tape the information which will be transcribed for analysis. Your signed consent to participate in the study is required before I proceed with the focus group discussions. If you are willing to participate in this study, please read the following and sign below.

- I hereby agree to participate in the focus group discussion which required opinion regarding the oral health section of the RtHC.
- I understand that I am participating freely and without being forced to do so in any way. I also understand that I can stop participating and withdraw from the study at any time should I decide to do so and that this decision will not in any way affect me negatively
- I understand that everything that is discussed in this group meeting is confidential and that all the participant's names will not be linked to anything that is said.
- I also agree to keep the content of the discussions confidential and not to repeat anything said by other focus group members or their identity to anyone outside of the group.

Name: ……

Signature: ……..

Date:……

Appendix 4 Check-list of information recorded in the RtHC

Clinic: _____ Serial No:

The use of Road to Health Chart (RtHC) in monitoring children's oral health

1. **Identification of personal information (sticker + pg.4)**

	Present	Absent
Child's name		
Child's ID		
Mother ID		
Date of Birth		
Facility where born		
Child's residential address		
Mother's name		
Mother's DOB		
Father's name		
Who does the child live with		

2. **Oral Health Section (pg.20)**

	Present	Absent
1st visit (first tooth)		
Age 12 months		
2nd year		
3rd year		
4th year		
5th year		

3. **Nutrition and diet**

	YES & duration	NO
Breast feeding practices (pg.2)		
Breast feeding practices (pg.10)		
Infant feeding guidelines (pg.11)		

Appendix 5 QUESTIONNAIRE FOR HEALTH PROFESSIONALS

Clinic: _____ **Serial No:** | | | |

1. **Qualifications**

Dentist	Dental Hygienist	Dental Therapist	Professional Nurse
PHC Nurse	Certified Nurse	Community Service	Other:

2. **Employment record**

Full-time	Sessional	Travelling to different sites	

3. **Is a dental clinic present at the facility**

YES	**NO**

4. If no dental clinic where are children to referred to if they have dental pain

……
……

5. **Are you aware of the oral health section in the RtHC booklet**

YES	**NO**

6. **If yes, who completes and signs the oral health section in the RtHC**

……
……

7. **If you complete it, is the oral health charting table (pg.20) easy to use?**

YES	**NO**

If no, why not

……..

8. **Are you confident to complete the oral health section in the RtHC.**

YES	**NO**

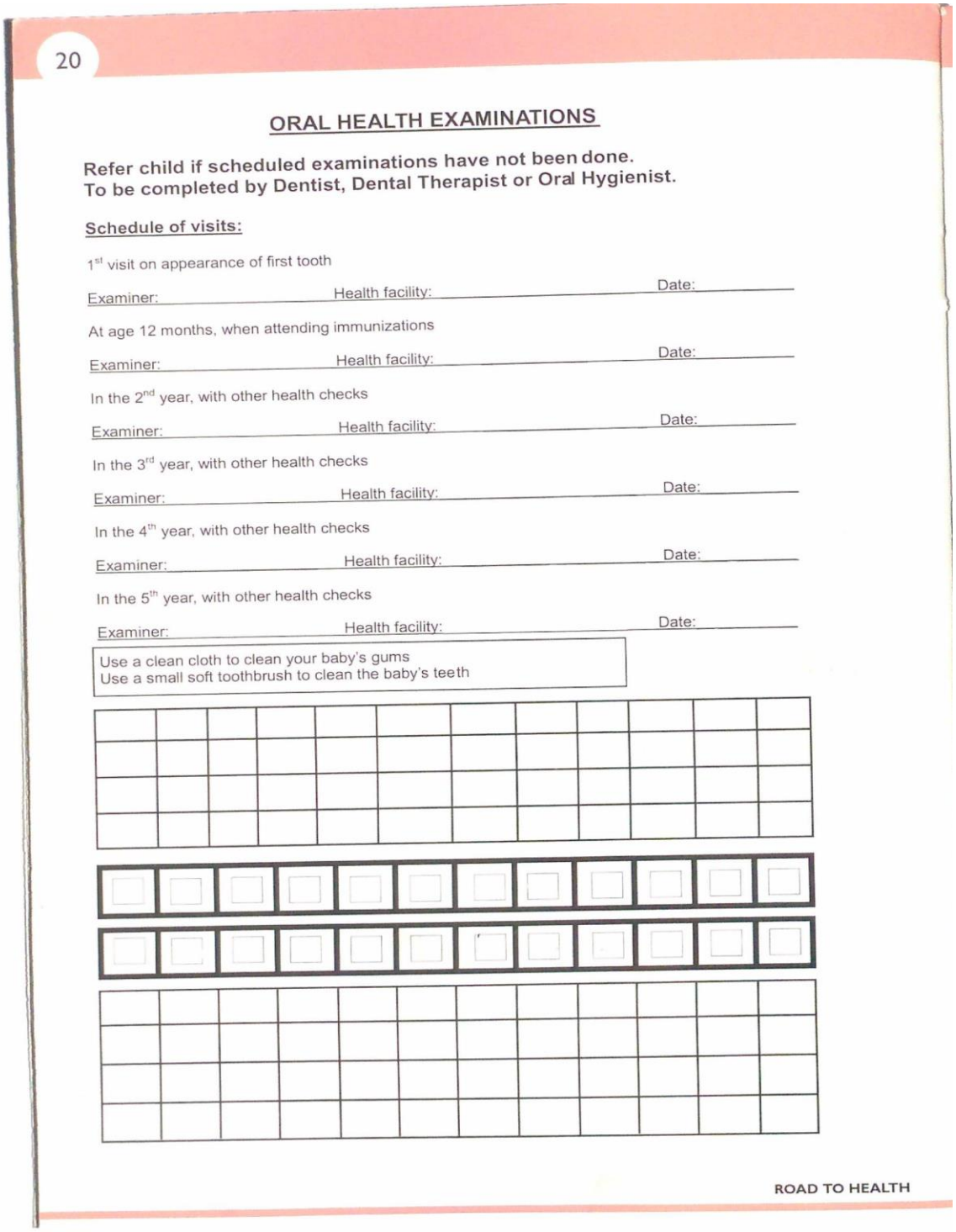
If no, why not

……..

9. **At what age do you think children should visit a dental professional?**

Appendix 6

Oral Section in RtHC page 20



20

ORAL HEALTH EXAMINATIONS

Refer child if scheduled examinations have not been done.
To be completed by Dentist, Dental Therapist or Oral Hygienist.

Schedule of visits:

1st visit on appearance of first tooth

Examiner: _____ Health facility: _____ Date: _____

At age 12 months, when attending immunizations

Examiner: _____ Health facility: _____ Date: _____

In the 2nd year, with other health checks

Examiner: _____ Health facility: _____ Date: _____

In the 3rd year, with other health checks

Examiner: _____ Health facility: _____ Date: _____

In the 4th year, with other health checks

Examiner: _____ Health facility: _____ Date: _____

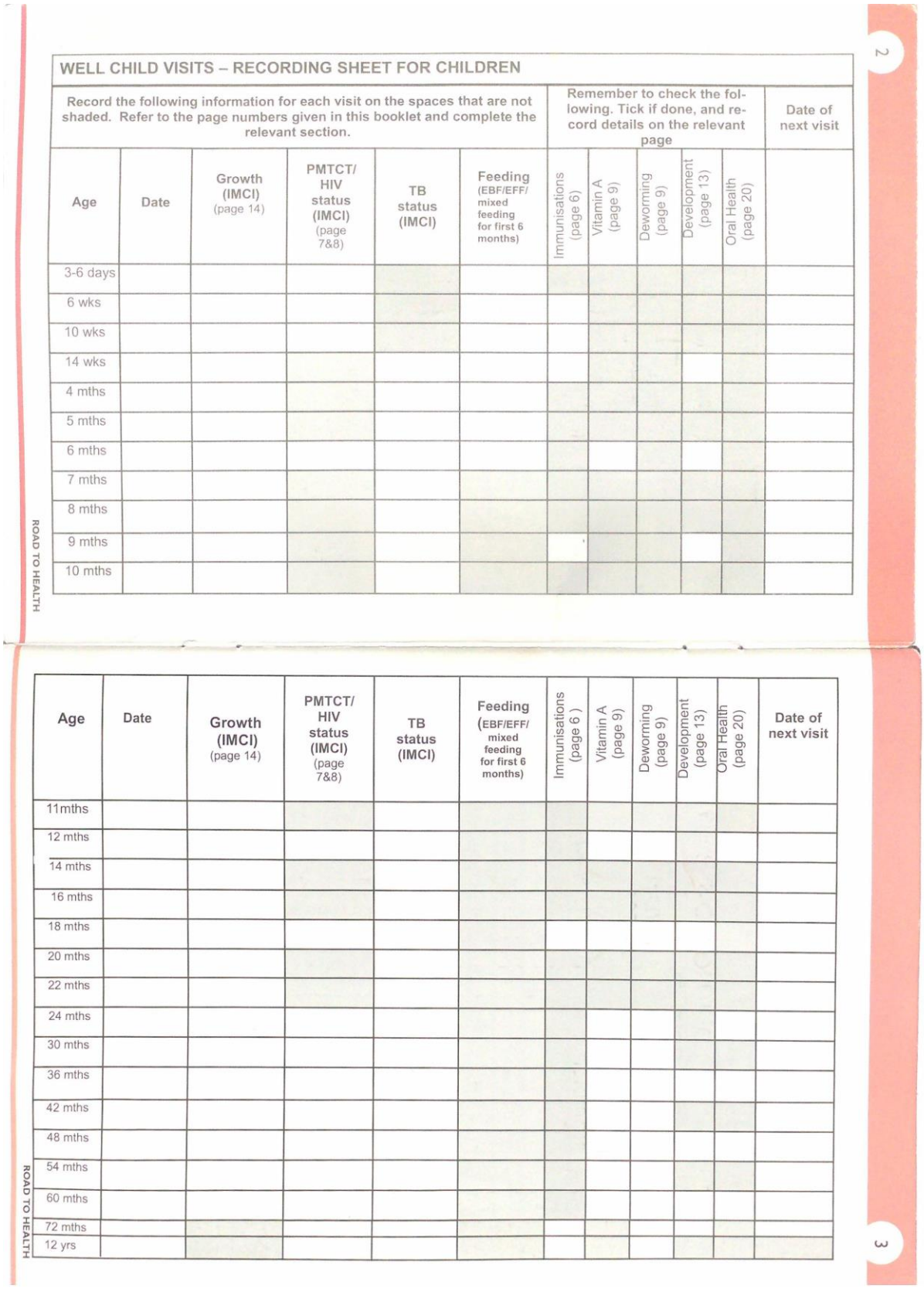
In the 5th year, with other health checks

Examiner: _____ Health facility: _____ Date: _____

Use a clean cloth to clean your baby's gums
Use a small soft toothbrush to clean the baby's teeth

ROAD TO HEALTH

Appendix 7-Child well visits



WELL CHILD VISITS – RECORDING SHEET FOR CHILDREN

Record the following information for each visit on the spaces that are not shaded. Refer to the page numbers given in this booklet and complete the relevant section.						Remember to check the following. Tick if done, and record details on the relevant page					Date of next visit
Age	Date	Growth (IMCI) (page 14)	PMTCT/ HIV status (IMCI) (page 7&8)	TB status (IMCI)	Feeding (EBF/EFF/ mixed feeding for first 6 months)	Immunisations (page 6)	Vitamin A (page 9)	Deworming (page 9)	Development (page 13)	Oral Health (page 20)	
3-6 days											
6 wks											
10 wks											
14 wks											
4 mths											
5 mths											
6 mths											
7 mths											
8 mths											
9 mths											
10 mths											

ROAD TO HEALTH

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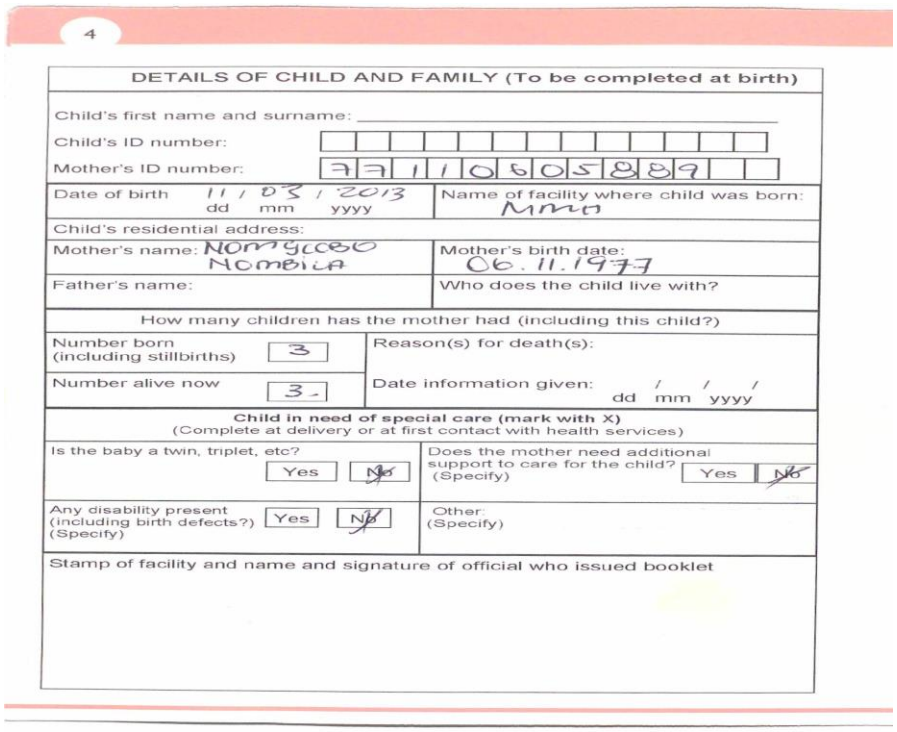
Age	Date	Growth (IMCI) (page 14)	PMTCT/ HIV status (IMCI) (page 7&8)	TB status (IMCI)	Feeding (EBF/EFF/ mixed feeding for first 6 months)	Immunisations (page 6)	Vitamin A (page 9)	Deworming (page 9)	Development (page 13)	Oral Health (page 20)	Date of next visit
11mths											
12 mths											
14 mths											
16 mths											
18 mths											
20 mths											
22 mths											
24 mths											
30 mths											
36 mths											
42 mths											
48 mths											
54 mths											
60 mths											
72 mths											
12 yrs											

ROAD TO HEALTH

3

Appendix 8- Demographic information



4

DETAILS OF CHILD AND FAMILY (To be completed at birth)

Child's first name and surname: _____

Child's ID number: | | | | | | | | | | | | | |

Mother's ID number: 7 7 1 1 0 6 0 5 8 8 9 | |

Date of birth 11 / 03 / 2013 (dd mm yyyy)	Name of facility where child was born: MMH
Child's residential address:	
Mother's name: NOMGCOBO NOMBILA	Mother's birth date: 06.11.1977
Father's name:	Who does the child live with?

How many children has the mother had (including this child?)

Number born (including stillbirths) 3	Reason(s) for death(s):
Number alive now 3	Date information given: / / / (dd mm yyyy)

Child in need of special care (mark with X)
(Complete at delivery or at first contact with health services)

Is the baby a twin, triplet, etc? Yes / No	Does the mother need additional support to care for the child? (Specify) Yes / No
Any disability present (including birth defects?) (Specify) Yes / No	Other (Specify)

Stamp of facility and name and signature of official who issued booklet

Appendix 9- Health promotion message page11

HEALTH PROMOTION MESSAGES

6 - 12 months

Feeding:

For all children start complementary foods at 6 months

- Continue breastfeeding;
- Always breastfeed first before giving complementary foods;
- Start giving 2—3 teaspoons of mashed dried beans and/or locally available animal foods daily to supplement the iron in the breastmilk. Examples include egg (yolk), minced meat, fish, chicken/chicken livers, mopani worms. Give soft porridge, vegetables and then fruit;
- Gradually increase the amount and frequency of feeds.
- Children between 6—8 months should have two meals a day. By 12 months this should have increased to 5 small meals per day, whilst frequent breastfeeding continues;
- Offer your baby safe, clean water regularly;
- If the baby is not breastfed, give formula or at least 2 cups of full cream cow's milk (cow's milk can be given from 9 months of age)

Play: Give your child clean household things to handle, bang and drop.

Communicate:

Respond to your child's sounds and interests. Tell your child the names of things and people.

Encourage feeding during illness Suggest an extra meal a day for a week after getting better

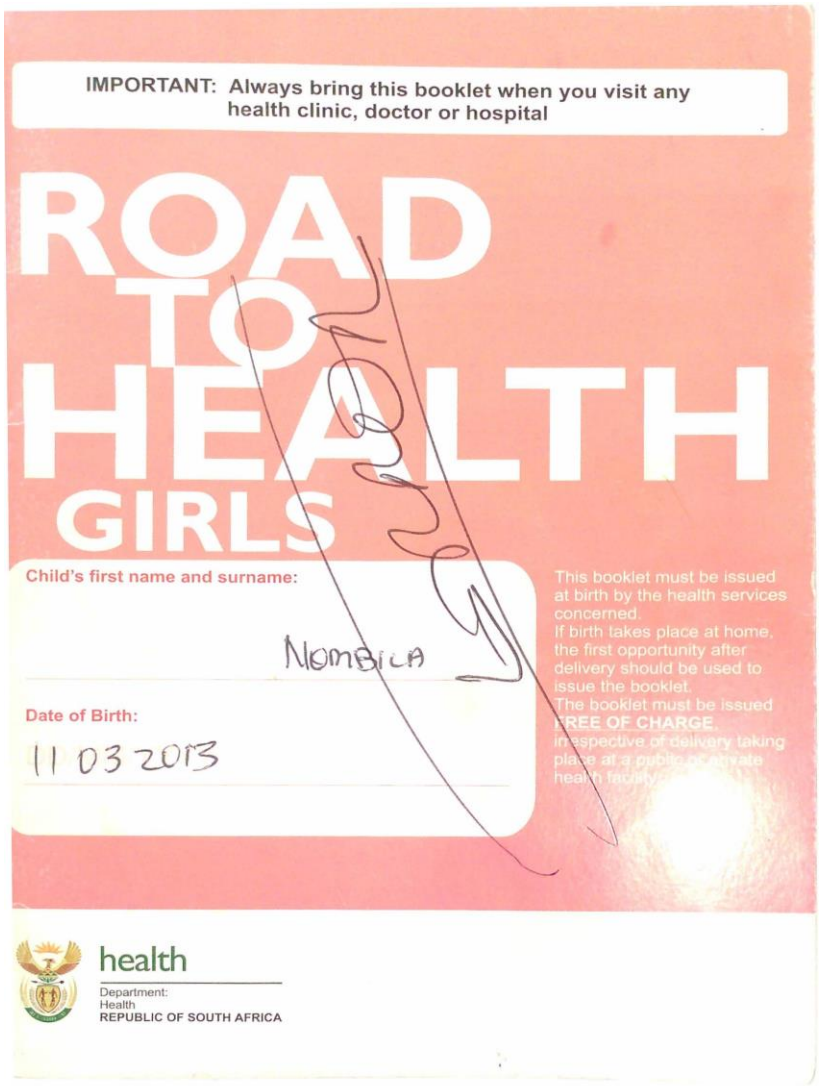
Feeding recommendation for DIARRHOEA

- Follow feeding recommendations for the child's age, but give small frequent meals (at least 6 times a day);
- Give a sugar-salt solution (SSS) in addition to feeds. Give SSS after each loose stool, using frequent small sips from a cup (half cup for children under 2 years and 1 cup for children 2—5 years). If the child vomits, wait for 10 minutes then continue, but more slowly

How to prepare a sugar-salt solution (SSS) at home

ROAD TO HEALTH

Appendix 10- Front cover RtHC



IMPORTANT: Always bring this booklet when you visit any health clinic, doctor or hospital

ROAD TO HEALTH GIRLS

Child's first name and surname:

NOMBICA

Date of Birth:

11 03 2013

This booklet must be issued at birth by the health services concerned.
If birth takes place at home, the first opportunity after delivery should be used to issue the booklet.
The booklet must be issued **FREE OF CHARGE**, irrespective of delivery taking place at a public or private health facility.

health
Department:
Health
REPUBLIC OF SOUTH AFRICA