

**COMPARISON OF KNOWLEDGE, ATTITUDES AND BEHAVIOUR
OF TEACHERS AND LEARNERS
REGARDING A SCHOOL-BASED ORAL HEALTH PROGRAMME
IN SWAKOPMUND, NAMIBIA.**

LINDA AUDREY GARISES



A minithesis submitted in partial fulfilment of the requirements for the degree of Master of Public Health, in the School of Public Health, University of the Western Cape.

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WESTERN CAPE
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KEY WORDS

Dental caries

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Prevalence of oral diseases

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Knowledge and attitude

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Swakopmund

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ABSTRACT

Background: Dental caries and gingivitis are reported to affect 60-90% of school children in most countries (World Health Organization, 2003). Learners in the Swakopmund district of Namibia were examined and it was found that 73% and 89% of them were affected by dental caries and gingivitis respectively (Ministry of Health and Social Services, 2003). This district has implemented an oral health programme at primary schools with the aim of reducing the prevalence of dental caries and gingivitis.

Aim: To compare knowledge, attitudes and behaviour of teachers and learners in response to the school-based oral health programme at four primary schools in Swakopmund district.

Study Design: This study is a cross-sectional survey that compared the responses of learners from high participating schools to those from low participating schools. The total sample was 186 participants comprising of 159 learners and 27 teachers.

Data Collection: Structured, self-administered questionnaires were used for the teachers whilst learners were interviewed by the researcher and research assistants using structured questionnaires. Data on knowledge of risk factors for dental caries and gingivitis as well as attitude and behaviour towards prevention of these diseases at school were collected.

Data analysis: Data were captured in Microsoft Excel Programme and imported to CDC Epi Info 2002 version 3.3 for analysis. Prevalence ratio (PR) was used as a preferable measure of effect at 95% confidence interval. Chi-square test was used to assess statistical significance of the proportional differences between high and low participating schools and the cut off point for statistical significance was a p-value < 0.05.

Results: Learners from low participating schools were more knowledgeable than learners from high participating schools in most of the knowledge questions and the results were statistically significant. There were positive oral health practices and attitudes reported by the learners with minimal differences between high participating and low participating schools and consequently the results were not statistically significant. The results for the variables knowledge, behaviour and attitudes for the teachers were not statistically significant. Teachers from both high and low participating schools exhibited high levels of knowledge and positive oral health behaviours and attitudes. However, teachers reported some shortcomings in the programme which included lack of: toothbrushes, parental involvement, time for oral health activities, regular workshops and educational materials.

Conclusion: The study revealed that learners and teachers from both high and low participating schools had positive oral health knowledge, attitudes and behaviour towards oral health. However, certain socio-environmental factors which are important determinants of oral health could explain the reasons for low participation in oral health programme by some schools. Therefore the Health Promoting Schools approach is a pragmatic way to promote oral health at schools in Swakopmund district because a Health Promoting School has a healthy public policy that creates a supportive environment for oral health, making healthy choices easier.

DECLARATION

I declare that *Comparison of Knowledge, Attitudes and Behaviour of Teachers and Learners Regarding a School-based Oral Health Programme in Swakopmund, Namibia* is my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

Linda Audrey Garises

May 2008

Signed:



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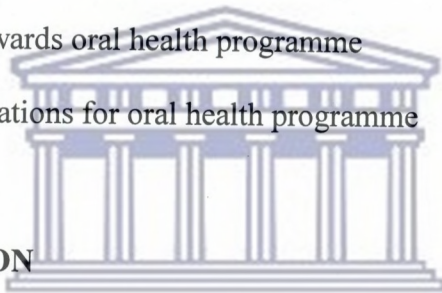
TABLE OF CONTENTS

CONTENTS	Page
Title page	i
Keywords	ii
Abstract	iii
Declaration	v
Acknowledgements	vi
Content page	viii
List of figures	xi
List of tables	xii
CHAPTER 1. INTRODUCTION	1
1.1 Background	1
1.2 Swakopmund District in context	3
1.3 School Oral Health Programme	4
1.3.1 Programme inputs	4
1.3.2 Process of the programme	6
1.3.3 Programme expectations	7
1.3.4 Programme constraints	8
1.4 Formulation of the problem	8
1.5 Problem statement	10
1.6 Purpose of the study	11
1.7 Organization of the report	11

CHAPTER 2. LITERATURE REVIEW	13
2.1 Prevalence of dental caries in children	13
2.2 Contributing factors to development of dental caries and gingivitis	15
2.3 Prevention of dental caries and gingivitis	18
2.4 Knowledge, Attitudes and Behaviour in health promotion	21
2.5 School-based oral health promotion programmes	24
CHAPTER 3. AIMS	29
3.1 Aim	29
3.2 Objectives	29
CHAPTER 4. METHODOLOGY	30
4.1 Study design	30
4.2 Study setting	31
4.3 Study population	32
4.4 Sample size	32
4.5 Sampling procedure	33
4.6 Data collection	34
4.7 Data collection tool	35
4.8 Data analysis	37
4.9 Validity	38
4.10 Reliability	39
4.11 Generalisability	39
4.12 Limitations	40
4.13 Ethical considerations	42



CHAPTER 5. RESULTS	43
5.1 Introduction	43
5.2 Demographic characteristics	43
5.3 Learners' Results	45
5.3.1 Oral health knowledge	45
5.3.2 Oral health behaviours	48
5.3.3 Attitudes towards oral health programme	49
5.4 Teachers' Results	50
5.4.1 Oral health practices	50
5.4.2 Attitudes towards oral health programme	52
5.4.3 Recommendations for oral health programme	52
5.5 Summary of results	53
CHAPTER 6. DISCUSSION	54
6.1 Learners' Data	54
6.1.1 Factors influencing knowledge	54
6.1.2 Oral health practices	56
6.1.3 Attitudes towards oral health programme	58
6.2 Teachers' Data	58
6.2.1 Knowledge on oral health	59
6.2.2 Oral health programme practices of teachers	59
6.2.3 Attitudes towards oral health programme	61
6.3 Perceived contributing factors for a successful oral health programme	62



UNIVERSITY of the
WESTERN CAPE

CHAPTER 7. CONCLUSION AND RECOMMENDATIONS	68
7.1 Conclusion	68
7.2 Recommendations	70
7.2.1 Short term	70
7.2.2 Long term	70

REFERENCE LIST	72
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APPENDICES

Appendix 1. Learners' Questionnaire	77
Appendix 2. Teacher's Questionnaire	80
Appendix 3. Evaluation of the piloting stage data	84
Appendix 4. Participation in the oral health programme	85
Appendix 5. Problem analysis diagram and criteria for problem selection	86
Appendix 6. Participant Information Sheet	87
Appendix 7. Informed Consent	89
Appendix 8. Permission for the research	91 & 92

LIST OF FIGURES

Figure 1. Risk factor approach in oral health promotion	17
Figure 2. Age distribution of the learners	44
Figure 3. Gender distribution of the learners	44
Figure 4. Teachers' recommendations	53

LIST OF TABLES

Tables 1.1-1.7	Learners' oral health knowledge	47
Tables 2.1-2.4	Learners' oral health behaviours	49
Tables 2.5-2.6	Learners' attitudes	50
Tables 3.1-3.4	Teachers' oral health practices	51
Table 4.1	Teachers' attitudes	52



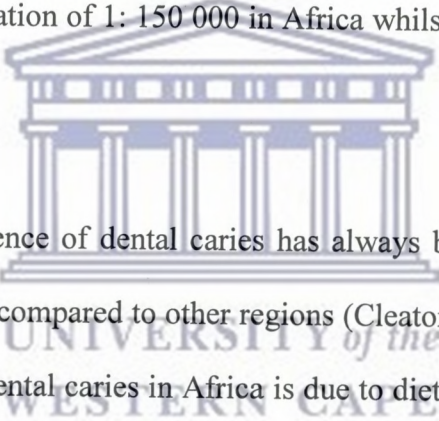
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CHAPTER 1

INTRODUCTION

1.1 Background

Dental caries and gingivitis are reported to be the most prevalent conditions in human populations especially in the developing countries (Stella, Kwan, Petersen, Pine & Borutta, 2005). According to the World Health Organization (WHO) (2004), an estimation of five billion people worldwide had experienced dental caries. Ninety percent of dental caries remain untreated in developing countries due to the shortage of manpower as reflected by the ratio of a dentist to population of 1: 150 000 in Africa whilst in the developed countries it is 1:2000 (WHO, 2004).



It is reported that the prevalence of dental caries has always been low in the developing countries including Africa as compared to other regions (Cleaton-Jones & Fatti, 1999). The increase in the incidence of dental caries in Africa is due to dietary behaviour and nutrition that are undergoing transition in most developing countries, particularly the rapid growing consumption of sugar (Enwonwu, Phillips, Ibrahim & Danfillo, 2004). According to WHO (2003a), the average Decayed Missing Filled Teeth index (DMFT) among 12 year olds in developing countries has increased from 1.5 in 1980 to 2.5 by 1998 whilst during the same period developed countries showed a decrease from DMFT of 5 to 2.5 among the same age group.

Dental caries and gingivitis affect both adults and children but the latter have been shown to be mostly affected.

Stella *et al* (2005) reported that in some countries over 80% of school children have been affected by dental caries and gingivitis. Furthermore, the same authors reported that 50 million school hours are lost annually because of oral health problems including dental caries. Therefore there is evidence that dental caries and gingivitis are public health problems. This is due to their high prevalence, high public demand for their treatment and impact on individuals in terms of pain, discomfort, social and functional limitations (WHO, 2003a).

Several studies reported that school-based oral health programmes have not been successful in reducing the prevalence of dental caries and gingivitis (Kay & Locker, 1998). Some of the reasons for the programmes not being successful in either improving or sustaining long term improvements of oral health included oral health professionals working in isolation without integration of their efforts into other health programmes, and with interventions that only target specific behaviours (Petersen, 2005a). Successful school oral health programmes are reported at schools that have a holistic approach towards improving health of the learners. These are schools where oral health has been embraced by the entire education authorities including the principal, the staff, the learners, parents and the entire community. It is in schools where the school oral health programme has been guided by the principles of health promotion and the Health Promoting Schools approach which embraces the development of healthy policies, creates supportive environments, involves the community, develops personal skills to improve knowledge, attitudes and behaviours and are supported by health services that are responsive to the needs of the community they serve (WHO, 2003b).

In Namibia a National School-based Oral Health Promotion Programme known as “Smiling Schools of Namibia” has been implemented since 1997 in the regions and districts where there are dental personnel for implementation as well as for monitoring and evaluation of the programme.

1.2 Swakopmund District in context

Swakopmund district is the west coastal district of Erongo region in Namibia. The district is composed of three towns namely Swakopmund, Henties Bay and Arandis. A 60-kilometer road eastwards links Swakopmund to Arandis and a 75 kilometers road northwards links Swakopmund to Henties Bay. One of the biggest uranium mines in the country, Rossing Uranium Mine, is situated near Arandis town. The district is a tourist destination whilst at the same time it is a choice of retirement, especially amongst the affluent. Hence the district is comprised of the affluent minority and poor majority (MoHSS, 2005). The main source of income in the district is salaries (73%) and the unemployment rate is 30% (NPC, 2003). The age composition of the district is such that less than 5 years is 10%, 5 to 14 years is 17%, 15 to 59 years is 67% and 60 years and above is 6% of the population. The total population for the district is an estimate of 33 900 people and the majority (26 310) stays in Swakopmund town (NPC, 2003).

Public health care services for Swakopmund district comprise of three state clinics, one in each of the three towns and a hospital which is situated in Swakopmund town. Dental services are only rendered from the hospital. The dental personnel for the district constitutes of an oral hygienist (school oral health programme coordinator for the district), dental therapist, a dental assistant and the regional dentist. However, the latter is

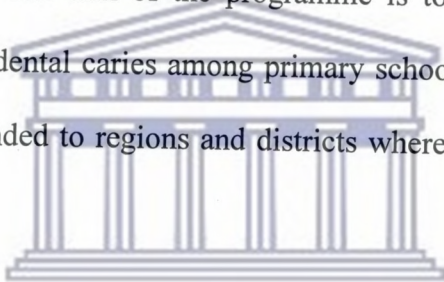
responsible for the entire region which is comprised of four districts including Swakopmund with a population of 107 663 people (MoHSS, 2008).

The district has eleven government primary schools and ninety percent of the children attend school (NPC, 2003).

1.3 School Oral Health Programme

1.3.1 Programme inputs

The school-based oral health programme was introduced in Namibia for the first time in Windhoek from 1996-1998. The aim of the programme is to reduce the incidence and prevalence of gingivitis and dental caries among primary school learners in Namibia. The programme was further extended to regions and districts where there are dental personnel (MoHSS, 1998).

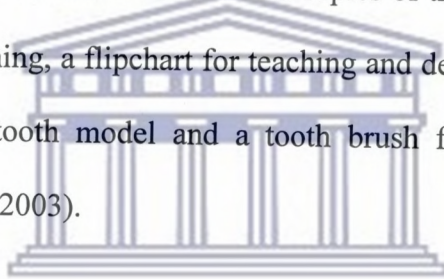


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In Swakopmund district the programme was implemented in the year 2000. This was commenced with a piloting stage whereby a baseline survey was conducted at three primary schools by the district's oral health team to assess the oral health status of learners in Swakopmund district. The piloting stage was funded by Africa Groups of Sweden (AGS), a Non-Governmental Organization that provided a consultant to structure oral health and dental services as well as to develop a National Oral Health Policy for Namibia. The baseline data revealed that although 75% of the learners stated that they brushed their teeth on a daily basis only 11% had healthy gums. Equally only 11% of the learners knew that dental plaque is the cause of bleeding gums, 62% of them had bleeding gums, whilst 22% and 7% had dental calculus and shallow pockets respectively. Seventy three percent of

the learners were affected by dental caries and they presented a DMFT of 2.7 among the 12 year olds (See Appendix 3) (MoHSS, 2003).

Training workshops were conducted for the teachers on the implementation of the oral health programme at school. The training covered topics such as the role of primary school teachers in oral health promotion; basic oral anatomy; importance of teeth including primary teeth; dental plaque; gingivitis and dental caries including the role of diet and fluorides in dental caries; tooth brushing and toothpaste techniques and oral health education. Each participant in the workshop was given a package of education material which comprised of a manual which covered all the topics of the workshop and classroom activities for oral health teaching, a flipchart for teaching and demonstration which was the replica of the manual, the tooth model and a tooth brush for demonstration of tooth brushing technique (MoHSS, 2003).



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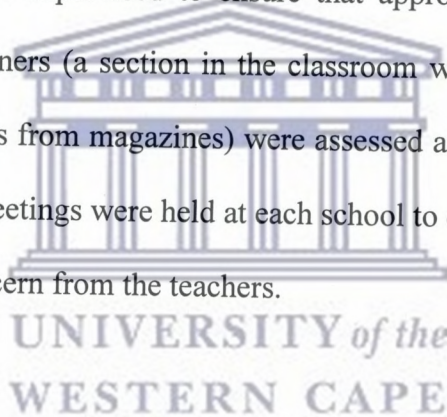
Parents were also sensitized through parents' awareness day, parents meeting and through school boards. Parents were made aware that their role in the programme would be to provide their children with tooth brush and toothpaste ensure that learners consume less sugary food, encourage learners to brush their teeth at home and that they should be cooperative when teachers require their assistance on matters pertaining to the programme (MoHSS, 2003).

In 2002 the programme was officially endorsed by the Director from the Ministry of Health's National Level who was also chosen by the district to be the patron of the programme for Swakopmund district. During the same event, the Floating Trophy

Competition was officially launched by the director. This Competition was meant to ensure sustainability of the programme as this was also the last year for the sponsorship of Africa Groups of Sweden donor organization. The competition consists of three trophies and the three best performing schools each year are awarded with these trophies during the annual commemoration of the National Oral Health Day in the district (MoHSS, 2003).

1.3.2 Process of the programme

Scheduled supportive visits were conducted in the schools to assist the teachers with the implementation of the programme. During these visits oral health education was given, tooth brushing sessions were supervised to ensure that appropriate technique was used correctly and oral health corners (a section in the classroom with oral health information such as drawings and pictures from magazines) were assessed and advice was given where necessary. Thereafter staff meetings were held at each school to discuss findings of the visit and to discuss matters of concern from the teachers.



Data were collected from the schools during each of the three school terms. This was data on the frequency of tooth brushing sessions, percentage of learners that participated in tooth brushing sessions and on percentage of learners with bleeding gums. Data was analyzed and feedback was given to the schools during schools' visits and during the oral health steering committee meetings.

The Oral Health Steering Committee is the body that oversees the oral health programme in the district. The planning of the programme's activities, monitoring of programme activities, lobbying of support and organization of events like Floating Trophy Competition

and National Oral Health day commemoration, are some of the responsibilities of the Committee. Membership is secured by the contact teachers from the schools that are participating in the programme, the school and health programme coordinator from Rossing Foundation (an NGO), the district's school health team, the Primary Health Care supervisor for the district and the district's oral health team (oral hygienist, dental therapist, dental assistant and the regional dentist). The chairperson of the Committee is the regional education officer from the Ministry of Education's Erongo regional office. Meetings are held three times a year, during each of the school terms. However, when there is need, ad hoc meetings are held.

1.3.3 Programme expectations

It is expected that at schools that are implementing the oral health programme, learners should be taught about the risk factors and prevention for gingivitis and dental caries and on the role of diet in dental caries. In addition it is expected that each class group should have an innovative oral health corner with clear oral health messages and this should be developed by both the class teacher and the learners. Furthermore it is expected that at these schools recommended tooth brushing techniques are demonstrated to the learners by the teachers, with emphasis of the importance of using fluoridated tooth paste. It is also expected that tooth brushing sessions are to be held at least twice a week whilst learners are encouraged to brush their teeth everyday at home. Furthermore a tooth brushing statistics form should be completed every time when tooth brushing takes place and this should indicate the number of learners who brushed at that time and a number of those with bleeding gums at the time. Teachers should then submit regularly a summary of the monthly tooth brushing statistics to the oral health contact teacher for the school.

1.3.4 Programme constraints

The constraints in the programme are inadequate resources such as transport to conduct visits to schools and other activities in an efficient and effective manner. Other constraints are lack of funds to be able to have regular workshops for the teachers, to sustain annual events like the Floating Trophy Competition and the National Oral Health day, to assist needy learners with tooth brushes and tooth paste and to regularly produce and distribute educational materials for the schools. Another shortcoming is the inadequate resources for dental services to enable provision of identified treatment needs for the learners.

1.4 Formulation of the problem

In 2004, which marked the end of the piloting stage, the oral health programme was evaluated. The examiner of the learners was the same person who examined them in 2001, the regional dentist. There were noticeable effects on the oral health status of the learner as compared to 2001's survey. In 2004, 41% of the learners had healthy gums, 39% had bleeding gums, 17% had dental calculus and only 3% had shallow pockets and 64% of the learners had dental caries presenting with a DMFT of 2.3 among the 12 year olds which was higher than the average DMFT of 1.2 for the country amongst children of the same age group (MoHSS, 2005). (See Appendix 3).

The Health Information reports of 2000-2004 revealed that dental caries was one of the top ten causes of Out Patient Department visits in Swakopmund hospital. Furthermore the school health services reports of Swakopmund district for 2000-2004 showed that dental caries and gingivitis were among the top five diseases at schools (MoHSS, 2005).

Sugar consumption has been found to play a major role in the occurrence of dental caries (Rugg-Gunn & Nunn, 1999). According to the Central Bureau of Statistics (2006) there is an increase in the sugar consumption in Namibia as shown by the import expenditures for sugar, honey and confectionary that almost doubled during the period of 2003 and 2004.

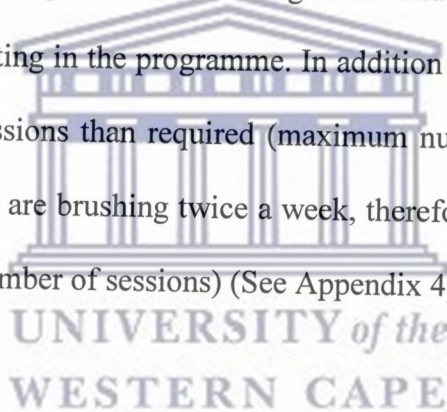
Furthermore empirical evidence revealed that fluoride was crucial for prevention of dental caries because it has a potential to lower the aggressiveness of dental plaque (Featherstone, 2000; Marthaler, 2004). Optimal levels of fluoride in water were found to have 20-40% reductions in caries over a lifetime (Daly, Watt, Batchelor & Treasure, 2002). In addition systematic reviews found that fluoride in water can reduce the prevalence of dental caries by 15% or by 2.2 DMFT (McDonagh, Whiting, Wilson, Sutton, Chestnut & Cooper, 2000, as cited by Petersen & Lennon, 2004). However, the fluoride concentration in water in most towns of Namibia is below what is considered as optimal concentration for the prevention of dental caries (Namibia Water Corporation, 2006). For countries with a maximum daily temperature of 32.5 degrees Celsius like Namibia the recommended limit for prevention of dental caries is 0.7mg of fluoride per liter of water (Featherstone, 2000). Most residential areas of Swakopmund district have a concentration of 0.4mg of fluoride per liter of water, 0.5-0.6mg of fluoride per liter of water is found mostly in private owners' reservoirs of water sources (Namibia Water Corporation, 2006), which is close to the optimal levels.

The experience of dental caries is further exacerbated by the fact that the district is challenged with limited human resources to deal with the consequences of the disease. This is portrayed by the ratio of dentist to the population, 1 dentist per 6000 inhabitants of

Swakopmund (MoHSS, 2005). Moreover due to inadequate dental equipment and instruments in Swakopmund dental clinic, the service is merely of an emergency nature. This confirms what was noted by Thorpe (2006) that due to the presence of several general health problems, low priority is given to oral health care in Africa.

1.5 Problem statement

Since 2001 Swakopmund district has implemented a school-based oral health programme at eight of the eleven government primary schools. The aim of the programme is to reduce the prevalence of dental caries and gingivitis amongst learners. It was noticed that at some schools, despite several meetings with the management and staff, a large number of learners are still not participating in the programme. In addition these schools have a lesser number of tooth brushing sessions than required (maximum number of brushing sessions should be 8 per month if they are brushing twice a week, therefore less than 6 sessions per month is regarded as a low number of sessions) (See Appendix 4).



This issue was discussed by the Oral Health Steering Committee. The Committee was concerned because although the evaluation of 2004 revealed that there were some improvements made in the oral health status of the learners, 39% of the learners still had bleeding gums and 17% had dental calculus. In addition 64% of the learners were still affected by dental caries. Therefore it was decided that if the aim of the programme was to be achieved, reasons for this low participation in the programme by some schools should be explored. It was decided that a study should be conducted to determine the level of knowledge of teachers and learners on the risk factors and prevention of dental caries and gingivitis as well as assessing their oral health behaviours and attitudes towards prevention

of these oral diseases at school (See Appendix 5). In this document oral health behaviours and oral health practices are used interchangeably especially in relation to teachers.

1.6 Purpose of the study

The purpose of the study was to determine reasons for high or low participation in the oral health programme by schools that are implementing the programme. This was done by comparing knowledge on the risk factors and prevention of dental caries and gingivitis as well as oral health behaviour and attitudes towards prevention of these diseases between teachers and learners from schools with high participation and those with low participation in the programme. It is expected that the study will facilitate the identification of the shortcomings in the programme and thereby improvements could be made to the programme. Identifying shortcomings in the programme and making necessary improvements is significant for this programme. This is because most of the districts in the country have not yet implemented the school oral health programme and therefore the Swakopmund district's oral health programme could act as a model for the school oral health programme in Namibia.

1.7. Organization of the report

Chapter 1

The first chapter introduces the study in terms of the background the problem, the study area, background of the school oral health programme in Swakopmund, formulation of the problem and problem statement, the purpose and the significance of the study.

Chapter 2

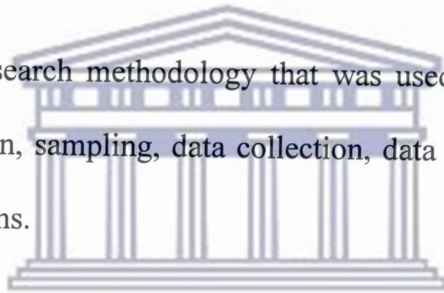
In this chapter literature is reviewed on the prevalence and prevention of dental caries and gingivitis, especially among children, as well as on contributing factors to these oral diseases. In addition literature that assessed effectiveness of school-based oral health programmes is also discussed in this chapter.

Chapter 3

In this chapter the aims and objectives of the study are stated.

Chapter 4

This chapter explains the research methodology that was used to conduct the study i.e. study design, study population, sampling, data collection, data analysis, limitations of the study and ethical considerations.



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Chapter 5

This chapter presents the results of the study.

Chapter 6

This chapter discusses the findings of the study.

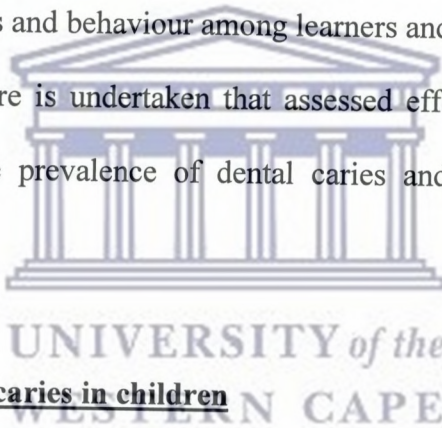
Chapter 7

Conclusions and recommendations on the school oral health programme in Swakopmund district, based on the findings from the study, are made in this chapter.

CHAPTER 2

LITERATURE REVIEW

In this chapter literature is reviewed on the prevalence of gingivitis and dental caries in children in both the developed and developing countries, in order to understand the magnitude of these oral diseases. Literature with empirical evidence is discussed that give insight on the risk factors of these oral diseases in order to ascertain congruence between their cause and their prevention. Thereafter deliberation is made on the literature to find out the validity of the hypothesis that infers that oral health knowledge can play a crucial role in leading to positive attitudes and behaviour among learners and teachers at school. Finally engagement with the literature is undertaken that assessed effectiveness of school-based programmes in reducing the prevalence of dental caries and gingivitis among school children.



2.1 Prevalence of dental caries in children

Dental caries is said to be one of the most common chronic childhood diseases. It is reported that whilst there have been some improvements in some countries in reducing the prevalence of dental caries, in other countries, especially the developing countries, there is an increase. In fact statistics show that one in four 5 to 6 year old children experience dental caries and the figure rises to above 90% in some developing countries (WHO, 2003b). In contrast, Cleaton-Jones and Fatti (1999) in their systematic review found that there was a decrease in the dental caries trends in Africa especially amongst the 5 to 6 year olds and 35 to 44 years olds. However, they could not come up with reasons for this decline

other than a possible chance observation. Hence they stated that although the results of the study were statistically significant, their *P* values were not strong.

Empirical evidence revealed that most developed countries were at one stage plagued by the pandemic of dental caries. Marthaler (2004) reviewed publications on the trends of dental caries and found that in the sixties in European countries the children of 12 years and 15 years of age had an average DMFT of 5 and 10 respectively. Meanwhile the Oral Health Global Data reported that in fact the latest prevalence of dental caries in these European countries had decreased to a DMFT of 2.1 (WHO, 2004). Denmark reported a 50% reduction of caries increment within a period of four years from 1962-1966. Netherlands also reported a decrease in dental caries occurrence as demonstrated by DMFT of 8 amongst the 12 year olds in 1965 decreasing to 1 by 1993. This was a dramatic reduction of 7 DMFT in a period of 28 years. Furthermore, in Zurich an average DMFT of 7 amongst the 12 year olds was reported in 1964 and by 1996 (32 years later) it had reduced to a DMFT of 0.84. Similarly Slovenia reduced the level of dental caries in a period of 11 years from a DMFT of 5.1 among 12 year olds in 1987 to a DMFT of 1.8 in 1998 (Marthaler, 2004).

In contrast, in developing countries where low levels of dental caries experience were always reported, the situation has reversed. With increasing urbanization, rapid socio-economic advancement and extensive changes of lifestyle dental caries has now reached moderate to high levels (Enwonwu *et al*, 2004). This was confirmed by WHO (2003a) when it reported that in developing countries the average DMFT among 12 year olds has increased from 1.5 in 1980 to 2.5 in 1998. For example it is reported that 100% of 6 and 12

years old children in Niger have signs of gingivitis that require treatment (WHO, 2003b). In South Africa the national surveys conducted between the periods 1999- 2002 reported low DMFT of 1.1 amongst 12 year olds (van Wyk & van Wyk, 2004). However, it is reported that this survey provided an incomplete picture of the burden of dental caries in South Africa as there were provinces and populations with quite high prevalence of dental caries. It is said that the survey did not take into account the significant caries index that takes into account children with high risk for dental caries (Ayo-Yusuf, Ayo-Yusuf & van Wyk, 2007). Thus it was noted that even in countries with low averages of DMFT, a significant proportion of children were found with relatively high levels of dental caries (WHO, 2004). This was also observed in Namibia where although the national survey reported a DMFT of 1.2 among 12 year olds, two primary schools presented with a DMFT of 3.6 and 3.5 respectively during the baseline data collection for the implementation of a school-based oral health promotion programme in Swakopmund (Schier, 1993; MoHSS, 2003).



2.2 Contributing factors to development of dental caries and gingivitis

In order to understand the root causes of oral diseases or the socio-environmental factors of these diseases, it is essential to understand the aetiology of these diseases (Petersen, 2005b). The aetiology of gingivitis has been reported to be bacterial dental plaque formed by micro-organisms as a result of food left on the teeth, which infect the gums leading to gingival inflammation and bleeding (Oliveira, 1998). Empirical evidence has shown that for dental caries to occur the interaction of three factors is a prerequisite; dental plaque, diet or fermentable carbohydrates and the tooth (Featherstone, 2000). Socio-behavioral studies conducted in Africa and Asia on child population have demonstrated that sugar consumption played a major role in the occurrence of dental caries (Petersen, 2005b).

In addition Gordon and Reddy (1985) found that the frequency of sugar consumption rather than just consumption of sugar was more crucial in the development of dental caries. Studies have confirmed that in the era when Africans relied on traditional staple diet very minimum dental caries was experienced. However, as dietary behaviour and nutrition are currently undergoing transition in most developing countries, towards “westernized diets”, the shifting has led to high sugar consumption and consequently to an increase in dental caries occurrence (Enwonwu *et al*, 2004).

Petersen (2005b) maintains that risks do not occur in isolation, they have their roots in complex chains of events happening over long periods of time. This is confirmed by Watt (2005) who stated that people’s behaviours are intertwined with social, economic and environmental conditions under which they are living.

Socio-behaviour factors were found to be risk factors for oral health diseases like gingivitis and dental caries. Therefore it is emphasized that it is important to understand the broader context which determines the risk factors and thus the behaviour patterns (Petersen, 2005b).

For example individual oral health behaviour such as tooth brushing, dietary patterns such as sugar consumption patterns and attendance of dental care such as regular dental check up are largely influenced by family, social and community factors as well as economic and political pressures (Watt, 2005). Hence Oliveira (1998) eloquently stated that behind the choice of eating sugary food lies a complex of other reasons including the reasons for the wide availability and promotion of sugar. Therefore a person’s behaviour is influenced by both internal and external factors and the broader socio-economic, cultural and

environmental factors are to a greater extent the determinants of oral health rather than the individual's lifestyle factors alone (Watt, 2005).

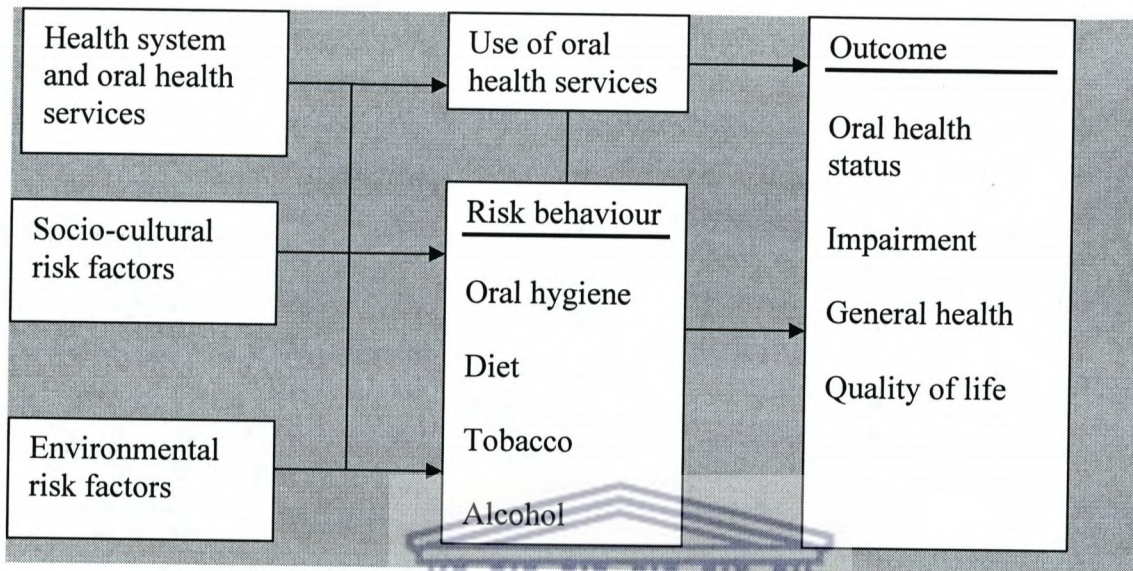


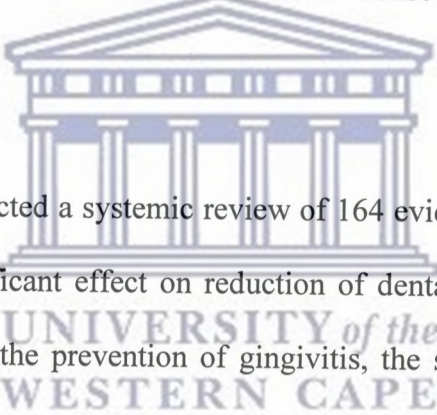
Figure 1. Risk factor approach in oral health promotion

Figure 1 shows the assessment of the risk factor approach (WHO, 2003a). The approach indicates that socio-cultural determinants such as poor living conditions, low education levels and traditions, beliefs and culture that do not support good oral health are also risk factors for oral health. Environmental factors such as poor access to water and unhealthy nutrition are also risk factors for oral health. In addition poor availability and accessibility to oral health services and moreover health systems that are not oriented to primary health care also determine the oral health of a society. Therefore the socio-cultural and environmental factors together with the type of health systems contribute to the oral health behaviour of a person such as dental visits, consumption of sugary food and tooth brushing. Consequently the oral health behaviour of a person will impact on one's oral health status and eventually on the quality of life of the person (WHO, 2003a).

Hence these risk factors that determine the oral health behaviour of a person need to be assessed prior to the implementation of an oral health intervention. Petersen (2005b) reported that in dental public health, risk assessment is meager with emphasis on behavioural factors rather than socio-environmental factors. Hence he asserted that in order to be able to prevent diseases effectively, including oral diseases, assessment of risk factors is pivotal.

2.3 Prevention of dental caries and gingivitis

Dental caries and gingivitis share dental plaque as a common risk factor. Therefore prevention measures to counteract dental caries will consequently prevent gingivitis (Oliveira, 1998).



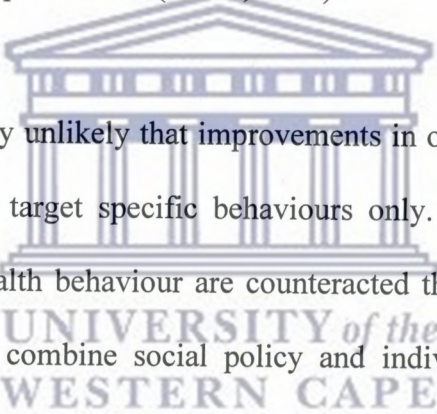
Kay and Locker (1998) conducted a systemic review of 164 evidence-based articles which reported a small to non-significant effect on reduction of dental caries increment due to tooth brushing. However, for the prevention of gingivitis, the studies showed significant reduction of plaque levels due to tooth brushing after a short follow-up period (Kay & Locker, 1998). This concurs with the findings of a study that assessed effectiveness of a school-based oral health education programme in China because although learners brushed their teeth with fluoride toothpaste twice a day, it was found that there were only improvements in gingival health but there was no reduction in dental caries increment among the learners after a period of three years (Petersen, Peng, Tai, Bian & Fan, 2004). In contrast Bratthall *et al* (1996, as cited by Marthaler, 2004) found dissimilar evidence on the effectiveness of tooth brushing in reducing dental caries. He reported that an enquiry that was conducted with 52 selected experts in the mid-nineties revealed that the major

contributory factor for reduction of dental caries was the daily tooth brushing using fluoride toothpaste preferably twice a day. Nevertheless, Marthaler (2004) concluded that various and continued use of fluorides, often used in combination (fluoride in the toothpaste, water fluoridation and topical fluorides applied at dental surgeries) were by far the most important factors for the decline in the prevalence of dental caries. However, the effects of fluoride are only experienced after a long period of time as seen for example in Zurich where it took 32 years, 7 years in Netherlands and 11 years in Slovenia (Marthaler, 2004).

Watt (2005) also reviewed 14 published articles of which some were those reviewed by Kay and Locker (1998) and he attributed the failure of preventive initiatives to the fact that they were palliative in nature and ignored the underlying factors that resulted in poor oral health, which he referred to as “causes of the causes”. Furthermore he stated that these interventions further intensify the inequalities in health as they benefit more those with more resources. This was also discovered by Schou and Wight (1994, as cited by Beal, 1996) when they found that prior to an oral health education programme which aimed at improving the oral hygiene of 5 year olds, there was no difference in the oral hygiene of the children. But after completion of the project, the oral hygiene of the non-deprived children significantly improved whilst there was no change in the oral hygiene of the deprived children. Therefore for prevention of dental caries and gingivitis, consideration of their determinants is indispensable and this can be partly addressed through health promotion.

Health promotion engages with the broader determinants of ill health like the root causes of gingivitis and dental caries through sensitive policies and actions. Health Promotion is defined as:”... a process of enabling people to increase control over their lives in order to

improve their health.” (WHO, 1986). With health promotion it is understood that health encompasses the entire well being of a person rather than just healthy life styles and therefore health is believed not just to be the responsibility of the health sector alone, but the entire society. Health promotion is said to operate within five principles namely 1) **build healthy public policy** that makes healthier choices the easier choice, 2) **create supportive environments** that are conducive for the people to be able to adopt healthy behaviour, 3) **strengthen community action** so that communities can have control over their health, 4) **develop personal skills** in order to enhance life skills and 5) **reorientation of health services** such that health services operate beyond curative services, but also be sensitive and responsive to people’s needs (WHO, 1986).



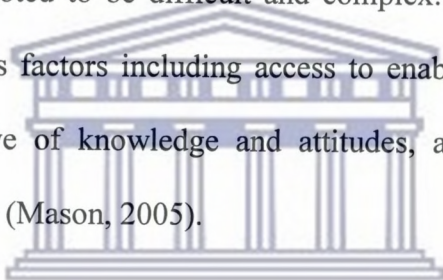
It has been found that it is very unlikely that improvements in oral health can be achieved by isolated interventions that target specific behaviours only. In oral health promotion individual barriers for oral health behaviour are counteracted through more effective and sustainable interventions that combine social policy and individual action and thereby promoting positive health behaviour such as making fluoride tooth paste and recommended tooth brushes affordable as well as appropriate food labeling and increasing the cost of sugar-containing foods (Petersen, 2005a).

However, improving knowledge, attitudes and behaviour is an essential component of an oral health programme for the overall reduction of gingivitis and dental caries (Oliveira, 1998).

2.4 Knowledge, Attitudes and Behaviour in health promotion

Knowledge and attitude were discovered to be the most important variables to predict behaviour. However, it was found that most importantly knowledge (facts) should be relevant to the target population for it to have an effect on attitudes (strong feelings and opinions) and thereby stimulate the anticipated behaviour (Katzenellenbogen *et al*, 1997, as cited by Umeh, 2003).

It has been observed that in many cases health professionals believe that health messages can result in desired health behaviour (Coulson, Goldstein & Ntuli, 1998). However behaviour change has been noted to be difficult and complex. This is because changing behaviour depends on various factors including access to enabling factors for behaviour change. Therefore irrespective of knowledge and attitudes, access to enabling factors strongly determines behaviour (Mason, 2005).



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Sociologists, psychologists and medical anthropologists found that health including oral health has extensive social implications. Therefore in an endeavour to facilitate the understanding of behaviour change process in health promotion they designed various behaviour change models according to behaviour theories (Coulson *et al*, 1998). These behaviour models were designed with an understanding that social factors for behaviour change operate at different levels i.e. micro-level (individual level), meso-level (institutional or organizational) and macro-level (population level) (Mason, 2005).

One of the models designed at micro-level is the Health Belief Model (HBM) which is based on the theory that the stronger the perceptions and beliefs of individuals, the higher

the possibility that behaviour change will occur. This model is coherently described within four components, that if a person perceives that he or she is susceptible to an illness, strongly perceive the illness as serious, strongly perceive that performing the desired behaviour will be beneficial to him or her and equally has an insight of the barriers but understand that these are outweighed by the benefits then there is a likelihood that the person will adopt the positive behaviour theories (Coulson *et al*, 1998).

Social learning theory and precede-proceed models are some of the models designed for the meso-level. With social learning theory it is believed that as people are entangled with their environments, one of the best possible ways for people to learn is by observing what others are doing. Additionally with reinforcements like encouragement and acknowledgement of their capabilities in the actions, behaviour can be enhanced. Therefore this model advocates observation, modeling and reinforcements for behaviour change (Oliveira, 1998). For example if dental health education is aimed at a group such as learners at school, there is a high possibility that peer group pressure can be exerted on the members of the group, thus strengthening the desired actions and behaviour change (Beal, 1996). With the precede-proceed model it is believed that behaviour depends on three factors namely predisposing factors like knowledge, attitudes, values and norms; secondly on enabling factors like skills and resources and thirdly on reinforcing factors like incentives for persistence or sustainability of the health behaviour such as praise, pain relief, etc. (Mason, 2005). In the case of the school oral health programme, the programme is imparting knowledge to learners about oral health with the hope that their attitudes would be positive towards oral health.

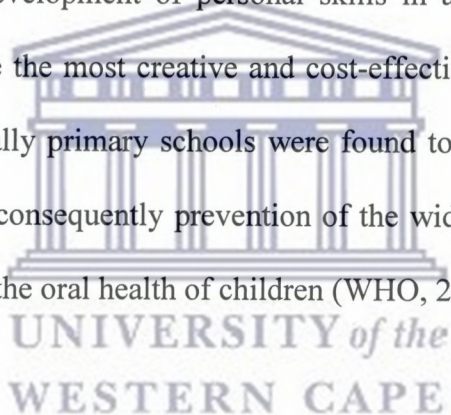
In addition if tooth brushes, tooth paste and educational materials which are enabling factors together with reinforcing factors such as acknowledgement of their tooth brushing behaviour from the dental personnel for example are available, there will be a high possibility of persistence and sustainability of the tooth brushing behaviour by the learners.

The diffusion of innovation model is an example of a macro-level model. This theory describes the possibility of a process that can allow behaviour change in a population that can happen by first influencing the innovators (these are described as people who usually seek information about new ideas such as academics), thereafter early adopters (respected members of the community like the local leaders), then the early majority (those who are more likely to adopt and sustain a behaviour), the last majority (those who will most probably adopt the behaviour by seeing the adoption by the others) and lastly the laggards (those who are usually isolated and will be the last to adopt the new idea) (Roger, 1983, as cited by Oliveira, 1998). For instance, the community can be encouraged to adopt the idea of fluoridation of water to prevent dental caries. This can be done by the entire dental fraternity in that community (private and public) convincing first other academics in the community about the advantages of water fluoridation. Once these early innovators have been convinced, then the next step would be to lobby the local leaders for them to support the idea. If these have been persuaded then with their support it is possible to influence the entire population from the early majority through to the last majority and the laggards.

Health promoters have to take into consideration three levels of impact. Firstly, micro-level impact which will influence individual perceptions and values about tooth brushing that has a direct impact on oral health behaviour.

Secondly, at meso-level, impact such as a supportive parent-teacher organization can facilitate smooth implementation of a health promotion programme. Thirdly, macro-level impact such as an oral health steering committee or district public health committee where the community has active participation and control over their health and therefore have a potential to influence policies such as fluoridation of water (Mason, 2005).

For a health promotion programme to be successful the plan should include assessment and acceptance of knowledge levels, norms, values, beliefs and opinions of the target population (Mason, 2005). Furthermore health promoting settings where people learn healthy behaviour through development of personal skills in a supportive environment, have been demonstrated to be the most creative and cost-effective way of improving oral health. Hence schools especially primary schools were found to be ideal settings for oral health behaviour change and consequently prevention of the widespread dental caries and gingivitis in order to improve the oral health of children (WHO, 2003b).



2.5 School-based oral health promotion programmes

Due to the fact that dental caries and gingivitis affect mostly children, schools were found to be an effective platform for oral health promotion to reach most children and not only for those seeking dental care (Stella *et al*, 2005). Moreover it has been found that in many instances for children who are at highest risk of dental diseases; schools may be the only source for good oral health (WHO, 2003b). Childhood and adolescence stages are influential stages in peoples' lives as these are the times when attitudes, beliefs and behaviour on oral health are being developed (WHO, 2003b).

Therefore by providing oral health education at school, children become equipped with knowledge on oral health, it helps children to develop personal skills and promotes positive attitudes (Stella *et al*, 2005).

However, the effectiveness studies of school-based oral health promotion programmes reported ineffectiveness of these programmes in reducing the prevalence of dental caries and gingivitis (Kay & Locker, 1998; Watt, 2005). Randomized control trials conducted in Zimbabwe and Tanzania and a cross-sectional study conducted in Botswana concurred with these findings. In these studies baseline data on the oral health status of the learners (DMFT and plaque scores levels) as well as on the level of knowledge of teachers in oral health was collected. Based on these findings, teachers were trained on oral health promotion through workshops where knowledge was given on risk factors of dental caries and gingivitis as well as on how to prevent or control them and teaching materials on oral health aspects were provided. Demonstrations at schools were given and oral health education and weekly or daily tooth brushing sessions were given and supervised by teachers at schools. On evaluation after a minimum period of three years and more than 10 years in the case of Botswana, either no difference was found between the experimental and control groups or small to non-significant effect on knowledge, reduction of DMFT and plaque levels (Frencken, Borsum-Andersson, Makoni, Mwashaenyi & Mulder, 2001; van Palenstein, Helderma, Munck, Mushendwa, van't Hof & Mrema, 1997; Moreri, 1999).

The reasons for the failure of these programmes were attributed to lack of human resources such as inadequate number of dental therapists to give subsequent support to the schools as they were the sole service providers at their designated dental clinics; lack of transport to

enable the dental therapists to do follow up visits at schools and lack of toothbrushes because learners were found in some cases using worn tooth brushes. These shortcomings together with lack of time for the teachers to implement the programme in their challenging situation whereby they are expected to teach large groups of children and lack of support by the parents for the programme aggravated the lack of motivation on the part of the teachers (Frencken *et al*, 2001; van Palenstein *et al*, 1997; Moreri, 1999). The failure of these programmes demonstrates the fact that health education alone does not change behaviour and therefore will not lead to a successful programme.

However, in a randomized control trial study it was found that though there was no difference in DMFT increments between the experiment and control groups, experiment children had lower scores of bleeding gums than the control group children (Petersen *et al*, 2004). Also quasi-experimental studies that evaluated oral health promotion programmes at schools found that school-based oral health programmes did achieve high knowledge and positive attitudes among learners and teachers and furthermore these interventions did manage to reduce the incidence of dental caries after a long period of time (Kay & Locker, 1998). This concurs with Jong (1981, as cited by Oliveira, 1998) when he asserted that effects of educational programme may not become evident until about a 15-20 years period.

However, there is strong evidence that school oral health programmes have the potential to yield desired oral health outcomes. These are well-designed oral health programmes which are responsive to the needs of the schools, where there is free availability of habit – inducing cues such as tooth brushes and tooth paste; maximum support of the teachers given by the oral health professionals with continuous reinforcement on oral health

knowledge and skills; continuous monitoring and evaluation of the programmes for rectification of deficiencies and maximum support of the parents (Oliveira, 1998). For example, in a programme in Wuhan's city of China, teachers were given extensive training on oral health topics and thereafter one day workshops were held annually to strengthen their knowledge, they were given extensive oral health educational materials, tooth brushes and tooth paste were supplied to the learners, mothers were encouraged and they attended the oral hygiene instruction sessions. The programme resulted in elevated levels of knowledge and positive attitudes among the teachers, learners and mothers and it improved the gingival health of the learners resulting in low bleeding scores (Petersen *et al*, 2004).

A number of studies that endeavoured to ascertain the effectiveness of oral health promotion programmes at schools were found not to be valid due to lack of rigour of their study designs. Kay and Locker (1998:139) eloquently stated that “until alternative, more appropriate methodologies are developed, validated and widely accepted, analysis of evidence using the systematic review remains the gold standard technique for assessing evidence of effectiveness”. However, Stella *et al* (2005) argued that both quantitative and qualitative methodologies have a significant role to play in the assessment of effectiveness. Moreover they stated that a plurastic approach to evaluation can actually strengthen its validity and avoid the limitations of the individual evaluation approaches. In addition it was noted that in most of these evaluation studies, failure was due to poorly defined aims and objectives (Beal, 1996; Mason, 2005).

School-based oral health promotion programmes do have the potential to reduce the incidence and prevalence of dental caries and gingivitis (Watt, 2005; Kay & Locker, 1998; Oliveira, 1998; Stella *et al*, 2005) but as noted earlier, where good oral health outcomes

were achieved, they occurred after a long period of time. It is therefore advised that evaluation over a short period of time should be aimed at intermediate health outcomes such as knowledge, attitudes and behaviour (Beal, 1996; Mason, 2005). Therefore this is what the current study has attempted to do.



CHAPTER 3

AIMS

3.1 Aim

The aim of the study was to compare knowledge, attitudes and behaviour of teachers and learners at four primary schools in Swakopmund district in Namibia, who are participating in the school-based oral health programme.

3.2 Objectives

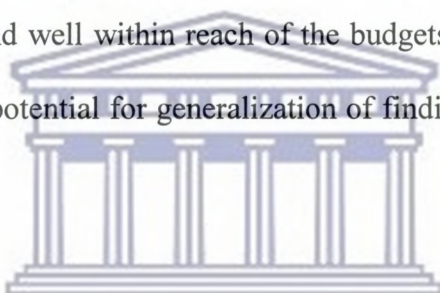
- To compare knowledge on risk factors and prevention of dental caries and gingivitis of learners from schools with high participation with learners from schools with less participation in the school oral health programme.
- To compare knowledge on risk factors and prevention of dental caries and gingivitis of teachers from schools with high participation with teachers from schools with less participation in the school oral health programme.
- To compare oral health behaviour and attitudes towards prevention of dental caries and gingivitis of learners from schools with high participation with learners from schools with less participation in the school oral health programme.
- To compare oral health behaviour and attitudes towards prevention of dental caries and gingivitis of teachers from schools with high participation with teachers from schools with less participation in the school oral health programme.

CHAPTER 4

METHODOLOGY

4.1 Study design

The cross-sectional survey design was chosen for the study. Surveys are useful to gain descriptive data about a population by collecting data from a representative sample of that population and drawing inferences to the total study population (Katzenellenbogen, Joubert & Abdool Karim, 1999). Such a study design is particularly appropriate for the current situation as it is generally very economical when compared to other observational and experimental study designs, and well within reach of the budgets for self-funded research. In addition, surveys maintain potential for generalization of findings, which is not the case with qualitative studies.



A cross-sectional study design enables measurement of an effect (Beaglehole, Bonita & Kjellström, 1993). This study aimed to assess the effect of a school oral health programme by measuring and comparing levels of knowledge, attitudes and behaviour (KAB) of teachers and learners from schools that have high and low participation in the school oral health programme. Surveys of this nature are argued to be pragmatic, because they are easy to conduct at all stages of evaluation including during formative evaluation when intermediate health outcomes are assessed. Therefore, these surveys help to assess the success of a health programme and identify shortcomings in the programme. Hence, in this study the teachers were asked to comment on the shortcomings of the programme and to give recommendations for improving the programme.

Success in the oral health programme was measured using the levels of knowledge of the learners as well as the magnitudes of oral health behaviour and attitudes towards the school oral health programme. Results from surveys have the potential to provide evidence for specific changes, which can be used in advocating for such changes (Katzenellenbogen *et al*, 1999). By collecting data about the attitudes and behaviours of the teachers and learners, the results are expected to present the attitudes and behaviours of the teachers and learners in the programme. Furthermore it is reported that KAB surveys can increase the understanding of both health workers and the communities about the associations between health problems and specific social and environmental factors which could contribute towards improving the implementation of such (Katzenellenbogen *et al*, 1999). In the current study of Swakopmund schools, it was expected that the study will elucidate factors that are associated with oral health behaviours and attitudes of learners and teachers in the school oral health programme.



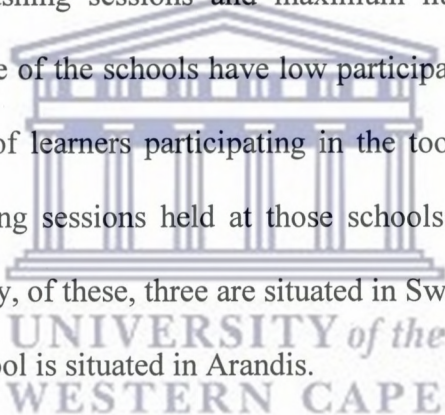
4.2 Study setting

The participating schools are situated in the Swakopmund district. This district is composed of three towns, namely Swakopmund, Henties Bay and Arandis. A 60 kilometer road eastwards links Swakopmund to Arandis and a 75 kilometers road northwards links Swakopmund to Henties Bay. The district has a population of 33 900 people with an unemployment rate of 30% (NPC, 2003). There are 11 public primary schools in the district and ninety percent of the children attend school.

Dental services are rendered from the hospital which is situated in Swakopmund. The dental health personnel for the district consist of an oral hygienist (the coordinator of the

school-based oral health programme), a dental therapist, a dental assistant and the regional dentist.

The school-based oral health programme has been implemented since 2001 in eight of the eleven primary schools in Swakopmund district. The aim of the programme is to reduce the prevalence of dental caries and gingivitis amongst the learners. According to the programme design, all learners should participate in the tooth brushing sessions and these sessions should take place twice per week at school. Some of the schools have high participation in the programme. This is evident from the high number of learners participating in the tooth brushing sessions and maximum number of tooth brushing sessions at these schools. Some of the schools have low participation in the programme as seen from the lesser number of learners participating in the tooth brushing sessions and lesser number of tooth brushing sessions held at those schools (See Appendix 4). Four schools participated in the study, of these, three are situated in Swakopmund and one which is also a high participating school is situated in Arandis.



4.3 Study population

The study populations were Grades 1 to 4 teachers and Grade 4 learners from the eight primary schools that are currently participating in the oral health promotion programme in the Swakopmund district.

4.4 Sample size

The sample size for the selection of learners was calculated according to the evaluation data of the piloting programme which revealed that only 36% of the 12 year olds were free of

dental caries; therefore the prevalence of dental caries was 64%. The sample size for this cross-sectional study was calculated using Epi Info 2002 version 3.3. In order to increase the validity of the study, a confidence level of 95% and a power to reject the null hypothesis of 80% were chosen (Poole, 2001)). These parameters yielded a sample size of 153 learners. However, to accommodate contingencies like learners being absent on the day of the data collection and refusal to participate, 15 more learners were added to the sample size; yielding 168 learners. Thus 42 learners were selected from each of the four schools. An equal number (21) of boys and girls were recruited from each school.

4.5 Sampling procedure

The sampling frame included all primary schools that were implementing the programme in the district. A multistage sampling was applied for selection of learners. The first stage of sampling was a purposive sample of schools based on their level of participation in the school-based oral health programme. The two schools with the least participation in the programme and the two with highest participation in the programme were selected. This was done with the purpose of establishing reasons why some schools have higher participation in the programme whilst some having lower participation. Therefore four schools participated in the study.

In the second stage of sampling, the names of all Grade 4 learners from the selected schools were included in the sampling frame. The stratified systematic sampling method was used. Learners from each school were grouped according to sex, and then systematically selected. An equal proportion of the sub sample of the school (42) was selected from each school. For example if there were three Grade 4 classes in a school, 14 learners were selected from

each class; of which 7 were boys and 7 girls. Individual learners from each class were selected using a sampling interval. The sampling interval was calculated for girls and boys separately, for each class according to the total number of boys and girls in the class. For example if there were 20 boys and 7 needed to be selected, and then the 20 boys were divided by 7 to get the sampling interval of 2.8 or 3. Every third boy in the list was selected until 7 boys were obtained.

Due to the small number of Grades 1 to 4 teachers, all the teachers from the four schools were expected to be the participants for the study.

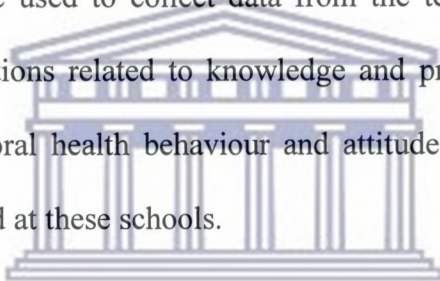
4.6 Data collection

Data collection was conducted on 4 consecutive days (04-07/02/2008) for each of the 4 schools. Three persons collected the data; these were the investigator and the two research assistants. A structured questionnaire was used to collect data. Learners were interviewed by the data collectors individually at the schools' halls, with a favourable distance between the interviewers to avoid distraction of each interview. A self-administered questionnaire was used to collect data from the teachers. The teachers assembled at a central point at each school and completed the questionnaire in the presence of the investigator. The process of completion of the questionnaire was explained to the teachers with reassurance again that their anonymity would be protected. Clarification of some questions was done on request by some teachers. For every submission the questionnaire was checked immediately for missing data.

At one of the low participating schools, half of the teachers refused to participate in the study. The teachers who agreed to participate in the study did not want to assemble at a central point to complete the questionnaire as it was done at the other three schools. The teachers stated different reasons for not being able to assemble at a central point and asked to be allowed to complete the questionnaires at their respective classrooms. Consequently it was noted that there was a degree of resemblance in the answering of the questions by some teachers from this school, which could bias the results.

4.7 Data collection tool

Structured questionnaires were used to collect data from the teachers and learners. The questionnaires contained questions related to knowledge and prevention of dental caries and gingivitis as well as on oral health behaviour and attitudes towards the oral health programme that is implemented at these schools.



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There were two sets of questionnaires, one for the teachers and one for the learners. The section on knowledge was similar for both questionnaires. For reported oral health behaviours at school, there were some similarities on some questions for both questionnaires but some questions were structured according to the relevance of the participants (i.e. for teachers or for learners). The questionnaire for the learners (Appendix 1) consisted of 21 questions. Of these questions, 9 were for knowledge, 6 for reported oral health behaviours and another 6 for attitudes towards the school oral health programme. The questions on knowledge were structured into the “true or false” method with options given for each question. For questions related to oral health behaviours they had to choose from the time frame options given, for example, how frequently are they taught oral health

related topics at school, how frequently they brush teeth at school, how frequently they consume sweets, etc. For the questions on attitudes they had to say whether they agree, disagree or undecided on attitudes that were stated on the questionnaire which were related to the implementation of the programme at their schools. The questions were developed according to what is expected to happen at schools. It was assumed that learners should have knowledge on the risk factors as well as on prevention of dental caries and gingivitis. In addition studies have revealed that school oral health programmes have yielded positive attitudes amongst learners and teachers where these programmes were implemented (Varenne, Petersen & Outtara, 2006; Petersen *et al*, 2004; Kay & Locker, 1998). Therefore questions on attitudes were included to ascertain the attitudes of learners and teachers in Swakopmund schools towards the oral health programme.

The teachers' questionnaire (Appendix 2) was structured in the same way as the learners' questionnaire, with respect to sections about oral health knowledge, attitudes and behaviour. However, the teachers' questionnaire contained some additional open-ended questions for some reported oral health behaviours. The open-ended questions were a means to find out from the teachers whether they do educate learners about healthy diets especially pertaining to dental caries, what kind of strategies they use and reasons for choosing those strategies. There were also measures to allow them to express themselves what they regarded as shortcomings in the programme and make recommendations. The teachers' questionnaire had 26 questions of which 9 were for knowledge, 6 for behaviour, 9 for attitudes and 2 for identification of shortcomings and recommendations.

4.8 Data analysis

The data were captured in Microsoft Excel program and imported to CDC Epi Info 2002 version 3.3 for analysis. Statistics of central tendency such as mean for continuous data like age was used. Bivariate tables were used to establish differences between high and low participating schools with regards to oral health knowledge, behaviours and attitudes variables.

Due to the fact that this is a cross-sectional study and therefore lacks longitudinal data, prevalence ratio (PR) was a preferable measure of effect at 95% confidence interval. This is because PR is more consistent for estimating the true effect than for example the odds ratio (OR) which usually underestimate or overestimate the effect (Thompson, Myers & Kriebel, 1998). The 95% confidence interval was chosen as a measure to increase precision. Hence Wolfe and Cumming (2004:140) stated "A researcher who routinely reports 95% CI can expect, over a lifetime, that about 95% of those intervals will capture the population parameter they estimate". Chi-square test was used to assess statistical significance of the proportional differences between high and low participating schools. The cutting off point for statistical significance was a p-value < 0.05 (Katzenellenbogen *et al*, 1999). The teachers' sample was small ($N < 30$) with some cells with a value less than 5; therefore Fisher's exact test was the appropriate test used for this small sample size to test significance of differences in proportions between high and low participating schools (Polit & Hungler, 1999).

4.9 Validity

Structured questionnaires were used to collect data from the participants. The questionnaires were compiled based on questionnaires from similar studies that evaluated oral health knowledge, attitudes and behaviour at schools that implemented oral health programmes (Nyandindi, 1995; Umeh, 2003; Moreri, 1999). The questionnaires were first piloted in November 2007 with 30 learners and 10 teachers at a school that is participating in the school-based oral health programme. Learners were interviewed by the investigator and the dental assistant. For teachers, a self-administered questionnaire was used to collect data in the pilot study. Thereafter the questionnaires were modified according to the experiences from the pilot study. In 2008 an additional research assistant was taken on board in the study. She was trained in data collection during the reorientation sessions of the dental assistant. This necessitated an orientation in conducting interviews for this new research assistant as the other research assistant who is a dental assistant was already trained during the piloting study. Therefore another small pilot was done whereby 15 learners from another school that is also participating in the oral health programme were interviewed by the three data collectors (the investigator and the two research assistants). The modified questionnaire was once more tested in the process and further minor gaps were rectified.

It could be argued that the study has a possibility of information bias due to social desirability. This is because in general people do not want to reveal bad information about them such as unfavourable health behaviour, for example, consuming sweets frequently in the case of dental caries or not brushing the teeth regularly. Unlike knowledge which is factual and therefore one is able to make a decision whether a person has knowledge or not,

in the case of self-reported behaviours and attitudes one depends on the information given by the respondent. Thus it has been commonly found in other studies that participants tend to under-report detrimental health behaviours and over-report enhancing behaviours (Katzenellenbogen *et al*, 1999). However, in this current study, there was a high correlation between knowledge, attitudes and behaviour of learners. This was shown by the fact that there were high levels of knowledge in general amongst all the learners which corresponded to the reported positive oral health behaviour and attitudes towards the school-based oral health programme. Therefore there was lesser likelihood of information bias.

4.10 Reliability

To maximize reliability, a structured questionnaire which had a fixed order and clear and unambiguous questions was used. The research assistants were trained on how to conduct interviews with emphasis on asking questions in the same manner amongst the participants and without leading and expanding on some questions. Furthermore a guideline on how to conduct the interview as well as on how to complete the questionnaire was developed and was used during the training of the research assistants as well as during data collection. These were measures to ensure that reliable data is obtained (Terre Blanche, Durrheim & Painter, 2006). Furthermore the teacher sample was used to validate results from the learners and this further increased the validity of the findings from the learners' data.

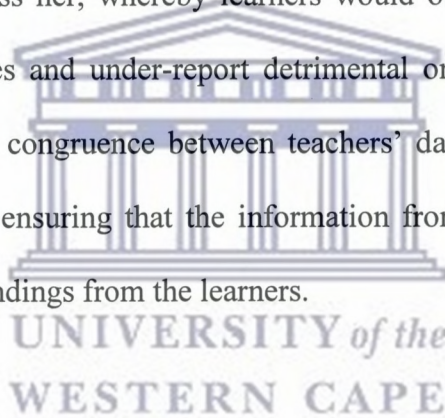
4.11 Generalisability

The results of the study are expected to apply to the study population, which is Grade 1 to 4 teachers and Grade 4 learners. However, the results could be applicable to the same

population, in schools with similar characteristics that are implementing the school-based oral health programme in Namibia.

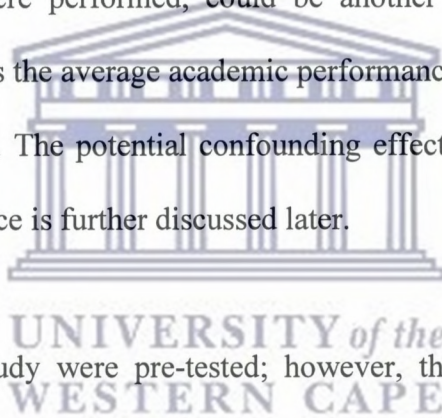
4.12 Limitations

There are possible biases and confounders which are possible limitations for the study. These are information bias such as social desirability bias and selection bias. Information bias could have happened because the oral health programme coordinator of the schools in Swakopmund is also the investigator of this current study. Her presence in the field as well her role as an interviewer could have led to learners answering what they thought she would want in order to impress her, whereby learners would over-report oral enhancing health behaviours and attitudes and under-report detrimental oral health behaviours and attitudes. However, there was congruence between teachers' data and learners' data and this facilitated the process of ensuring that the information from the learners was valid. This added credibility to the findings from the learners.



The possible selection bias could have been caused by non-response from teachers from one particular school. It is possible that the non-respondent teachers may have differed from the respondent teachers in their oral health knowledge, reported oral health behaviour and attitudes towards the school oral health programme. However, these differences were not investigated in the current study. This may have over- or underestimated the associations found in the study. Given the non-significance of all the findings for teachers, it is unlikely that their participation would have made a difference.

The possible confounder could be due to the potentially higher social status of learners from the low participating schools compared to learners from high participating schools, as evidenced by the higher school fees payable at the low participating schools. Social status was found to be a confounder (Beaglehole *et al*, 1993). From the findings, it could be inferred that the school oral health programme made learners from the low participating schools more knowledgeable than learners from high participating schools, whereas the low participating schools learners' higher social status might have exposed them to oral hygiene measures before the implementation of the programme at their schools (Katzenellenbogen *et al*, 1999). However, the lack of socio-economic data to elucidate the context, in which the oral health behaviours were performed, could be another limitation in this study. Another potential confounder is the average academic performance of learners between low and high participating schools. The potential confounding effects of differences in social status and academic performance is further discussed later.



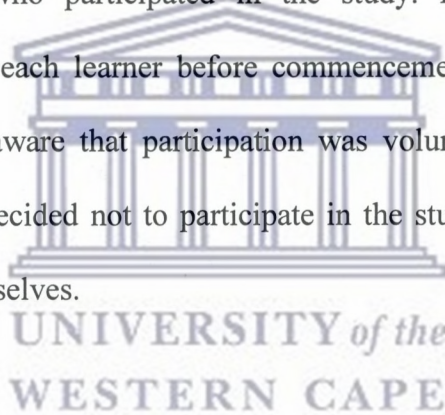
The questionnaires for the study were pre-tested; however, they were designed by an investigator who is still a student. This could have led to a questionnaire that was not robust enough with formulaic shortfalls and candid errors. Another limitation was the use of close-ended questions which resulted in obtaining limited information. Furthermore the use of KAB survey which is said to be too rigid and they provide simplistic answers to complex questions about the determinants of behaviour, was another limitations for the study (Katzenellenbogen *et al*, 1999).

A further limitation for the study was the use of cross-sectional study design which lacks longitudinal data. This design has weak causal inference because temporality cannot be

proven; therefore you cannot establish whether the cause preceded the effect or not (Beaglehole *et al*, 1993).

4.13 Ethical considerations

Ethical clearance and approval was obtained from the University of Western Cape's Research and Ethics Committee as well as from the Ministry of Health's Research and Ethics Committee (Ref.: 17/3/3/ AP). Thereafter permission was requested to conduct the study at the schools from the Ministry of Education and from the schools. Consent for participation in the study was received from the parents of the learners who participated as well as from the teachers who participated in the study. Furthermore consent for participation was asked from each learner before commencement of the interview. The participants were also made aware that participation was voluntary and that they were allowed to withdraw if they decided not to participate in the study anymore without any negative repercussions to themselves.



CHAPTER 5

RESULTS

5.1 Introduction

In this chapter the findings from the questionnaires that were administered to the study participants (learners and teachers) from two groups of schools, high participating and low participating schools are presented. In the first section the results of the demographic characteristics of the participants are presented. The second section gives an overview of learners' responses pertaining to **knowledge** on aetiology and prevention of dental caries and gingivitis, oral health **behaviour** and **attitudes** towards an oral health programme that is implemented at their schools. A description and comparison of the two groups of schools based on their level of participation in the oral health programme is made. In the last section the results of the teachers' responses relating to knowledge on the aetiology and prevention of dental caries and gingivitis as well as their practices and attitudes towards the oral health programme are presented.

5.2 Demographic characteristics

One hundred and fifty nine (95%) out of a sample of 168 learners participated in the study; of these 81 (51%) were from high participating schools (HPS) and 78 (49%) were learners from low participating schools (LPS). A total number of 27 teachers participated in the study, 16 (51%) were from HPS and 11 (49%) were teachers from LPS. The teachers constituted of 25 (93%) females and 2 (7%) males; with one male from each group (HPS

and LPS). The data on the age of the teachers were not collected because of their reluctance to divulge this information in the pilot study.

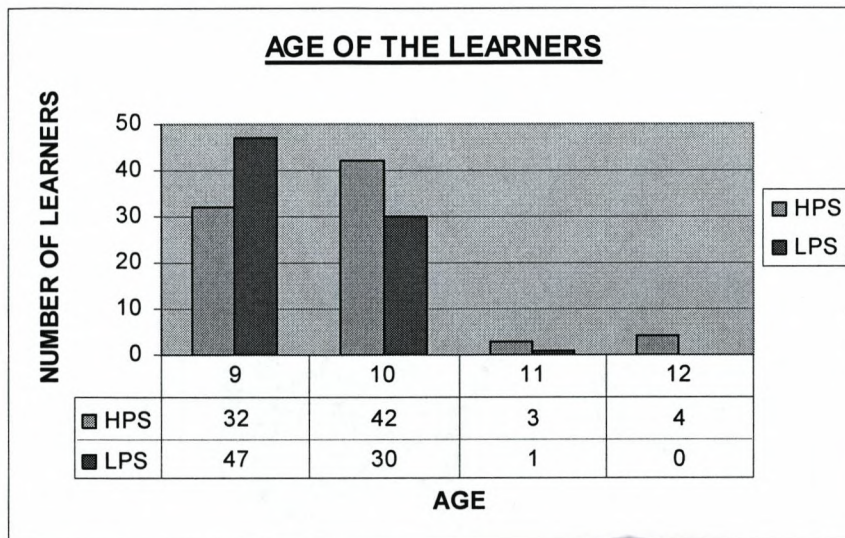


Figure 2. Age distribution of learners

Figure 2 shows the age distribution of the learners ranging from 9 to 12 years. The mean of participating learners was 9.5 years (SD = 0.4479). The mean age for HPS was 9.7 years (SD = 0.7546) and the mean age for LPS was 9.4 years (SD = 0.5206). The age difference between high and low participating schools was statistically significant ($\chi^2 = 8.3199$; $P < 0.05$), with learners from HPS being on average older than those from LPS.

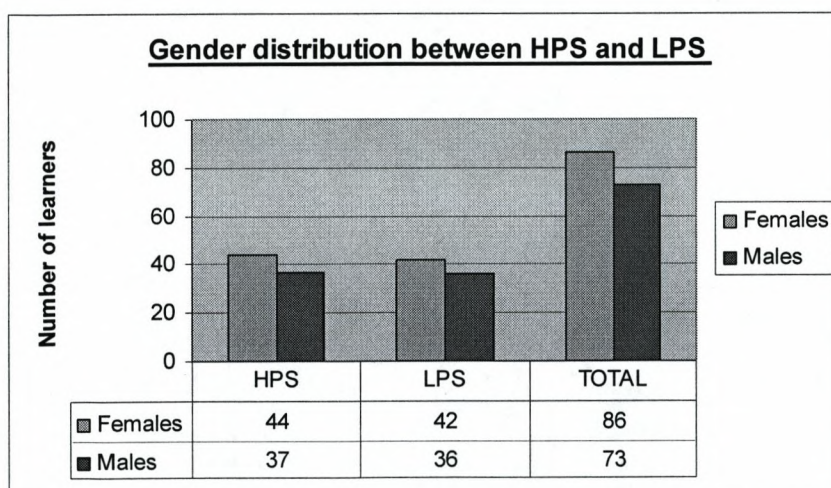


Figure 3. Gender distribution of learners

Figure 3 presents the gender distribution among the learners showing that 86 (54%) of the participants were females and 73 (46%) were males. From HPS there were 44 (51%) females and 37 (49%) males and from LPS there were 42 (51%) females and 36 (49%) males. There was no significant difference in gender distribution between HPS and LPS participants ($\chi^2 = 0.00$ and $P > 0.05$).

5.3 Learners' Results

5.3.1 Oral health knowledge

Table 1.1 shows that of the 129 (81%) participants who mentioned that sugar is a cause of dental caries, 60 (46.5%) were participants from HPS and 69 (53.5%) were from LPS. The proportional difference between HPS and LPS participants was significant ($\chi^2 = 5.32$; $P < 0.05$). Participants from HPS were less likely to know that sugar is the cause of dental caries compared to participants from LPS (Prevalence Ratio [PR] = 0.84; 95% CI = 0.19 – 0.71).

Table 1.2 shows that 126 (79%) participants stated that a hole on the tooth is a sign of dental caries; of these 59 (47%) were participants from HPS and 67 (53%) were from LPS. The proportional difference between HPS and LPS participants was significant ($\chi^2 = 4.12$; $P < 0.05$). However, learners from HPS were marginally less knowledgeable that a hole on the tooth is a sign of dental caries than learners from LPS (PR = 0.85; 95% CI = 0.18 – 1.05).

Table 1.3 illustrates that 117 (74%) participants indicated that eating less sugar can prevent occurrence of dental caries. Of these participants 49 (42%) were participants from HPS and 68 (58%) were from LPS. There was a significant proportional difference between HPS and LPS participants ($\chi^2 = 14.56$; $P < 0.05$). This indicated that participants from the HPS were

more than 30% less likely to know that eating less sugar can prevent occurrence of dental caries as compared to participants from LPS (PR = 0.69; 95% CI = 0.09 – 0.53).

Table 1.4 shows that out of the 114 (72%) participants who stated that toothpaste can prevent dental caries, 47 (41%) were participants from HPS and 67 (59%) were from LPS. The proportional difference between HPS and LPS participants was statistically significant ($\chi^2 = 15.21$; $P < 0.05$). The participants from the HPS were more than 30% less likely to know that toothpaste can prevent dental caries as compared to participants from LPS (PR = 0.68; 95% CI = 0.09 – 0.52).

Table 1.5 demonstrates that of the 134 (84%) participants who mentioned germs on the teeth cause gingivitis, 59 (44%) were from HPS and 75 (56%) were from LPS. The proportional differences between HPS and LPS participants was statistically significant ($\chi^2 = 16.30$; $P < 0.05$). Therefore there was a 24% lower probability for participants from HPS to know that germs on the teeth can cause gingivitis compared to participants from LPS (PR = 0.76; 95% CI = 0.02 – 0.39).

Table 1.6 illustrates that 121 (76%) participants stated that swollen gum is a sign of gingivitis. Of these 54 (45%) were participants from HPS and 67 (55%) were from LPS. Thus there was a significant proportional difference between HPS and LPS participants ($\chi^2 = 8.08$; $P < 0.05$). Learners from HPS were less likely to state that swollen gum is a sign of gingivitis compared to learners from LPS (PR = 0.78; 95% CI = 0.13 – 0.76).

Tables 1.1-1.7 Combined Table on learners' knowledge

1.1 Cause of dental caries – Sugar			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	60 (46.)	21 (70)	81 (50.9)
LPS	69 (53.5)	9 (30)	78 (49.1)
TOTAL	129 (81.1)	30 (18.9)	159 (100)
PR = 0.84 (95% CI = 0.19- 0.71) ; $\chi^2 = 5.37$; $P < 0.05^*$			
1.2 Sign of dental caries – teeth with holes			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	59 (46.8)	22 (66.7)	81 (50.9)
LPS	67 (53.2)	11 (33.3)	78 (49.1)
TOTAL	126 (79.2)	33 (20.8)	159 (100)
PR = 0.85 (95% CI = 0.18 – 1.05); $\chi^2 = 4.12$, $P < 0.05^*$			
1.3 Prevention of dental caries – eat less sugar			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	49 (41.9)	32 (76.2)	81 (50.9)
LPS	68 (58.1)	10 (23.8)	78 (49.1)
TOTAL	117 (73.6)	42 (26.4)	159 (100)
PR = 0.69 (95% CI = 0.09 – 0.53); $\chi^2 = 14.56$; $P < 0.001^*$			
1.4 Toothpaste prevents dental caries			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	47 (41.2)	34 (75.6)	81 (50.9)
LPS	67 (58.8)	11 (24.4)	78 (49.1)
TOTAL	114 (71.7)	45 (28.3)	159 (100)
PR = 0.68 (95% CI = 0.09 – 0.52); $\chi^2 = 15.21$; $P < 0.001^*$			
1.5 Cause of gingivitis - germs			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	59 (44)	22 (88)	81 (50.9)
LPS	75 (56)	3 (12)	78 (49.1)
TOTAL	134 (84.3)	25 (15.7)	159 (100%)
PR = 0.76 (95% CI = 0.02- 0.39); $\chi^2 = 16.30$; $P < 0.001^*$			
1.6 Sign of gingivitis – bleeding gums			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	66 (49.6)	15 (57.7)	81 (50.9)
LPS	67 (50.4)	11 (42.3)	78 (49.1)
TOTAL	133 (83.6)	26 (16.4)	159 (100)
PR = 0.95 (95% CI = 0.28 – 1.83); $\chi^2 = 0.57$; $P = 0.45$			
1.7 Sign of gingivitis – swollen gums			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	54 (44.6)	27 (71.1)	81 (50.9)
LPS	67 (55.4)	11 (28.9)	78 (49.1)
TOTAL	121 (76.1)	38 (23.9)	159 (100)
PR = 0.78 (CI = 0.13 – 0.76); $\chi^2 = 8.08$; $P < 0.001^*$			

5.3.2 Oral health behaviours

The results for components of the questionnaire that related oral health-related behaviour and attitudes of participants show no statistical significance with the exception of frequency in the consumption of sweetened juices and in the attitudes of the learners towards being encouraged by the teachers to eat healthy food.

Table 2.1 illustrates that of the 47 (30%) participants that indicated that they are taught oral health related topics at least twice a week by their teachers, 20 (43%) were from HPS and 27 (57%) were participants from LPS. However, the proportional difference between HPS and LPS participants was not significant ($\chi^2 = 1.88$; $P = 0.13$).

Table 2.2 indicates that of the 79 (50%) participants that indicated that their teachers let them brush twice a week at school, 39 (49%) were from HPS and 40 (51%) were participants from LPS. Equally there was no difference in the tooth brushing behaviour between HPS and LPS participants who reported brushing teeth twice a week at school ($\chi^2 = 1.72$; $P = 0.69$).

Table 2.3 demonstrates that 108 (68%) participants reported that they consume sweetened juices everyday; of these 46 (43%) were participants from HPS and 62 (57%) were from LPS. The proportional difference between HPS and LPS was significant ($\chi^2 = 9.40$; $P < 0.05$). Learners from HPS were almost 30% less likely to consume sweetened juices than learners from LPS (PR = 0.71; 95% CI = 0.16 – 0.72).

Table 2.4 shows that a total number of 62 (39%) participants reported that they visited a dentist within the last year. Twenty eight (45%) were participants from HPS and 34 (55%) were from LPS. There was no significant difference in reported dentist visits behaviour between HPS and LPS participants ($\chi^2 = 1.36$; $P = 0.24$).

Tables 2.1-2-4 Combined Table on learners' oral health behaviours

2.1 Teaching of oral health topics – Twice a week			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	23 (42.6)	58 (55.2)	81 (50.9)
LPS	31 (57.4)	47 (44.8)	78 (49.1)
TOTAL	54 (34)	105 (66)	159 (100)
PR = 0.71 (95% CI = 0.29 – 1.23); $\chi^2 = 2.28$; $P = 0.13$			
2.2 Learners brushing – Twice a week			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	39 (49.4)	42 (52.5)	81 (50.9)
LPS	40 (50.6)	38 (47.5)	78 (49.1)
TOTAL	79 (49.7)	80 (50.3)	159 (100)
PR = 0.94 (95% CI = 0.45 – 1.72); $\chi^2 = 0.16$; $P = 0.69$			
2.3 Consumption of sweetened juices – Everyday			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	46 (42.6%)	35 (68.6%)	81 (50.9%)
LPS	62 (57.4%)	16 (31.4%)	78 (49.1%)
TOTAL	108 (67.9%)	51 (32.1%)	159 (100%)
PR = 0.71 (95% CI = 0.16 – 0.72); $\chi^2 = 9.40$; $P < 0.001^*$			
2.4 Dentist's visits – Has ever visited dentist			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	28 (45.2)	53 (54.6)	81 (50.9)
LPS	34 (54.8)	44 (45.4)	78 (49.1)
TOTAL	62 (39)	97 (61)	159 (100)
PR = 0.79 (95% CI = 0.34 – 1.36); $\chi^2 = 1.36$; $P = 0.24$			

5.3.3 Attitudes towards oral health programme

Table 2.5 shows that 136 (86%) participants agreed that teachers should continue encouraging learners to eat healthy food. Of these 64 (47%) were from HPS and 72 (53%) were participants from LPS. The proportional difference between HPS and LPS participants was significant ($\chi^2 = 5.68$; $P < 0.05$). Learners from HPS were less likely to agree to be encouraged to eat healthy food by their teachers as compared to learners from LPS (PR = 0.86; 95% CI = 0.10 – 0.90).

Table 2.6 shows that 157 (99%) participants agreed that the programme should continue at schools; of these 80 (51%) were from HPS and 77 (49%) were participants from LPS. There was no significant difference in attitudes between the participants from HPS and LPS towards continuation of the oral health programme at their schools ($\chi^2 = 0.00$; $P = 0.97$).

Tables 2.5-2.6 Combined Table on learners' attitudes

2.5 Teachers should encourage learners to eat healthy food			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	64 (47.1)	17 (73.9)	81 (50.9)
LPS	72 (52.9)	6 (26.1)	78 (49.1)
TOTAL	136 (85.5)	23 (14.5)	159 (100)
PR = 0.86 (95% CI = 0.10 – 0.90); $\chi^2 = 5.68$; $P < 0.05^*$			
2.6 Oral health programme should continue at schools			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	80 (51)	1 (50)	81 (50.9)
LPS	77 (49)	1 (50)	78 (49.1)
TOTAL	157 (98.7)	2 (1.3)	159 (100)
PR = 1.00 (95% CI = 0.01 – 82.56); $\chi^2 = 0.00$; $P = 0.97$			

5.4 Teachers' Results

The results (for knowledge, attitudes and behaviour) of the teachers were not statistically significant. This could mostly be attributed to the small sample size for teachers. Some results on oral health behaviour and attitudes are highlighted.

5.4.1 Oral health practices

Table 3.1 demonstrates that a total number of 17 (63%) participants stated that they teach oral health related topics at least twice a week at school; from these 9 (53%) were from HPS and 8 (47%) were participants from LPS ($P = 0.32$).

Table 3.1-3.4 Combined Table on teachers' oral health practices

3.1 Teaching of oral health topics – Twice a week			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	9 (52.9)	7 (70)	16 (59.3)
LPS	8 (47.1)	3 (30)	11 (40.7)
TOTAL	17 (63)	10 (37)	27 (100)
PR = 0.77 (95% CI = 0.06 – 3.19); P = 0.32			
3.2 Learners brushing – Twice a week			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	15 (65.2)	1 (25)	16 (59.3)
LPS	8 (34.8)	3 (75)	11 (40.7)
TOTAL	23 (85.2)	4 (14.8)	27 (100%)
PR = 1.29 (95% CI = 0.36 – 314.49); P = 0.16			
3.3 Sensitisation on healthy diet – Demonstration of healthy and unhealthy food			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	3 (37.5)	13 (68.4)	16 (59.3)
LPS	5 (62.5)	6 (31.6)	11 (40.7)
TOTAL	8 (29.6)	19 (70.4)	27 (100)
PR = 0.41 (95% CI = 0.03 - 2.08); P = 0.14			
3.4 Sensitisation on healthy diet – Give information and advise			
TYPE OF SCHOOL	YES n (%)	NO n (%)	TOTAL n (%)
HPS	11 (73.3)	5 (41.7)	16 (59.3)
LPS	4 (26.7)	7 (58.3)	11 (40.7)
TOTAL	15 (55.6)	12 (44.4)	27 (100)
PR = 1.89 (95% CI = 0.59 – 26.49); P = 0.10			

Table 3.2 shows that 23 (85%) participants stated that they let learners brush teeth twice a week at school; of these 15(65%) were from HPS and 8 (35%) were participants from LPS (P =0.1).

Table 3.3 demonstrates that 8 (30%) participants stated that they use demonstration strategies for sensitisation of learners on healthy food, 3 (37.5%) were from HPS and 5 (62.5%) were participants from LPS (P = 0.14).

Table 3.4 shows that 15 (56%) participants indicated that they sensitise learners on healthy food by giving them information and advice, 11 (73%) were from HPS and 4 (27%) were participants from LPS ($P = 0.10$).

5.4.2 Attitudes towards oral health programme

Table 4.1 shows that although the majority of teachers 26 (96%) agreed that the oral health programme should continue at schools, 1 (4%) from LPS disagreed with that.

Table 4.1 Teachers' attitudes

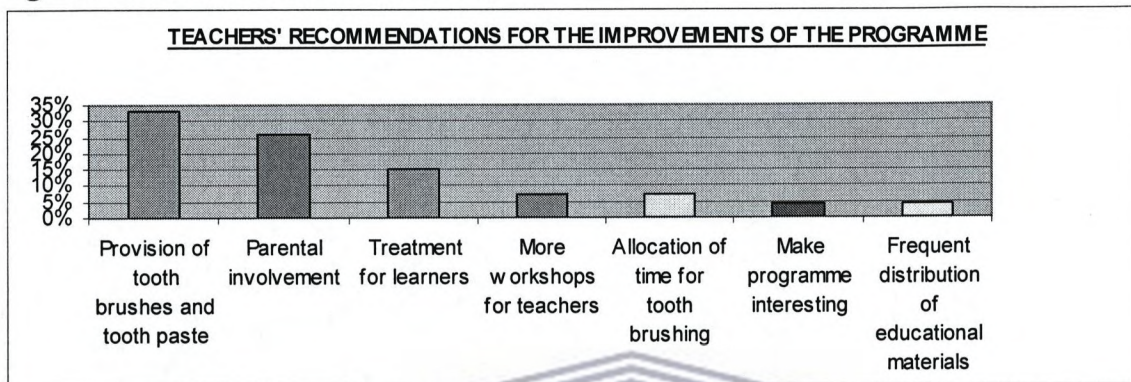
4.1 The Oral Health Programme should continue at schools			
TYPE OF SCHOOL	YES	NO	TOTAL
HPS	16 (61.5)	0 (0)	16 (59.3)
LPS	10 (38.5)	1 (100)	11 (40.7)
TOTAL	26 (96.3)	1 (3.7)	27 (100)
PR = 1.10 (95% CI = limits undefined); P = 0.40			

5.4.3 Recommendations for oral health programme

Figure 4 is a summary of recommendations made by the teachers when they were asked in the open-ended questions what they thought the shortcomings were (if any) in the programme and what their recommendations were to improve the programme. Of the 27 teachers, 9 (33%) indicated that provision of tooth brushes and toothpaste was crucial; 7 (26%) suggested that involvement of the parents was fundamental; 4 (15%) suggested that learners should be provided with treatment as many have unattended dental problems; 2 (7%) suggested regular workshops for the teachers in order to motivate teachers; 2 (7%) indicated that dedicated time should be allocated for tooth brushing sessions as the 10 minutes time which is often taken from a period's time affects the school work; 1 (4%) teacher stated that he/she finds it difficult to teach oral health topics because of lack of educational materials. Education materials were given six years ago and are now old and

turned out and therefore a suggestion was made that educational materials should be frequently produced and distributed to the schools. One (4%) teacher stated that the programme has now become tedious and therefore innovation should be found to make it more interesting.

Figure 4. Teachers' recommendations



5.5 Summary of results

The results that are presented in this chapter show that in general learners and teachers from both high and low participating schools were highly knowledgeable about the aetiology and prevention of dental caries and gingivitis. However, there were significant differences on knowledge levels on some items between the learners. The mean scores of 88% among the low participating schools and 78% among the high participating schools on oral health knowledge shows that learners from low participating schools were more knowledgeable than those from high participating schools. In addition, the majority of participants reported positive oral health behaviours and attitudes towards the oral health programme that is implemented at their schools. As a result the minimal difference between the schools was not statistically significant. However, it was noted that some teachers from low participating schools seemed to be having a negative attitude towards the programme as compared to teachers from high participating schools.

CHAPTER 6

DISCUSSION

In this chapter the findings of the study are discussed to ascertain analogy with the literature review as well as whether the findings are new discoveries to the scholastic world.

6.1 Learners' Data

6.1.1 Factors influencing knowledge

The current study was conducted three weeks after the schools had reopened after a long vacation, when teachers are usually busy with administrative matters. The schools had therefore not started with the oral health programme fully. However, learners exhibited high levels of oral health knowledge with a mean score of 83% on knowledge questions of the questionnaire. This confirms what has been observed in other studies that simple educational strategies do have consistent positive effect on oral health knowledge amongst learners (Kay & Locker, 1998; Varenne *et al.*, 2006).

In the current study, learners from the low participating schools (LPS) were more knowledgeable than learners from high participating schools (HPS). The mean score for knowledge was 88 % amongst LPS and 78% amongst HPS. This was surprising because it was expected that learners from HPS would be more knowledgeable than learners from LPS. Similar experiences were found in a study in Botswana which evaluated a school-based oral health programme and hypothesised that the more the exposure to the oral health programme, the more knowledgeable the learners would be. It was found that although 88% of all the learners indicated that school was their source for oral health knowledge,

learners from the schools where the programme was implemented were less knowledgeable than learners from schools where the programme was not implemented (Morero, 1999). These results were said to be possibly attributed to contamination as the study participants resided within the same geographical area. This cannot be ruled out for the current study because learners from both groups of schools also reside in the same geographical area and therefore there could also have been contamination. Moreover during data collection, the first two days were allocated to HPS and then the last two days to LPS. Therefore by the time of data collection at LPS, the learners could have already heard about the type of questions that were asked during data collection from HPS learners.

The dilemma with cross-sectional studies is that causal inference is weak because of lack of temporal relationship; you cannot establish whether the cause preceded the effect or not (Beaglehole *et al.*, 1993). The fees for the participating schools ranged from R100 – R540 per annum per child with LPS having higher fees. In addition the LPS were schools that were previously meant for privileged and favoured groups during the era of apartheid in Namibia. This is apparent by the good infrastructure of these schools compared to the high participating schools with infrastructure that resemble typical schools that were meant for the previously marginalized and disadvantaged groups. Furthermore learners from low participating schools have higher academic performance when compared with learners from high participating schools (Ministry of Education, 2008). Therefore though socio-demographic data was not collected from the learners, it can be extrapolated from the school fees that learners from LPS could have better socio-economic status compared to HPS learners. For that reason it is possible that due to their better socio-economic status and therefore better exposure to more knowledgeable influences and with available

enabling factors, learners from LPS benefited more from the programme as compared to learners from HPS with less social supportive learning influences. This was also experienced in an intervention that aimed at improving the oral hygiene of 5 year olds. Prior to the intervention the oral hygiene of the learners was the same. After the implementation of the intervention it was found that the oral hygiene of the non-deprived had significantly improved whilst there was no change in the oral hygiene of the deprived children (Schou & Wight, 1995, as cited by Beal, 1996). Furthermore when interventions are implemented, they usually benefit more those who already have more resources thus intensify the existing inequalities (Watt, 2005). Social class and academic performance are reported to be a confounder in cross-sectional studies (Beaglehole *et al*, 1993; Muirhead & Marcenes, 2004). Hence it is possible that social class and academic performance are confounders in this current study and has therefore compounded the results. Consequently it can be inferred that the learners from LPS who come from a better socio-economic background could have had an advantage by having increased awareness of and access to oral hygiene measures before the implementation of the programme. Thus the programme could have only improved the knowledge they already had on oral health. Therefore, socio-economic and environmental factors are important determinants of oral health.

6.1.2 Oral health practices

There were no significant differences in most of the reported oral health behaviours between HPS and LPS learners. However 63% of the learners from LPS reported more frequent brushing compared to 37% learners from HPS. In the meantime according to the routine oral health statistics that were collected from these schools (as stated in Chapter 1 under subheading 1.3.2 - Process of the programme), HPS had more frequent tooth

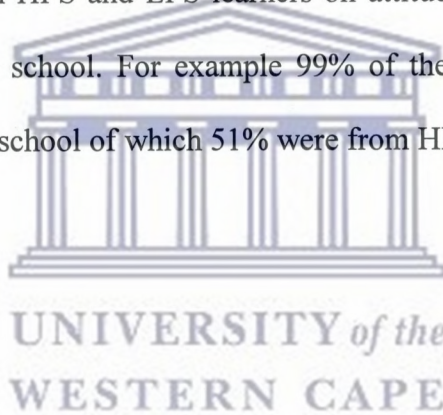
brushing sessions at school than LPS and based on that they are called high and low participating schools (MoHSS, 2008). It has been observed in various studies that oral health enhancing behaviours are usually over-reported and detrimental behaviours are under-reported (Nyandindi, 1995; Moreri, 1999; Varenne *et al*, 2006) which could have been the case when the oral health statistics were collected.

Gordon and Reddy (1985) found that the frequency of sugary consumption was more crucial in the development of dental caries and that was emphasized to the learners when explaining the occurrence of dental caries. However, 57% of the learners from LPS reported that they consume sweetened juices on a daily basis as compared to 43% learners from HPS. This is what is expected to happen because learners from HPS where there is higher active participation in the programme should have better oral health behaviours than learners from LPS. This is confirmed by Oliveira (1998) who states that repeated actions like consistent oral health information and frequent tooth brushing can lead to positive oral health behaviour. On the other hand this behaviour of learners from LPS to consume sweetened juices frequently despite reporting high knowledge on risk factors for dental caries, could be attributed to higher socio-economical environmental factors because sweet eating is accepted as a norm throughout these societies (Beal, 1996). Hence parents were found to have a strong influence on behaviour change amongst children. In a study on behavioural and demographic factors during early childhood and poor dental health at 10 years of age, a child's early dietary habits such as consumption of sweets and sweetened drinks were found to be significantly associated with the mother's habits (Mattila *et al*, 2005).

Therefore van Palenstein *et al* (1997) concluded that if positive oral health practices are not encouraged at home, it makes it difficult for the children to practice in their homes what they have learnt at school.

6.1.3 Attitudes towards oral health programme

School-based oral health programmes result in positive attitudes amongst learners towards the prevention of oral diseases (Varenne *et al*, 2006; Petersen *et al*, 2004; Kay & Locker, 1998). The majority of learners in the current study reported positive attitudes towards implementation of the oral health programme at school. As a result there were no significant differences between HPS and LPS learners on attitudes towards prevention of dental caries and gingivitis at school. For example 99% of the learners agreed that the programme should continue at school of which 51% were from HPS and 49% were learners from LPS.



6.2 Teachers' Data

The results between HPS and LPS teachers were statistically non-significant on all the tested variables namely knowledge, attitudes and practices. This is due to the small sample size of the teachers. When a sample size is small ($N < 30$) there is usually a risk of large standard error (Polit & Hungler, 1999). The small sample results in skew distributions and the confidence interval becomes quite wide capturing a diverse range of effect sizes and thus making estimate of effect size imprecise (Katzenellenbogen *et al*, 1999). Consequently the results become statistically non-significant even when there are important real effects at times (Polit & Hungler, 1999).

6.2.1 Knowledge on oral health

There were high levels of knowledge on oral health found amongst the teachers in the current study. This is in line with what is reported by studies where the effect of school-based oral health programme on teachers' knowledge was positive (Kay & Locker, 1998; Varenne *et al*, 2006). In one study it was found that knowledge of the teachers had increased by 40% after the implementation of the programme (Petersen *et al*, 2004). During the workshop that was held in 2007 for the teachers in the Swakopmund district, the average score for the pretest on knowledge was 47% but the average score for the post-test was 65% (MoHSS, 2008). This showed that teachers had increased knowledge after the workshop. Therefore it is not surprising that learners demonstrated high levels of knowledge because their teachers were equally highly knowledgeable about oral health.

6.2.2 Oral health programme practices of teachers

More teachers (67.5%) from LPS use demonstration strategies when teaching learners about healthy and unhealthy diets as compared to teachers (37.5%) from HPS. As diet is a major contributory factor to the occurrence of dental caries, most teachers from LPS found it imperative to demonstrate to the learners what sugary and non-sugary food was. However, most of the teachers from HPS preferred to just verbally inform the learners about diet to emphasize the issue of sugary and non-sugary food. This is despite the emphasis made during the training workshops of the teachers that teachers should use demonstration strategies for dietary counseling about sugary food. Demonstration strategies are said to be fundamental for communication of ideas amongst the primary school learners. By showing learners examples of sugary and non-sugary food or healthy and unhealthy food, it makes teaching vivid and pleasant for the learners (Scevak & Moore,

1997). Hence it is not surprising that learners from low participating schools were more knowledgeable than learners from high participating schools. This is because demonstration strategy in dietary counseling for learners provides learners with experience to see these foods for better understanding and comprehension of what is meant by healthy and unhealthy food, especially sugary or non-sugary food (Scevak & Moore, 1997). In Tanzania, where although 74% of the teachers reported that they had taught oral health, it was found that only 24% were willing to give comprehensive dietary counseling to the learners which included demonstration of sugary and non-sugary food. It is reported that teachers in Tanzania said they found it worthless to give dietary counseling because learners were not responsible for buying or preparing their food (Nyandindi, Palin-Palokas, Milén, Robinson, Kombe & Mwakasagule, 1994). This was the experience at the Swakopmund schools. At times during school visits, learners were found having lunch consisting of bread with jam and a sweetened drink. When teachers were asked why the consumption of sugary food was still persistent even though they were giving dietary counseling to the learners about the harmful effects of sugary food for their teeth, the teachers blamed the parents. The teachers stated that the learners say their parents do not heed what the learners tell them about sugary food. The teachers commented that they felt helpless as long as the parents who are responsible for feeding learners are not cooperative with regard to adhering to adequate diets for the prevention of oral health diseases.

In the current study 65% and 35% of the teachers from HPS and LPS respectively reported that they let the learners brush their teeth twice a week at school. Unlike with the learners' data where more learners from LPS reported brushing twice a week than HPS learners, the teachers' information was on par with the routine oral health statistics that there is less

tooth brushing frequency by LPS compared to HPS. Therefore the less frequency of tooth brushing sessions at the LPS can be assumed to be a lack of motivation by the teachers to undertake this task at these schools. This is in accordance with a finding that teachers do participate in oral health tasks that are assigned to them, but their willingness to perform the task is low (Nyandindi *et al*, 1994). In Swakopmund, teachers had stated that besides their workload they are expected to teach large classes, and are still expected to implement programmes that were not in the school's curriculum such as traffic safety, HIV/AIDS and oral health (MoHSS, 2008). In addition most of these programmes have to be implemented according to programme design and reports need to be produced (MoHSS, 2008). Moreover, many a time these programmes lack or have insufficient educational materials which necessitate teachers to develop educational materials of their own for these programmes. Furthermore, for the success of these programmes, teachers need cooperation from the parents and many a time this is lacking. Therefore all these factors have contributed to the low morale of the teachers in executing these programmes at school; hence they just implement them by virtue of being instructed to do so but with lack of motivation.

6.2.3 Attitudes towards oral health programme

Teachers from LPS and HPS, the same like the learners, reported positive attitudes towards the oral health programme implemented at their schools. However, there were less tooth brushing sessions and less learners participating in the programme at the LPS. Half of the teachers from one of the LPS refused to participate in the study and the only teacher who stated that the programme should be discontinued was from LPS. From this one can infer that some teachers from the LPS have negative attitudes towards the oral health

programme. This could be attributed to the fact that the programme is not part of the curriculum but there is still expectation that they implement the programme. From time to time teachers have to ask parents to purchase tooth brushes and tooth paste for the learners when they already have the problem of non-cooperative parents in school activities. In addition they have to improvise or develop educational materials for the programme as there is no continuous distribution of educational materials for the school oral health programme. These factors make it cumbersome for the teachers to implement the oral health programme at school. Consequently this has led to negative attitudes towards the school oral health programme by some teachers at some schools.

6.3 Perceived contributory factors for a successful oral health programme

Teachers made recommendations for the improvement of the programme. For a health promotion programme to be successful, access to enabling factors is of paramount importance (Mason, 2005).



Thirty three percent of the teachers in the current study suggested that tooth brushes and tooth paste should be provided for the learners. It was found that in a tooth brushing intervention whereby learners were provided with tooth brushes, tooth paste, washbasins and mirrors, learners brushed more frequently. But when the distribution of these habit-inducing items ceased, the learners stopped brushing their teeth at school (Wind, Kremmers, Thijs & Brug, 2005).

In Namibia for the purpose of sustainability of the oral health programme, parents are entrusted with the responsibility of providing tooth brushes and tooth paste because the

programme cannot be reliant on donors continuously. When donations are received however, they are distributed to the schools. There was a significant improvement in the participation of the learners in the programme at all schools in 2007 when tooth brushes and tooth paste were donated by Colgate and Rossing Foundation. In Tanzania it is reported that due to economic realities learners were using old worn out tooth brushes at school and as a result they had extensive bad oral hygiene (Nyandindi, 1995). This was experienced also at times at some schools in Swakopmund that some learners were using old tooth brushes and teachers were constantly encouraged to ensure that learners do not use worn out tooth brushes as these were not effective in the removal of dental plaque.

Twenty six percent of teachers recommended involvement of parents in the programme but lack of parental involvement in school activities is always reported to be a challenge. In a study conducted in South Africa on the impact of an oral health promotion strategy for teachers, it was found that lack of parental involvement was one of the major barriers reported by the teachers for the implementation of oral health programme (Brijlal, 2002). In Swakopmund district a parents' awareness day on the school oral health programme was held during the initiation of the program. Despite mobilization of the parents, the event was poorly attended. The teachers stated that this is a norm at their schools because there is always poor attendance by the parents to school events. Consequently parents were sensitized about the programme during parents meeting at some schools and through school boards for some. However, schools do invite the oral health programme coordinator whenever they want her to address the parents about the programme. In meetings or gatherings where parents were present, the parents showed positive attitudes towards the programme and they were keen that the programme continues at the schools.

On the other hand, parental involvement was reported as being one of the main reasons for successful oral health programmes. For example a randomized control trial study conducted amongst Scottish school children who were said to have one of the highest prevalence of dental caries in Europe, found that the intervention achieved a significant reduction in dental caries increment in the test group when compared with the control group. The innovation in this study was reported to be the magnitude of participation of the parents, whereby the mothers volunteered to supervise the tooth brushing sessions at school, ensuring consistent frequency of the brushing sessions, correct technique of brushing as well as effective use of the fluoride toothpaste (Watt, 2005).

Fifteen percent of the teachers in the current study recommended that learners should be provided with comprehensive dental treatment. For example, in order to be able to clean teeth effectively, removal of dental calculus is a prerequisite because due to its porous nature it harbours dental plaque, thus making removal of dental plaque difficult. However this is not done, there is a gap in the Swakopmund programme because learners are not provided with comprehensive dental treatment due to lack of school dental services which should be an integral part of the programme. This is due to inadequate resources for dental treatment in Swakopmund district. The only treatment that could be rendered to the learners is extractions. This shortcoming was also observed in Botswana because although the oral health programme had been running for more than 10 years at schools, no preventive treatment was given to the learners besides extractions (Moreri, 1999). The reported best practices in school based oral health programme such as those in China and Denmark, were comprehensive because they included preventive dental treatment for the learners (Stella *et al*, 2005).

Seven percent of the teachers recommended that frequent workshops should be arranged regularly in order to motivate teachers. It has been noted that training workshops not only increase the knowledge and skills amongst teachers but also has a potential to heighten their motivation (Petersen *et al*, 2004). This was also observed during workshops that were held in Swakopmund district when teachers reported that the workshops motivated them and gave them confidence to be able to implement the programme at their respective schools. However, due to lack of funds for three years (2003-2005), workshops could not be held for the teachers in Swakopmund. On the other hand, one of the shortcomings related to these workshops in most studies which reported on the school-based oral health programmes, is that not all the teachers can attend the workshops (Nyandindi *et al*, 1994; Frencken *et al*, 2001; Brijlal, 2002). Only representative teachers from each school are sent to attend. Those who are trained are expected to impart the knowledge to the rest of their colleagues. Nyandindi *et al* (1994) found that teachers who attended the workshops themselves were more motivated and comprehensive when educating learners about oral health than those who are taught by those who attended.

The programme is not accorded an appropriate value by the Ministry of Education and therefore there is not enough commitment on their part. There is minimal time allocated for tooth brushing sessions at schools on the programme. Hence teachers also recommended in this study that dedicated time should be allocated for oral health activities at schools in Swakopmund. The minimal time allocated to the programme at the schools shows the minimal value the programme is accorded at these schools. Similar findings were experienced in Tanzania where even though the programme was part of the curriculum, teachers complained of very limited time allocated for health matters including oral health

and also that there was a lack of educational materials for oral health topics (Nyandindi *et al*, 1994). Educational materials for teaching oral health were distributed at Swakopmund schools between 2001 and 2002. These educational materials were purchased from the budget of Africa Groups of Sweden Non-Governmental Organization which funded the piloting stage of the programme. Whenever posters and leaflets are received from Colgate, they are distributed to the schools. Furthermore schools are encouraged to develop their own educational materials. Empirical evidence showed that where successful oral health programmes were reported, adequate time was allocated for oral health activities and educational materials were provided. For example in China, adequate time was allocated for oral health activities and teachers were provided with oral health education materials. These included a manual on oral health, a booklet and a guide for oral health lessons, a manuscript for puppet theatre, accompanying text for slide shows, macro-models, flannel graphs and worksheets as well as self-evaluation forms for self-evaluation of oral health knowledge by the learners. In addition the schools received various macro-models, slides, posters and other didactic materials. The teachers reported that the educational materials were very effective in teaching and demonstration during oral health lessons and consequently they were very willing to implement the programme at school (Petersen *et al*, 2004).

As it has been noted earlier, successful school oral health programmes were reported at schools that have a holistic approach towards improving the health of the learners. These were schools where the school oral health programme was guided by the principles of health promotion. As WHO (2003a) confirms, it is very unlikely that improvements in oral health can be completely achieved by isolated interventions that only target specific behaviours.

A Health Promoting School has a healthy public policy that is embraced by the entire school's staff, governing body, learners, parents and other relevant stakeholders. This healthy policy creates a supportive environment for oral health and thus making healthy choices easier. In the process personal skills are developed and positive attitudes are promoted for all in the Health Promoting School (WHO, 2003b). Furthermore due to community participation in a Health Promoting School, it is not only learners who experience health benefits in a Health Promoting School but the entire community (WHO, 2003).

This study shows that there was congruence between the learners' high levels of knowledge and the teacher's high levels of knowledge. Therefore the programme did improve the oral health knowledge of teachers and learners. Consequently this resulted in positive oral health behaviours and attitudes amongst learners and teachers towards the oral health programme. However, the negative attitudes of some of the teachers could be attributed to the shortcomings in the programme which they had highlighted and could be the reasons for the low participation at some of the schools. Lack of resources for this programme could jeopardize the efforts that have been exerted in the programme because this could be used as a justification by the Ministry of Education and the teachers for the inadequate commitment in the programme. Consequently this could compromise a programme that had good intentions of reducing the prevalence of gingivitis and dental caries amongst the learners.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 CONCLUSION

This study was conducted to determine the oral health knowledge, attitudes and behaviours of teachers and learners from high and low participating schools in order to establish reasons for these different levels of participation in the school oral health programme that is implemented in Swakopmund district.

The learners in this study demonstrated high levels of knowledge and reported positive attitudes and behaviour towards the oral health programme that is implemented at their schools. This was consistent with what has been found in other similar studies that school oral health programmes do result in high levels of oral health knowledge and positive attitudes. However, it was surprising that learners from high participating schools in the programme were less knowledgeable compared to learners from low participating schools in the programme. This confirmed that socio-environmental factors are also determinants of oral health.

The teachers in this study also exhibited high levels of knowledge and also reported mainly positive behaviours and attitudes towards the school oral health programme. However, the study found that some teachers from low participating schools had negative attitudes towards the programme and this could be the reason for the low participation in the programme at these schools. The teachers expressed some discontent with circumstances under which they are expected to implement the school oral health programme. The

grievances that the teachers stated were lack of tooth brushes and tooth paste, persistent lack of parental involvement, lack of allocation of time for oral health activities by the school authorities, lack of regular workshops to motivate the teachers, lack of educational materials to teach oral health topics and lack of dental treatment for the learners. This shows that the school oral health programme of Swakopmund has a crucial shortage of enabling factors, making it difficult for the teachers to implement the programme. It has been stated that “without supportive policies,... budget and commitment from relevant government departments, the obstacles faced by schools and teachers in promoting oral health may remain insurmountable” (Stella *et al*, 2005:684) as is the case with the oral health programme in this study. This study demonstrates that oral health knowledge alone does not lead to the success of an oral health programme. Therefore the Health Promoting Schools approach is a pragmatic way to promote oral health at school because it is a comprehensive approach which addresses the immediate as well as underlying determinants of oral health. Furthermore, a qualitative study should be conducted to explore reasons for lack of parental involvement in the school oral health programme as parents are the most important stakeholders for the success of this programme.

With the following recommendations it is hoped that the Swakopmund district’s oral health programme could act as a model for the school oral health programme in Namibia.

7.2 RECOMMENDATIONS

7.2.1 Short term

Swakopmund district and Erongo region health management teams under the Ministry of Health and Social Services should ensure that:

- Adequate budget and resources are allocated for the programme annually.
- Oral health training workshops are conducted annually for teachers.
- Educational materials for teaching oral health are made available and distributed frequently to the schools.
- Measures are in place for sustainable procurement of toothbrushes and tooth paste such as lobbying other stakeholders to take responsibility for this.
- The Oral Health Steering Committee should lobby the schools' governing bodies to sensitize parents for their involvement in the programme.
- Negotiations are engaged with the Ministry of Education to allocate dedicated time for oral health activities at schools.
- Preventive dental treatment resources are available in order to provide the necessary treatment to the school children.

7.2.2 Long term

- The Ministry of Health and Social Services should introduce the Health Promoting Schools approach in the Swakopmund district so that the school oral health programme can be one of the Health Promoting School programmes rather than a

single vertical programme, as vertical programmes were found to be neither sustainable nor effective whilst enormous efforts are invested in them.

- The Ministry of Health and Social Services should ensure provision of more resources for oral health services especially at a district level. These are training and employment of more dental auxiliaries such as oral hygienists and dental therapists as these cadres are more efficient and effective for oral health services at a district level. Therefore in order to be responsive to the needs of the school children as well as the entire population, allocation of reasonable and meaningful budget for oral health services at district level is imperative.
- The Ministry of Health and Social Services should convince and encourage the Ministry of Education to integrate the oral health programme in the primary schools' curriculum.



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APPENDIX 1

LEARNERS' QUESTIONNAIRE

Date of Interview _____

Interviewer _____

Personal Particulars

1. **Serial Number** _____

2. **School's name** _____

3. **Sex** Male Female (Please tick the appropriate box)

4. **Age**

5. **Name the two most common dental problems experienced by the learners at your school.**

.....
.....



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6. **KNOWLEDGE**

Please tick true or false for the following

6.1 The functions of teeth are:	True	False
1. To chew food properly		
2. For self defense against attacks		
3. Helps to open up bottles		
4. For good facial appearance		
5. To facilitate speech		
6.2 The cause of dental caries is:		
1. Eating too much salt		
2. Eating too much meat		
3. Eating too much sugar		
4. Drinking too much water		
6.3 The signs of dental caries are:		
1. Whiter teeth		
2. Teeth with holes		
3. White stained teeth		
4. Black stained teeth		

6.4 Measures to prevent dental caries are:	True	False
1. Brush teeth properly and frequently		
2. Eat less meat		
3. Eat less sugary food		
4. Drink more coffee		
5. Always use toothpaste during brushing		
6.5 The most common cause of gingivitis:		
1. Eating too much salt		
2. Eating too much meat		
3. Eating too much sugar		
4. Germs on the teeth		
6.6 The signs of gingivitis are:		
1. Black gums		
2. Bleeding gums		
3. Swollen gums		
4. Brown gums		
6.7 Measure to prevent gingivitis is:		
1. Eat less salt		
2. Drink more water		
3. Brush teeth properly and frequently		
4. Eat less meat		
6.8 Characteristics of a good tooth brush are:		
1. Long handle, small head and medium to soft bristles		
2. Long handle and wide opened bristles		
3. The one used for more than a year		
4. Short handle and hard bristles		
6.9 The following describe the importance of a toothpaste:		
1. For good breath		
2. To prevent dental caries		
3. To make germs to stick to the teeth		
4. To prevent gingivitis		
5. To make teeth strong		

7. BEHAVIOUR/PRACTICES (Please tick the appropriate answer)

7.1 On average how many times are you taught oral health related topics at school?

1. Every day	
2. Once a week	
3. Twice a week	
4. Once a month	
5. Other	
6. Never	

7.2 On average how frequently do you brush your teeth at school?

1. Every day	
2. Once a week	
3. Twice a week	
4. Once a month	
5. Other	
6. Never	

7.3 How many times do you usually eat sweets?

1. Every day	
2. Once a week	
3. Twice a week	
4. Once a month	
5. Other	

7.4 How many times do you usually drink cool-drinks or sweetened juices?

1. Every day	
2. Once a week	
3. Twice a week	
4. Once a month	
5. Other	

7.5 When last did you go to the dentist?

1. This month	
2. Last year (2007)	
3. More than a year ago	
4. Never	
5. Other	

7.6 What was the reason for going to the dentist in your last visit?

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8. ATTITUDES (Please tick the appropriate answer)

COMMENTS	Agree	Disagree	Undecided
8.1 Prevention of oral diseases among learners at school is important.			
8.2 Learners appreciate oral health information they receive from the teachers and remember the precautions for healthy teeth and gums.			
8.3 Learners should be encouraged to eat healthy food in order to prevent dental caries			
8.4 Learners appreciate the tooth brushing sessions at school and cooperate			
8.5 The oral health programme has helped to improve the oral hygiene of the learners.			
8.6 The oral health programme should continue at school.			

APPENDIX 2

TEACHERS' QUESTIONNAIRE

Date of Interview _____

Personal Particulars

1. Serial Number _____

2. School's name _____

3. Sex Male Female (Please tick the appropriate box)

4. Name the two most common dental problems experienced by the learners at your school.

.....
.....

5. KNOWLEDGE



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Please tick the appropriately

5.1 The functions of teeth are:	True	False
1. To chew food properly		
2. For self defense against attacks		
3. Helps to open up bottles		
4. For good facial appearance		
5. To facilitate speech		
5.2 The cause of dental caries is:		
1. Eating too much salt		
2. Eating too much meat		
3. Eating too much sugar		
4. Drinking too much water		
5.3 The signs of dental caries are:		
1. Whiter teeth		
2. Teeth with holes		
3. White stained teeth		
4. Black stained teeth		

5.4 Measures to prevent dental caries are:	True	False
1. Brush teeth properly and frequently		
2. Eat less meat		
3. Eat less sugary food		
4. Drink more coffee		
5. Always use toothpaste during brushing		
5.5 The most common cause of gingivitis is:		
1. Eating too much salt		
2. Eating too much meat		
3. Eating too much sugar		
4. Germs on the teeth		
5.6 The signs of gingivitis are:		
1. Black gums		
2. Bleeding gums		
3. Swollen gums		
4. Brown gums		
5.7 Measure to prevent gingivitis is:		
1. Eat less salt		
2. Drink more water		
3. Brush teeth properly and frequently		
4. Eat less meat		
5.8 The characteristics of a good tooth brush are:		
1. Long handle, small head and medium to soft bristles		
2. Long handle and wide opened bristles		
3. The one used for more than a year		
4. Short handle and hard bristles		
5.9 The following describe the importance of a toothpaste:		
1. For good breath		
2. To prevent dental caries		
3. To make germs to stick to the teeth		
4. To prevent gingivitis		
5. To make teeth strong		

6. BEHAVIOUR/PRACTICES (Please tick the appropriate answer)

6.1 On average how many times do you teach oral health related topics?

1. Every day	
2. Once a week	
3. Twice a week	
4. Once a month	
5. Other	
6. Never	

6.2 On average how frequently do you let the learners brush their teeth at school?

1. Every day	
2. Once a week	
3. Twice a week	
4. Once a month	
5. Other	
6. Never	

6.3 On average how frequent do you sensitize learners about healthy diet?

1. Every day	
2. Once a week	
3. Twice a week	
4. Once a month	
5. Other	
6. Never	

**6.4 If you do sensitize learners about healthy diet, how do you do it?
Please explain.**

.....

.....

.....

6.5 Do you submit the oral health statistics to the contact teacher on monthly basis?

Yes No

6.6 If your answer is No at 6.5 please explain the reasons.

.....

.....

7. ATTITUDE (Tick one option for each statement)

OPTIONS

STATEMENT	Agree	Disagree	Undecided
7.1 Prevention of oral diseases among learners at school is important.			
7.2 Teachers should have partial responsibility for oral health promotion among learners at school.			
7.3 Teachers have the potential to influence and motivate learners to lead to healthy habits.			
7.4 Teachers can easily conduct oral hygiene activities during classroom periods and get the children to participate effectively.			
7.5 Learners appreciate oral health information they receive from the teachers and remember the precautions for healthy teeth and gums.			
7.6 Learners appreciate the tooth brushing sessions at school and cooperate.			
7.7 The oral health programme has helped to improve the oral hygiene of the learners.			
7.8. Teachers should further encourage learners to eat healthy food in order to prevent dental caries.			

7.9 Do you think that the oral health programme should be continued at schools? (Please tick the appropriate block)

Yes

No

7.10 If your answer is No at question 7.9, please give reason/s for your answer.

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8. What improvements do you think need to be done in the programme, please state reason/s for your suggestion/s?

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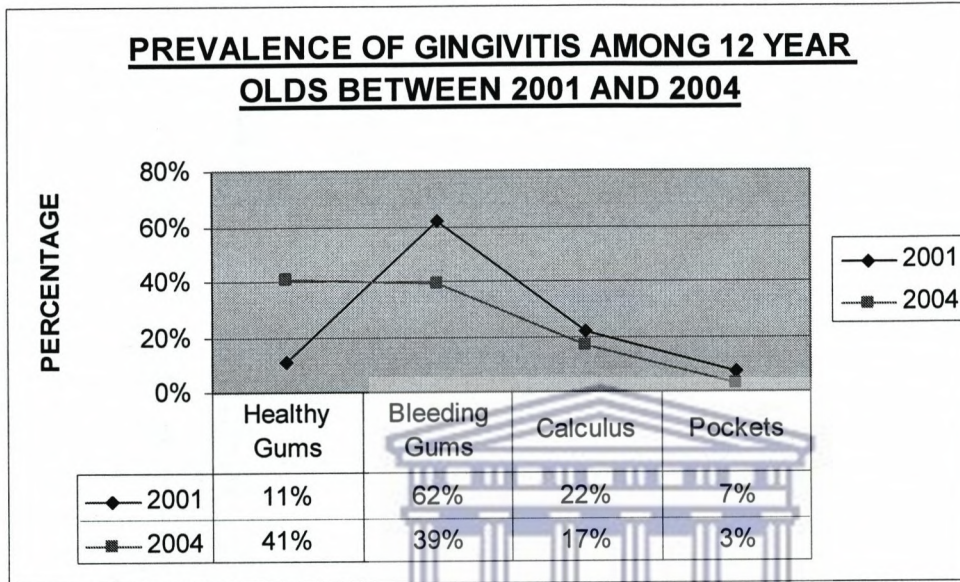
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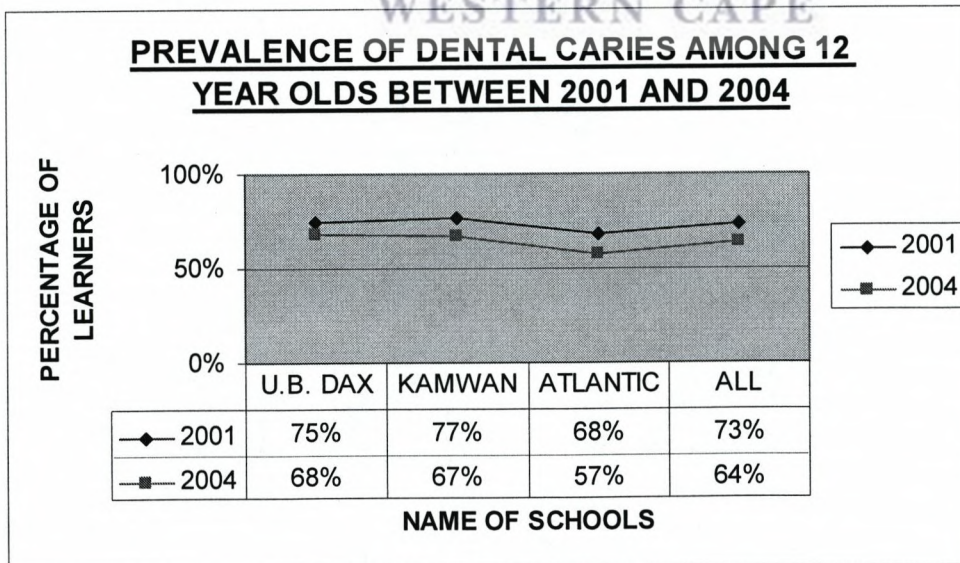
APPENDIX 3

Evaluation of the piloting stage of a school-based oral health programme

2001 - Baseline and 2004 - Evaluation



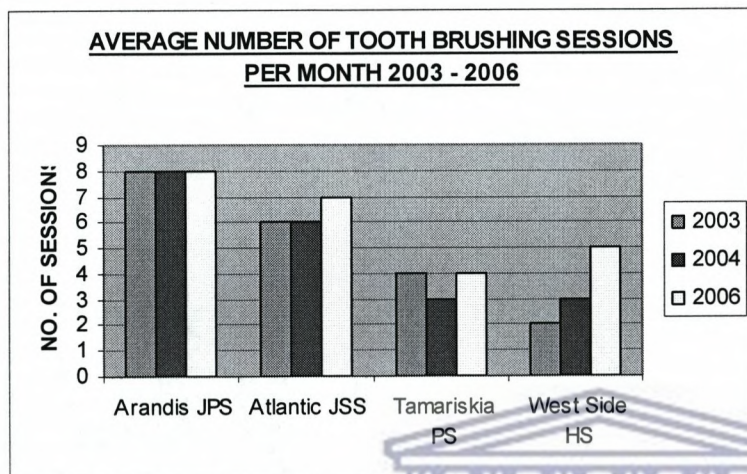
Comparison of prevalence of gingivitis between 2001 and 2004



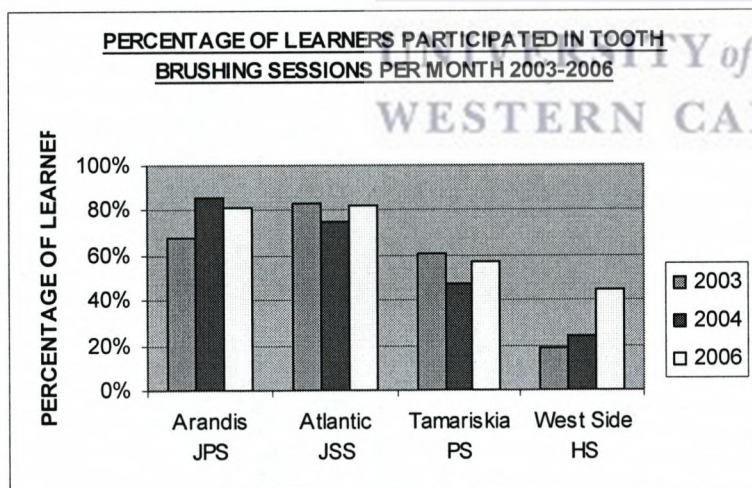
Comparison of prevalence of dental between 2001 and 2004

APPENDIX 4

PARTICIPATION OF THE FOUR SCHOOLS OF THE STUDY IN THE SCHOOL ORAL HEALTH PROGRAMME OF SWAKOPMUND DISTRICT



Tooth brushing sessions between the four schools: 2003-2006

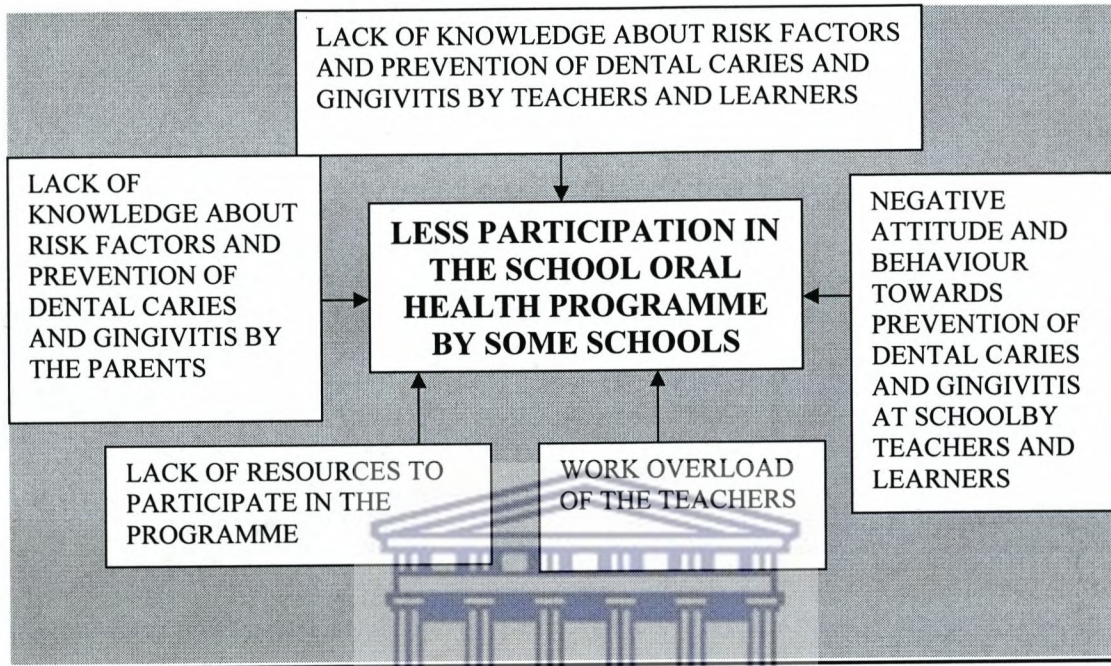


Learners participated in tooth brushing sessions: 2003-2006

APPENDIX 5

PROBLEM ANALYSIS DIAGRAM AND

CRITERIA FOR THE RESEARCH PROBLEM SELECTION



Problem analysis diagram

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CRITERIA	Lack of knowledge by the parents	Lack of resources for the programme	Lack of knowledge by the teachers & learners	Negative attitude and behaviour of teachers & learners	Work overload of teachers
RELEVANCE	1	1	1	1	0
DUPLICATION	1	1	1	1	1
FEASIBILITY	0	0	1	1	0
POLITICAL ACCEPTABILITY	0	0	1	1	0
APPLICABILITY OF RECOMMENDATIONS	0	0	1	1	0
URGENCY OF DATA	1	1	1	1	1
ETHICAL ACCEPTABILITY	0	0	1	1	0
TOTAL SCORES	3	3	7	7	2

Criteria for selection of the research problem

APPENDIX 6.



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School of Public Health



Private Bag X17 □ BELLVILLE □ 7535 □ South Africa
Tel: 021- 959 2809, Fax: 021- 959 2872
ccarolissen@uwc.ac.za

PARTICIPANT INFORMATION SHEET FOR MPH RESEARCH

1. Information about the interviewer

I am Linda Garises, a student at the School of Public Health (SOPH), University of Western Cape in South Africa. As part of my Masters Degree in Public Health, I am required to conduct a research in order to obtain the degree. Therefore I am expected to administer a questionnaire to you as my participant that will consist of questions related to evaluation of the school-based oral health promotion programme that is implemented at your school with the aim of reducing tooth decay and gum disease among the learners.

I am accountable to my supervisor – Ms. Suraya Mohamed who is contactable at the following numbers respectively: 0027-21-9592628 or 0027-21-9592809; E-mail address: sumohamed@uwc.ac.za.

2. Purpose and contents of the interview

The purpose is to assess knowledge, attitudes and behaviour of teachers and learners about the school-based oral health promotion programme that they are implementing at their schools. This is aimed at understand reasons for the less/high participation of learners in the programme at some schools. The questions on the questionnaire will be based on knowledge about causes of tooth decay and gum disease as well attitudes and behaviour of teachers and learners towards prevention of these oral diseases at school.

3. The process of the research

All teachers will be asked to assemble at a common place at school for them to administer self the questionnaire which will be explained to them how to complete it. Learners will be interviewed by me the researcher and the research assistants.

4. Benefits of the study

As the results of the study are expected to facilitate the rectification of the identified shortcomings in the programme, this will enhance the programme. Thus this will make it to reduce the prevalence of tooth decay and gum disease among the learners, the beneficiaries of the programme.

5. Confidentiality

At all times I will keep the source of the information confidential. Furthermore I shall keep any other records of your participation locked away at all times.

6. Things that may affect your willingness to participate

If there is anything that you would prefer not to discuss, please feel free to say so. I will not be offended and there will be no negative consequences if you would prefer not to answer the question. I would appreciate your guidance should I ask anything which you see as intrusive.

7. Informed Consent

I am expected to receive your written consent before I can resume with this research. Attached with this information sheet is a consent form which if you agree to participate in this research, you are to sign it.

8. Enquiries

For further enquiries regarding this research please contact my supervisor at the details mentioned in section 1 or myself through the following contact details.

Linda A. Garises
Student No: 8530984
Tel No: 064-4106053 (w); 064-461069 (h)
Mobile: 0813303328
E-mail address: lgarises@mtcmobile.com.na

APPENDIX 7



UNIVERSITY OF THE WESTERN CAPE

School of Public Health

Private Bag X17 □ BELLVILLE □ 7535 □ South Africa
Tel: 021- 959 2809, Fax: 021- 959 2872
ccarolissen@uwc.ac.za

INFORMED CONSENT FORM – ORAL HEALTH RESEARCH

This consent form serves as a proof of agreement for the participant who is willing to participate in the pilot research. The title of the research is “Comparison of knowledge, attitudes and behaviour of teachers and learners in response to the school-based oral health programme in Swakopmund district, Namibia”.

As it was mentioned in the Participant Information Sheet participation in this research is voluntary. Therefore you can choose to participate or not to participate. Additionally you are free not to answer certain questions should you decide not to do so and if you do not wish to continue anymore with the research, you are also free to stop at any stage.

If you decide to participate in the research, your signed consent is required before you complete the questionnaire.

Participant's agreement

I do understand the research and its purpose as explained in the participant information sheet as well as by the researcher. I also do have an understanding that it is voluntary and therefore I am not obliged to participate. Equally I do have a right to choose not to answer certain questions if I feel like doing so and I could terminate my participation at any stage.

I hereby willingly declare my participation in this pilot research.

Name of the participant/ Guardian (Printed)

Consent Date

Signature of the participant/Guardian
Researcher's agreement

Consent Date

I shall keep the contents of the above research confidential. The contents will be used for the purposes referred to above, but may be used for published or unpublished research at a later stage without further consent. Any change from this agreement will be renegotiated with you.

Name of the researcher (Printed)

Date

Signature of the researcher

Date



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Private Bag X17, Belville, 7535
South Africa
Tel: +27 (0) 21 959 2163
Fax: +27 (0) 21 959 2755
E-mail: csjohnson@uwc.ac.za

HIGHER DEGREES COMMITTEE

2 October 2007

TO WHOM IT MAY CONCERN

Dear Sir/Madam

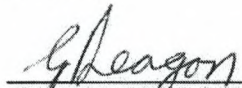
Research Project of MS LINDA GARISES (Student Number: 8530984)

This letter confirms that Ms Linda Garises is a registered student in the Faculty of Community and Health Sciences at the University of the Western Cape.

Her research proposal entitled "*Comparison of knowledge, attitudes and behaviour of teachers and learners regarding a school-based oral health programme in Swakopmund, Namibia*" submitted in fulfilment of the requirements for Masters in Public Health has been examined by the Higher Degrees Committee and found to be of high scientific value, methodologically sound and ethical.

We fully support the research and kindly request that you allow her access to your organization.

Sincerely



DR GAVIN REAGON
Chairperson:
Higher Degrees Committee



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A place of quality, a place to grow, from hope to action through knowledge



9 - 0 / 0001

REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198
Windhoek
Namibia

Ministerial Building
Harvey Street
Windhoek

Tel: (061) 2032562
Fax: (061) 272286
E-mail: myzauana@mhs.s.gov.na
Date: 26 March 2008

Enquiries: Ms. M. Zauana Ref.: 17/3/3/AP

OFFICE OF THE PERMANENT SECRETARY

Ms. Linda Audrey Garises
P. O. Box 773
Swakopmund
Namibia

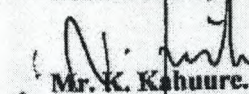
Dear Ms. Garises

RE: Comparison of knowledge, attitudes and behaviour of teachers and learners in response to the school-based oral health programme in Swakopmund district, Namibia

1. Reference is made to your application to conduct the above-mentioned study.
2. The proposal has been evaluated and found to have merit.
3. Kindly be informed that approval has been granted under the following conditions:
 - 3.1 The data collected is only to be used for your Masters degree;
 - 3.2 A quarterly progress report is to be submitted to the Ministry's Research Unit;
 - 3.3 Preliminary findings are to be submitted to the Ministry before the final report;
 - 3.4 Final report to be submitted upon completion of the study;
 - 3.5 Separate permission to be sought from the Ministry for the publication of the findings.

Wishing you success with your project.

Yours sincerely,


Mr. K. Kahuure.

PERMANENT SECRETARY



Forward with Health for all Namibians by the Year 2005!