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PATTERN OF DENTAL TREATMENT AT CHEMIN GRENIER DENTAL CLINIC, MAURITIUS, FROM 2000 TO 2006.

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A research report submitted to the Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa, in partial fulfilment of the requirements for the degree of Master of Science in Dentistry.

Johannesburg 2009

DECLARATION

"I declare that this research report is my own work. It is being submitted in partial fulfilment for the degree of Master of Science in Dentistry at the University of Witwatersrand, Johannesburg, South Africa. It has not been submitted for any other degree or examination at this university or any other University."

_____

Avisham Ramphul

27/09/09

I dedicate this report to my family,
and thank GOD for giving me
the strength to do it

ABSTRACT

Introduction

An analysis of the patterns of dental treatment delivered over a period of time provides administrators with data from which they can assess the quality of service delivery being delivered so that they can make improvements where necessary. This may be referred to as a situation analysis.

Oral Health surveys on the other hand drive policy decisions. The oral health needs of a population are identified in the surveys thus allowing the formulation of an oral health care policy for the country.

In Mauritius neither situation analyses nor oral health surveys have been conducted. The only study into this oral health status of the population in Mauritius has been a DMFT study carried out by the WHO - 1989) 1990

Objectives of this study

Little data exists at a local/district level on the patterns of dental care provided over a long term basis at individual clinics. This study sought to compare patterns of dental treatments at a selected clinic over a six year period. The aims were to

(1) To investigate the pattern of treatment delivered at a particular dental clinic (Chemin Grenier Dental Clinic) in Mauritius over a period of seven years from year 2000 to year 2006.

(2) Determine whether the package of care offered has changed over the study period.

(3) To provide recommendations on how to improve the delivery of oral health care at dental clinics in Mauritius.

Materials and methods

The research location was Chemin Grenier, a village in Mauritius, an island state in the middle of the Indian Ocean. It has a state funded dental clinic, where all treatment is free of charge. All the data for the purpose of this study has been ontained from this clinic. Since the introduction of free oral health care in Mauritius, extractions have been most common dental treatment offered in the public service.

The treatment offered were divided into three categories, namely,

- Dental extractions
- Conservative procedures aiming at preserving dentition, that is restorative work
- Preventive work which included scaling and fissure sealant placements

The data was collected from monthly summary sheets of treatment performed at the clinic. They were compiled and the results were showcased by graphs and tables.

Results

The results show that patient attendances have gradually increased placing additional pressure on a already overloaded system.

The treatment delivered has changed over the period of the survey with a decrease in the relative percentages of extractions done and a concomitant increase in restorative procedures. Preventative treatment has remained relatively constant over the period analysed.

Conclusion

If significant changes are to be affected in the oral health status of the population in Mauritius prefer planning a necessary. The following strategy is recommended

A - Carry out an assessment of the oral health status of the community. (Natural Oral Health Survey) which will provide quantitative data and also of the perceptions of oral health in terms of it being a priority in their lives which will provide the quantitative data.

P - Develop a National Oral Health Policy basal on this data.

A - Ensure that the dental service are delivered in terms of this policy.

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CHAPTER 1

INTRODUCTION

Health is defined as a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity (WHO, 1946). Health is a basic human right and oral health is a significant component of general health (Mautsh & Sheiham, 1995).

Oral diseases qualify as major public health problems owing to their high prevalence and incidence in some regions of the world. Similarly for other diseases, the greatest burden of oral diseases is on disadvantaged and socially marginalized populations. The severe impact in terms of pain and suffering, impairment of function and effect on quality of life must be considered (,WHO, 2003).

Oral health surveys provide policy makers with an indicator of the oral health status and treatment needs of the population, while an analysis of the pattern of dental treatment delivered over a period of time provides policy makers with data from which to reassess current policies and if the need be, to make necessary adjustments to improve oral health care delivery. Analysing patterns of treatment helps to identify weaknesses and allows for better planning for the future in the delivery of oral health care.

There are various factors which influence the pattern of treatment, namely the patient, the provider, access to health care, the health care system in place, socio-economic status and cultural issues among others (Brennan & Spencer, 2007). All these influence in one way or another, the oral health of the population. The WHO Oral Health Report (2003), highlights the fact that there are still communities in both developed and developing countries that suffer from poor oral health.

Availability and accessibility of oral health facilities in Africa is largely limited because of financial constraints. Reports from developing countries underline the low utilization of oral health care facilities and dental visits are primarily motivated by symptomatic reasons (Varenne, Msellati, Zounrana, 2005).

CHAPTER 2

LITERATURE REVIEW

Equity in health implies that everyone should have a fair opportunity to attain their full potential and, more importantly, no one should be prevented from achieving this potential (WHO, 1986). Mautsch & Sheiham (1995) have equated inequity to injustice. According to them, despite efforts to make health systems more equitable, in poorer countries and communities, people's health and their access to health care facilities are getting worse.

Akpabio (1990) has enumerated a list of barriers to good oral health care:

- Low priority given to oral health
- Inappropriate or no oral health policy
- Inappropriate strategy and technology
- Lack of oral health man power
- Inadequate and scarce resources
- HIV/ AIDS problems

These barriers also directly influence the pattern of treatment.

One leading indicator of oral health in adult populations is tooth loss. In many developing countries, access to oral health services is limited and teeth are often left untreated or are extracted because of pain and discomfort. Throughout the world, losing teeth is still seen by many people as a natural

consequence of ageing. While in some industrialized countries there has been a positive trend of reduction in tooth loss among adults in recent years, the proportion of edentulous adults aged 65 and older is still high in other countries (WHO).

2.1 Responsibility of health care delivery.

There has been a lot of debate on the responsibility which society in general and the state should shoulder in respect to the provision of basic health care. Different countries and international organizations have different views on this issue.

In 1948, the United Nations drafted the Human Rights Declaration which asserts that “Everyone has the right to a standard of living adequate for health and wellbeing of himself and his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control. “A 1983 US Presidential Commission stated, that it was society’s moral obligation to ensure adequate health to one and all.” The American College of Physicians (1990) has called for a national policy to minimize financial barriers and ensure access to health care.

Countries have had to adopt various strategies to address the rising cost of financing health care systems. Some have been more successful than others.

Countries like the Netherlands (Government Committee on Choices in Health Care, 1992), Britain (Roberts, 1992) and Canada (Mhatre & Debber,1992) have expressed concerns about cost of health care. They are of the opinion that the concept of universal care is under threat and there is an increasing call to adopt the idea of rationing care in favour of those with greatest need. Such issues are even more relevant to developing countries and the concept of rationing care in favour of those with greatest need is gaining momentum (Dharamsi & Mac Entee, 2002).

2.2 Health care systems

The way healthcare is delivered also directly influences treatment patterns. The mode of delivery varies from country to country. The UK, for example, which is considered as a developed nation, delivers healthcare through the National Health Service – NHS.

The NHS is funded partly by employees, their employers and partly through government subsidies on behalf of the unemployed. Through the NHS, health care can be accessed through public service providers or private providers. The NHS works well within the UK. However it is highly unlikely that such a system would be successful in a developing country. High unemployment

rates and low incomes as well as a high percentage of the work force in informal sectors would make such a scheme very difficult and expensive to implement.

In countries in which the government is unable to provide free health care for all people, other means of gaining revenue in order to sustain the rising costs of health care have been used. Many countries including those from Africa opt for the user fee system (Nolan & Turbat, 1995).

Many African countries have opted for the user fee system. A few countries in Anglophone Africa, for instance Ethiopia, Namibia and South Africa have had national user fee systems for years, while in many others, charges have historically been applied per visit in both governmental and non governmental facilities (Nolan & Turbat, 1995; Russel & Gibson, 1995).

In Mauritius, an island state in the middle of the Indian Ocean, the state provides free health care to all citizens through the welfare system. Health care is one of the pillars of the welfare state.

The welfare system is a framework of government policies and programs designed to ensure citizens have an acceptable level of socioeconomic welfare and access to necessary services regardless of their wealth and

income (Fenna, 1998). A Welfare state means different things in different countries. A central conclusion of most historical studies of social policy is that the state's responsibility for meeting human needs has increased steadily during the last century (Bruce, 1961; Fraser, 1973; Thane, 1982; Trattner, 1989). State involvement in welfare is of course, a primary characteristic of the communist countries (Madison, 1968; Navarro, 1977; Dixon, 1981; Deacon, 1983) and, as several writers (Hardiman & Midgley, 1982; Midgley, 1984; Jones, 1990) have shown, of many developing countries as well.

Through government funding, health care, from primary level to tertiary level is free of charge in public health care institutions in Mauritius. It is however highly unlikely that the present system of the welfare state will be sustainable in the future. The rising cost of health care delivery is of major concern to all policy makers. Most probably, the welfare state will be maintained in the country in order to promote social cohesion, which is a prerequisite for sound economic growth, but it will have to undergo changes in its organization and funding.

2.3 Socioeconomic status and health

Oral care as an integral part of general health has suffered enormously as a result of the rising cost of health care and the decreased accessibility to the oral health care facilities (Mautsh et al, 1995)

In North America, a quarter of the population, usually the socially marginalized section of society, visit dentists for little more than emergency care (Miller, Brunelle, Carlos et al, 1987; Charette, 1993). In South Africa, over 75% of the black population visits the dentist for symptomatic reasons (Van Wyk, Faber, Van Rooy et al, 1994). According to (Weiss et al 1993) it is hard to quantify as to how much of such behaviour can be attributed solely to poverty, but at least, it raises concern about the way dentistry is offered.

Many researchers have expressed the opinion that dentistry is a health service accessible to only the more advantaged members of society (Field, 1995; Chen, Anderson, Barmes et al, 1997; Jones, 1998). Yet, there is enough evidence to suggest that loss of teeth and other dental problems are more common and have more serious consequences on people of low income groups (Miller et al 1987; Todd & Ladder 1991; Charette, 1993).

The problem of unequal distribution of oral health services exists in nearly all countries. There is unequal distribution of resources. The majority of the resources are used by the minority of the population who require the least care – Tudor Hart's Inverse care law (Mautsh & Sheiham, 1995).

Social status is directly related to economic power. They both act as major contributors to inequalities in oral health. According to Bolin (1997) and Sweeney et al (1999), social status is the most important factor explaining differences in caries among European children. The US Department of Health and Human Services, 2000, report, also points towards a substantially greater number of decayed teeth and untreated oral diseases among children from low income families in the US. Gamble and Cotuga (1999) reached a very interesting conclusion. They are of the opinion that poorer groups of society are very often the main marketing targets of food with high sugar contents, hence increasing their risks of suffering from oral health problems.

Gilbert, Shelton & Duncan (2002) undertook an audit of dental treatment procedures by dentate adults during a twenty four month period. Their study highlighted the fact that African Americans were less likely to receive dental prophylaxis, restorative treatment procedures and fixed prosthodontics than whites. An analysis of dental visit procedures and providers in 1996 in the US which looked at treatment pattern over a period of ten years revealed that poorer patients had fewer preventive procedures done and more of restorative and surgical work as opposed to patients of higher income groups. The same pattern was noticed for diagnostic and prosthetic procedures. This study also revealed that patients with a lower education level had fewer diagnostic and

preventive procedures done, but more restorative, prosthetic and oral surgical procedures than patients of a higher education group (US Department of Health and Human Services, 2000)

2.4 Operator bias

Ntabaye, Scheultz & Poulsen (1998), surveyed household access to and household utilization of emergency oral healthcare services in rural Tanzania. According to them, most dentists in Tanzania adopted a therapeutic approach rather than a preventive one, with extraction of teeth being favoured treatment for dental caries.

In Australia, socially disadvantaged people who face difficulties accessing oral health care facilities in private sector, are more likely to receive a pattern of service oriented towards extraction and less emphasis on preventive and maintenance care in the public clinics (Brennan, Luzi & Robert -Thomson , 2008).

Marcus, Druny & Brown (1996), are of the opinion that operator's bias plays a significant role in the decision making process when recommending tooth extraction versus a tooth sparing procedure. This bias arises despite the fact that dental training both at undergraduate and postgraduate level stresses on proper history taking, clinical assessment, diagnosis and treatment planning.

2.5. Utilisation of Oral Health Services

A survey conducted in a peri urban settlement of South Africa found that, only 37% of adults had consulted a dentist or medical doctor usually for a tooth extraction (Westaway, Viljoen & Rudolf, 1994). A study in the Ivory Coast reported that only 11.4% of city dwellers in Aledgon had visited a dentist because of dental problems (Samba, Gwinan, Sangore et al, 2004). The majority of patients with dental pain resorted to traditional and modern self medication practices. Another study in Nigeria showed that 9.0% of households had used dental services during the past year while variables such as "zone of residence" and "household educational and social class ranking" affected use of oral care services (Adegbembo, 1994). In Tanzania, the principal factors associated with the utilization of oral health care services were distance to treatment facility and previous dental symptoms (Mosha & Scheutz, 1993).

Tickle, Milsom & Blinkhorn (2002) looked at inequalities in dental treatment provided to children in the UK, and found that the differences in oral health were as a result of socio demographic factors and regularity of attendance.

According to Davis (1981), patterns of tooth loss by social class has been linked, not only to cultural factors such as attitudes, but also to the delivery system itself.

In a recent study investigating the association between educational indicators and dental caries experience in 12 yr old children in developing countries revealed that dental caries experience of 12 yr old children appears to be highest in countries with low level of primary education (Egri & Gunayo, 2004).

Zhu, Petersen & Wang (2003) reported that 42 percent of school children in China had never visited the dentist. Studies of caries in two UNICEF defined regions – Sub Saharan African Region and Middle Eastern Crescent (including North Africa) were systematically reviewed by Cleaton – Jones (2001). He reported no overall change in caries level in ten countries from each of the two regions between 1988 and 1998.

2.6 Health in Mauritius

The health system in Mauritius is under the supervision of the Ministry of Health and Quality of Life.

The mission statement of the ministry is to:

- Enhance the health status of the population
- Improve the quality of health care delivery with a view to increasing patients' satisfaction.
- Enhance social equity through the provision of a wider range of health services to the whole population.
- Ensure that the health sector is consolidated and that the health services

remain accessible to every citizen.

2.6.1 Population Statistics

The population of Mauritius estimated as at end of 2004 was 1,201,000 (594,063 males and 606,937 females). There has been an annual average growth of 1 percent these past ten years. Life expectancy at birth was in 2004, 68.7 for males and 75.5 for females. Infant mortality rates as of end of 2004 was 14.0 per thousands lives. Maternal mortality rate figures for 2004, was 0.16 per thousand births (Island of Mauritius, Analysis of the Health situation, 2004).

2.6.2 Health Care Delivery in Mauritius

Health care is delivered through a pyramidal system. In order of hierarchy in terms of level of care provided, we first have the five regional hospitals, followed by two district hospitals, 2 community hospitals, twenty two Area Health Centres and 109 Community Health Centres. There are also specialized hospitals, namely, an ophthalmology hospital, a hospital for chest disease, an Ear Nose and Throat Hospital and a hospital for cardiac conditions. In 2004, there was one doctor for every 950 inhabitants (Island of Mauritius, Analysis of the Health situation, 2004).

2.6.3 Morbidity

The first case of AIDS was reported in Mauritius in 1987. At the end of 2004 there were 1233 reported cases of HIV. The main mode of transmission is through the intravenous way, mainly with prisoners exchanging needles to take drugs.

In 2004, 20.5 percent of patients treated at Hospitals were people above the age of 60. A very high percentage of patients in that category were admitted because of acute myocardial infarction and other ischaemic heart diseases, diabetes mellitus, cerebro-vascular diseases, hypertensive disease and heart failures, (Island of Mauritius, Analysis of the Health situation, 2004).

Mauritius has the highest prevalence of diabetes in the world. Nearly one in every five adults over the age of 30 has diabetes and the other tragedy is that nearly half of those people are not aware that they have this condition. Moreover in most of those who know they have the disease, the diabetes is uncontrolled. More than one in five deaths in Mauritius is related to diabetes (Island of Mauritius, Analysis of the Health situation, 2004)

2.6.4 Causes of death

Heart diseases (excluding hypertensive disease, acute rheumatic fever and diseases of pulmonary circulation) and cerebrovascular diseases were the first two principal causes of death in 2004, accounting for 31.0 and 15.1 % of death respectively. Diabetes was in third position accounting for 6.1% of deaths (Island of Mauritius, Analysis of the Health situation, 2004)

2.6.5 Oral Health in Mauritius

Oral Health in Mauritius is under the supervision of the Ministry of Health and Quality of Life. It is provided by both the public and the private sector. Most oral health practitioners are currently in the private sector. When dental health services were first introduced in Mauritius in state hospitals and clinics in 1968, only extractions were performed. We have come a long way since then, and today a comprehensive package of care is available to the population. Specialized oral health services are provided in four disciplines of dentistry, namely oral and maxillofacial surgery, orthodontics, endodontics, and public health dentistry.

The dental profession in Mauritius is regulated by the Dental Council. Every year, dentists have to renew their registration with the council to be able to practice. Dentists currently practicing in Mauritius qualified from a number of

countries, the majority currently comes from Russia, India, Pakistan, France, England and Romania. Two dentals schools have been established in Mauritius recently and the first local graduates will be qualifying in 2009.

At the end of 2006, there were 179 registered dental health practitioners in Mauritius, including 13 dental specialists. The distribution of dental specialists is as follows

- 6 Oral and Maxillofacial surgeons
- 5 Orthodontists
- 1 Endodontist
- 1 Public Health Specialist

As of 2006, the dentist/population ratio is 1: 6704(Ministry of Health and Quality of Life,Mauritius,2006).The state currently employs 56 dentists. The head of Dental Services in Mauritius occupies the post of Director of Dental Services. He is assisted in his duties by four Superintending Dental Surgeons who are responsible for the administrative management of the different districts of the island. There are 43 Dental Surgeons / Senior Dental Surgeons working in the different state dental clinics.

2.6.6 Specialized Oral Health Services

There are 9 dental specialists employed by the Ministry of Health and Quality of Life, namely

- 3 Orthodontists
- 4 Oral and Maxillofacial surgeons
- 1 Public Health Specialist
- 1 Endodontist.

2.6.7 Treatment provided at state dental clinics are as follows

- Restorative work
- Minor oral surgery
- Preventive work such as placement of fissure sealant and scaling
- Root canal treatment

Special attention is given to primary school children as well as pregnant mothers. The dental division also distributes fluoride tablets to babies. It has to be pointed that a study made by Courtens in 1991 revealed that the fluoride levels of water sources around the island was very low, ranging from 0.002 to 0.008 ppm (Courtens, 1991). There has been very little research done on oral health in Mauritius.

2.6.8 DMFT study in Mauritius

The World Health Organization has undertaken work on establishing DMFT indices in collaboration with the Oral Health Department in Mauritius. In addition, there was a study carried out by the WHO in collaboration with the Nutrition Unit of the Ministry of Health in Mauritius on fluoride and sugar intake among adults and youth in Mauritius.

A 1989/1990 WHO report on Mauritius illustrates the low priority given to oral health by local policy makers. The study highlights the fact that only 1.4% of health care expenses were dedicated to oral health care (Courtens, 1991)

Table 2.1 Health Expenditure in Mauritius for the year 1989-90

Health Expenditure					
	% of GNP Spent on Health	Annual Expenditure on Oral Health Care	Oral Health Care as % of Health Care Expenses	Year	Source
Total	n.a.	$ 568,000 USD	1.4	1989-90	1991

Ref : WHO Oral Health Country /Area profile Programme

The DMFT index is used to assess the oral health status as well as efficiency of oral health care delivery in a given population.

The following can be used as a guide to understand the DMFT index:

- A large D component shows that there are practically no dental services in the community.
- A large F component indicates a proper restorative service.
- A small DMFT shows that there is proper preventive service.
- A large M component indicates a good extraction service

The World Health Organization has promulgated a classification of caries prevalence which is used as a reference basis.

Table 2.2 WHO DMFT Index

DMFT Range	Age 12 years classification
0.1 -1.1	Very low
1.2- 2.6	Low
2.7-4.4	Moderate
4.5-6.5	High
6.5 and higher	Very high

Ref : World Health Organisation

In 1980, the World Health Organization had set as goals for the year 2000, the following:

- Age 6 years: More than 50% of children must be caries free

- Age 12 years:

    - Countries with DMFT greater than 3 must decrease to 3 by year 2000.
    - Countries with DMFT less than 3 must not rise, but rather decrease further.

Table 2.3 DMFT study in Mauritius for age 12, 15 and 33-44 years old

Age Group	Year	% Affected	DMFT	D	M	F
12 years	1993	n.a	4.9	n.a	N/A	N/A
15 years	1990	84	4.2	2.2	0.7	1.3
33-44 years	1990	97	11	2.1	6.8	2.1

Ref : Dental Department, Ministry of Health and Quality of Life, Mauritius

Table 2.3 illustrates the DMFT values for three different age groups in Mauritius .The values for all three age groups show that the DMFT's are higher than what the World Health Organisation aims for . The missing teeth component of the 33- 44 age group is alarming and shows a mainly extraction oriented service.

Table 2.4 DMFT study in Mauritius for 6 years old

Age 6 Years Old	Year 1990	Year 2001
Number	234	627
% Affected	84%	91%
D	4.4	4.2
M	0.7	1.5
F	0.1	0.1
DMFT	5.2	5.8

Ref: Dental Department, Ministry of Health and Quality of Life, Mauritius

Table 2.4 shows the DMFT results in Mauritius for six year olds in 1990 and eleven years later in 2001. There has unfortunately not been any improvement over the period of 11 years. The high decayed component shows an absence of dental service in the community. The 2001 WHO study did not, include 12 and 15 years old. The World Health Organisation goals have not been met, both in 1990 and in 2001.

CHAPTER 3

OBJECTIVES OF THIS STUDY

Little data exists at a local/district level on to the patterns of dental care provided over a long term basis at individual clinics. This study sought to compare patterns of dental treatments at a selected clinic over a six year period. The aims were to

(1) To investigate the pattern of treatment delivered at a particular dental clinic (Chemin Grenier Dental Clinic) in Mauritius over a period of seven +years from year 2000 to year 2006.

(2) Determine whether the package of care offered has changed over the study period.

(3) To provide recommendations on how to improve the delivery of oral health care at dental clinics in Mauritius.

CHAPTER 4

METHODS AND MATERIALS

4.1 Study Design

It is a retrospective cross sectional audit of pattern of dental care over a 7 year period (2000-2006).

4.2 Study Population and Location

Mauritius is a small island state located in the middle of the Indian Ocean. It is situated between the Australian and African continent. It is 1865 square km in size, 67 km in length, and, 47 km in width. It has a population of around 1.2 million people. It is part of the African continent, geographically located in Southern Africa (Atlas of Mauritius,2003).



Figure 4.1 A map situating the Mauritian capital city Port Louis in relation to the African continent.

The research location is Chemin Grenier. Chemin Grenier is a village in the extreme south of the island, about 60 kilometres south east of the capital, Port Louis.

The dental clinic is part of a Health Centre. This clinic was chosen for this study because the study was done by an operator who worked there for 3 and a half years. Also the data used for the purpose of the study was readily available.

The dental clinic serves the population of

- Chemin Grenier
- Chamouny
- Part of Surinam
- Rivière des Gallets
- Baie du Cap
- Saint Martin
- Bel Ombre

The population served by the clinic is around 20,000 people. It consists mainly of middle and low income people. The main activities in the area are: agriculture, mainly sugar cane plantation, fishing, and the hotel industry.



Figure 4.2 A map of Mauritius highlighting Chemin Grenier in the extreme south of the island.

The clinic is opened everyday from 9 am to 4 pm, Monday to Friday and on Saturdays from 9 am to 12. On week days, lunch time is from 12 to 1 pm.

There is currently one operator (dental surgeon) and one dental assistant working at the clinic.



Figure 4.3 A picture of Chemin Grenier Dental Clinic.

In the morning sessions, outpatients are seen. The treatment consists primarily of pain relief. In the afternoon, patients are seen on appointments.

The basic package of care offered at the study clinic is as follows:

- Restorations with amalgam and composite
- Extractions and other minor surgical procedures
- Root canal treatment
- Placement of fissure sealants in school children
- Scaling and oral hygiene instruction
- Distribution of fluoride tablets to babies

All treatments are free of charge. Endodontics is usually not performed in the clinics. Radiographs and endodontics do not form part of the package nor is any time spent on oral hygiene educators nor oral health promotion as the operators are too busy.

4.3 Study Sample

This study used data from all patients that attended the clinic during the study period. There was a total of 47, 622 patient attendances during the years 2000 to 2006.

4.4 Study Instrument

The study instrument consisted of the patient's folder that was kept for each individual attending the study clinic. Each card contained the following data.

- Name and surname of patient
- Age

- Sex
- Address
- Consent and signature of patient
- Type of treatment performed
- Dental history
- Medical history

Blood pressure and urine sugar test of all patients above the age of 40 and anyone below 40 with a history of those two conditions or who were considered at risk. The data from each patient's card is recorded in a book. Each month a summary sheet of patient attendance as well as treatment performed is made. At the end of the year, a yearly summary sheet as illustrated in the next page is compiled.

Table 4.1 Yearly summary sheet of treatment performed at Chemin Grenier

Date	JAN	FEB	M	AP	MA	JU	JL	AU	SE	OC	NO	DEC
• *Babies below the age of 3												
• *Pre primary school children between age of 3 to 4												
• *Primary school children aged 5 to 12												
• *Outpatients												
Expectant and Nursing mothers												
Medically compromised patients												
• *Hospital patients												
Inmates of private institutions												
Number of patients done under GA												
Extractions Deciduous Teeth												
Extractions (permanent teeth) school children												
Extractions (Permanent teeth) Adults												
Temporary fillings (Deciduous teeth)												
Temporary fillings (Permanent teeth)Adults												
Permanent teeth filled (Amalgam)school children												
Permanent teeth filled (Amalgam)Adults												
Permanent teeth filled (Composite)school children												
Permanent teeth filled (Composite)Adults												
Pit and Fissure Sealant												
Scaling												
Extraction of impacted wisdom												
Surgical extractions												
Endodontic Treatment												
Wiring and Removal of wires												
No of X rays taken												
Examined and Advised												
Bleeding socket												
Dental Abscess												
Septic Socket												
Dental Cysts												
Gum Disease												

- *Excludes patients who are not medically compromised ,ex diabetic or hypertensive*

4.5 Data Collection forms and Analysis

The data used for the purpose of this study comes from the compilations of a yearly summary sheet from year 2000 to 2006 (Table 4.1). The raw data was transferred to an Excel spread sheet and grouped as follows

The total number of patient attendances for a particular year was calculated as the sum for the whole twelve months of a particular year of

- Babies less than 3 yrs old
- Pre primary school children between 3 and 4 yrs
- Primary school children between 5-12 yrs
- Outpatients
- Expectant and nursing mothers
- Medically compromised patients
- Hospital patients
- Inmates of private institutions

The total number of restorations placed was calculated as the sum of:

- Permanent fillings (amalgam) adults
- Permanent fillings (composite) adults
- Permanent fillings (amalgam) school children
- Permanent fillings (composite) school children
- Temporary fillings deciduous teeth

The total number of extractions was calculated as the sum of the extraction of

- deciduous teeth
- permanent teeth in scholars
- permanent teeth in adult
- surgical extractions

The total number of preventive procedures was calculated as the sum of the told number of scale and polish plus the number of fissure sealants placed for each year

The total number of restorative procedures, extractions as well as preventive procedures were then expressed as a percentage of the total number of patient attendance for the corresponding year.

Other data such as numbers of endodontic procedures, dry sockets abscesses and gum disease which could also be of interest were also extracted from the data sheets and transferred to the Excel spread sheet.

Statistical significance was tested for using the Chi Square test and probability levels of <5% were regarded as being significant.

4.6 Ethics and Consent

Ethics approval was sought from Human Research Ethics Committee (Medical) of the University of Witwatersrand before beginning the study. The clearance number is M070934. Authorisation to carry out the study was granted by the Director of the clinic.

4.7 Limitations of the study

This research only looks at the pattern of treatment at one of the thirty three public dental clinics in Mauritius. This may not be representative of the pattern of dental care for the whole of Mauritius

CHAPTER 5

RESULTS

5.1 Patient attendances

The total number of patient attendances for various ages and special group categories is shown in Table 5.1 and Table 5.2 and in Fig 5.1. The numbers range from a low of 5904 in 2002 to a high of 8834 in 2005. The ratio of children to adult patients changed from 1:2 in 2000 to 1:3 in 2006 while the numbers of nursing or expectant mothers showed a decrease from 9.1% of all patient attendances in 2000 to 3% in 2006. (Table 5.2)

Table 5.1 Patient attendance from year 2000 to 2006

Year	2000	2001	2002	2003	2004	2005	2006
Patient attendance	6157	6748	5904	6010	6275	8834	7696

Table 5.2. Number of patient attendances for various age and special group categories

	2000		2001		2002		2003		2004		2005		2006	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Babies younger than 3 years	32	0.5%	21	0.3%	23	0.4%	26	0.4%	93	1.5%	33	0.4%	39	0.5%
Pre Primary 3- 5 years	155	2.5%	258	3.8%	234	4.0%	162	2.7%	194	3.1%	227	2.6%	219	2.8%
Primary 5 - 12 years	1,698	27.6%	2,003	29.7%	1,512	25.6%	802	13.3%	1,271	20.3%	1,975	22.4%	1,401	18.2%
Sub-total	**1,885**	**30.6%**	**2,282**	**33.8%**	**1,769**	**30.0%**	**990**	**16.5%**	**1,558**	**24.8%**	**2,235**	**25.3%**	**1,659**	**21.6%**
Outpatients	3,437	55.8%	3,691	54.7%	3,565	60.4%	4,481	74.6%	4,103	65.4%	5,923	67.0%	5,488	71.3%
Expectant and nursing mothers	560	9.1%	474	7.0%	441	7.5%	234	3.9%	276	4.4%	288	3.3%	231	3.0%
Medically compromised patients	242	3.9%	217	3.2%	92	1.6%	305	5.1%	338	5.4%	388	4.4%	318	4.1%
Inmates	33	0.5%	82	1.2%	37	0.6%	-	0.0%	-	0.0%	-	0.0%	-	0.0%
Sub-total	**4,272**	**69.4%**	**4,464**	**66.2%**	**4,135**	**70.0%**	**5,020**	**83.5%**	**4,717**	**75.2%**	**6,599**	**74.7%**	**6,037**	**78.4%**
Total	**6,157**	**100.0%**	**6,746**	**100.0%**	**5,904**	**100.0%**	**6,010**	**100.0%**	**6,275**	**100.0%**	**8,834**	**100.0%**	**7,696**	**100.0%**

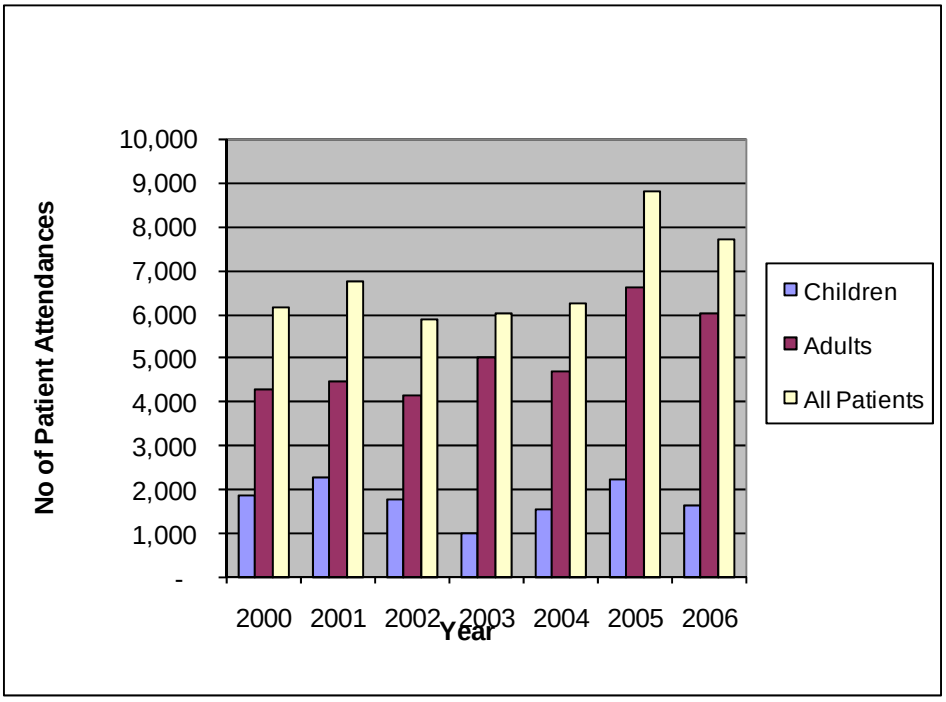

Fig 5.1. Number of patient attendances for all patients and for adults and children

5.2 Number of fillings placed

The numbers, type of fillings and category of patient in which they were placed is shown in Table 5.3 and Fig 5.2. The numbers range from a low of 1608 in 2001 to a high of 5448 in 2005 with temporary fillings accounting for more than 50% of the total number in 2000, 2001 and 2003 but dropping to 25.7% in 2006. Amalgam was the material used in 36.5% of the teeth filled in 2000 but increased to 60.3% of fillings placed in 2006.

The numbers of composite fillings remained relatively constant at round about the 10% level ranging from a low of 8.2% in 2004 to a high of 14% in 2006 (Table 5.3)

Table 5.3. Number and types of fillings placed in deciduous teeth and permanent teeth

	2000		2001		2002		2003		2004		2005		2006	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
Temporary Fillings														
Deciduous	73	4.1%	107	6.7%	162	8.9%	181	6.1%	354	10.9%	318	5.8%	426	10.8%
Permanent School	79	4.4%	67	4.2%	54	3.0%	112	3.8%	110	3.4%	192	3.5%	162	4.1%
Permanent Adult	741	41.6%	698	43.4%	669	36.8%	1,274	43.0%	1,391	42.9%	2,126	39.0%	430	10.9%
Sub total	**893**	**50.2%**	**872**	**54.2%**	**885**	**48.7%**	**1,567**	**52.9%**	**1,855**	**57.2%**	**2,636**	**48.4%**	**1,018**	**25.7%**
Amalgam fillings														
Permanent School	167	9.4%	77	4.8%	146	8.0%	318	10.7%	58	1.8%	243	4.5%	152	3.8%
Permanent Adult	483	27.1%	438	27.2%	580	31.9%	827	27.9%	1,061	32.7%	2,018	37.0%	2,231	56.4%
Sub total	**650**	**36.5%**	**515**	**32.0%**	**726**	**40.0%**	**1,145**	**38.6%**	**1,119**	**34.5%**	**2,261**	**41.5%**	**2,383**	**60.3%**
Composite fillings														
Permanent School	21	1.2%	9	0.6%	19	1.0%	32	1.1%	38	1.2%	54	1.0%	41	1.0%
Permanent Adult	216	12.1%	212	13.2%	187	10.3%	220	7.4%	229	7.1%	497	9.1%	513	13.0%
Sub-total	**237**	**13.3%**	**221**	**13.7%**	**206**	**11.3%**	**252**	**8.5%**	**267**	**8.2%**	**551**	**10.1%**	**554**	**14.0%**
TOTAL	**1,780**	**100.0%**	**1,608**	**100.0%**	**1,817**	**100.0%**	**2,964**	**100.0%**	**3,241**	**100.0%**	**5,448**	**100.0%**	**3,955**	**100.0%**

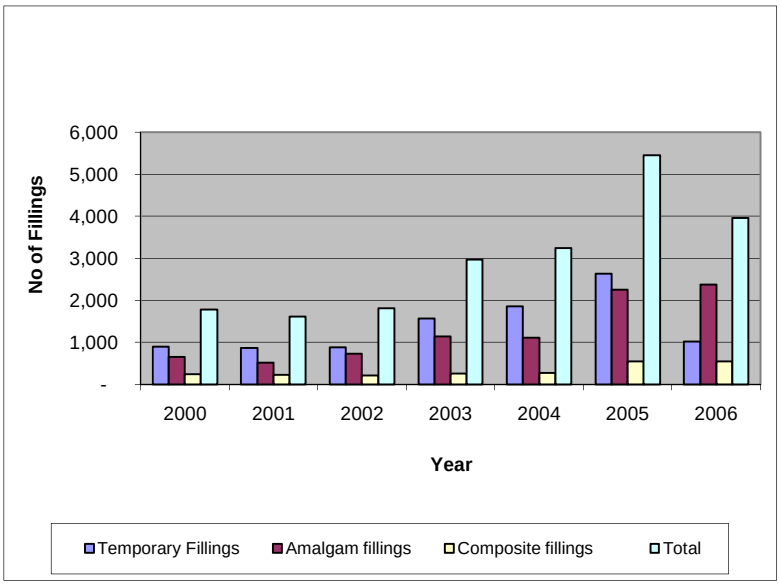

Fig 5.2 Number and type of fillings placed for the period 2000 – 2006

When the numbers of fillings placed were expressed as a percentage of the total patient attendances, the results show that the percentages increased steadily from 28.9% in 2000 to a high of 61.7% in 2005 and then decreased to 51.4% in 2006. (Table 5.4, Fig 5.3.)

Table 5.4 Fillings placed expressed as a percentage of total patient attendances

	2000	2001	2002	2003	2004	2005	2006
Filling placed	1780	1608	1817	2964	3241	5448	3955
Patient attendances	6157	6746	5904	6010	6275	8834	7696
% of fillings placed	28.9%	23.8%	30.8%	49.3%	51.6%	61.7%	51.4%

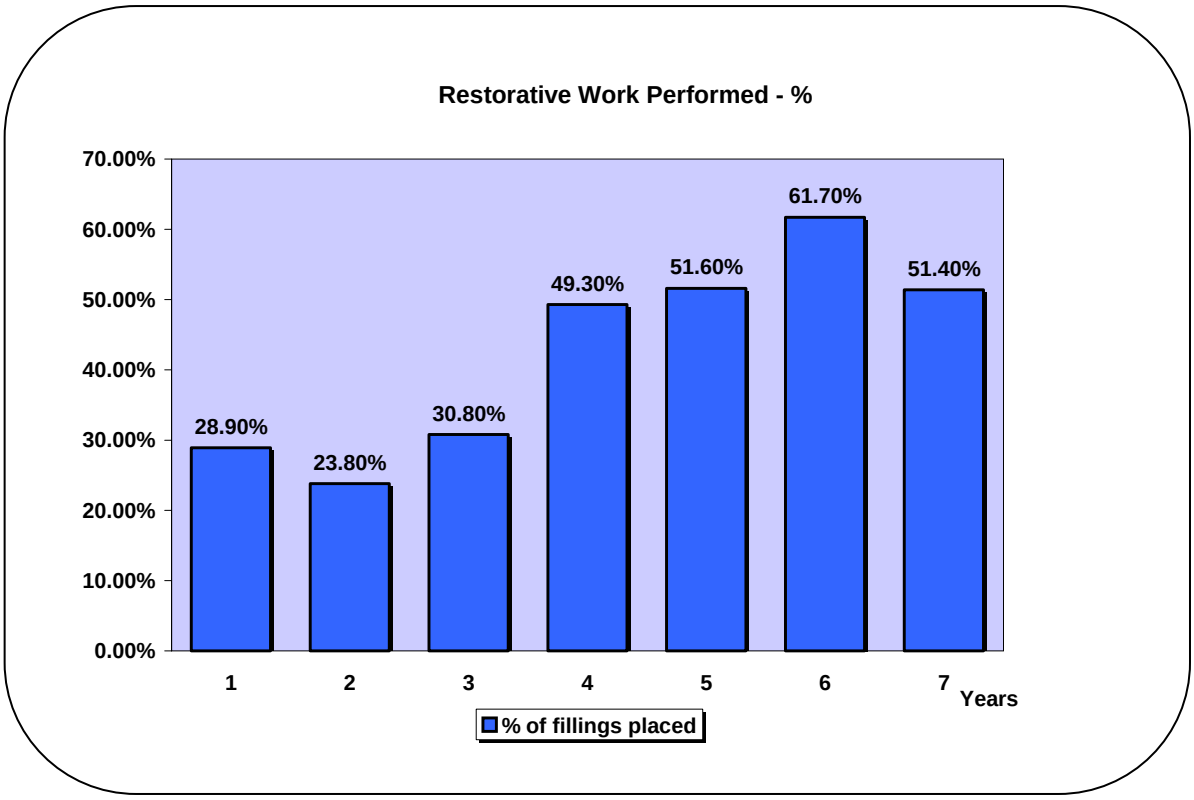

Figure 5.3

Restorative work expressed as a percentage of total number of patient attendances .

5.3 Number of extractions

The numbers of extractions (including surgical removals) is shown in Table 5.5 and in Figure 5.4. As can be seen, this number ranges from 2628 in 2000 to 2417 in 2006. The percentage of extractions of deciduous teeth out of the total number of extractions across all age groups showed a decrease from 45% in 2000 to 31% in 2006. As for permanent teeth among scholars, the percentages remain relatively unchanged, varying from 1 to 4 percent of all extractions across the different age groups. The percentage of extractions among adults out of total number of extractions across all age groups showed an increased from 52 % in 2000 to 68% in 2006. These results are shown in Table 5.5

Table 5.5 Number of extractions in children and adult patients for period 2000 to 2006

	2000		2001		2002		2003		2004		2005		2006	
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
Extraction														
Deciduous teeth	1,179	45%	1,020	39%	940	35%	792	29%	584	34%	960	39%	746	31%
Permanent teeth Scholars	76	3%	58	2%	106	4%	57	2%	31	2%	57	2%	23	1%
Permanent teeth Adults	1,373	52%	1,553	59%	1,676	62%	1,840	68%	1,123	65%	1,462	59%	1,648	68%
Total	**2,628**	**100%**	**2,631**	**100%**	**2,722**	**100%**	**2,689**	**100%**	**1,738**	**100%**	**2,479**	**100%**	**2,417**	**100%**
Surg extractions	141		67		86		148		116		196		196	
Wisdom teeth extractions	2		2		5		3		10		23		17	

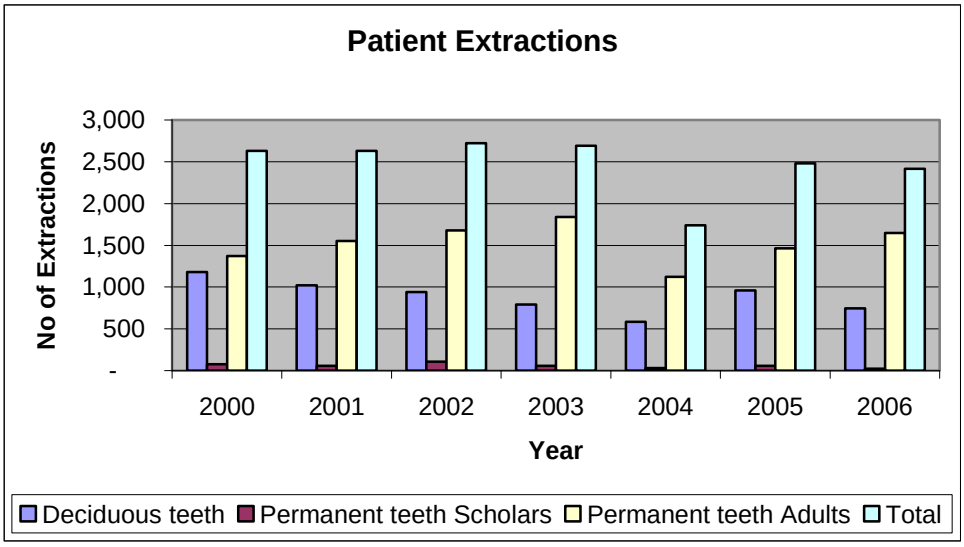

Fig 5.4. Number of extractions in children and adult patients

When the total number of extractions was expressed as a percentage of the total patient attendances (Table 5.6 and Fig 5.5) it could be seen that the extraction rate decreased from a high of 46.1% in 2002 to a low of 28.1% in 2005 with a small increase to 31.4% in 2006, of all patient attendances. (Table 5.6, Fig 5.5)

Table 5.6 Number of extractions expressed as a percentage of total patient attendance

Year	2000	2001	2002	2003	2004	2005	2006
Extraction	2628	2631	2722	2689	1738	2479	2417
Patient attendances	6157	6746	5904	6010	6275	8834	7696
% of Extraction	42.7%	39%	46.1%	44.7%	27.7%	28.1%	31.4%

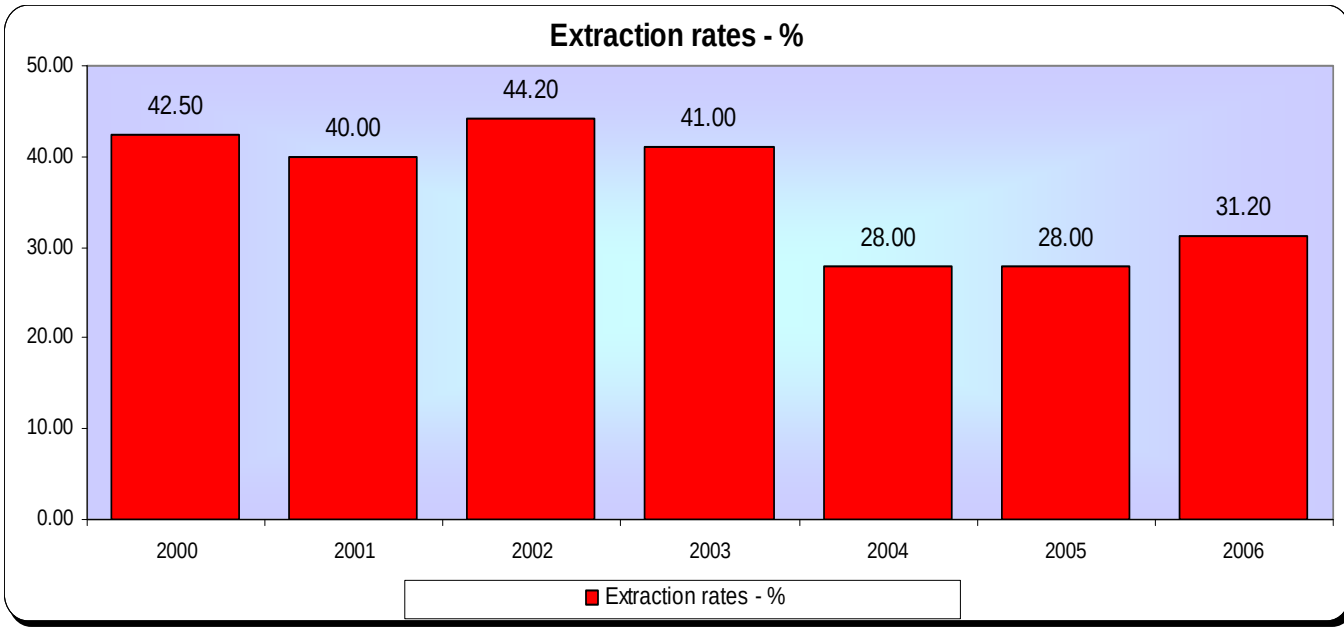

Figure 5.5 Extractions expressed as a percentage of the total number of patient attendances from 2000 to 2006

5.4 Preventive procedures

The total number of preventative procedures is show in Table 5.7 and in Fig 5.6. It can be seen from this data the number of such procedures remained very low ranging from a 208 in 2002 to a high of 860 in 2005.

Table 5.7 Number of preventative procedures performed

	2000		2001		2002		2003		2004		2005		2006	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Fissure sealants	135	31.3%	94	44.1%	56	26.9%	276	48.3%	16	6.1%	440	51.2%	179	41.1%
Scaling and polish	297	68.8%	119	55.9%	242	116.3%	295	51.7%	248	93.9%	420	48.8%	257	58.9%
Total	**432**	**100.0%**	**213**	**100.0%**	**208**	**100.0%**	**571**	**100.0%**	**264**	**100.0%**	**860**	**100.0%**	**436**	**100.0%**

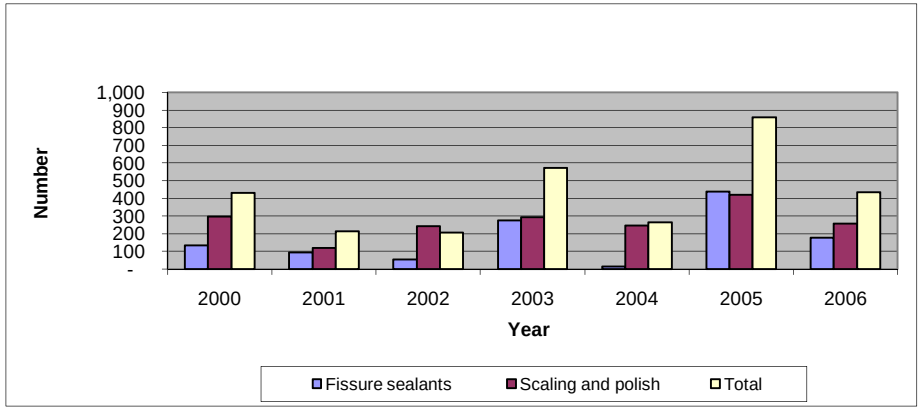

Fig 5.6 Number of preventative procedures performed from 2000 to 2006

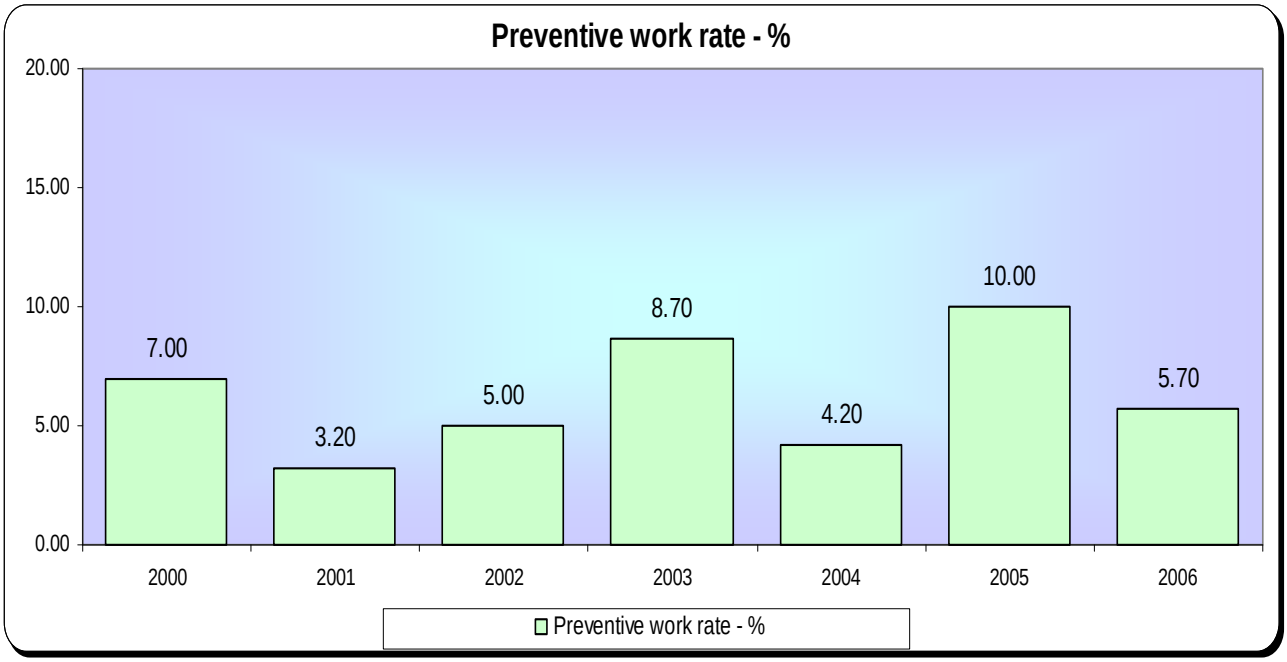

Figure 5.7 Numbers of preventative procedures expressed as a percentage of total patient attendances.

When the number of preventive procedures were expressed as a percentage of total patient attendance, the results show no discernable trend (Table 5.8)

Table 5.8 Number of preventive procedures expressed as a percentage of patient attendance for each year.

	2000	2001	2002	2003	2004	2005	2006
Preventative procedures	432	213	298	571	264	860	436
Patient attendances	6157	6746	5904	6010	6275	8834	7696
Percentages	7%	3.2%	5.0%	9.5%	4.2%	9.7%	5.6%

Table 5.9 Percentage of fissure sealants placed in 5-12 yr olds

Year	2000	2001	2002	2003	2004	2005	2006
No. of children (5-12 yrs)	1698	2003	1512	802	1271	1975	1401
No. of fissure sealants placed	135	94	56	276	16	440	179
% of fissure sealants placed	8%	4.7%	3.7%	34%	1.2%	22%	12.8%

Table 5.9 shows a very low percentage of fissure sealant placements in school children of the age of 5 to 12 years. In the year 2003 there was an improvement, that is from 3.7% in 2002 to 34 % in 2003, but this dropped again in 2004 to a low of 1.2%

Table 5.10 Comparison of numbers of fillings and of extractions expressed as a ratio of extractions to fillings.

	2000 %	2001 %	2002 %	2003 %	2004 %	2005 %	2006 %
Fillings	28.9	23.8	30.8	49.3	51.6	61.7	57.4
Extraction	42.7	39	46.1	44.7	27.7	28.1	31.4
Ratio of extractions to fillings	1.5	1.6	1.5	0.9	0.5	0.45	0.6

Table 5.10 shows the ratio of numbers of extractions to numbers of fillings. The year 2003 proved to be a turning point, with the number of restorations exceeding the number of extractions for the font tone. This trend was then maintained from 2004 to 2006.

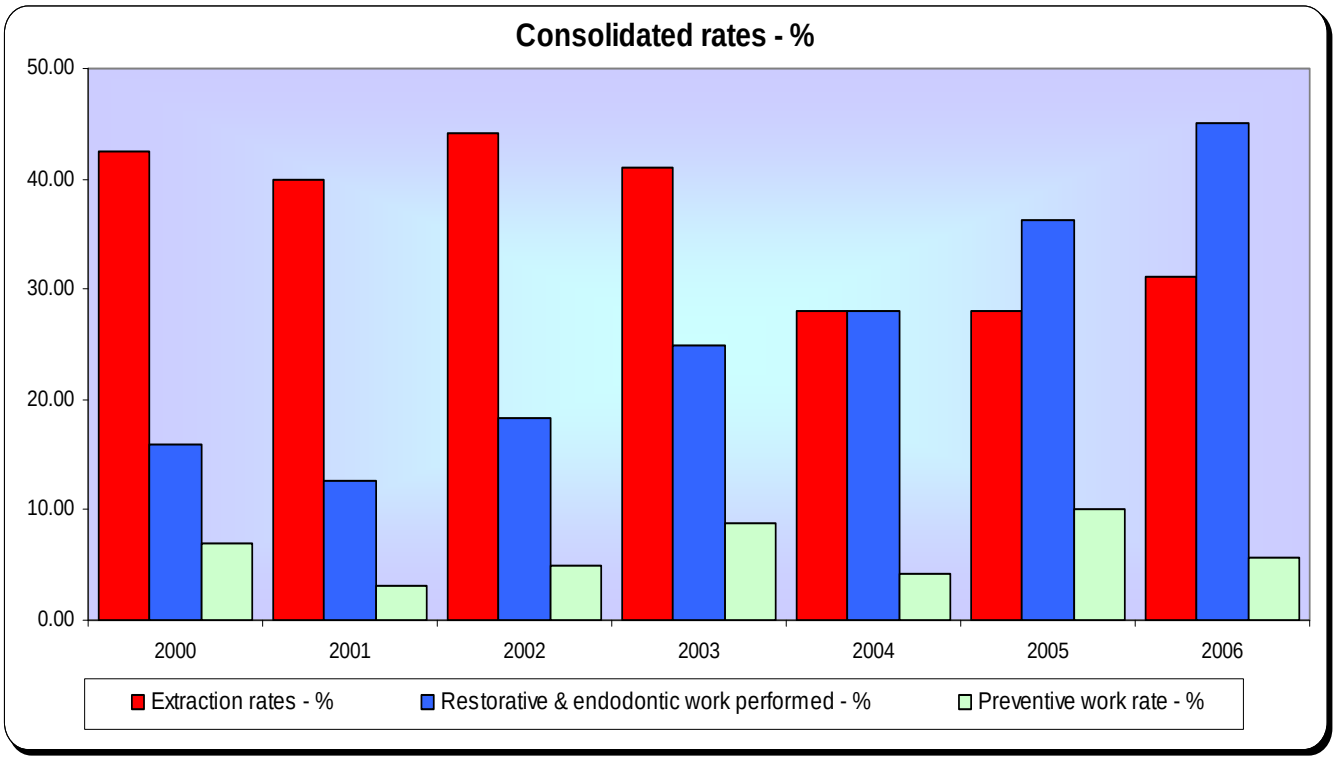

Figure 5.8 Comparison of numbers of filings, extractions, preventative procedures expressed as a percentage of total patient attendances.

The changing treatment pattern from a predominantly extraction oriented service to a predominantly restorative oriented service can clearly be seen with the preventive aspect showing no particular trend.

Table 5.11 Number of treatments performed and patient attendance from year 2000 to 2006 with year 2000 as baseline.

	Years						
Treatment type	**2000 Baseline**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
No. of Extractions per year	2628	2631	2722	2689	1738	2479	2417
Restorative No. of Fillings	1780	1608	1817	2964	3241	5448	3995
No. Preventive Treatment (a + b)	432	213	298	571	264	860	436
a. No. of Fissure Sealants	135	94	56	276	16	440	179
b. No. of scalings	297	119	242	295	248	420	257
No. of patient attendance per year	6157	6746	5904	6010	6275	8834	7696

A tabular view of the results reflected in Fig 5.8 is shown in Table 5.11 above. Table 5.11 illustrates the number of extractions, restorative procedures (fillings) preventive procedures (scaling and polish as well as fissure sealant placed) as well as total patient attendance from year 2000 to 2006. These results were compared between the years 2000 to 2006 with year 2000 as baseline. Comparisons were made between the years and significance was set at $p< 0,05$ using the Chi square test method. In terms of extractions, the numbers have remained fairly constant across the years. However the results of year 2004 were significantly different ($P < 0.05$) .There was a significant drop in number of extractions in year 2004. This could be attributed to the fact that a new operator started working at the clinic that year, and made a conscious effort to reduce the number of extractions. The number of fillings remained relatively the same from year 2000 to 2003. But an increase was noted as from 2003. The results of year 2005 proved to be significantly different ($P < 0.05$), with a significant increase in the number of fillings placed compared to the previous years. This is most probably as a result of patient education campaigns which encouraged people to attend the clinic regularly and at an earlier stage of dental disease, hence making restorations possible. The new operator at the clinic was also explaining to each and every patient why they should rather consider a restoration instead of an extraction when the tooth was still restorable. As far as preventive treatment is concerned, there is no discernable trend. However, year 2005 proved to be significantly different with a significant increase in both fissure sealants placed and scaling

done as compared to other years (P< 0.05). More attention was given to school children and the scaler apparatus was functional throughout the whole year.

There was a significant rise in patient attendance in year 2005 (p<0.05). This can be attributed to a rise in oral health awareness in the local population.

CHAPTER 6

DISCUSSION

6.1 Summary of main results

The patterns of treatment delivered at the Chemin Grenier Dental Clinic has changed over the period of this study from an extraction overled service to a restorative one. There has been little emphasis on preventive treatment during that period with no district tred emergency.

6.1.1 Patient attendance

The patient attendance has risen constantly from 2000 to 2006. The ratio of children to adult patient has changed from 1:2 in 2000 to 1:3 in 2006, while the attendance of nursing and expectant mothers showed a decrease during that time period. The rise in general patient attendance can be attributed to the following factors:

• greater awareness of the population of their oral health.

• the area has undergone a lot development the past few years as a result of the tourism boom. New hotels have been built in the area, hence creating more employment opportunities. Also other tourism related activities have cropped up, such as retail shops and restaurants. This has lead to an increase in the population of that area.

This is similar for patient attendance patterns in most developing countries (Harkison , Cleaton-Jones, 2004).

The decreased ratio for child to adult attendance (1:2 to 1:3) is attributed to an increased attendance by adults rather than a decrease in children accessing the clinic for dental services.

6.1.2 Number of fillings

The total number of fillings has increased from a low of 1608 in 2001 to a high of 5448 in 2005 ($P < 0.05$) (Table 5.3). Amalgam was the material of choice for fillings (Table 5.3)

The following reasons can explain this:

- greater awareness of patients for tooth preserving procedures.
- patients attending the clinic at an earlier stage of dental disease, thus making restorations possible
- conscious effort by the operator to opt for tooth preserving procedures whenever possible

6.1.3 Number of extractions

The percentage of extractions done at the clinic decreased from year 2000 to 2006 from a high of 46.1% in 2002 to 28.1% in 2005. This can be attributed to the following:

- greater awareness of patients to opt for tooth preserving procedures
- patients attending the clinic at an earlier stage of dental disease, hence avoiding the need for extractions.
- conscious effort by the operator to avoid extraction when possible.

• the World Health Organisation has donated four mobile dental clinics to Mauritius. These mobile clinics go to the patients. They go to schools and workplaces to see patients. Coupled to this, regular talks are organised by the public health department, in schools, work places and through media. This has helped to create a greater awareness of oral health in the population. Hence, as people become more dentally educated, they are taking greater responsibility for their oral health. This explains why there is increased attendance at dental clinics, and patients choosing to restore teeth rather than to extract .Patients are also attending the clinic at an earlier stage of disease.

These results contrast with other studies done in rural Africa. A study in rural Egypt highlighted the high percentage of extractions performed and minimal conservative work which amounted to an average of 0.85% of the total treatments (Wissa Zahran, 1986). However, one has to be careful when comparing the data since the study in Egypt looked at 10 clinics in various rural locations whereas the study in Mauritius involves only one clinic. Another study in Tanzania, examining the dental treatment demands among Tanzanian patients showed that there was an overwhelming need for emergency care for later stages of oral diseases (Van Palenstein Nathoo, 1990). Again, we have to bear in mind that the study in Tanzania was a national one as opposed to the one in Mauritius which was a district one, focussing on only one clinic.

Kroon et al, (2001), looked at the trends in treatment performed in the Pheloppepa Dental Clinic in South Africa for the first five years of operation of the clinic. One of the goals of the clinic was to try and preserve as many teeth as possible. The results showed that 71.3% of treatments performed were extractions. Preventive and restorative procedures made up 15.7% and 1.3% respectively of all procedures performed at the clinic.

6.1.4 Preventive treatment

Clinicians treat the end points of diseases. For oral health, this strategy becomes unsustainable due to the high cost of dental restorative procedures. In the long term, the only sustainable option available for countries with limited resources is prevention, that is, keep patients healthy. Thus, it was disappointing to note that rates of preventive treatment were extremely low ranging from a minimum percentage of 3.2 % to a maximum of 9.7 % of treatment performed. No upward trend was noted. Scaling formed the bulk of preventive worked performed.

The low rate of preventive treatment could be attributed to the following:

- lack of clear policy from National Government regarding the importance of prevention in dentistry.
- absence of a policy on water fluoridation
- regular breakdown of equipment and long delays for repairs
- not enough emphasis on education of patients
- too much pressure from emergency adult patients, hence very little time left for preventive treatment on children

The low rates of preventive work is also a feature of other countries in the African continent.

A DMFT study in South Africa showed that only 39 percent of children are caries free. Analysis of the different components of the DMFT/dmft shows high levels of untreated caries in all age groups (decayed component), while an exceptionally high level of missing teeth was also recorded in the adult group. Negligible levels of filled teeth were recorded in all age groups. This observation is consistent with other studies done in South Africa and other African countries. This may be due to an in adequacy of oral health personel and dental facilities as well as lack of awareness about oral health and dental services among the majority of the population, (Van Wyk, 2004).

6.2 National Oral Health Policy

Mauritius does not currently have a National Oral Health policy. This highlights the low importance given to oral health by policy makers in Mauritius. Other developing nations, such as Nepal and South Africa have adopted such policies with a view to improving the oral health of their respective populations. The primary aim of the National Oral Health Policy is the provision of high quality, effective, basic oral health care to all people. This includes the emphasis on preventive, curative and rehabilitative care. Particular emphasis is placed on the development of human resources for oral health, the development of appropriate curative care at all levels of the

primary health care

The South African Department of Health has devised a comprehensive primary health care service package. The provision of basic treatment in services consists of the following:

- an examination
- bite wings
- scale and clean and polishing
- simple (1-3 surface) fillings
- emergency relief of pain and sepsis, including dental extraction .

The department has also set national goals for 2010 in terms of DMFT/dmft and in terms of access to health care (SA National Oral Health Strategy)

The absence of a National Oral Health policy in Mauritius shows that Oral Health is not taken seriously by the Government. The Oral Health Service are demanded and can only be based on need. An assessment of oral health in the country needs to be determined in a policy formulated and services planned and delivered in terms of that policy.

There is no doubt that the development of a National Oral Health Policy will assist in formulating effective oral health strategies and provide a framework for proper planning, service delivery and, as a result, positively influence the oral health of the population.

6.3 Common Risk Approach and Education

For any policy to be successful, policy makers must first acknowledge the fact that oral health is an integral part of general health. The World Health Organisation has recommended a common risk factor approach to oral health (WHO, 2003).There is a list of modifiable risk factors common to the four most common non-communicable conditions, namely, cardiovascular diseases, diabetes,cancer and chronic obstructive pulmonary disease (WHO, 2003). All four conditions share similar risk factors to oral health Diet, for example, plays an important role in the development of cardiovascular diseases and associated conditions. It is also an important cause of dental caries. Ninety percent of oral cancer is caused by tobacco and alcohol consumption. Tobacco and diabetes are strongly associated with periodontal diseases (WHO, 2003).

The leading cause of death in Mauritius is non-communicable diseases namely diabetes. Mauritius has the highest prevalence of diabetes in the world. (Ministry of Health and Quality of Life, Island of Mauritius, 2005). Non-communicable diseases are lifestyle related conditions, where diet plays a preponderant role (WHO, 2003). Poor diet also impact directly on the oral health of the population. In addition to that, the strong correlation between diabetes and periodontal problems, would suggest that a lot of extractions are performed as a result of periodontal problems. It is hence extremely important to include oral health in any policy on non-communicable diseases. An active participation of the Oral Health Department will undoubtedly have a more

meaningful impact on people's general health of the population.

A simple measure that could for example be implemented is the inclusion of oral manifestations of chronic diseases such as diabetes on posters and any other form of educational campaigns being held.

In addition to health promotion and community participation, a multi sectorial approach has to be considered in almost all programmes if lasting solutions to problems are to be found. Oral health projects tend to be selective and mostly do not consider a multi sectorial approach. Oral health should be integrated in general health programmes by tackling causes that are common to a number of chronic diseases, by including oral health in a general health education context and by adopting strategies directed to populations rather than individuals (Mautsch, Sheiham, 1995.)

It is also a fact that the poor oral hygiene of the population in general can be attributed to the low level of education on oral health issues. People have up to now failed to grasp the idea that oral health is an integral part of systemic health. Many people do not realise the importance of keeping an intact dentition, and strongly believe that extraction is the best treatment option for dental pain. Many others are under the impression that extracting a tooth is actually "less painful "a procedure than restoring a tooth, hence they opt for extraction. Dental fear is also a determinant factor in the quest for dental

treatment. Patients tend to wait until the pain is unbearable to visit the dentist. In most instances, it is then too late to restore the tooth. An adult dental health survey conducted in the UK revealed that 25 percent of the adult population is sufficiently fearful of dentistry to avoid or delay attendance (Todd Ladder, 1988). Behavioural science is now an integral part of dental education. Its role in proper dental management cannot be underestimated.

Lack of education also means that very few patients present to clinics for 6 monthly or annual check ups. In a study on the utilization of health resources in Burkina Faso, Varenne et al , (2006), concluded that the perceived importance of oral health problems emerged as a significant factor in health service utilization. Adults who paid less attention to oral diseases compared to general diseases were unlikely to seek health service.

6.4 Lack of Fluoride in tap water

The country has not up to now, not adopted a policy on water fluoridation. This partly explains the high level of caries. A study conducted by the World Health Organisation shows that the water has a concentration of 0.0009 parts of fluoride per million (Courtens, 1991). There is enough clinical evidence to suggest that water fluoridation is the most cost effective, passive oral health measure which helps to reduce dental caries. The Australian National Health and Medical Research Council (2007) states that “fluoridation of drinking water remains the most effective and socially equitable means of achieving community wide exposure to the caries prevention effects of fluoride.”

A global consultation on the use of fluoride in oral health, jointly organized by the FDI and the International Association for Dental Research in Geneva in November 2006 stated that the benefits of fluoride for the prevention and control of dental caries has been known to the scientific and public health community for more than 60 years. While fluoride in various delivery systems is widely available in many developed countries, it is estimated globally, only 20 % of the world's population benefit from appropriate exposure of fluoride. Regrettably, particularly people in developing countries and disadvantaged communities are deprived of fluoride for dental health (Petersen, 2006).

The world experts at the Geneva consultation on fluoride in 2006, expressed their concerns about the growing disparities in dental health and the lack of progress in tackling the worldwide burden of tooth decay, particularly in disadvantaged populations. According to the experts, prevention by using fluoride is the only realistic way of reducing this burden in populations.

In light of current literature, there is no doubt that a national policy on the use of fluoride will be of great benefit on the oral health, and hence on the general health of the population in Mauritius. It is high time that the authorities implemented a fluoridation policy (Yeung , 2007)

6.5 Operator's choice and work load

Patient attendance has risen constantly from 2000 to 2006. This has significantly increased the pressure on the clinic. Many operators feel that it is easier to just extract as many teeth as possible rather than restore when faced with a situation of having to seen 40 patients from 9 am to 12 am.

The operator's attitude towards dental health education and the time constraint also plays a significant role in treatment options being offered. Many operators fail to explain to patients the importance of an intact dentition, and hence why they should rather opt for a restoration instead of an extraction when the tooth is not irreversibly damaged. Despite the teaching in dental schools that treatment planning should be based on good history, clinical assessment, investigations, correct diagnosis, and patient consent, dentist bias is suggested as a possible influence on the treatment decision when prescribing extraction versus a tooth sparing procedure to a patient (Marcus et al.,1996).

It has to be underlined that a new operator worked at Chemin Grenier Dental Clinic from mid 2004 to 2006. During that period, the number of restorations and root canal treatment performed was actually higher than the number of extractions performed. This tends to confirm Marcus's concept of operator bias.

6.6 Human Resource

Currently the dentist to population ratio is 1:6704. The state employs 56

dentists, and 5 of them are in managerial roles. Many operators have expressed concern about the toll which the sheer load of patients put on their health and how it negatively impacts on the quality of treatment offered. Many feel that there is a lack of appreciation for the hard work they put in, in difficult working conditions. There has, for a very long time, been a severe shortage of dentists in the public sector. It would be beneficial to create a flexible recruitment system with less red tape and bureaucracy. Operators could opt to work on a part time basis, and also on fixed term contracts.

It is critical to any organisation's success to be able to keep staff motivated. There is unfortunately not enough effort being done to promote staff welfare, and to keep them motivated.

It is a very common occurrence to find clinics with equipment out of order for months. The problem is compounded by a lack of qualified dental maintenance technicians.

There is also unfortunately no continuous upgrading of dental materials and instruments. Very often, operators have to improvise with instruments available. New and more effective materials continuously become available on the market. However the Oral Health Department does not have a mechanism to look at reviews of these materials and hence upgrade the stock available for use by the operators. It would be beneficial to set up a committee to continually review materials and equipment and also receive input from operators.

Moreover, there is a lack of support in terms of continuous dental education. Mauritius is far from the major oral health research centres, we unfortunately do not have regular access to world class academics to help staff remain clinically up to date. It is hence important for the department to create an environment and a support mechanism where staff can continuously update themselves and hence improve quality of treatment offered. Unlike the medical field, the Ministry of Health in Mauritius has not heavily invested in the training of dental specialists. It is obviously not seen as a priority for them. One way of keeping staff motivated would be to allow them to rotate in the different dental speciality services offered by the department. For example, general dentists with a particular interest in orthodontics could spend time in the orthodontic department, and eventually see patients who require removable appliances. The same could apply for Endodontics and Oral Surgery. This is commonly done in most dental hospitals overseas.

6.7 Weakness of study

One weakness of this study is that it reflects treatment pattern at only one clinic in Mauritius. It would be interesting to find out the results of a national study where treatment data from all public dental clinics were analysed. Since treatment data is readily available, it would not be difficult to compile and analyse it. It would also be interesting to look at the extent of operator's bias in terms of treatment procedures performed by various operators.

6.8 Directions for future research

It is critical for the Oral Health Department to regularly perform research on the oral health of the population. It will enable the department to identify its strength and weaknesses and also assist in proactive planning. It is important to initiate all staff members to research and stress its importance and relevance to health planning. This will also help in making staff understand why proper record keeping is essential for research purposes. First and foremost, Mauritius needs a National Oral Health Policy as soon as possible. Based on that policy, research topics would be identified and relevant staff should be identified to conduct the research over a period of time. Possible research topics could be – percentage of the population that is edentulous and edentulousness among diabetic patients, DMFT surveys, and treatment patterns across the whole island over a period of time, amongst others.

CHAPTER 7

CONCLUSION

This study has shown that the patterns of attendance and care at Chemin Grenier Dental Clinic has changed from year 2000 to 2006:-

- Patient attendance has shown a significant increase over the study period
- The percentage of extractions performed has decreased while the percentage of has restorations increased.
- There has been little variation in the amount and type of preventive services offered. In fact, the percentage of preventive treatment remained disappointing low.

A National Oral Health Survey with subsequent formulation of a National Policy on Oral Health is an urgent priority for Mauritius if an increased level of oral health is to be achieved.

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