UTILISATION OF DENTAL SERVICES IN MAURITIUS

BY ADULTS 35-44 YEARS - 1993

BASTI RISHI KINNOO
DMD (Shiraz University - Iran)

A thesis submitted in partial requirement for the degree of

MASTER OF DENTAL SCIENCE

(Public Health Dentistry)

Department of Preventive Dentistry
Faculty of Dentistry
University of Sydney
1993
Oral health is to a large extent related to behaviour. Behavioural factors directly affecting oral health include frequency of use of sugary products, frequency of cleaning of teeth, use of fluoride, and frequency of dental service utilisation. Regular visits to the dentist play a dual role in relation to maintenance of oral health. On one hand, they allow education and monitoring of self-care in relation to prevention of oral diseases and improvement of oral health. On the other hand, they allow for early diagnosis and prevention of oral and dental diseases, enabling them to be treated in the early stage.

Increased knowledge about factors which influence utilisation of dental services enable planners to design dental programmes which are better tailored to the characteristics and needs of the population and therefore stand a greater chance of being efficient and acceptable. To this end a study was designed and administered in Mauritius to obtain information on utilisation of dental services by adults of 35-44 years old.

More specifically, the aims of the study were to:
- collect data on utilisation of dental services by adults of 35-44 years;
- study the relationship between utilisation and selected socio-variables;
- compare results with those of similar studies;
- establish baseline data for comparison with future studies; and
- recommend interventions for improving dental service utilisation.
The interview survey was carried out in February 1993 using questions based on WHO criteria for dental service utilisation. The questionnaire form was divided into a section on personal demography, a section on service utilisation and one on attitude and behaviour related to dental care. The sample consisted of 352 adults of 35-44 years. The reason for selecting the sample from this age group was because this group is the standard WHO age group for monitoring oral health conditions in adults. The sample was stratified by place of residence and sex according to the national distribution. Statistical analysis was carried out using the SPSS package at p<0.05.

The survey produced interesting findings\(^1\) about the adults pattern of utilisation of dental services; some of these findings are listed below:

- Thirty-nine percent of persons of this sample reported having visited the dentist within the previous 12 months with an average of 5.1 months since last dental visit and 1.7 visits per person. There was no significant differences between males and females and between urban and rural residents with regard to the use of dental services. However, the rate of utilisation became even more evident as the level of education increased.

\(^1\) A presentation of some of the findings were made at the thirty-third meeting of the IADR (Australian and New Zealand branch) in September 1993.
Regarding the respondents' motives for seeking care, 'To get teeth cleaned' and 'To have tooth extraction' were most frequently encountered. 'To have a check-up' and 'To get something fixed' were next and 'Something was hurting' was the least important.

The main reason (79%) stated for not seeking care was that there was nothing wrong. Availability of service was not perceived as a barrier to utilisation.

Private practice was the place of the last dental visit for 84% of those who made a dental visit during the previous 12 months.

Teeth were reported to be brushed twice per day by 90% of the respondents.

Regular use of fluoride toothpaste was reported by 96% of the sample.

More than 50% of the interviewees thought they did not perceive anything wrong with their teeth, gums or mouth. However, there was a high demand for advice or treatment among those who perceived some form of oral discomfort. Examination was thought to be required by 44%, extraction by 30%, scaling by 19%, fillings by 19%, and prevention by 17% of these respondents.

Differences between males and females were not marked. However, more females visited to have tooth extraction, had more tooth extraction needs and reported using fluoride toothpaste more regularly.
Differences between urban and rural areas surveyed were less than expected. More persons in rural areas visited the dental services for tooth extraction and reported less frequent tooth brushing. The level of education appeared to be the single most valid determinant of oral health service utilisation. It is arguable whether it is the level of education per se or the extent of exposure to dental related matters which is the determining factor for utilisation.

Based on the survey's findings, several recommendations have been postulated:

- the formulation of appropriate educational and promotional programmes devoted to changes of behaviour. Increasing knowledge about oral health and improving the oral health behaviour are considered important in closing the gap brought about by social position;
- oral health promotion at worksites as a strategy to remove barriers to professional care;
- the promotion of primary health care approach in service delivery;
- the regular monitoring of dental disease and behaviour patterns.

Besides reporting on the survey, brief background information on Mauritius and a general literature review on factors influencing utilisation of dental services are also presented in this thesis to facilitate discussion and interpretation of the results.
ACKNOWLEDGEMENTS

To Associate Professor P D Barnard, MDS MPH Mich. DSc, FRACDS FICD FAPHA, Head of the Department of Preventive Dentistry, University of Sydney and my highly esteemed supervisor for his constant expert guidance and invaluable suggestions.

To Shanti Sivaneswaran, BDS Mysore MDS DPHDent, Lecturer of the Department of Preventive Dentistry, University of Sydney, my gratitude for the supervision provided and the friendship and support given to me over the last two years.

To Dr S Lahti, Associate Professional Officer, WHO, my sincere gratitude for the guidance and cooperation given in carrying out the survey in Mauritius.

To AIDAB, for granting me a scholarship which has enabled me to follow the course in Public Health Dentistry at the University of Sydney.

And last but not least, to all those who helped me in one way or the other during my studies.
DEDICATED

To my family
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary</td>
<td>ii</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>vi</td>
</tr>
<tr>
<td>Dedication</td>
<td>vii</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>viii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>x</td>
</tr>
<tr>
<td>List of Figures</td>
<td>xi</td>
</tr>
</tbody>
</table>

1 INTRODUCTION

2 MAURITIUS: A BACKGROUND

2.1 Location                                   | 6    |
2.2 Historical Background                      | 6    |
2.3 Demographic Characteristics               | 8    |
2.4 Education                                 | 11   |
2.5 Economy                                   | 11   |
2.6 Health Service Structure                  | 12   |
2.7 Dental Workforce                          | 13   |
2.8 Public Dental Services                    | 17   |
2.9 Oral Health Data                          | 20   |

3 UTILISATION OF DENTAL SERVICES: A LITERATURE REVIEW

3.1 Background                                | 21   |
3.1.1 Definition of utilisation               | 22   |
3.1.2 Common measures of utilisation          | 23   |
3.1.3 Utilisation and oral health status      | 25   |
3.1.4 Rationale for utilisation               | 27   |
3.2 Factors Influencing Utilisation Patterns  | 34   |
3.2.1 Socio-demographic                       | 35   |
3.2.2 Structural variables of dental care delivery system | 52   |
3.2.3 Psychosocial factors                    | 57   |
3.3 Barriers to Attendance                    | 63   |
## MATERIALS AND METHODS OF SURVEY

4.1 Introduction 70
4.2 Development and Contents of the Questionnaire 71
4.2.1 Contents of the questionnaire 72
4.3 Definition of Terms 74
4.4 Sampling Method 76
4.4.1 Sample selection 76
4.4.2 Sample size 76
4.4.3 Stratification 77
4.5 Pilot Study 78
4.6 Implementation of the Survey 80
4.7 Statistical Treatment of the Data 81

## RESULTS

5.1 The Sample 82
5.2 Service Utilisation 87
5.3 Attitude and Behaviour 96

## DISCUSSION

6.1 Strength, Limitations and Shortcomings of the Study 110
6.2 Utilisation of Dental Services 113
6.3 Attitude and Behaviour 117

## RECOMMENDATIONS

7.1 122

## REFERENCES

8.1 135

## APPENDICES

9.1 Questionnaire form used for pilot study 150
9.2 Questionnaire form used for main study 155
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Projections of the resident population of Mauritius, 1990-2010</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Dentist workforce in Mauritius</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Dentist-population ratio from 1982 to 1991</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>Practice-Profile-Time study of government dentists</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>Distribution by age</td>
<td>83</td>
</tr>
<tr>
<td>6</td>
<td>Distribution by sex</td>
<td>83</td>
</tr>
<tr>
<td>7</td>
<td>Distribution by place of residence</td>
<td>83</td>
</tr>
<tr>
<td>8</td>
<td>Distribution by population group</td>
<td>84</td>
</tr>
<tr>
<td>9</td>
<td>Distribution by occupation</td>
<td>85</td>
</tr>
<tr>
<td>10</td>
<td>Distribution by education</td>
<td>85</td>
</tr>
<tr>
<td>11</td>
<td>Distribution by income</td>
<td>86</td>
</tr>
<tr>
<td>12</td>
<td>Type of dental service mostly used</td>
<td>87</td>
</tr>
<tr>
<td>13</td>
<td>Dental care in last 12 months</td>
<td>88</td>
</tr>
<tr>
<td>14</td>
<td>Number of months since last dental visit</td>
<td>89</td>
</tr>
<tr>
<td>15</td>
<td>Number of dental visits in past 12 months</td>
<td>90</td>
</tr>
<tr>
<td>16</td>
<td>Reason(s) for obtaining dental care at last visit</td>
<td>92</td>
</tr>
<tr>
<td>17</td>
<td>Place of dental visit</td>
<td>93</td>
</tr>
<tr>
<td>18</td>
<td>Reason(s) for not obtaining dental care in the last 12 months</td>
<td>95</td>
</tr>
<tr>
<td>19</td>
<td>Perception of problem in teeth, gums or mouth</td>
<td>96</td>
</tr>
<tr>
<td>20</td>
<td>Advice or treatment wanted</td>
<td>97</td>
</tr>
<tr>
<td>21</td>
<td>Type of advice or treatment perceived to be required</td>
<td>99</td>
</tr>
<tr>
<td>22</td>
<td>Intention of visiting dentist in near future</td>
<td>100</td>
</tr>
<tr>
<td>23</td>
<td>Past source(s) of learning to take care of teeth</td>
<td>102</td>
</tr>
<tr>
<td>24</td>
<td>Preferred source(s) of learning to take care of teeth</td>
<td>104</td>
</tr>
<tr>
<td>25</td>
<td>Regular use of fluoride toothpaste</td>
<td>105</td>
</tr>
<tr>
<td>26</td>
<td>Frequency of brushing teeth previous day</td>
<td>106</td>
</tr>
<tr>
<td>27</td>
<td>Satisfaction with appearance of natural teeth</td>
<td>107</td>
</tr>
<tr>
<td>28</td>
<td>Comments about dental services in Mauritius</td>
<td>108</td>
</tr>
<tr>
<td>29</td>
<td>Suggestions on how services could be improved</td>
<td>109</td>
</tr>
</tbody>
</table>
**LIST OF FIGURES**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ministry of health organisational chart</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>Treatment perceived to be required</td>
<td>98</td>
</tr>
<tr>
<td>3</td>
<td>Intention of visiting dentist in near future</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Preferred source(s) of learning to take care of teeth</td>
<td>103</td>
</tr>
<tr>
<td>5</td>
<td>Regular use of fluoride toothpaste</td>
<td>105</td>
</tr>
<tr>
<td>6</td>
<td>Frequency of brushing teeth previous day</td>
<td>106</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

The rate of utilisation of dental services has long been regarded as one of the important measures and predictors of the status of the oral health of a population (WHO 1985). Increased knowledge about factors which influence utilisation of dental services will enable planners to design more effective dental programs.

Information about the population's use of dental services is both necessary and useful as the dental sector experiences the impact of changing forces which influence the number of people who visit the dentist and the types of services they consume. When such information is available, it can help dentists and planners move towards more optimal distributions of workforce and financial resources.

The need for a better understanding of the factors affecting utilisation of dental services has been recognised by researchers and has stimulated numerous studies related to this field. The list of factors that have been studied is extensive and includes sociodemographic factors, psychological factors, environmental factors, economic factors, and political factors.

Regardless of the factors involved in the adoption of 'oral' behaviours, the behaviour and the oral disease experience of the individual patient and/or the community in relation to any existent dental care services give
rise to the complex interplay between need(s), demand(s) and utilisation of services. The latter has been used as both a behavioral and an economic index in describing, monitoring and evaluating dental health programs and dental care delivery systems and shown to affect, to a varying degree at least, the oral health status of the community (Striffler 1983; WHO 1985).

Mauritius is a small island situated in the south-west of the Indian Ocean. It has a multiracial population of about one million and is currently being served by 145 dentists. An early assessment of the oral health in Mauritius was carried out by WHO. It was not until 1990, that another survey, including 6, 12, 15 and 35-44 years old persons (N=1147) was carried out with WHO assistance mainly to derive a comprehensive picture of the caries and periodontal disease prevalence (Courtens 1991). Background information for the planning of oral health services has been derived from these studies.

In the survey carried out in Mauritius in 1990 (Courtens 1991), it was found that
(a) As much as 97% of people of this age group were affected by caries; they had the highest DMFT (11) among the people examined with a missing component of 6.8 teeth;
(b) 77% of this age group had periodontal pockets of which 32% had deep pockets (N = 262).
It will be of much interest therefore to investigate the behaviour of this group towards utilisation of dental services.

Caries, which was highly prevalent among 12-year old children in Mauritius in the past, has been brought to a moderate level of DMFT = 2.8 (Courtens 1991). This could be attributed to the widespread use of fluoride in toothpaste, mouthrinses and dietary supplements. The control of caries in children paves the way for other groups of population such as the 35-44 year cohort to receive more attention and be targeted for preventive measures.

These studies, together with the regular reports on oral health activities prepared by the government dental clinics, do not give much information about the non-clinical elements of dentistry such as oral health habits, attitude and dental behaviour of the attenders. Nor have they tried to monitor closely the pattern of utilisation of dental services, and to investigate the reasons why people do or do not attend as well as the real and perceived barriers to the seeking of dental care.

The dental sector of the health care industry in Mauritius appears to be experiencing a period of growth together with an increase in dental awareness among the public. The corresponding increase in the demand for dental care can be met with minimal difficulties if it can be predicted accurately. An understanding of the utilisation pattern is a useful asset to
the planners and providers of dental service and has an economic value to those who provide the financial source for dental care.

There is a need to establish a baseline data for comparing with future surveys and thereby evaluating changing patterns in dental health. This would provide materials for planning future dental services, manpower requirements, educational and promotion strategies, in a rational and appropriate manner, in accord with the community's known needs, demands, and wishes in the pursuit of health.

The present study aims at filling part of this gap by collecting socio-demographic, utilisation, attitudinal and behavioral data to:

- determine the adequacy and use of dental services in Mauritius by the 35-44 years old persons;
- identify some of the individual, institutional and cultural factors which influence the seeking of professionally administered dental care;
- and to recommend interventions for improving dental service utilisation.

To achieve these aims, a questionnaire-interview type of survey was designed and administered to obtain information on utilisation of dental services in Mauritius in a sample of 35-44 years old persons.
The rationale for selecting the sample from the age group 35-44 years is as follows: This group is the standard monitoring group for oral health conditions of adults; the appropriate period to assess the full effect of caries, the level of severe periodontal involvement; and the general effects of care provided (WHO 1987). Being a standard group, comparison with other similar national and international studies is possible.

In this thesis, a brief background information on Mauritius is presented. This is followed by a review of literature related to the utilisation of dental services; the method and results of the survey carried out and an analysis of the results. The final part consists of a discussion of the study and subsequently some recommendations are given for improving dental service utilisation in Mauritius.
This chapter gives a brief background information on the island of Mauritius, the site of the present study. The different aspects considered are: geographical and historical, demographic, educational, economic and health service with greater emphasis on the dental workforce and public dental services.

2.1 Location

The island republic of Mauritius is situated in the south west of the Indian Ocean about 2000 kms from the east coast of Africa. The island lies just within the tropic of Capricorn 20° south of the Equator and 57° east of Greenwich and has an area of 1865 km². The Mauritian territory comprises of some other islands, the main ones being Rodrigues, Agalega and St Brandon.

2.2 Historical Background

The island was probably visited by Arab sailors during the Middle Ages. During the early 16th century, Portuguese sailors visited it several times. Dutch sailors first visited the island in 1598 and named it Mauritius, after their ruler Prince Maurice of Nassau. The Dutch settlement never developed enough to produce dividends and they finally left Mauritius in 1710. The French landed on the island in 1715 and called it 'Isle de France'. 
With slave labour imported from Madagascar and Africa, the French rapidly developed the country. In 1810 the British sent an expedition to capture the island following successful raids by French ships on English commerce. By the Treaty of Paris in 1814 the Isle de France, which regained its former name 'Mauritius', was ceded definitely to Great Britain, together with its dependencies which included Rodrigues and the Seychelles which was detached from Mauritius in 1903. The British conquest was followed by rapid social and economic changes. During the early years of British administration, slavery was abolished in 1835. Indentured labourers were then brought from India to work in the sugar cane fields. That was the beginning of a new period of the island's history and the Indian immigration was to change rapidly the fabric of the society.

After general elections in 1967 a formal resolution asking for independence was passed in the Legislative Assembly and Mauritius achieved independence on the 12th March 1968. Mauritius became an independent state within the Commonwealth with a democratic parliamentary system. In March 1992 the island became a republic, severing further any remaining colonial ties with the United Kingdom.
2.3 Demographic Characteristics

The various population movements of the 18th, 19th and early 20th centuries have made Mauritius a unique blend of different races, cultures and religions. People of European, African, Indian and Chinese origins have created a multi-racial society where the various cultures and traditions flourish in peace and harmony. When the British abolished slavery in 1835 the population stood at 100,000. By the turn of the century, the population numbered 371,000 and in 1944, it stood at 419,000.

After the Second World War, the increase was more rapid, particularly because of the rise in the birth rate and the drop in the infantile mortality rate following the provision of better health services. The rate of natural increase which was about 2.9 percent in 1969 has dropped considerably with family planning campaigns and greater awareness due to better education. In 1989 the gross reproduction rate was estimated to be 1.06, just below replacement level (Courtens 1991).

During the last five years the population grew at an average rate of 1.1% per year. At the end of 1991, it was estimated at 1,077,673 persons giving an overall density of 578 persons per km². About 60 per cent of the population were living in the rural areas. Rodrigues, which is the main outer island, had an estimated population of 34,379 all living in rural conditions.
The male:female ratio was about 1:1 for both Mauritius and Rodrigues. The mean age for the population was 28.7 years and the median 26.2 years. The life expectancy for a newborn baby was 65.6 years for a male and 73.4 years for a female. Death is caused mainly by diseases of the circulatory system (43.8% of total deaths), diseases of the respiratory system (9.8%) and neoplasms (8.6%).

In the years to come, the population pyramid will further change towards a higher median age. While in 1990, the less than 15 years old made up 30% of the population, the projection for 2010 foresees a decline to about 22.6%. Conversely, the 45-54 years group which in 1990 formed 7.8% of the population will double to 14.3% (Table 1).
Table 1 Projections of the resident population of Mauritius, 1990-2010

<table>
<thead>
<tr>
<th>Age</th>
<th>Population 1990</th>
<th>Projected pop. 2000</th>
<th>Projected pop. 2010</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15</td>
<td>315,610</td>
<td>289,815</td>
<td>286,618</td>
<td>-9.2</td>
</tr>
<tr>
<td>15-19</td>
<td>97,209</td>
<td>102,381</td>
<td>102,268</td>
<td>5.2</td>
</tr>
<tr>
<td>20-24</td>
<td>102,671</td>
<td>110,336</td>
<td>96,578</td>
<td>-5.9</td>
</tr>
<tr>
<td>25-29</td>
<td>105,589</td>
<td>91,861</td>
<td>101,770</td>
<td>-3.6</td>
</tr>
<tr>
<td>30-34</td>
<td>93,596</td>
<td>96,348</td>
<td>109,262</td>
<td>16.7</td>
</tr>
<tr>
<td>35-44</td>
<td>141,653</td>
<td>189,669</td>
<td>184,707</td>
<td>30.4</td>
</tr>
<tr>
<td>45-54</td>
<td>82,754</td>
<td>133,216</td>
<td>180,989</td>
<td>118.7</td>
</tr>
<tr>
<td>55-64</td>
<td>63,013</td>
<td>72,588</td>
<td>118,396</td>
<td>87.9</td>
</tr>
<tr>
<td>65-74</td>
<td>39,005</td>
<td>46,682</td>
<td>55,099</td>
<td>41.3</td>
</tr>
<tr>
<td>75-79</td>
<td>9,976</td>
<td>14,288</td>
<td>15,206</td>
<td>52.4</td>
</tr>
<tr>
<td>80+</td>
<td>7,699</td>
<td>9,662</td>
<td>13,871</td>
<td>80.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,058,775</td>
<td>1,164,846</td>
<td>1,264,764</td>
<td>19.4</td>
</tr>
</tbody>
</table>

Assumptions:
(i) Fertility: Gross reproduction rate declines from 1.14 in 1990 to 0.99 in 2000 and 0.90 in 2010.
(ii) Mortality: The expectation of life is assumed to increase by about 1.5 years for males and 2.5 years for females during 1990 - 2000.
(iii) Migration: Net yearly outmigration of 1,200 males and 1,300 females during 1990 - 2000 and none afterwards.

2.4 Education

Education is free at the primary and secondary levels up to the age of 20. Ninety-eight per cent of school age children actually attend primary school. In June 1991, the pupil:teacher ratio was 21 for primary schools and 20 for secondary schools of Mauritius. The Mauritius Institute of Education and the University of Mauritius provide courses for post secondary education. It is to be noted that the University does not provide courses for medical and dental degrees. The adult literacy rate was estimated at 90 percent in 1985.

2.5 Economy

The Mauritian economy was formerly essentially dependent on sugar production. Today, sugar is gradually losing its economic pre-dominance, however it is still very important. Activities in the manufacturing industries, specially within the export processing zone, the tourism industry and also intensification and diversification of agriculture have accelerated considerably the socio-economic development. The export processing zone for example, now employs 38 per cent of Mauritian labour and accounts for more than half of the gross export revenue. In 1992 an annual growth rate of the gross domestic product of 6.5 percent was forecasted.
2.6 Health Service Structure

Health activities in the country are basically the responsibility of the Ministry of Health, although other departments may be involved in health promotion. The Chief medical officer is the main adviser to the minister for all health matters. He is assisted by the principal medical officers. The dental division which is headed by a principal dental surgeon falls under the responsibility of the curative principal medical officer.

There are 4 regional hospitals, 5 district hospitals and 4 specialised hospitals (Psychiatric, Chest, Eye and E.N.T) on the island. Five hundred and thirty-three doctors including 174 specialists are employed in the public service while 457 doctors work as private practitioners. There are 29 area health centres scattered over the island, each designed to contain a dental clinic. At the Ministry of Health, the line of authority for a set of activities is based on a vertical organisation (Figure 1).
2.7 Dental Workforce

Oral health services are provided by a public sector which has selected consumer groups targetted for priority receipt of services and a private sector which provide services to the remaining population. The private sector consists of about 100 actively practising dentists and about ten specialists while the public sector has 37 dentists including two specialists in oral surgery and two in orthodontics. All dentists are trained overseas as there is no dental school in Mauritius.
At present there are 25 government dental clinics in Mauritius. Two mobile trailer clinics serve to provide oral care for school children in remote areas, and also for handicapped children. Oral care provided by the public service is free of charge.

The dental division of the Ministry of Health is headed by the principal dental surgeon who is mainly occupied with assuring the good functioning of the dental clinics and managing the oral health personnel. There are no operating dental auxiliaries such as dental hygienists, or dental therapists involved in oral care delivery. Government dental surgeons are assisted in their tasks by chair-side assistants, who receive an on-the-job training during a short period of about six months. Each dental clinic is operated by a dentist and one or two dental assistants. There is no dental technician in the Government service; the orthodontists make their own appliances. All prosthetic work is carried out by the private dentists with the assistance of technicians who are mostly unqualified.

According to the report of the principal medical statistician of 1992, the number of dentists has more than doubled during the last ten years. The figures are given in Table 2.
Table 2  Dentist workforce in Mauritius  (as at end of year)

<table>
<thead>
<tr>
<th>Year</th>
<th>Government services</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>23</td>
<td>48</td>
<td>71</td>
</tr>
<tr>
<td>1983</td>
<td>23</td>
<td>59</td>
<td>82</td>
</tr>
<tr>
<td>1984</td>
<td>21</td>
<td>68</td>
<td>89</td>
</tr>
<tr>
<td>1985</td>
<td>21</td>
<td>69</td>
<td>90</td>
</tr>
<tr>
<td>1986</td>
<td>24</td>
<td>82</td>
<td>106</td>
</tr>
<tr>
<td>1987</td>
<td>25</td>
<td>95</td>
<td>120</td>
</tr>
<tr>
<td>1988</td>
<td>28</td>
<td>99</td>
<td>127</td>
</tr>
<tr>
<td>1989</td>
<td>31</td>
<td>103</td>
<td>134</td>
</tr>
<tr>
<td>1990</td>
<td>37</td>
<td>103</td>
<td>140</td>
</tr>
<tr>
<td>1991</td>
<td>37</td>
<td>108</td>
<td>145</td>
</tr>
</tbody>
</table>

SOURCE: Annual report of the Principal Medical Statistician; Ministry of Health (1992)

The Dentist:Population ratio is sometimes regarded as a measure of availability of dental manpower. In Mauritius, there has been a tremendous improvement in the dentist:population ratio during the last decade as shown in Table 3.
Table 3 Dentist-Population ratio from 1982 to 1991

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Number of dentists</th>
<th>Dentist / population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>998521</td>
<td>71</td>
<td>1:14056</td>
</tr>
<tr>
<td>1983</td>
<td>999945</td>
<td>82</td>
<td>1:12194</td>
</tr>
<tr>
<td>1984</td>
<td>1016658</td>
<td>89</td>
<td>1:11423</td>
</tr>
<tr>
<td>1985</td>
<td>1025601</td>
<td>90</td>
<td>1:11395</td>
</tr>
<tr>
<td>1986</td>
<td>1034387</td>
<td>106</td>
<td>1:9758</td>
</tr>
<tr>
<td>1987</td>
<td>1040343</td>
<td>120</td>
<td>1:8670</td>
</tr>
<tr>
<td>1988</td>
<td>1049347</td>
<td>127</td>
<td>1:8262</td>
</tr>
<tr>
<td>1989</td>
<td>1057424</td>
<td>134</td>
<td>1:7891</td>
</tr>
<tr>
<td>1990</td>
<td>1065818</td>
<td>140</td>
<td>1:7613</td>
</tr>
<tr>
<td>1991</td>
<td>1077673</td>
<td>145</td>
<td>1:7432</td>
</tr>
</tbody>
</table>

(N.B As the annual registration of dentists started only in 1993, it is assumed that the number of dentists refer to the active workforce)

Eighty-five per cent of the private dental clinics are located in the main urban areas. Prices for dental treatment in private clinics are not fixed, but most practitioners follow the guidelines for a minimum tariff provided by the dental associations. Most complex dental work are now carried out on the island through modern dental laboratories which have been set up in recent years. Although the private sector serves a large proportion of the population, little information is available about their patient and treatment patterns. This information would have been very valuable for planning purposes.
The legislation regulating the oral health services are Public Health Act (RL 4/323 - 31 December 1925), Private Health Institutions Act 1989 (Act 11 of 1989) and the Dental Council Act (Act. No. 30 1989). These acts regulate the registration of dental surgeons, starting of practice and they give the possibility to regulate the collection of information about the oral health services. The Dental Council takes care of the registration and ethical aspects of dentistry.

2.8 Public Dental Services

The service provided in the government dental clinics are free of charge. In contrast with the past when only emergency treatment were given at the public dental clinics, present day dental care includes a much larger variety of dental services for selected groups. Schoolchildren are screened mainly for dental caries in standards III (age 7 years) and standard V (age 9 years) at all primary schools.

Most dental clinics still devote a considerable portion of their working time for emergency treatment, such as tooth extraction, which is carried out in the morning sessions. More complicated oral surgery cases are dealt with by the two oral surgeons.
The medically compromised patients and pregnant women are eligible for more comprehensive dental care which are available at the clinics. A weekly restorative session for adult outpatients has also been recently introduced. Orthodontic treatment is provided for children by the two orthodontists upon referral by the government dentists.

Levels of natural fluoride in drinking water were measured by the government laboratories in 1980 and found to be very low (maximum 0.008 ppm). Fluoridation of drinking water was tried in 1966-67 but abandoned soon afterwards, as there were many problems to obtain optimal concentration of fluoride. Because of difficulties with the introduction of water fluoridation, alternative ways of reducing caries prevalence with fluorides were considered.

Preventive activities today consist of fluoride and sealant programs. The fluoride program was started in 1981 and consists in the provision of fluoride tablets and fluoride mouthrinses. The sealant program which is still in its infancy, has a very limited coverage.

The cost, in 1990, of the purchase of fluoride tablets for babies and pre-primary school children was about 1 US$\(^1\)/year/child; it was slightly more for primary school children (about 1.3 US$). Fluoride powder for mouth rinsing cost about 0.02 US$/year/child. Fifteen to seventeen thousand

\(^{1}\) 1 US dollar = 15 Mauritian Rupees (Feb. 1993)
US$ are yearly made available by WHO and UNICEF for the purchase of the fluorides. All other costs are borne by the government.

The following table (Table 4) gives a distribution of various clinical activities performed routinely by the government dental surgeons as studied by Lahti in 1992. It is noted that about 50% of the time is occupied with diagnosis and restorative dentistry and that cancelled and unfilled appointments make about 11% of the time unproductive.

Table 4 Practice-Profile-Time study on government dentists

<table>
<thead>
<tr>
<th>Dental activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis</td>
<td>26.6%</td>
</tr>
<tr>
<td>Preventive I, health education</td>
<td>10.1%</td>
</tr>
<tr>
<td>Preventive II, topical applications</td>
<td>1.7%</td>
</tr>
<tr>
<td>Preventive III, scaling</td>
<td>5.3%</td>
</tr>
<tr>
<td>Restorative Treatment</td>
<td>26.3%</td>
</tr>
<tr>
<td>Endodontics</td>
<td>1.9%</td>
</tr>
<tr>
<td>Periodontics</td>
<td>1.3%</td>
</tr>
<tr>
<td>Orthodontics</td>
<td>0.6%</td>
</tr>
<tr>
<td>Oral Surgery</td>
<td>1.0%</td>
</tr>
<tr>
<td>Cancelled and Failed appointments</td>
<td>8.2%</td>
</tr>
<tr>
<td>Unfilled Appointments</td>
<td>3.3%</td>
</tr>
<tr>
<td>Non-clinical Work</td>
<td>6.4%</td>
</tr>
<tr>
<td>Administrative Work</td>
<td>7.4%</td>
</tr>
<tr>
<td>Technical Work</td>
<td>2.1%</td>
</tr>
</tbody>
</table>
2.9 Oral Health Data

The oral health situation in Mauritius and Rodrigues were studied by WHO in 1990 (Courtens 1991). The study covered caries and periodontal disease prevalence, some oral health habits and knowledge, and information on streptococcus Mutans levels.

The data from the survey showed that there was a high prevalence of caries in the primary dentition (dmft = 5.2; N = 234) and moderate disease levels in the permanent dentition of the 12 years old (DMFT = 2.8; N = 338). Ninety-seven percent of the 35-44 age group were affected by caries (DMFT = 11, N = 262). Seventy-seven per cent of the group had periodontal pockets of whom 32% had deep pockets (i.e. six millimeters or more). The mean number of sextants with 'bleeding or worse' condition was 5.2. Fourteen per cent had a denture of whom 4% a full denture in at least one of the jaws. Another 25% were in need of partial dentures. There is to date no study on the oral health of the elderly segment of the population.
3 UTILISATION OF DENTAL SERVICES: A LITERATURE REVIEW

This chapter is devoted to reviewing the available literature concerning the utilisation of dental services. Common themes are addressed, with examples of studies cited, rather than an exhaustive study-by-study review. The first part attempts to describe the nature of utilisation as a valuable tool in the assessment and planning for oral health. The second part of this chapter discusses health and illness behaviour. The last section deals with some of the most important factors believed to influence the utilisation of dental services. The factors are discussed under three basic dimensions namely: sociodemographic, structural, and socio-psychological. Finally, some of the barriers to attendance are described.

3.1 Background

The study of utilisation of dental services is an important aspect of oral epidemiology. Although the first major dental utilisation study was conducted in the 1930’s, many of the studies on which our understanding of utilisation is based were undertaken between 1964 and 1974 (Gift 1984). Interest in utilisation declined during the late 1970s and 1980s when cost containment emerged as the dominant policy issue. Dental utilisation, however, remains an important variable in a considerable number of studies which focus on other topics, such as access to health care, health care for the elderly and prepayment plans (Gift 1984).
The available literature indicates that, with respect to standards of unmet need, dental service utilisation is low relative to the utilisation of other types of medical services. One explanation of these high levels of unmet dental need is that disease like caries and periodontitis are frequently asymptomatic and invisible to the untrained eye. Furthermore, they are often not recognised as impediments to function or social well-being and are therefore often neglected; besides, poor dental health is in general not life-threatening.

3.1.1 Definition of Utilisation

Before defining utilisation, it is most appropriate to discuss the terms need and demand. A number of definitions of need and demand have been developed over the years. But those offered by Spencer (1980) may suffice here. Normative need refers to the need for a service or services as determined by a professional or other expert, perceived need is the need for care as defined by the patient, and demand arises out of the desire or attempt by the public to seek professional care.

A universal and operational definition of utilisation is absent from the literature. Utilisation is simply a fact of use; meaning 'to put to use' or 'to make use of' but the term itself does not necessarily distinguish the extent or degree to which a person makes use of something.
In this regard, utilise implies a dichotomy, that is, use or non-use. Therefore, a population's utilisation of dental services really refers to the number of individuals that make use of dental services. An increase in utilisation means literally that a large number of individuals utilise dental services. It is measured in numbers of individuals -not quantities of services. A related concept, the utilisation rate, simply refers to the proportion of the population that utilises dental services over a specified period of time.

3.1.2 Common Measures of Utilisation

Some of the most common measures of utilisation are:

- The number of visits per person per year is the most commonly reported measure of utilisation, yet it gives neither the number of people using services nor the quantities and prices of services which were purchased. Furthermore, it gives equal weight to all visits to a dental office, without regard to the qualitative nature of care given or the type of provider seen. Consequently, this measure of utilisation fails to provide the specificity which is needed by dental planners. It cannot be used to explain or predict how many or which type of services and providers will be demanded by a population. This measure is commonly used as the dependent variable in many studies such as those reported by the National Center for Health Statistics of the U.S. Department of Health, Education and Welfare (Gift 1984).
The second most common measure of utilisation is the percentage of a population visiting a dentist on an annual basis. It is a meaningful statistic from the perspective of public health because it provides a rough measure of dentistry's contact with the total population. Increases in the percent of people seen on an annual basis can be interpreted as improvements in the nation's health. However, like the average number of visits per person, it does not recognise any qualitative attribute of care actually received, and its explanatory and predictive powers are inconsequential.

'No visit' is often used in utilisation research and is determined by the lack of visits in a specified time period. This variable may suffer more from under-reporting than other variables, since many people fail to admit how long it has actually been since they have had a dental visit.

The reported first dental visit in a series of visits is another measure used by researchers, particularly those involved in U.S. National Opinion Research Center (NORC) studies (Giff 1984). This measure avoids over-reporting of visits and recognises that visits may have different values. The number of annual visits among persons with at least one visit is a better measure of quantity than most other utilisation variables. Although it does not reflect the complexity of the services received, it does help illustrate a differential in the quantity of services received by different groups after entering the system.
- The annual expenditures have also been used to measure dental service utilisation in many studies. Although translating a lump sum of money into an actual number of people making a dental visit is problematic, it has been combined successfully with other measures in certain studies to reflect utilisation.

- The use of prepayment plans has been equated with the use of dental services in several studies, but the interpretation of this variable for overall utilisation should be made with care since it only relates to covered individuals and services.

Utilisation is measured by social surveys and analyses of patient records. Social surveys, in addition to measuring utilisation, provide data on the characteristics of utilizers and non-utilizers. Data on actual services consumed and the cost of those services are less easy to obtain due to lack of knowledge on the part of the respondents or failure in recall. Such data can be gathered from patient records.

3.1.3 Utilisation and Oral Health Status

The assumption that utilisation is directly related to oral health has not been sufficiently tested. While several studies internationally have considered this association, most US surveys on dental need have reported little in the way of data on utilisation of services (Gift 1984).
In many studies, utilisation of dental services has been used as a predictor of oral health status. One of the most comprehensive and significant studies is the US Public health Service/World Health Organisation International Collaborative Study of Dental Manpower Systems in relation to Oral Health Status (ICS). From the ICS, it became evident that utilisation is a poor predictor of oral health status in places with structural school dental services, for example New Zealand and Norway and a more important predictor in open-structured systems, that is, those without a mechanism for regular visits such as the USA. In these systems utilisation, the perception of need, and having a preventive visit behaviour pattern predict treatment status.

The ICS results show that better dental health status is found among those who are frequent utilisers, have no perceived prosthetic need, are satisfied with their teeth, and have gone to the dentist for preventive treatment. Lesser levels of dental health are found among those who do not have a recent visit, have a perceived prosthetic need, are not happy with their teeth, and those whose most recent visit was for symptomatic reasons.
3.1.4 Rationale for Utilisation

Epidemiological studies (Striffler 1983; Todd et al 1982) have revealed that far more people are in need of dental attention than those who present themselves to dentists for treatment, despite significant increases noted in most industrialised countries in the proportion of people who visit a dentist each year. This discrepancy, sometimes referred to as the 'clinical iceberg' (Last 1963), has been a long-standing concern of policy makers and health care practitioners. Policy makers want to know whether services are reaching those in need and how services might be modified in order to promote their use by those in need. Practitioners, however, are more likely to be concerned with the 'inappropriate' use of services and delays in seeking treatment. The overriding concern of all health professionals is that effective treatment of physical and oral conditions always depends upon the patient's initiative in seeking care. Understanding treatment seeking and utilisation behaviour is necessary in order to promote effective and efficient care.

The illness career

The concept of an illness career or transition was coined by McKinlay (1971) to refer to the way in which people progress through a number of stages from the initial phase of symptom recognition through to medical contact. It is widely applicable. Even though dental care is in principle organised along the lines of a preventive service, in practice many visits are associated with the experience of symptoms and many 'preventive'
consultations actually result in some course of dental treatment (Davis 1987). Historically, of course, the great majority of dental visits were symptom-related and this is still the predominant pattern among some social groups and in some countries.

In the World Health Organisation ten-nation report (1985) on dental care, for example, on average just over half of all adults in the 35-44 age group had visited the dentist at least once in the previous year. Overall, for two-thirds of the adult population the last dental visit is likely to have been prompted by symptoms. Therefore, the experience of symptoms is probably important in stimulating the majority of dental visits. It is for this reason that the illness career concept is a useful one.

It would be easy to assume, for example, that there is a reasonably straightforward relationship between the experience of symptoms and the decision to seek professional help. Yet this is not the case. Firstly, there are a lot of people who experience symptoms - many of them quite painful and inconvenient - who do not take their symptoms to the dentist (Davis 1987).

Although the majority of those experiencing toothache go to the dentist as a result, the less disruptive, commoner and more ambiguous symptoms are much more likely to be ignored, suppressed or accommodated in various ways short of actually seeking professional attention.
The illness behaviour

Kasl and Cobb (1966) defined health behaviour as any activity undertaken by individuals who see themselves as healthy for the purpose of preventing disease or detecting it at an asymptomatic stage. Once symptoms are elevated to the stage of conscious interpretation and evaluation, a person enters a phase termed 'illness behaviour'. Illness behaviour refers to the activities people undertake in trying to make sense of their symptoms, interpret them, and seek remedy if necessary (Kasl and Cobb 1966). One of those 'remedies' may be to visit a dental practitioner.

At the core of the concept of health behaviour is the acceptance by the individual that somehow they are 'at risk'. In essence, a person needs to feel susceptible to a particular condition and that condition, also has to be seen by them as constituting a reasonably serious threat to their health, comfort or appearance. It is only then that they are likely to feel 'at risk'. More than this, the activity that is supposed to counter the 'risk' - the health behaviour - must appear to be effective and adequate to the task. A cue or 'trigger' to action may also be necessary before what is still only a latent tendency is translated into actual behaviour. These are all essential ingredients of what has come to be called the Health Belief Model (Rosenstock 1966).
At the most, people visit a dentist on average once or twice a year. A significant proportion of the population go to the dentist at very infrequent intervals. Yet, as already noted, the experience of oral symptoms - ranging from intense pain to more subtle signs - is very widespread. Clearly illness behaviour is a very important filter in determining whether people embark on the final stage of the illness career; that is, the final stage of actually visiting a dentist.

The decision about whether to go to a dentist follows the weighing up of a number of potential costs and benefits. Essentially this process involves the evaluation of the significance of symptoms, and the weighing of the benefits that could follow from visiting the dentist against the possible disadvantages of such a course of action.

The assessment of symptoms and the action they dictate is basically a social process. Zola (1973) has suggested five 'social triggers' that might precipitate a visit to a medical practitioner:

- perceived interference with vocational or physical activity;
- perceived interference with social or personal relations;
- an interpersonal crisis (lifestyle changes);
- a sudden change in 'normal' symptoms (symptom reassessment);
- pressure from others.
Although developed for medical utilisation, this scheme can be applied, though perhaps not uniformly, in the case of oral care. The impact of oral problems on social relations can be seen clearly enough, for example, bad breath but it is less obvious that such symptoms can interfere with vocational or physical activities. Probably only an impacted wisdom tooth, or oral cancer, or a severe periodontal or caries problem, would hamper normal activities in this way. The other three ‘triggers’ apply equally well since both the perception of symptoms and the impact on social relations, either in an interpersonal crisis or through pressure from others, are of considerable relevance to the dental context.

In considering the response to symptoms, Mechanic (1968) lays greater emphasis on the character of the symptoms themselves. He has identified the following ten variables to be important in the seeking of professional care:

1. The visibility, recognizability and perceptual salience of the symptoms;
2. The perceived seriousness of the symptoms;
3. The extent to which symptoms disrupt family, work, and other social activities;
4. The frequency of the appearance of symptoms and their persistence or frequency of recurrence;
5. The tolerance thresholds of others who are exposed to the symptoms;
6. The knowledge, cultural assumptions and understanding of the person and relevant others;

7. Other needs or practical matters competing with the illness response;

8. Competing possible interpretations which can be assigned to symptoms once recognized;

9. Emotional barriers in the form of fear and anxiety which influence the choice of actions to deal with the problem; and

10. The availability, physical proximity, and the financial and/or emotional costs of taking various courses of action.

In weighing up the advantages and disadvantages of going to a dentist, perhaps the principal benefit in view is the possibility that a visit might result in appropriate treatment, relief of discomfort and cure. It is during the making of these judgements that culturally derived knowledge about health and illness, the influence of others, and past experience with illness and health care providers have their greatest effect. Equally, for some people it is the belief that the dentist can do nothing that in the end decides them not to make a visit; for example, the elderly may believe that their symptoms are the natural accompaniment of ageing and so not worth taking to a dental practitioner.
Another benefit associated with visiting the dentist is the more symbolic one of having 'done the right thing'. The profession enjoys a prestige that in itself can confer benefits on the client, a form of placebo effect in which some satisfaction is derived merely from making a visit to the practitioner.

Finally, by going to the dentist a person's unease about their oral condition is legitimised in the view of others and their illness career fulfilled. For a person to continue their illness behaviour without either a 'cure' or a passage to some other status like 'well again' or 'chronically ill', is not socially acceptable. Such a person does not earn the sympathy and tolerance of others.

Furthermore, in entering the patient role a person gains two benefits - in return for meeting two obligations. First, they are temporarily excused normal role obligations in order to visit the dentist for treatment. Secondly, they are treated by others with sympathy rather than admonition for their condition, since they are assumed to have a health problem from which they cannot recover on their own and solely of their own volition. In return for these two benefits of the patient role, a person is obliged firstly to want to recover and secondly to consult and cooperate with a competent and qualified practitioner, in other words, a dentist.
Clearly, the decision-making processes which result in the use of a professional service are complex, fluid, and difficult to pin down. This should indicate that human behaviour with respect to health cannot be explained simply and easily by reference to one or more variables that characterise the services themselves or the people who do or do not use them.

3.2 Factors Influencing Utilisation Patterns

Numerous factors which are associated with the use of dental services have been identified through a series of studies and surveys conducted to explore the gap between need and demand for dental care. Some of these are simple associations with no statistical significance reported; other associations are significant in simple cross-tabulations, while still others are significant contributors in the analysis of multiple variables (Gift 1984).

Bauer and Pierson (1978) catalogued 37 independent variables to explain the use of services. These can be condensed into three major groups namely: sociodemographic, personal and psychological, and structural. In addition, transportation and other access factors, perceived need, cultural values, and actual level of dental disease have also been found by Gift (1984) to be strongly linked to the use of dental services.
The belief that one is susceptible to dental disease and that the disease will have serious effects have been identified as important factors in predicting utilisation of dental services (Kegeles 1961).

The sociodemographic variables have been studied most frequently, probably because of their relative ease of measurement and their ready accessibility. At the individual variable level, income seemed to be important as an explanatory variable in more studies than any other, followed by age, sex, race/ethnicity and education of the household head. All of the other variables have received less study (Gift 1984).

This review will consider the relations between each major variable and the utilisation of dental services. Sociodemographic variables are considered first, followed by variables relating more closely to the structure of dental care delivery and finally, some psychosocial variables related to personality, attitudes, and perceptions are discussed.

3.2.1 Sociodemographic factors

Age

Age has been used as an explanatory variable in a large number of studies on the use of dental services. In a review of thirty-one studies Gift (1984) found that the very young and the very old rarely use dental services. Adolescents and young adults had the highest use, and this declined into middle age thus establishing an inverted U-shaped pattern.
Douglass and Cole (1979a) found that the peak usage of dental services in the US was by individuals between the ages of 6 years and 24 years. This was followed by a steady decline in those up to the age 65 years, and a sharp drop to low rates for people aged 65 and older. A similar pattern was found by Ritchie et al (1981). Many European studies report the highest use of services during school age as a result of school delivery systems, with declining visits after school age. Thus, the height of the inverted-U curve is at an early age. Interestingly, this pattern is the reverse of what it is in medical care where, as expected from the age distribution of objective need for medical attention, the very young and the very old go to the doctor far more frequently than those in the intervening age groups.

Some of the age-related associations may be the direct result of oral disease levels, the presence of teeth, previous experience with dentists and exposure to dental health education. Up until the age of 6, most people have had little contact with a dentist. After age 10, there are few people who have never been to a dentist.

The young adult population, being exposed to considerable dental health education and likely to have all or most natural teeth, is expected to have better utilisation patterns than other age groups. Both dental awareness and the presence of teeth have been associated with a high utilisation of dental services.
In contrast, low utilisation by today's elderly population may reflect the fact that many are edentulous and thus do not perceive themselves in need of dental care. In addition, today's elderly are more poorly educated and have had less exposure to dental health education than the young. Thus, encouragement to visit the dentist, even when teeth are present, may not have been adequate. How much of this is related to economic factors and how much to social expectation and generational experience is not clear (Davis 1987).

In a study of utilisation of dental services by the aged, dentate status, perceived need, and recent symptom experiences were found to be the best predictors. When dentate status was removed as a predictor, the role of fear and anxiety became somewhat more important (Holtzman, Berkey, Mann 1990).

Anderson (1992) attempts to explain the utilisation pattern associated with the elderly group in four ways. Firstly, some variation in the use of services can reflect the natural history of dental change and disease throughout life. Secondly, age can be treated as an intervening variable reflecting changes in attitude and behaviour which is related to social development from childhood to adult life. Also, there is a suggestion that some elderly people may be more reluctant to use dental services merely because they are old (Smith and Sheiham 1980). Thirdly, use of services can be affected by age-related eligibility for free dental services;
becoming unemployed or pregnant were cited by Finch et al (1988) as examples of eligibility for free treatment triggering a resumption attendance in adulthood following a lapse in adolescence. Finally, age analyses are further complicated by changes which occur in one generation but not the next.

Nevertheless, it is plausible to assume that with growing affluence, higher levels of educational attainment and improving standards of professional care, coupled with a better exposure to dental health education, and fluoridation, future generations of the elderly may well expect more of their oral health and comfort and therefore be far more demanding of the dental care system than they are at present. A changing trend in age relationships has already been observed in some research. Andersen et al (1976) have recorded an increase in utilisation among the elderly and the very young in the US.

Another recent study of older adults (Gambucci et al 1986) has shown that persons aged 60 and older are no longer underutilisers of dental care. The utilisation rates among older adults with natural dentition may actually exceed the rates of other subgroups of the adult population. Future increases in utilisation by the age 60 and older group may be influenced more by a decrease in edentulism among people in that age group than by other factors such as awareness of dental health issues or cohort differences in attitudes toward oral health.
The sex distribution among older adults may also contribute to the high utilisation rates among older adults. Women utilise dental health care services more frequently than do men and make up a larger percentage of the older adult population. As long as women continue to enjoy greater average longevity than men, this factor will continue to influence the utilisation rates of the group as a whole. If this trend continues, the inverse U-shaped curve will level out, virtually eliminating predictive relationships between age and utilisation.

Older adults are demanding and receiving complex and expensive dental health services at a proportionally greater rate than younger people, and this is occurring despite the fact that a very small percentage of older adults has any type of dental insurance (Gambucci et al 1986).

Patient age has also been found to be associated with the type of dental services used. Obviously the dentition status of the patient has some impact on this since more elderly are edentulous, this age group is more likely to receive prosthetic services. On the other hand, regular dental exams and prophylactic care should be reasonably well distributed across age. It appears, however, that patients between 13 and 44 years in the US are most likely to receive a prophylaxis during dental visits (Kiyak 1993).
Sex

Sex is the other biological variable that, along with age, is routinely employed in standard epidemiological analyses.

Many studies indicate that women use dental services more frequently than men, and women are more likely to be regular attenders than men, a difference which occurs at all ages (Jackson et al 1973; Miller et al 1975; Ritchie et al 1981). A number of reasons could contribute to this difference: Nathanson (1978) argues that the apparent differences between the sexes can be explained by variations in informal understandings about the way in which men and women are expected to cope with physical discomfort, to respond to health survey interviews on the subject and to interact with medical practitioners.

Mechanic (1978) in another review of the literature largely concurs with the Nathanson thesis, arguing that women's social obligations give them a greater opportunity for seeking care and being sick and that, further, they may be more prone to report distress since this is culturally more acceptable for women that it is for men. Research by other investigators on women's responses to illness provides some support for this interpretation (Geertson and Gray 1970; Berkanovic 1972).
Besides, mothers may attend more regularly with their children and have treatment themselves in a way which fathers do not; mothers may find it easier to attend when they are not in employment, maternity-related free treatment may encourage attendance. In his study on path analysis of the utilisation of dental services, Reisine (1987) noted that men tended to have higher number of visits due to higher need and women more visits regardless of need.

There is also an important difference in the style - if not the frequency - of dental utilisation. A review of the literature by Nathanson (1977) supports the view that not only are women less likely to be involved in active risk-taking behaviour, but they are also more likely than men to carry out a range of preventive measures, including a more preventive approach to the use of medical and dental services. This confirms earlier work by Rosenstock (1966), on the use of preventive and detection services, and by Kasl and Cobb (1966) on free health examinations.

This more preventive approach is also reflected in the fact that women are much more likely to claim to brush their teeth frequently and tend more often to visit the dentist for preventive reasons. Frequent dental attendance among women means more treatment and therefore fewer sound teeth. Furthermore, for those destined to have their teeth extracted
prematurely at some stage, higher utilisation means that this transition to
the edentulous state proceeds at a quicker pace than it does among men
(Davis 1980).

Gender differences are more important in younger populations than
among the elderly. Young females make 10-25% more visits to dental
providers than do males. But in the elderly, this difference is
insignificant. Perhaps because of greater utilisation in the earlier years,
older women are more likely than older men to be edentulous. More
women than men have coronal caries among younger groups but the
reverse trend is found for root caries; both young and older men have
higher rates of root caries (Kiyak 1993).

However, information for the USA on long-term trends in the use of
dental services suggests that the gender difference in utilisation pattern,
such as it is, is decreasing quite rapidly (Douglass and Cole 1979;
Andersen et al 1976). It is conceivable that females entering the labour
force in proportions more like males and acquisition of values more
similar to each other may account for convergence of male/female dental
care use patterns in recent years. In fact, Andersen (1975) argues that
once one has taken into account the relevant variables like age, social
class and race, the difference may now be quite insignificant.
Race and ethnicity

Despite paucity of information and problems of interpretations related to the measurement and categorisation of races and ethnic origin, the literature generally reports that a larger proportion of American whites than non-whites use the dental services (Gift 1984).

An analysis of use of dental services for the period 1957-60, showed the proportion visiting the dentist in any given year in the USA was more than twice as high among whites than it was among blacks (39% against 17%); by 1968-70 the rate of visiting among non-whites had increased to 28 per cent, compared to 47% among whites. Even more striking evidence of the continuing importance of the racial factor over and above the impact of social class is the fact that low income whites actually see the dentist more frequently than do high income blacks. After taking into account the effects of income, area of residence and education, survey information shows that non-whites still have lower levels of utilisation for both medical and dental services (Davis 1980).

In most industrial societies there is considerable overlap between social class and racial group, with racial minorities in most cases being concentrated in working class occupations. This means that in many instances, what appears to be a characteristic of minority racial status - such as the low use of dental services - is often better understood in the broader context of social class (Davis 1980).
A more recent study has shown the racial differences to be more dramatic, with non-whites in the United States making one third to one half the number of dental visits made by whites. The difference may be related to other factors such as socio-economic status, residence, access to dental services, and availability of a regular source of dental care. Unfortunately, the reports available on national survey provide information only on main effects, not interactions between these person and environmental characteristics (Kiyak 1993).

However, several studies (Hochstein, Athanasopoulos and Larkins 1968) have reported discrepant results which may imply that other factors are interacting with race and confound the differences. In Moosbrucker and Jongs's (1969) study of low income black and white families in a Boston Head Start programme, the expected racial differences did not emerge. Instead, there were a great number of similarities in patterns of dental care, including recency of last visit, current felt need for dental treatment, making appointments when in need of care and attitudes towards visiting the dentist.

Evidence suggests that, once in the system there is every indication that the effect of race is greatly reduced, if not entirely eliminated (Kravits and Schneider 1975; Milone 1973). Race differences in the volume of care received were rather small. Despite this apparent similarity in the volume of care received, it is probably still true to say that among those who go
to the dentist, differences in the style or pattern of usage still remain; for example, blacks are probably more likely to use public clinics and tend to receive emergency dental treatment and extractions rather than preventive and restorative work. Again, this style or pattern of usage is very reminiscent of other socially and economically disadvantaged groups in the population.

Moosbruker and Jong (1969) found racial barriers between client and practitioner to be important and that part of the explanation of the persistence of these racial differences in the pattern of care is the existence of well-entrenched stereotypes about blacks held by many dentists in the USA. The study by Salber et al (1978) in the American south confirms the impression that such stereotypes may act as a barrier, especially for higher income blacks who might otherwise be expected to share much the same aspirations for high quality dental care as the white middle class.

Other research indicates that the purpose of the visit and the services received, as well as the use of available systems, do vary between American white and non-white groups (Kravits and Schneider 1975). Differences between knowledge of prevention and preventive dental behaviours among racial groups were attributed to differences in education and exposure to product information rather than racial factors (Soh 1992).
Although very few studies have been conducted with large enough samples to consider a variety of ethnic group comparisons, a few studies do permit ethnic comparisons on a limited basis. As far as the utilisation of dental services in the US is concerned, generally speaking Jews have the highest level of dental visiting, followed by Catholics and Protestant whites, then Puerto Ricans and finally blacks (Suchman and Rothman 1969). Chicanos also use dental services less, and tend to use them less preventively. Shuval (1970) noted major differences in preventive dental behaviour and response to the delivery system when comparing people with Asian, African, European or Israeli-Palestine backgrounds. On the contrary, Kiyak (1981) found no differences in utilisation between lower socioeconomic status Chinese and Caucasians in a study.

Ethnicity related to language differences has been infrequently studied, but Sarda et al (1972) found that dental health education in the familiar language at a health center enhanced the use of professional services more than did home care visits conducted in the English language. In a study of 100 mothers originating from Pakistan or Bangladesh, Williams and Gelbier (1988) concluded that low use of dental services was as much related to the women's perception of need among the competing priorities of their role as mothers and housewives as it was to language barriers. However, fear and anxiety were more likely where there were communication problems.
It would seem therefore, that race and ethnic origin per se does not determine whether or not a person will seek dental care. As stated previously, what appears to be a characteristic of minority status - such as the low use of dental services - is often better understood in a broader social context.

**Income**

Dental treatment is perceived to be the most sensitive of all the health services to variations in family income. Income, as measured by self-reported net and gross income for an individual family or head of household is perhaps the most frequently reported explanatory variable. With respect to the history of dental care utilisation, this is not surprising since the ability to pay a fee for a service has always been considered to be a primary barrier to seeking care.

Initially, income was considered the key variable associated with utilisation, on the assumption that if income were equalized by providing financial assistance, barriers to utilisation would be diminished. While this appears to be somewhat true in medical care, it has not been confirmed in dentistry (Bulman et al 1968; Andersen et al 1976; Newman and Larsen 1979). Nevertheless, income remains an important factor in determining whether individuals attend for dental care even when the financial barrier to receiving care is reduced.
In her review of literature, Gift reports that the relation between utilisation and income is a direct and positive one: as income increases so does utilisation, with the differences showing up more in income extremes. The association is not entirely linear, however, since there are bigger gaps between some income groups than others.

Different income groups have been found to consume different types of dental services (Freeman and Lambert 1965). Low income people are more likely to visit the public dental clinic, while higher income people are more likely to be seen in a private dental office. Income also appears to help explain specific types of dental care which will be sought, since the orientation towards preventive and restorative dentistry increases with income, while conversely, patients with lower income tend to make more visits for extractions and relief of pain. This indicates that socially determined patterns of behaviour associated with income are often related to occupation and educational background, because these three factors are often positively associated with each other.

_Occupation_

The occupation of the head of household is often used in utilisation research as a measure of socioeconomic status, although occupation is sometimes identified for each individual in the study. Occupation is usually a product of education and a determinant of income. Therefore, in looking at rates of utilisation of dental services by occupation, the
combined effects of these two factors become evident (Douglass and Cole 1979a). While it is not feasible to rank all occupations according to status, they can be grouped with unskilled, semi-skilled, and labourers as low status; skilled, clerical, and sales as middle status; and executive and professional-managerial as high status. Available findings indicate lower use among the unskilled and semi-skilled population than among those in higher level occupations, with the highest utilisation rate found among professional and executive level occupations. The majority of workers in the middle range of occupations do not exhibit utilisation patterns that differ dramatically from each other. In a study of utilisation by occupational groups in Denmark, non-shift workers were found to make more regular use of dental services (Petersen 1981).

Education

Education is another socioeconomic variable that has been frequently used in studies of dental utilisation. Most often education of the head of household has been the primary measure used, but within a household each individual’s education has frequently also been considered in relation to dental utilisation. Education of the household head is an important predictor of utilisation and oral health status for family members across all age groups. Families headed by college graduates are two to three times more likely to seek dental services than those headed by an individual with eight years or less of education (Kiyak 1993). Studies and surveys have shown that utilisation increases as the
level of education increases (Young and Striffer 1964). A notable exception to this pattern was found by Salber et al (1976) in their study of two southern rural communities in the US. The utilisation rate of blacks increased somewhat as level of education increased to 7-11 years, but decreased slightly for the 12 plus years levels of education. Therefore, they concluded that education, like income, is only a partial explanation of unequal rates of utilisation of dental services by segments of the population. It was also observed that gaps in utilisation between the very poorly educated and those with moderate education were larger than the differences in utilisation among other educational groups such as high school and college graduates (Beck et al 1981).

Location

Perhaps because of availability rather than for any notable analytic reason, geographic location of an individual or family has been frequently studied in utilisation research. Analysis of such data reveals that the proportion of persons visiting the dentist varies in different regions. But as populations become mobile and as media and other influences eliminate many of the separations among regions, these utilisation differences may disappear.

A number of studies in the mid-1960s and onwards have shown an association between attendance rates and locality (Jackson et al 1973; Carmichael 1985). It appears that individuals in urban communities, in
areas with a high dentist to population ratio, and with several easily accessible dental services are more likely to use dental services than those who do not live in such communities (Kiyak 1993).

Much of this may be related to social class, under-dentist ed areas are likely to be those with the higher proportions of low income families. Ritchie et al (1981) found that regular attenders were more likely to travel longer distances than non-regular attenders, suggesting that for the latter having a dentist nearby may encourage a decision to seek care once other barriers have been overcome.

Community type was also found to be associated with levels of utilisation (Anderson et al 1976; Wan and Yates 1975). Although the differences are small, utilisation increases with the density of the population from farm, to rural non-farm, to suburban, to central city. Cultural barriers such as lack of familiarity with appointments and other system characteristics appear to be greater in rural areas (Elliot 1972).

**Community variables**

Several community variables, other than size, influence dental service utilisation; among the most significant of these is community water fluoridation. In most reported studies in the US, utilisation is found to be lower in those areas where the water is fluoridated (Douglas et al 1971).
3.2.2 Structural Variables of Dental Care Delivery System

Dental utilisation patterns have also been described using the structural characteristics of dental care delivery systems:

**Organisational characteristics of the delivery system**

The way the health services are organised may be as important as the sociodemographic factors in determining patterns of utilisation. Members of particular categories of society may not have the necessary expertise to cope with certain organisational structures and will therefore delay or avoid utilising them (Young and Willmott 1959). Until the ICS, little had been done to compare the different impact of system characteristics on utilisation of services. The ICS provides an evaluation of the impact of the dental delivery system on the use of services since multiple systems are compared. Both utilisation and reasons for utilisation appear to differ across systems, with motivation being a far greater explanation in open, non-structured system (Cohen 1978). Unmet need is greater among children in open systems. The comparison of unmet need among adults does not show as great a difference. Various studies suggest that prerequisites to use are perceived need and previous utilisation history (Jenny 1979).

**Previous contact with delivery system**

Previous contact with the dental delivery system is one variable which may explain the differences in utilisation rates associated with other
variables such as age and education (Shuval 1970). Persons with more recent visits are more likely to have had another visit earlier in the same year, thus, having a positive experience in the dental delivery system may provide the person with the incentive to continue to visit the dentist. Bad experience of dentistry can adversely affect attitudes to dentists and dentistry, and future use of services (Collett 1969, Van Groenestijn et al 1980).

Previous contact with the dentist occurs in a structured school delivery system within several European countries. Billie (1980) reported that when Danish youth left a free school programme and entered a copayment programme, utilisation fell from 99% to 85% by 20 years of age. This decline was also closely associated with socioeconomic status: those leaving school early (usually students from the lower classes) have reduced utilisation to 76% by age 20. In other words, reducing the impact of the school system by leaving it early, in combination with lower socioeconomic status, has a detrimental effect on adult utilisation. Schwarz and Hansen (1976) also found that previous school dental care was an important predictor in adult utilisation.

Response to recall is positively related to previous contact with the delivery system, as measured by having completed treatment at an earlier visit and having a regular source of care. Having more recent contact to the dentist is also related to visiting a dentist (Bonito et al 1978).
Having a regular source of care

A study by Kronenfield (1979) found a strong relation between having a regular dentist and actually visiting a dentist at least once in the past year. Of those people with a regular source, 67% had visited a dentist at least once in the past year vs 18% of those without a regular source who had visited a dentist. Young people are most likely to report a regular dental source.

Prepayment and financial assistance

Generally speaking, prepayment does appear to increase the proportion of persons visiting the dentist (Lewis 1981), with the largest impact being on those who were already regular or irregular users of dental services rather than non-users (Galgainaitis and Gift 1980). Persons who generally do not use the dentist, except when they perceive need or feel pain, may go to the dentist immediately after the introduction of a prepayment plan, causing an initial surge in visits, but do not appear to continue to the pattern of high utilisation (Morehead et al. 1971). A major beneficiary group appears to be children from low-income families and/or who have parents with little formal education. Utilisation rates for elderly in the US (NCHS) continued to be low whether or not they had dental insurance and approach those for younger age groups without insurance (Kiyak 1993).
While increasing the number of visits, the availability of public assistance through Medicaid or other welfare aid has not been sufficient to close utilisation gaps in the US (Lawson 1979). Reasons given for non-use are the inability or unwillingness to travel (Leverett and Jong 1970) and a lack of knowledge of eligibility (Tryon, Powell and Roghmann 1970). It seems that providing free, readily accessible care is not the entire solution to inadequate utilisation. Even with convenient location, no cost, and no lost income, pressure from officers was required to obtain increased utilisation in the US Navy dental clinic (Peterson 1979). Also in the UK, despite the provision of free service, there is evidence of social class gradient in the use of dental service (Bulman et al 1968; Dickson 1968; McKinlay 1969; Scarrott 1969). In addition to the availability of free care, motivation and incentives were essential to cause a significant increase in utilisation (Hughes and Legler 1979; Pelton 1972).

Nikias (1969) and Avnet and Nikias (1967) found that in the US, people who sought coverage on their own were more likely to visit a dentist than those who obtained it automatically as a benefit of employment, but the amounts of care received were similar for both groups. They also found that the larger the portion of the premium paid by the employer, the fewer the number of visits.
A study on a large population of employees enrolled in a prepayment plan showed a steady decline in the number of complete denture services and in the number of simple and surgical extractions but there was an increase in the rate of use of periodontic and endodontic services (Field 1979).

In the US, dental insurance has been the fastest growing fringe benefit during the 70's. Further, it has evolved into a cost-effective means for getting more people to seek dental treatment. Given the assumption that increased utilisation improves oral health, public or private dental insurance programs are important public health measures (Grembowski, Conrad, Milgrom 1985).

To-day, dental insurance is facing some significant new challenges, mainly because purchasers of care perceive the need to trim all health care costs due to the rapid escalation of medical and hospital costs. Prepayment is seen as one way to reduce out-of-pocket expenditures, control costs over time and assist in making dental care less of a discretionary service. The source and level of payment will have to become a more systematically examined factor to completely understand its role in utilisation (Andersen and Anderson 1967; Gift, Newman and Loewy 1981).
3.2.3 Psychosocial factors

Perception of dental symptoms and perception of need

Perceived symptoms are a key variable in health studies because perceived symptoms constitute a major determinant of self-care or provider-based care (Feldman 1966). Newman and Anderson (1972) and Newman (1971) have reported perceived symptoms as the major explanatory reason for visits during the year.

Perceived need, as opposed to objectively assessed need, has emerged in many studies as one of the most accurate predictors of both medical and dental services utilisation. When perceived need is operationalised as toothaches and oral discomfort, it turns out to be a better predictor of utilisation than income or dentist to patient ratios in the community. A series of studies has found low perceived need among non-users. Perceived lack of need has been found to be higher for the edentulous elderly than for the dentate (Kiyak 1993).

Links between the perception of need, recognition of symptoms and the use of dental services have been reported by a number of researchers (Gift 1984; Smith and Sheiham 1980), but these associations have often lacked a theoretical framework which would permit the use of the observations to explain and predict behaviour (Anderson, Morgan 1992). An early exception was Kegeles (1961) who suggested that if motivation is to act in a certain way it is dependent on the perceived susceptibility to
a disease, the belief that the disease has serious consequences, the belief that taking certain actions will reduce the effects of the disease, and the belief that taking certain actions are not worse than having the disease itself.

Several researchers have found the presence of teeth and general oral health status to be related to the utilisation of dental services and the types of services reported. Petersen (1981) reported a fairly realistic relation between perceived and actual dental need in a Danish population. However, Miller et al (1975), and Smith and Sheiham (1980) found that even perceived need does not necessarily lead to service use. The reasons given for not seeking treatment included fear, cost and the problems of finding a dentist.

**Attitudes toward oral health, dentist, and dental care**

A number of studies conducted have found perceived need and dental attitudes to be the most powerful predictors of dental care utilisation (Kiyak 1993). One of the studies which considered attitudes and sociodemographic variables using multiple regression techniques found that attitude variables had more predictive value than traditional socioeconomic variables (Beck, Cons, Ettinger, Willard, Field and Jakobsen, 1981).
In a study of elderly persons, Kiyak (1980) reported a difference in use if the elderly perceived oral health as a sign of aging rather than as a symptom of ill health; otherwise, attitudes were not strongly associated with use and non-use of dental services. In another study of low socioeconomic status participants, Kiyak (1981) found that fear of unacceptable consequences is a motivator for the use of services.

The major conclusion of British literature on attitudes to dental care and dental health has been that people in the lowest social classes put a low value on preserving their teeth (Dickson 1968; Scarrot 1969; Vogan 1970; Blaxter et al 1982). This variation in attitudes is also likely to be reflected in patients' attitudes to the dental health and dental care of their children (Beal and Dickson 1974; Blaxter et al 1982).

Miller and Kiyak (1980) found no difference between utilisers and non-utilisers in fear or locus-of-control measures. They found use more related to the respondent's value system than to his personality type. These findings indicate the complex interaction of attitudes with socio-demographic variables and show the necessity for further analysis of the interaction between variables affecting utilisation.

Although the subjects in a survey generally held positive attitudes towards dental health, with regard to the importance of maintaining good oral hygiene as well as to the importance of their appearance, the need
for regular dental care was not seen to be important in achieving this (Mattin and Smith 1991). A discrepancy between believing people should
go to the dentist regularly and going oneself has also been reported
repeatedly (Gift 1984).

The study of Woolgrove et al. (1987) illustrates the interaction of beliefs,
attitudes and practice:

When compared with regular attenders, 'trouble only' attenders:
- put less value on having teeth and keeping them until old age;
- put less value on having their teeth examined by a dentist;
- were not convinced that dentists themselves recommended regular
dental visits;
- believed that dentists were less likely to prevent pain and to enable
  them to keep their teeth; and
- were more likely to evaluate spending time at the dentist, and the
dentist hurting them, as an unpleasant experience.

The patients’ attitudes toward the skills and competence of the dentist, in
combination with their orientation toward the value of oral health care
have been found to be related to utilisation (Gift and Newman 1979;
Kegeles 1963a). In research using multivariate analysis, attitudes towards
the child’s dentist were found to be a better predictor of utilisation than
were sociodemographic variables (Gift and Newman 1979).
Kriesberg and Treiman (1962) discovered that the public's chief concerns were with the dentist's personality and his skill in minimizing pain and fear of what may happen. Shuval (1970) also reported similar findings. Attitudes and experience are interactive: although attitudes influence behaviour, attitudes are themselves shaped or reinforced by experience. Dentistry is no exception, and several studies support the view that a person's earlier experience of dentistry will influence their attitudes and their decisions to attend in the future (Kegeles 1974, Green and Green 1985, 1989).

Researchers have also found that the dentist/patient relationship affects utilisation (Frazier, Jenny, Bagramian, Robinson and Proshak 1977), particularly when the incongruence of attitudes regarding the value of dental care is evident. General satisfaction with dentists' competence is found to be associated with utilisation. Satisfaction with care was associated with higher education, higher income, age (young adult), and feeling no need to go to the dentist (Bureau of Economic and Behavioural Research, ADA 1979)
Orientation of parents

Both the early socialisation of the child regarding oral health care and visiting the dentist, and the orientation of parents, have been shown to affect adult and child utilisation behaviour. Blinkhorn (1981) provides evidence that mothers’ encouragement of dental health education in the primary socialisation stages leads to increased utilisations of services.

Kriesberg and Treiman (1960) found in a US study that parents’ behaviours, level of knowledge, and attitudes were related to the teenagers’ use of preventive dental services. This finding gained further support from Rayner (1970) who concluded in his study that mothers’ attitudes to dental health were a result of mothers’ practices, and the mothers’ own dental health behaviour was an influential factor in determining their childrens’ dental health practices. More specifically, he found that upper socioeconomic status mothers were less concerned than lower class mothers about their children’s teeth but had better dental behaviour. Low socioeconomic status mothers expressed values and attitudes that indicated an alienation or removal from the mainstream. The middle class mothers had value and attitudes that appeared conducive to change which would result in more visits.
3.3 Barriers to Attendance

In the previous sections, various factors contributing to dental utilisation have been discussed. Even if these lead an individual to consider contacting a dentist, a number of barriers may still have to be overcome before they receive treatment. World-wide, the barriers to the receipt of oral health care vary. They vary because the professions are organized so differently and because human cultures vary so greatly.

**Availability and access to dental service**

Improved access to dental services and a greater of concentration of dentists have been associated with an increase in utilisation (Douglass and Cole 1979a; O'Mullane and Robinson 1977; Wan and Yates 1975). Access to dental care is not limited to a measure of the distance from the patient to the dentist, but includes the time costs of waiting time for an appointment, the availability of a dentist who will agree to special financial arrangements for certain patients, and the convenience of keeping an appointment. House (1978) theorized that patient time costs are significant in predicting utilisation.

In under-dentistied areas, longer waiting times for an appointment and greater distances to travel are added to any other disincentives to attend, particularly for lower income groups. An increase in the concentration of dentists should lead to decreased waiting time in the office and travel time to the office. But even good dentist to population ratios in a locality
may disguise busy practices used by people visiting the dentist from their work place rather than their home (Tee 1982). Some work suggests that decreased travel time and waiting time are indeed weakly associated with utilisation of dental services (Holtmann and Olsen 1976). However, increasing the dentist-to-population ratio seems only to affect middle class patients, raising them to rates characteristic of upper class utilisation rates (O’Mullane and McCarthy 1979). It appears that highly motivated people in low dentist-to-population areas will still seek care.

Finding a good dentist was considered a barrier to attendance by respondents in studies reported by Smith and Sheiham (1980). Close proximity of a dentist to work or home was a key factor in selecting a dental practice to visit (Ritchie et al 1981). Regular attenders were more likely to travel longer distances than non-regular attenders, suggesting that for the latter having a dentist nearby may encourage a decision to seek care once other barriers have been overcome (Ritchie et al 1981). The presence of dental practices conveniently situated in the locality needs to be matched by the availability of other resources necessary for making an appointment and attending. The ability to take time off work to visit the dentist was also reported to be a barrier (Finch et al 1988) as were inconvenient opening hours of the dental practice (Williams and Gelbier 1988).
Finally, the availability of appointments can affect the decision to attend (Scarrott 1989). The WHO International Collaborative Study (1985) data tend to show, however, that access and availability were less important than acceptability of care in predicting utilisation for highly developed industrialised countries. These relations might be different in countries having poor manpower-to-population ratio and great distances between services and people.

**Dental fear and anxiety**

The link between attendance and fear or anxiety is well established, though the prevalence of dental anxiety reported in studies varies. It is also the most common barrier. In studies which have explored reasons for not attending the dentist, fear is frequently cited (Ritchie et al 1981; Wardle 1982; Todd et al 1982; Finch et al 1988). Corah et al (1984, 1985) found in a survey of 746 dentists in the US that 75% believed anxiety to be the biggest barrier to seeking care as well as a critical factor in determining patient satisfaction. This view was supported by Schuurs et al (1984) who reviewed studies from 10 countries. Even though several foci have been identified in studies, Schuurs et al asserted that conclusive evidence about the causes of dental anxiety did not exist.
Several 'origins' of dental fear and anxiety have been suggested in the literature. These include family environment, especially during childhood, family dental experience and attitude towards dentistry, emergency type of maternal dental visits, negative expectations from others, previous traumatic dental treatments (Forgione and Clark 1974, Cohen et al 1982, Kleinknecht et al 1973).

Anxiety and fear have been related to the anticipation of pain (Wardle 1982) and this can be made worse by the practice environment and by prolonged waiting before examination or treatment (Green and Green 1989). It sounds disturbing that much of dental fear is related to patients anticipating the dentist’s disapproval of them because of their oral hygiene status (Gale 1972). This suggests that the way the dentist deals with the patient may cause fear, and it is no wonder if some patients reported their dislike of dentist’s personality. The anaesthetic needle and the drill are the most common fear-producing stimuli of the dental procedure (Molin and Seeman 1970; Kleinknecht et al 1973).

The notion that dental anxiety negatively affects regularity of dental attendance has been proven in several studies, although being afraid does not keep everyone from making regular dental visits. Those who are dentally anxious and yet make regular dental visits might have at their disposal adequate coping resources with regard to their anxiety (Billing and Moos 1981), and an incentive might be needed. Highly anxious
individuals were found to be more likely to have their last visits for
symptomatic reasons, and were less likely to engage in preventive dental
activities (Cohen et al 1982).

Costs
The real or perceived costs of dental care have been reported as a
barrier to the use of services to a varying extent in a wide range of social
groups and patient types (Todd et al 1982; Jackson 1986; Finch et al
1988). This barrier can exist in two primary ways: (1) the actual price of
the service is too high, and (2) the amount of disposable income available
for buying the service is too low. Therefore, changes in either price or
income will alter the cost barrier. Income and price of dental services do
seem to be market forces that play a major role in the use of dental
services (Douglass and Cole 1979a).

Based on the close association of income and patterns of utilisation, one
might predict that cost is the leading barrier in not seeking care. This,
however, has seldom, if ever, been the predominant self-reported reason
given by any study population for not going to the dentist. Furthermore,
when the cost barriers were removed in the low income groups, the
utilisation rate did not rise in most instances unless some other form of
motivation, such as dental health education, was provided (Nikias 1977).
Yule et al (1988) reviewed the impact of patient charges and the use of dental services in the National Health Service in the UK, and concluded that dental charges had influenced the type and amount of treatment but not courses of treatment.

Price and cost barriers have different impacts on each socioeconomic group. In his study Kiyak (1993) notes that the public will be more likely to seek necessary dental services to the extent that costs are reasonable or are perceived to be reasonable relative to the local cost of living. On the other hand, if the public views dental services as a luxury that can only be afforded by the rich and all expenses must be paid out-of-pocket (as is the case in many developing countries), regular preventive dental care will not be sought. Providing free or low cost dental services through dental insurance or a third party payment scheme to a population group for whom dental services were previously prohibitively expensive does not necessarily enhance utilisation. It is also essential to instil in that group greater attention to and interest in oral health by improving both personal values and environmental opportunities.
Dentists’ social and communication skills

The respondents’ image of the dentist in the study of Finch et al (1988) was not one which encouraged attendance; they were considered impersonal in their approach to patients, and preoccupied with the clinical and ‘mechanical’. The ability of dentists to interact well with patients, especially with anxious patients, or patients holding negative attitudes to dentistry, may enable them to increase patient satisfaction with the care and retain these patients at their practice. Dentists are in a position to influence the satisfaction that patients experience, particularly by their own interactions with them and are thus well placed to promote their own services (Jackson 1978; Green and Green 1989).

In the dental literature no study was found which had directly investigated, in depth, the relationship between attendance behaviour and different styles of interaction. Nevertheless, the same general themes emerge: that the nature and extent of interaction between dentist and patient influenced patient attitudes to, and satisfaction with, their dentist (Jackson 1981; Gale et al 1984; Corah et al 1984). Insufficient sensitivity to patient attitudes and needs was established as a barrier to dental care by the FDI-General Assembly (Cohen 1987). The barrier of poor communication clearly exists and the problems to be addressed in improving communication will require attention in undergraduate and postgraduate vocational training.
4 MATERIALS AND METHODS OF SURVEY

4.1 Introduction

As a means of studying the pattern of utilisation of dental services by adults in Mauritius, a descriptive dental survey was designed to be implemented in Mauritius in February 1993. To ensure the value of the survey this project was thoroughly scrutinised and approved by the writer's supervisors, namely Prof P.D. Barnard and Dr S. Sivaneswaran of the Department of Preventive Dentistry, University of Sydney and discussed in detail with the visiting WHO Associate Professional Officer of Oral Health in Mauritius, Dr S. Lahti.

There was little or no existing information on the dental service utilisation of the population, hence there was a need to collect baseline data. This study was designed in the format of a structured interview questionnaire to be carried out by the writer on a sample of adults who were aged between 35-44 years at the time of study.

According to the 1990 population census (Annual Digest of Statistics, Mauritius 1991), adults of the 35-44 years, comprised approximately 13.6% of the population of Mauritius.
4.2 Development and Contents of the Questionnaire

A formal contact with the Principal Dental Surgeon's office of the Ministry of Health in Mauritius was established in August 1992 as regards the appropriateness of the study. The survey format was designed with the service utilisation questions based on the 'WHO Combined Oral Health and Treatment Assessment form' (1976). The decision to adopt a WHO protocol allowed for a systematic approach to the collection and reporting of data, international uniformity, and data comparison with other countries.

Some modifications were made to the questionnaire after local considerations were taken into account. The question on 'Who treated you' in the WHO form was omitted: In Mauritius both the medical practitioner and the dentist are allowed to operate in the mouth as per the Dental Council Act (1989), but in practice, however, the dentist is the only person to deliver dental care. Also, for the question 'Where did you have dental treatment?' the alternatives 'Dental Hospital', 'Dental laboratory', and 'Company or Friendly society clinic' have not been used as they are not considered relevant to the local context. Similarly, 'school dental clinic' was omitted because it was not considered an appropriate source of treatment for the cohort under study.
4.2.1 Contents of the Questionnaire

The survey form consisted of a covering introductory page (of papersize A4) followed by four pages with a total number of twenty-five questions of which three were open-ended (A3 size folded into a A4 document). The answers would be recorded as a tick in the appropriate box unless specification is required.

The form was divided into three sections, namely a section on demographic data, a section on service utilisation and a third section on attitude and behaviour. A copy of the questionnaire is attached at the appendix (Appendix 2).

*Personal demographic data*

Questions pertaining to the following were asked: age; sex; place of residence; ethnic group; present occupation; highest level of education; and family income.

*Service utilisation*

Questions asked in this section were:

- Type of dental service mostly used;
- Frequency of dental visit during the previous twelve months;
- The reason(s) for visiting the dentist in the past twelve months;
- The reason(s) for not visiting the dentist in the past twelve months;
- Place where the last dental visit was made.
Attitudes and behaviour

In this final section of the survey form, questions on the following were asked:

- Perception of disease in teeth and/or gums;
- Perceived need and type of dental care to be demanded, if problem in teeth and/or gums present;
- Intention of effecting a dental visit to resolve the problem;
- Actual source of learning about oral hygiene;
- Preferred source of learning about oral hygiene;
- Use of fluoride toothpaste;
- Frequency of tooth brushing;
- Satisfaction with the appearance of natural teeth;

Finally, two open-ended questions were asked:

- to determine the respondent's attitude on the actual dental services and
- to record suggestions on methods for improving the dental services in Mauritius.
4.3 Definition of Terms

Age

Lifespan in years (Gregorian Calendar) at the last birthday as stated by the interviewee. Age was expressed according to the international convention whereby age at birth is 0 years.

Place of residence

The place of residence was recorded as whether the respondent was living in a rural or urban setting. The rural area is defined as the locality where local government is administered by a district council, while the urban area is administered by a municipal council.

Population group

The different population groups were:

Hindu: population with Hinduism as their faith;
General Population: people of European, African or mixed origin;
Muslim: people having Islam as their faith;
Sino-Mauritian: people of Chinese origin.

Present occupation

The present occupation was defined as the main job in which the interviewee spends most of his/her time. This was an open-ended question but responses were subsequently compressed into three categories, namely a low, a medium and a high status occupation category. These were further reduced to two classes at a later stage.
**Level of education**

The highest level of education attained was recorded in one of four categories:

- **Primary:** person who has attended any year of the first six-grade school;
- **Secondary:** person who has attended any year of the seven-grade school after primary school;
- **Tertiary:** person who is studying or has attended any year of college or university - after a secondary school certificate.
- **None:** person who has not attended a primary school;

**Monthly family income**

The monthly family income was the sum of the incomes, to the nearest rupee, of the interviewee and spouse. The income was then recorded into one of the nine categories in the questionnaire. Recent data shows that the average monthly earnings in large establishments by industrial group for September 1991 was Rs 4600 (Annual Digest of Statistics 1991). This provided the basis for establishing the different income categories.

**Service utilisation in last twelve months**

Whether the respondent has had any contact with a dental treatment setting during the previous twelve months, i.e. during the period beginning February 1992 and ending January 1993.
4.4 Sampling Method

4.4.1 Sample selection

Sampling adult subjects for a truly representative sampling is known to be difficult (WHO 1987). Samples have, therefore, been drawn from readily accessible organised groups, namely office and factory workers to obtain a reasonably representative sample. Given the constraints facing the execution of such a survey, an advantage of such a sample was convenience, in that a large part of the study could be conducted during a routine working day and at the working site.

4.4.2 Sample Size

In determining the sample size, the following factors were considered: the resources available; the length of the survey period; the geographical distribution of the work-sites; and the work schedule of the sample population. It is further recognised that a survey sample should be large enough to yield sufficiently precise estimates and offer an acceptable chance of detecting significant differences between population groups.

Having evaluated the above factors, it was anticipated that approximately 350 subjects would be interviewed by the writer in a period of 3 weeks. On the basis of 18 working days for the 3 weeks, this would constitute a workload of approximately 20 subjects per day.
It was assumed that a difference in dental service utilisation could exist within the selected sample with respect to place of residence and occupation. Hence, to ensure a further degree of representativeness of the sample, an attempt at stratification by residence and occupation was made in the selection of the factory and office sites.

4.4.3 Stratification

The distribution of the population of the island is such that 60% live in rural areas and 40% in urban areas (Annual Digest of Statistics 1991). The sample distribution was made to follow this proportion to show representativity by location.

The sample was divided as follows:

Urban: 2 cells (2 x 70) = 140 subjects.
Rural: 3 cells (3 x 70) = 210 subjects.
Total = 350 subjects.

Using such a sample, comparison can then be made between urban and rural groups. The elements of each cell were then chosen on an occupational basis, thereby allowing for an indirect stratification by education and income. Furthermore, the sample was selected so as to have equal proportion of males and females. Twenty sites were then identified where the labour force was sufficiently large (n>100) to contain different categories of workers.
4.5 Pilot Study

A pilot study involving interviews with 150 adults of 35-44 years was conducted in September 1992, with the collaboration of the Principal Dental Surgeon's office and the WHO Associate Professional Officer in Mauritius. The subjects were selected from those attending 10 government dental clinics (4 urban and 6 rural clinics to show population representativeness). The study was scheduled to run over one week. It provided opportunities to look at possible difficulties which could arise in the implementation of the main survey. Methods employed for the survey, selection of adults, procedures and questions were all tested and subsequently accepted, altered or amended. The pilot survey also served as an opportunity for determining variations in pattern of dental service utilisation likely to be assessed. The results from this pilot study were not included in final data analysis. A copy of the questionnaire used for the pilot study is attached at the appendix (Appendix 1).

Having reviewed the results, some amendments of the contents were made in developing the final questionnaire which was used for the main survey in February 1993. The changes made to the questionnaire used in the pilot study were:

1) The question on marital status was omitted as the pilot study showed that 95% of the sample were married.
2) The question 'How long have you been living in this area?' was also rejected as it was believed not to have much bearing in Mauritius which has a non-fluoridated water supply.

3) A 'none' category was added to the education alternatives as the pilot study indicated that some people did not have any education.

4) The six income groups were expanded to nine groups following the pilot results and the upper limits were redefined to make classification clearer.

5) A question on the type of service mostly used was added to compare with that actually used during the past year.

6) In the question 'Is there anything wrong with your teeth, gums, or mouth' in the Attitude and Behaviour section, the open ended question as to 'where' there was something wrong was changed into four alternatives, namely teeth only; gums only; teeth and gums; and other.

7) A question was added as to the intention of the respondent to seek care when something wrong was perceived in the mouth.

8) The question on dental floss was omitted as it was found not to be a common behaviour (91% of the pilot sample reported not using dental floss).

9) The question on frequency of brushing was made into a closed question with four choices.

10) Finally, a question was added to seek general comments on the dental services in Mauritius.
4.6 Implementation of the Survey

The Principal Dental Surgeon of the Ministry of Health was informed of the survey procedures to be used and approval for the survey was obtained. Letters requesting permission to carry out the survey together with a copy of the questionnaire were sent to the manager or administrator of each selected organisation. Two out of twenty cases did not respond favourably to the request. Consequently, they were substituted by two other similar institutions.

Collection procedures

An arrangement was made to meet the workers during their lunch time. They had been previously age-selected and informed of the arrival of the writer. The place for conducting the survey was determined by the infrastructure of the work-site and its surroundings. This was either the meal room or a convenient room in the building with both parties seated facing each other. After formal introduction and obtaining consent, the interview was carried out by the writer and the responses were recorded in the questionnaire form. The language used was English wherever possible and a translation into 'creole' (the Mauritian language) for those who could not comprehend English. Survey forms were reviewed at the end of each day for completeness and accuracy of recordings.
Survey period

The survey data collection phase covered a period of approximately 3 weeks, during the month of February 1993.

4.7 Statistical Treatment of the Data

When the survey interviews were completed, the forms were allocated numbers and assembled in order to facilitate checking. The responses were entered on a database program and analysed using the SPSS software package. Cross-tabular analysis was conducted using the Chi-square test (at the probability level of 5%) as the statistical tool in judging the significance of association between variables involved. Yates correction for the Chi-square test was used whenever any expected value was less than five.
5 RESULTS

This chapter deals with the presentation of the data collected during the survey together with the statistical analysis of the results. The survey was carried out in all selected areas during the month of February 1993 and data collection was completed within the scheduled time framework. All the responses were entered into a database program by the end of the same month.

5.1 The Sample

Sample size

The number of adults interviewed was 352 but the sample size was reduced to 345 following 'cleaning' of the data collected. Some of the questionnaire forms were incorrectly filled.

Age

Adults aged 35 to 44 years at their last birthday were interviewed during the survey. The average age of the sample was $39 \pm SD 2.9$ years. The age distribution of the sample is shown in Table 5.
Table 5  Distribution by age

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>57</td>
<td>17</td>
</tr>
<tr>
<td>36</td>
<td>43</td>
<td>13</td>
</tr>
<tr>
<td>37</td>
<td>40</td>
<td>12</td>
</tr>
<tr>
<td>38</td>
<td>44</td>
<td>13</td>
</tr>
<tr>
<td>39</td>
<td>26</td>
<td>7</td>
</tr>
<tr>
<td>40</td>
<td>37</td>
<td>11</td>
</tr>
<tr>
<td>41</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>42</td>
<td>28</td>
<td>8</td>
</tr>
<tr>
<td>43</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>44</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

Sex

The sample was comprised of 49% males and 51% females (Table 6).

Table 6  Distribution by sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>168</td>
<td>49</td>
</tr>
<tr>
<td>Female</td>
<td>177</td>
<td>51</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

Place of residence

Forty-one percent of the respondents came from the urban areas while 59% were rural dwellers (Table 7).

Table 7  Distribution by place of residence

<table>
<thead>
<tr>
<th>Place of residence</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>141</td>
<td>41</td>
</tr>
<tr>
<td>Rural</td>
<td>204</td>
<td>59</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>
Population group

Sixty-seven percent of the respondents belonged to the Hindu ethnic group, 15% were from the general population (Mauritians of African or European origin), 15% were Muslims and 3% were Sino-Mauritians (Table 8).

Table 8 Distribution by population group

<table>
<thead>
<tr>
<th>Population group</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindu</td>
<td>232</td>
<td>67</td>
</tr>
<tr>
<td>General Population</td>
<td>51</td>
<td>15</td>
</tr>
<tr>
<td>Muslim</td>
<td>51</td>
<td>15</td>
</tr>
<tr>
<td>Sino-Mauritian</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

Present occupation

Ninety-two per cent of the sample surveyed were employed at the time of the study. As an open-ended question was used, the occupations stated were coded into eight categories. For analytical convenience, these were then compressed into a low and a high status groups according to job skill required. The lower status category comprised 49% of the sample and the higher status 51% (Table 9).
Table 9 Distribution by occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Code</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housewife/None</td>
<td>low</td>
<td>28</td>
<td>8</td>
</tr>
<tr>
<td>Labourer</td>
<td>low</td>
<td>53</td>
<td>15</td>
</tr>
<tr>
<td>MachineOperator/Driver</td>
<td>low</td>
<td>88</td>
<td>26</td>
</tr>
<tr>
<td>Tradesperson</td>
<td>high</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Clerk</td>
<td>high</td>
<td>41</td>
<td>12</td>
</tr>
<tr>
<td>Police officer</td>
<td>high</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Teachers</td>
<td>high</td>
<td>43</td>
<td>13</td>
</tr>
<tr>
<td>Professional</td>
<td>high</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>345</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Highest level of education*

With regard to the education level of this sample, 98% reported having ever been to school with 36% having studied at a primary school, 46% at a secondary school and 16% at a tertiary institution. Less than 3% of the respondents stated that they had not attended any school. These four groups were then coded into low and high education groups (Table 10).

Table 10 Distribution by education.

<table>
<thead>
<tr>
<th>Highest level of education</th>
<th>Code</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>low</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Primary</td>
<td>low</td>
<td>123</td>
<td>36</td>
</tr>
<tr>
<td>Secondary</td>
<td>high</td>
<td>159</td>
<td>46</td>
</tr>
<tr>
<td>Tertiary</td>
<td>high</td>
<td>54</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>345</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Monthly family income

The respondents were asked to indicate their monthly family income from the given list of nine categories of income. Forty-two percent of the sample stated they were earning a monthly family income of less than Rs 4000. Of those whose family income were more than Rs 4000 per month, 27% indicated they were in the 'Rs 10000 and above' category (Table 11).

<table>
<thead>
<tr>
<th>Monthly family income</th>
<th>Code</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs 0 - Rs 1999</td>
<td>low{}</td>
<td>59</td>
<td>17</td>
</tr>
<tr>
<td>Rs 2000 - Rs 3999</td>
<td>low{}</td>
<td>87</td>
<td>25</td>
</tr>
<tr>
<td>Rs 4000 - Rs 4999</td>
<td>high{}</td>
<td>46</td>
<td>13</td>
</tr>
<tr>
<td>Rs 5000 - Rs 5999</td>
<td>high{}</td>
<td>34</td>
<td>10</td>
</tr>
<tr>
<td>Rs 6000 - Rs 6999</td>
<td>high{}</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>Rs 7000 - Rs 7999</td>
<td>high{}</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Rs 8000 - Rs 8999</td>
<td>high{}</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Rs 9000 - Rs 9999</td>
<td>high{}</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Rs 10000 and above</td>
<td>high{}</td>
<td>55</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

1US dollar = 15 Mauritian rupees (Feb.1993)
5.2 Service Utilisation

Type of dental service mostly used

When the respondents were asked about the type of dental service mostly used, 75% indicated using mostly the private dental surgeries while less than a quarter reported using mostly the government dental clinics (Table 12). The type of dental service mostly used was best predicted by the education of the individual (multiple logistic regression technique; p<0.001).

<table>
<thead>
<tr>
<th>Type of dental service mostly used</th>
<th>Code</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital dental clinic</td>
<td>Govt.</td>
<td>67</td>
<td>20</td>
</tr>
<tr>
<td>Health centre dental clinic</td>
<td>Govt.</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Other (rare users)</td>
<td>(Govt.)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Private dentist</td>
<td>Private</td>
<td>260</td>
<td>75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

Dental care in last 12 months

About 39% of persons interviewed indicated that they had obtained dental care within the previous twelve months.

The proportion was higher among females; and slightly higher among persons from urban areas although the differences were not significant when using Chi-square significance test at p<0.05.
Proportionately, more persons visited the dentist in the upper groups of occupation, education and income than in the lower groups; however, the difference was significant only within the education variable (Table 13). The multiple logistic regression analysis determined education as the best predictor for obtaining dental care in the last twelve months \((p<0.01)\).

**Table 13 Dental care in the last 12 months**

<table>
<thead>
<tr>
<th>Utilisation of service</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>133</td>
<td>39</td>
</tr>
<tr>
<td>No</td>
<td>212</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

**Comparison by socio-variables**
% persons visiting in last 12 months

<table>
<thead>
<tr>
<th></th>
<th>Sex</th>
<th>Location</th>
<th>Occupation</th>
<th>Education*</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>U</td>
<td>R</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Utilised</td>
<td>35</td>
<td>42</td>
<td>40</td>
<td>38</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>44</td>
<td>33</td>
<td>44</td>
<td>33</td>
</tr>
<tr>
<td>Not utilised</td>
<td>65</td>
<td>58</td>
<td>60</td>
<td>62</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>56</td>
<td>67</td>
<td>57</td>
<td>67</td>
</tr>
</tbody>
</table>

\(M = \text{Male} \quad U = \text{Urban}\)  
\(F = \text{Female} \quad R = \text{Rural}\)  
\(* = \text{Significant with Chi-square test } (p<0.05)\)
Number of months since last dental visit

The mean number of months since last visit for those who had visited the dentist in the previous twelve months was 5.1 ± SD 3.3. The mean was higher, though not significantly, among females and among persons from rural areas. Neither was there much difference in the mean number of months since last dental visit between the two groups of persons within the variables of occupation, education, and income groups (Table 14).

Table 14  Number of months since last dental visit  
(for those who visited the dentist within the past 12 months-N=133)

<table>
<thead>
<tr>
<th>Months since last visit</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or less</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>100</td>
</tr>
</tbody>
</table>

Comparison by socio-variables  
Mean number of months since last dental visit

<table>
<thead>
<tr>
<th>TOTAL</th>
<th>Sex</th>
<th>Location</th>
<th>Occupation</th>
<th>Education</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M  F</td>
<td>U  R</td>
<td>Low  High</td>
<td>Low  High</td>
</tr>
<tr>
<td>X</td>
<td>5.1</td>
<td>5.3 6.8</td>
<td>5.1 7.0</td>
<td>5.1 5.0</td>
<td>5.1 5.1</td>
</tr>
</tbody>
</table>

X  =  Mean number of months since last dental visit  
M  =  Male                   U  =  Urban  
F  =  Female                 R  =  Rural
Number of dental visits in past 12 months

The mean number of dental visits for those who visited the dentist in the past twelve months was $1.7 \pm SD 1.2$. About 88% of these persons indicated they had made one or two visits.

There were no major differences in the number of dental visit between any of the subgroups of the variables of sex, place of residence, occupation, education and income (Table 15).

<table>
<thead>
<tr>
<th>Number of visits</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>79</td>
<td>59</td>
</tr>
<tr>
<td>2</td>
<td>38</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>100</td>
</tr>
</tbody>
</table>

Comparison by socio-variables
Mean number of dental visit in past 12 months

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>Sex</th>
<th>Location</th>
<th>Occupation</th>
<th>Education</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>F</td>
<td>U</td>
<td>R</td>
<td>Low</td>
</tr>
<tr>
<td>X</td>
<td>1.7</td>
<td>1.5</td>
<td>1.8</td>
<td>1.6</td>
<td>1.7</td>
<td>1.7</td>
</tr>
</tbody>
</table>

X = Mean number of dental visit in past 12 months
M = Male    U = Urban
F = Female  R = Rural
Reason(s) for obtaining dental care at last visit (within the past 12 months)

Thirty-six percent of those who visited the dentist in the previous 12 months reported having done so in order to get their teeth cleaned, 36% visited to have tooth extraction, 23% went for a check-up and 20% visited to get something fixed. The mean number of responses per person was 1.25.

A higher proportion of males than females (47:28) visited 'to get teeth cleaned'. Going 'to have tooth extraction' was indicated more frequently by females and by respondents in the rural areas and in the low subgroups of occupation, education and income. Analysis with logistic regression technique showed education and income as best predictors for a dental visit to have tooth extraction (p<0.001).

More urban respondents and those from the high status of occupation, education and income reported having visited the dentist 'for a check-up'. It was found that occupation and education were good predictors for a dental visit to have a check-up (p<0.001). 'To get something fixed' was expressed more often by persons from high status of occupation, education and income (Table 16).
Table 16 Reason(s) for obtaining dental care at last visit
(for those who visited the dentist within the past 12 months- N=133)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>To get teeth cleaned</td>
<td>48</td>
<td>36</td>
</tr>
<tr>
<td>Something was hurting</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>To have tooth extraction</td>
<td>48</td>
<td>36</td>
</tr>
<tr>
<td>Went for a check-up</td>
<td>31</td>
<td>23</td>
</tr>
<tr>
<td>To get something fixed (e.g. filling repaired)</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>Don't know</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total responses</td>
<td>166</td>
<td>125</td>
</tr>
</tbody>
</table>

Comparison by socio-variables
% Persons who visited a dentist in previous 12 months

<table>
<thead>
<tr>
<th></th>
<th>To get teeth cleaned</th>
<th>Something was hurting</th>
<th>To have tooth extraction</th>
<th>Went for a check-up</th>
<th>To get something fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>47</td>
<td>5</td>
<td>26</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>8</td>
<td>44</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Place of residence</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>32</td>
<td>12</td>
<td>23</td>
<td>39</td>
<td>25</td>
</tr>
<tr>
<td>Rural</td>
<td>39</td>
<td>3</td>
<td>45</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>Occupation</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>30</td>
<td>5</td>
<td>64</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>High</td>
<td>40</td>
<td>8</td>
<td>16</td>
<td>35</td>
<td>27</td>
</tr>
<tr>
<td>Education</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>23</td>
<td>0</td>
<td>74</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>High</td>
<td>41</td>
<td>10</td>
<td>20</td>
<td>32</td>
<td>27</td>
</tr>
<tr>
<td>Income</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>25</td>
<td>8</td>
<td>67</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>High</td>
<td>42</td>
<td>6</td>
<td>19</td>
<td>31</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>7</td>
<td>36</td>
<td>23</td>
<td>20</td>
</tr>
</tbody>
</table>

* = Significant with Chi-square test (p<0.05)
Place of last dental visit (within the past 12 months)

Eighty-four percent of those who had made a dental visit in the previous twelve months had visited a private dental practice and the remainder had used a government dental service with 14% visiting a hospital dental clinic and 2% a health centre dental clinic.

There were no apparent differences between males and females in the place for their dental visit. The proportion visiting a private dentist was significantly higher among urban residents and persons in the higher subgroups of occupation, education and income (Table 17). Education was the only variable which had significantly predictive value in determining the place of last dental visit (p<0.001).

<table>
<thead>
<tr>
<th>Place of dental visit</th>
<th>Code</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital dental clinic</td>
<td>Govt.</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>Health Centre dental clinic</td>
<td>Govt.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Private dentist</td>
<td>Private</td>
<td>112</td>
<td>84</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>133</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 17 cont.
Comparison by socio-variables
% Persons who visited a dentist in previous 12 months (N=133)

<table>
<thead>
<tr>
<th></th>
<th>Govt</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
<td>88</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>81</td>
</tr>
<tr>
<td>Place of residence*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>4</td>
<td>96</td>
</tr>
<tr>
<td>Rural</td>
<td>24</td>
<td>76</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>High</td>
<td>9</td>
<td>91</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>High</td>
<td>8</td>
<td>92</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>27</td>
<td>73</td>
</tr>
<tr>
<td>High</td>
<td>9</td>
<td>91</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>84</td>
</tr>
</tbody>
</table>

* = Significant with Chi-square test (p<0.05)

Reason(s) for not obtaining dental care in the last 12 months

The major factor in not receiving dental care in the previous twelve months was the perceived absence of dental problems. Seventy-nine percent of persons responding to that question indicated there was 'nothing wrong' with their teeth; 8% stated they were 'too busy'; 'being afraid of, or not liking dentists' was reported by 6% of the respondents whereas 6% said they 'could not afford' the cost of dental care. 'No service available' was not selected by any of the persons interviewed. The mean number of responses per person was 1.03. Being afraid of, or not liking dentists was reported more often by the low income than the
high income earners. However, there were no other marked differences between persons in the subgroups of the variables of sex, place of residence, occupation and education. (Table 18).

Table 18 Reasons for not obtaining dental care in the last 12 months

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing wrong, no reason to go</td>
<td>167</td>
<td>79</td>
</tr>
<tr>
<td>Afraid of dentists, don't like dentists</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Can't afford it, costs too much</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Didn't want to spend money on dental care</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Was too busy</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td>No service available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have no teeth or have false teeth</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other reason (specify)</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>219</td>
<td>103</td>
</tr>
</tbody>
</table>

Comparison by socio-variables
% Persons who did not visit a dentist in previous 12 months (N=212)

<table>
<thead>
<tr>
<th></th>
<th>Nothing Wrong</th>
<th>Afraid of dentist</th>
<th>Can't afford</th>
<th>Didn't want to spend</th>
<th>Too busy</th>
<th>Having no teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>78</td>
<td>5</td>
<td>8</td>
<td>2</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td>79</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>74</td>
<td>7</td>
<td>9</td>
<td>1</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Rural</td>
<td>82</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>79</td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>High</td>
<td>79</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>80</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>High</td>
<td>78</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>74</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>High</td>
<td>82</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

* = Significant with Chi-square test (p<0.05)
5.3 Attitude and Behaviour

*Perception of problem in teeth, gums or mouth*

Responses to the question: 'Is there anything wrong with your teeth, gums or mouth now?' were sought from the total sample. Fifty-one percent indicated there was nothing wrong while 49% felt some discomfort in their teeth, gums or mouth. There were some differences between the subgroups in the variables of occupation, education and income with the lower status perceiving more discomfort (Table 19). Perception of oral disease was best predicted by the occupation variable (p<0.01).

**Table 19 Perception of problem in teeth, gums or mouth**

<table>
<thead>
<tr>
<th>Anything wrong</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>176</td>
<td>51</td>
</tr>
<tr>
<td>Yes, teeth only</td>
<td>99</td>
<td>29</td>
</tr>
<tr>
<td>Yes, gums only</td>
<td>32</td>
<td>9</td>
</tr>
<tr>
<td>Yes, teeth and gum</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Yes, other (specify)</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

*Comparison by socio-variables*

% Persons Perception of problem in teeth, gums or mouth

<table>
<thead>
<tr>
<th></th>
<th>Sex</th>
<th>Location</th>
<th>Occupation*</th>
<th>Education*</th>
<th>Income*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>U</td>
<td>R</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>No</td>
<td>54</td>
<td>49</td>
<td>52</td>
<td>50</td>
<td>43</td>
<td>59</td>
</tr>
<tr>
<td>Yes</td>
<td>46</td>
<td>51</td>
<td>48</td>
<td>50</td>
<td>57</td>
<td>41</td>
</tr>
</tbody>
</table>

M = Male
F = Female
U = Urban
R = Rural

* = Significant with Chi-square test (p<0.05)
Advice or treatment wanted

Among those who perceived disease in their teeth, gums or mouth, nearly all (98%) wanted some advice or treatment and there was no difference across the socio-variables studied (Table 20).

Table 20  Advice or treatment wanted
% Persons who perceived problem in teeth, gum or mouth (N=169)

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>165</td>
<td>98</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>100</td>
</tr>
</tbody>
</table>

Comparison by socio-variables
% Persons who perceived problem in teeth, gum or mouth (N=169)

<table>
<thead>
<tr>
<th></th>
<th>Sex</th>
<th>Location</th>
<th>Occupation</th>
<th>Education</th>
<th>Income</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>U</td>
<td>R</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Yes</td>
<td>96</td>
<td>99</td>
<td>98</td>
<td>97</td>
<td>99</td>
<td>96</td>
</tr>
</tbody>
</table>

M = Male    U = Urban
F = Female   R = Rural

Advice or treatment perceived to be required

Of those who perceived a need for advice or treatment, 44% indicated that they would need an oral examination; 30% tooth extraction; 19% scaling; 19% filling; and 17% prevention. The mean number of responses per person was 1.4.
Advice on prevention was perceived as a greater need by males and persons from the higher occupation, education and income group. Examination was perceived as a greater need by males and persons from the urban areas and in the higher education and income group. The need for tooth extraction was greater among the females, persons from the rural areas and persons from the lower status of occupation, education and income. Perceived need for filling was greater among persons from higher occupation and education (Figure 2, Table 21).

The multiple logistic regression analysis showed education to be the best predicting variable for the need of advice on prevention and filling (p<0.001). Income was significantly more important in determining the need of examination (p<0.001) and both education and income were predictive for the need for tooth extraction (p<0.001).

**Figure 2** Treatment perceived to be required
% persons who wanted advice or treatment

![Chart showing treatment perceptions](chart.png)
Table 21  Type of advice or treatment perceived to be required (N=165)

<table>
<thead>
<tr>
<th>Advice / Treatment</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention</td>
<td>28</td>
<td>17</td>
</tr>
<tr>
<td>Dentures</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Examination or Cleaning</td>
<td>73</td>
<td>44</td>
</tr>
<tr>
<td>Orthodontic Care</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Scaling or Periodontal care</td>
<td>31</td>
<td>19</td>
</tr>
<tr>
<td>Tooth Extraction</td>
<td>49</td>
<td>30</td>
</tr>
<tr>
<td>Filling, Crown or Bridge</td>
<td>31</td>
<td>19</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Don't know</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>231</td>
<td>140</td>
</tr>
</tbody>
</table>

Comparison by social variables
% Persons who wanted advice or treatment

<table>
<thead>
<tr>
<th>Prev</th>
<th>Den</th>
<th>Exam</th>
<th>Orth</th>
<th>Scal</th>
<th>Tooth</th>
<th>Filling</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>25</td>
<td>7</td>
<td>59</td>
<td>5</td>
<td>19</td>
<td>16</td>
<td>25</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>6</td>
<td>32</td>
<td>0</td>
<td>19</td>
<td>41</td>
<td>13</td>
</tr>
<tr>
<td>Place of residence</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>23</td>
<td>0</td>
<td>59</td>
<td>3</td>
<td>15</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Rural</td>
<td>13</td>
<td>10</td>
<td>34</td>
<td>2</td>
<td>21</td>
<td>37</td>
<td>15</td>
</tr>
<tr>
<td>Occupation</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
<td>7</td>
<td>38</td>
<td>1</td>
<td>18</td>
<td>43</td>
<td>9</td>
</tr>
<tr>
<td>High</td>
<td>29</td>
<td>4</td>
<td>52</td>
<td>4</td>
<td>20</td>
<td>12</td>
<td>32</td>
</tr>
<tr>
<td>Education</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>5</td>
<td>9</td>
<td>32</td>
<td>1</td>
<td>17</td>
<td>49</td>
<td>7</td>
</tr>
<tr>
<td>High</td>
<td>27</td>
<td>3</td>
<td>55</td>
<td>3</td>
<td>20</td>
<td>13</td>
<td>29</td>
</tr>
<tr>
<td>Income</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>8</td>
<td>31</td>
<td>2</td>
<td>20</td>
<td>47</td>
<td>14</td>
</tr>
<tr>
<td>High</td>
<td>27</td>
<td>4</td>
<td>57</td>
<td>2</td>
<td>17</td>
<td>12</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>6</td>
<td>44</td>
<td>2</td>
<td>19</td>
<td>30</td>
<td>19</td>
</tr>
</tbody>
</table>

* = Significant with Chi-square test (p<0.05)
Intention of visiting dentist in near future

Those persons who perceived a need for advice or treatment were asked whether they intend to see a dentist in the near future. Eighty-four percent responded affirmatively, 12% were not sure and 4% indicated they had no intention of doing so.

No major differences in intention of visiting a dentist in near future were shown in any of the socio-variables studied. The only exception being that a higher proportion of males than females (15:10) were 'not sure' of making a visit to the dentist (Table 22, Figure 3).

Table 22  Intention of visiting a dentist in the near future
(for those who perceived need for advice or treatment).

<table>
<thead>
<tr>
<th>Intention of visiting dentist</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>139</td>
<td>84</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Not Sure</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>165</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 3 Intention of visiting dentist in the near future
% Persons who perceived need for advice or treatment by socio-variables.
Past source(s) of learning to take care of teeth

When asked their source of learning to take care of their teeth, 54% stated home as their source; 28% dentist; 24% teacher; 18% friends and relatives; 14% newspapers and magazines; 13% tv/radio and 10% advertisements in media. The mean number of responses per person was 1.7.

Significantly more females than males indicated 'home' as their source of learning. 'Dentist' as the source of learning was more often quoted by persons from urban areas and by those with a higher status of education and income. 'Teacher' was indicated more by persons of higher status of occupation, education and income.

'Newspapers' and advertisements as sources of learning to take care of teeth were stated more frequently by persons from urban areas and by those with a higher status of occupation, education and income. 'Doctor' was indicated more often by urban residents and persons in the high status of education (Table 23).
Table 23 Past source(s) of learning to take care of teeth (N=329)

<table>
<thead>
<tr>
<th>Source</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friends/Relatives</td>
<td>58</td>
<td>18</td>
</tr>
<tr>
<td>Newspapers/Magazines/Pamphlet</td>
<td>47</td>
<td>14</td>
</tr>
<tr>
<td>Medical Doctor</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Advertisements in media</td>
<td>34</td>
<td>10</td>
</tr>
<tr>
<td>TV/Radio</td>
<td>43</td>
<td>13</td>
</tr>
<tr>
<td>Teachers at School</td>
<td>80</td>
<td>24</td>
</tr>
<tr>
<td>Dentist</td>
<td>92</td>
<td>28</td>
</tr>
<tr>
<td>Dental Assistant</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>At Home</td>
<td>179</td>
<td>54</td>
</tr>
<tr>
<td>Others</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>561</strong></td>
<td><strong>170</strong></td>
</tr>
</tbody>
</table>

Comparison by socio-variables
% Persons

<table>
<thead>
<tr>
<th>Sources</th>
<th>Sex</th>
<th>Location</th>
<th>Occupation</th>
<th>Education</th>
<th>Income</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>U</td>
<td>R</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Friend</td>
<td>21</td>
<td>14</td>
<td>17</td>
<td>18</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>News -paper</td>
<td>18</td>
<td>11</td>
<td>21*</td>
<td>9</td>
<td>4</td>
<td>24*</td>
</tr>
<tr>
<td>Doctor</td>
<td>4</td>
<td>4</td>
<td>7*</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Advert.</td>
<td>13</td>
<td>8</td>
<td>16*</td>
<td>7</td>
<td>5</td>
<td>15*</td>
</tr>
<tr>
<td>TV/Radio</td>
<td>13</td>
<td>13</td>
<td>12</td>
<td>14</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Teacher</td>
<td>28</td>
<td>21</td>
<td>26</td>
<td>23</td>
<td>15</td>
<td>33*</td>
</tr>
<tr>
<td>Dentist</td>
<td>32</td>
<td>25</td>
<td>42*</td>
<td>19</td>
<td>23</td>
<td>32</td>
</tr>
<tr>
<td>Dent/-assist</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Home</td>
<td>48</td>
<td>60*</td>
<td>50</td>
<td>57</td>
<td>56</td>
<td>53</td>
</tr>
</tbody>
</table>

M = Male  
F = Female  
* = Significant with Chi-square test (p<0.05)  
U = Urban  
R = Rural
Preferred source(s) of learning to take care of teeth

When asked 'Where would you like to learn to take care of your teeth?' 67% of the persons interviewed indicated 'dentist' as the preferred source; 20% 'TV/Radio'; 8% 'newspapers and magazines'; 8% 'home'; and 7% 'teacher'. The mean number of responses per person was 1.2.

No major differences in 'dentist' and 'home' as the preferred source were shown within the socio-variables. 'TV/Radio' was indicated more by persons with a higher status of occupation and education. 'Newspaper' was stated more by persons from urban region and those with a higher status of occupation and education. 'Teacher' as the preferred source was higher in persons from urban region and those with a higher status of occupation, education and income (Figure 4, Table 24).

Figure 4 Preferred source(s) of learning to take care of teeth
%Persons

- Friend
- Newspaper
- Doctor
- Advertisement
- TV / Radio
- Teacher
- Dentist
- Dental Assistant
- Home
- Other
Table 24  Preferred source(s) of learning to take care of teeth (N=341)

<table>
<thead>
<tr>
<th>Source</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friends/Relatives</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Newspapers/Magazines/</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>Pamphlet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Doctor</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Advertisements in media</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>TV/Radio</td>
<td>68</td>
<td>20</td>
</tr>
<tr>
<td>Teachers at School</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>Dentist</td>
<td>229</td>
<td>67</td>
</tr>
<tr>
<td>Dental Assistant</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>At Home</td>
<td>27</td>
<td>8</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>430</td>
<td>125</td>
</tr>
</tbody>
</table>

Comparison by socio-variables
% Persons

<table>
<thead>
<tr>
<th>Sources</th>
<th>Sex</th>
<th>Location</th>
<th>Occupation</th>
<th>Education</th>
<th>Income</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>U</td>
<td>R</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Friend</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>News -paper</td>
<td>8</td>
<td>7</td>
<td>13*</td>
<td>4</td>
<td>2</td>
<td>13*</td>
</tr>
<tr>
<td>Doctor</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Advert.</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>3</td>
<td>2</td>
<td>8*</td>
</tr>
<tr>
<td>TV/Radio</td>
<td>23</td>
<td>17</td>
<td>24</td>
<td>17</td>
<td>14</td>
<td>26*</td>
</tr>
<tr>
<td>Teacher</td>
<td>11</td>
<td>3</td>
<td>12*</td>
<td>4</td>
<td>3</td>
<td>12*</td>
</tr>
<tr>
<td>Dentist</td>
<td>63</td>
<td>71</td>
<td>64</td>
<td>69</td>
<td>72</td>
<td>62</td>
</tr>
<tr>
<td>Dent/-</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Home</td>
<td>8</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

M=Male  F=Female  U=Urban  R=Rural  * = Significant with Chi-square test (p<0.05)
Regular use of fluoride toothpaste

Overall, ninety-six percent of those interviewed indicated they had been using fluoridated toothpaste regularly. Regular use of fluoride toothpaste was higher in females than males (99:92) but within the variables of place of residence, occupation, education and income, there were no marked variations (Table 25, Figure 5).

Table 25 Regular use of fluoride toothpaste (N=345)

<table>
<thead>
<tr>
<th>Use of fluoride toothpaste</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>330</td>
<td>96</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 5 Regular use of fluoride toothpaste
%Persons by socio-variables
Frequency of brushing teeth previous day

More than 99% of respondents indicated that they had brushed their teeth on the previous day and over 85% said they had brushed twice. The mean number of times of brushing teeth on the previous day per person was 1.95. There were some differences in frequency of brushing between urban (2.02) and rural (1.90) residents and between persons of low education (1.90) and high education (2.0) (Table 26, Figure 6).

Table 26  Frequency of brushing teeth previous day (N=345)

<table>
<thead>
<tr>
<th>Frequency of tooth-brushing</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>294</td>
<td>85</td>
</tr>
<tr>
<td>3 or more</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean number of times of brushing = 1.951 ± SD 0.404

Figure 6  Frequency of brushing teeth previous day
Mean number of times by socio-variables
Satisfaction with appearance of natural teeth

Nearly 80% of the respondents were satisfied to varying degree with the appearance of their natural teeth. For analytical purposes, the 'very satisfied' and the 'fairly satisfied' were grouped together; and so were the 'not satisfied' and 'very dissatisfied'. A higher proportion of males (42%) felt 'very satisfied' with their natural teeth than females (29%) and 'unsatisfied' was more expressed by respondents in the low education and low income subgroups (Table 27).

Table 27 Satisfaction with the appearance of natural teeth

<table>
<thead>
<tr>
<th>Degree of satisfaction</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>57</td>
<td>17</td>
</tr>
<tr>
<td>Fairly satisfied</td>
<td>64</td>
<td>19</td>
</tr>
<tr>
<td>Satisfied</td>
<td>151</td>
<td>44</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>63</td>
<td>18</td>
</tr>
<tr>
<td>Very dissatisfied</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>341</td>
<td>100</td>
</tr>
</tbody>
</table>

Comparison by socio-variables

% Persons

<table>
<thead>
<tr>
<th>Variables</th>
<th>Very satisfied</th>
<th>Satisfied</th>
<th>Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>42</td>
<td>39</td>
<td>19</td>
</tr>
<tr>
<td>Female</td>
<td>29</td>
<td>49</td>
<td>22</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>39</td>
<td>45</td>
<td>16</td>
</tr>
<tr>
<td>Rural</td>
<td>33</td>
<td>44</td>
<td>23</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>32</td>
<td>45</td>
<td>23</td>
</tr>
<tr>
<td>High</td>
<td>40</td>
<td>43</td>
<td>17</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>28</td>
<td>48</td>
<td>25</td>
</tr>
<tr>
<td>High</td>
<td>40</td>
<td>43</td>
<td>17</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>27</td>
<td>47</td>
<td>26</td>
</tr>
<tr>
<td>High</td>
<td>41</td>
<td>42</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>44</td>
<td>20</td>
</tr>
</tbody>
</table>

* = Significant with Chi-square test (p<0.05)
General comments about dental services in Mauritius

This open-ended question was asked to invite general comments about dental services in the country. About 75% of the sample responded to that question with an average of one comment per person. The comments were written down verbatim or translated and were subsequently condensed into smaller groups. These comments were not cross tabulated by the socio-variables of sex, place of residence, occupation, education and income.

Of those comments given, 29% of the respondents expressed satisfaction and 23% unsatisfaction with the dental services. Concern for cost of dental care was expressed by 'private dentist too expensive' (15%) and 'dental cost too high' (12%). Table 28 below gives a listing of the various comments made by the respondents.

Table 28  Comments about dental services in Mauritius (N=261)

<table>
<thead>
<tr>
<th>Comments</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory</td>
<td>76</td>
<td>29</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td>60</td>
<td>23</td>
</tr>
<tr>
<td>Private dentist too expensive</td>
<td>38</td>
<td>15</td>
</tr>
<tr>
<td>Dental cost too high</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Should wait for too long</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Private dentist better</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Poorly accessible</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Poorly informative</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Dentist too money minded</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Very good</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Dentist brutal, inhuman</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>261</td>
<td>100</td>
</tr>
</tbody>
</table>
Suggestions on how services could be improved

The different suggestions expressed were grouped into a few categories. The suggestions were of various nature ranging from more promotion on preventive dentistry (27%), more dentists in remote or rural areas (15%), more dental services at hospitals (15%), better planning or management of the dental services (13%), strategies for a lower dental cost (10%), dentist on working site (8%), third party prepayment (5%). The average number of suggestions per respondent was 0.78 (Table 29). The suggestions were not cross-tabulated by the different socio-variables.

<table>
<thead>
<tr>
<th>Suggestion</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>More promotion on preventive dentistry</td>
<td>55</td>
<td>27</td>
</tr>
<tr>
<td>More dentist in remote/rural areas</td>
<td>31</td>
<td>15</td>
</tr>
<tr>
<td>More dental services at hospitals</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>Better planning / management</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>Lower dental cost strategies</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>Dentist on working site</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td>Third party prepayment</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Dentist of quality</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>More dentists in hospital</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>203</td>
<td>100</td>
</tr>
</tbody>
</table>
The results of the study are discussed in this chapter. The first part of the discussion examines aspects of the design and methods in terms of their strengths, limitations and shortcomings. The second part deals with an interpretation of some of the major findings and some implications of the study.

6.1 Strengths, Limitations and Shortcomings of the Study

In order to study the pattern of utilisation of dental services of adults, a sample was drawn from persons of the age cohort 35-44 years, this being the standard monitoring group for health conditions of adults (WHO 1987). As adult subjects are difficult to sample, it was deemed practical to have a convenience sample selected mainly from working sites. This method is advocated in the 'basic methods for oral health surveys' of the WHO (1987) when truly representative sampling is difficult.

Few difficulties were experienced in carrying out the interview with the sample. Everybody contacted agreed to participate in the survey. The data were recorded as reported and therefore are limited only by the recall and reports of the respondents. It is possible that some groups were better able to recall details more accurately than others. Also, use of the local dialect could have induced some errors in the translation and interpretation of the responses.
Another caution which should be taken when interpreting the results is that the subjects being fully aware of the aim of the survey could have changed their natural behaviour to specifically meet the expectations of the researcher (the Hawthorne effect).

The first part of the questionnaire consisting of demographic and utilisation data was answered well. In the section on 'Attitude and Behaviour', some persons experienced difficulties in recalling sources of learning to take care of teeth (Question 19) and responses to the last open ended questions on comments and suggestions to improve dental services (Questions 24 and 25) were not given by all of the persons interviewed.

The sampling frame was adhered to both with respect to number and stratification by sex and place of residence. It was thought that these were the main variables wherein differences in utilisation rates would be observed. However, the sample size was found not to be large enough to allow for cross-tabulation of data at the second level for all of the variables. Representativeness of the target population with respect to the socio-variables of occupation, education and income was not possible.

It should be noted that no efforts were made to analyse the data by ethnicity (or population group) so that any different behaviour and perceptions of these subgroups which might have existed were not
determined. Some researchers have indicated that ethnic origin per se does not determine whether or not a person will seek dental care (Moonsbrucker and Jong 1969); however, it could be meaningful when taken in a broader social context. It is to be noted here that national census done after 1972 had ceased to categorize the Mauritian population into ethnic groups thus making representativity difficult to assess.

Occupation was compressed into a low and a high status groups with respect to the amount of skill required for the job. This was done arbitrarily for analytical purposes. In fact, quite a few of the occupations listed in the high status are not perceived as such in the Mauritian context. A standard for categorizing occupation in Mauritius was unavailable for consultation.

The proportion of persons of this sample who reported having ever been to school was very high. However, the precise level of education attained in terms of number of years of schooling was not obtained.

Income enables the purchase of services, including dental care. For the majority of Mauritian adults, dental services are provided on a fee for service basis; the consumer pays for such services either directly, or sometimes indirectly through provident health funds. The question on income was often responded to with some degree of hesitation in spite of
the awareness of the subjects of the confidentiality of their responses. While it is common for many people to have side jobs or to work overtime, only income from the main occupation was recorded. Also since in most households the incomes are pooled, the family income was recorded instead of individual ones.

Though several dental surveys have been published for Mauritius, only limited information about the oral health related behaviour, perceptions and knowledge of this particular age cohort (35-44 years) was found in the dental literature. Comparisons with similar studies were therefore limited. A definite outcome of this study has been therefore the setting up of a baseline for future studies.

6.2 Utilisation of Dental Services

Dental visits in the past 12 months

At least one dental visit in the previous 12 months had been made by 39% of adults 35-44 years. When compared to similar age group in the ICS (WHO 1985), it is seen that this utilisation rate is similar to that of non-metropolitan regions of Yamanashi, Japan (40%); Canterbury, New Zealand (39%) and Lodz, Poland (38%); It is similar also to that of Hong-Kong adults (37% Lind et al 1987) but is less than that for Australian adults (53%) (Barnard 1993). No data for this particular age cohort was available for comparison from the developing countries.
There were no significant differences in the utilisation of dental services between males and females although evidence in the literature seems to suggest that females have a tendency to utilise more dental services than males (Ritchie et al 1981). Also no significant differences were found in the number of persons who used dental services from urban and rural areas; and from low and high occupation and income groups. Sex, place of residence, occupation and income therefore do not appear to be significant predictors for utilisation of dental services in this study. The strongest explanatory variable was education of the individual. Many other studies and surveys have shown that utilisation increases as the level of education increases (Young and Striffer 1964, Sogaard 1987, Kiyak 1993).

Reasons for obtaining dental care

The time since last visit or the number of visit reveals little about a person's last dental encounter. The reason(s) for visiting tell more about the use of services. The reasons reported for the last visit were fairly well distributed between preventively oriented (tooth cleaning and checkup) and treatment orientated (tooth extraction, something was hurting and to get something fixed).

Visiting the dentist for a tooth extraction was more prevalent among females, rural persons, and those from the lower socio-economic status. A possible explanation for this trend could be as follows: Analysis with
the multiple logistic regression technique showed education and income as strong explanatory variables for the use of service for tooth extraction (p<0.001). Also, it was found that significantly more females than males in this age group have low education (54:22) and low income (54:30). Similarly more rural residents are to be found in the low education (51:19) and low income (52:28) categories establishing thus the link.

Conversely, more urban residents and persons from higher socio-economic status visited the dentist preventatively for a check-up. Although studies generally show females to visit for asymptomatic reasons more often than males, in this study the difference between the sexes was not significant. It should be noted here that the percentage of adults giving asymptomatic reasons for the last visit is far greater than that of Yamanashi, Japan (39:4) and Lodz, Poland (39:12) as given in the ICS (WHO 1985).

Restorative work for adults is provided mainly by the private dentists on a fee-for-service basis, it is then not surprising that adults with a higher socio-economic status visited dentists more often 'to get something fixed' than adults with a lower social position. Income appears to help explain specific types of dental care which will be sought. Members of low income families are more likely to visit the dental clinic for extractions and relief of pain, and higher income patients are more likely to be seen for preventive and restorative work.
**Place of dental visit**

Adults of this age group reported having made the last dental visit to the private dentist much more than to the government clinics (84:16). As private dentists are the main dental care providers for adults, this ratio is not unexpected. In fact, in response to a previous question (question 8) 75% indicated that they mostly used the private dental services. The government clinics offer mainly emergency treatment for the average adult but more comprehensive treatment for certain special groups. A policy for restoring adult teeth in the government clinics on a treatment need has been introduced recently (1991). As this 3-hour program is run only once weekly, it would be too optimistic to think it could have a large effect on improving adult's oral health.

The comparison by variables showed that the government services were used mostly by rural residents and persons from the lower socioeconomic class. However these people also made large use of the private services. Considering that 85% of the private dentists have their surgeries in the urban areas, it would appear that this geographic distribution does not present a barrier for the rural residents to access to the private clinics.

**Reason for not obtaining dental care in the last 12 months**

The main reason stated for not receiving dental care in the previous twelve months was the perceived absence of dental problems. This reason was reported irrespective of sex, location, occupation, income
and education of the respondents. Of lesser importance was fear of the dentist and cost of dental care. Availability of oral health services was not a significant barrier to consumers in all of the study sites. Lack of perceived need is the most frequently mentioned reason for inattendance in the literature (Horst 1993). However, several studies have shown that patients often misjudge their need for treatment. And according to Gift (1984), these responses possibly disguise real but undefined reasons for not visiting the dentist.

6.3 Attitude and Behaviour:
Over fifty percent (51%) did not perceive anything wrong with their teeth, gums or mouth. Links between the perception of need, recognition of symptoms and the use of dental services have been reported by a number of researchers (Sheiham 1981, Gift 1984), but these associations have often lacked a theoretical framework which would permit the use of the observations to explain and predict behaviour (Anderson, Morgan 1992).

Advice or treatment wanted
Among those who perceived disease in their teeth, gums or mouths, nearly all (98%) wanted some advice or treatment. However, the question was formulated in such a way that it was not possible to differentiate whether the need was on advice or treatment.
Advice or treatment perceived to be required

There was a relatively high perceived treatment need for examination (44%) and lower need for prevention (17%). The high perceived need for tooth extraction (30%) reflects the value the respondents attach to their teeth, an attitude much related to a low education. This radical treatment was more favoured by females, rural inhabitants and persons in the lower socio-economic class. It is known that people in the lowest social classes place a low value on preserving their teeth (Blaxter et al 1982).

Intention of visiting a dentist

A high demand (84%) for dental care was expressed following the perceived need of treatment. The present dental health status of the adults appear to significantly influence their present demand for dental visits.

Sources of learning to take care of teeth

In order to determine ways to motivate the adults to oral care, past and preferred sources of learning oral hygiene were requested. While more than half of the respondents indicated 'home' as their past source of learning, 67% would prefer to learn from a dentist. The fact that the respondents were aware of the interviewer being a dentist might have influenced the outcome.
It should be noted here that the persons also indicated TV and radio as the second preferred source of learning. This mode of disseminating dental messages could well be exploited in the future.

**Regular use of fluoride toothpaste**

A very high percentage of adults responded positively to the question on use of fluoride toothpaste (96%). Considering that practically all toothpaste marketed in Mauritius is fluoridated, this response was expected. It was also observed that for quite a substantial number of the adults the meaning of fluoride stops there.

**Frequency of tooth brushing**

About 90% of the respondents indicated that they had brushed their teeth at least twice on the previous day. The mean number of times of brushing (1.95) was comparable with similar age group in Australia (Barnard 1993). The frequency of tooth brushing does not seem to match the high degree of periodontal involvement of this age group as reported in a previous study (Courtens 1991).

The efficacy of toothbrushing in controlling periodontal diseases depends on the removal of plaque from the teeth, which is not necessarily related to the frequency of brushing. The degree to which these oral hygiene practices were oral health orientated or based on other motivation was not investigated in the present study.
Satisfaction with natural teeth

Nearly 80% of the respondents were satisfied with their natural teeth, with a higher proportion of males 'very satisfied' than females (42:29). There may have been some individual variations in the way of answering this question. Males of this age cohort consistently expressed more satisfaction with their teeth in Leipzig (Germany), Sydney (Australia) and metropolitan Trondelag (Norway) as indicated in the ICS (WHO 1985).

General comments

Twenty-five percent did not respond to this question. Satisfaction with the service was expressed by 29% and dissatisfaction by 23%. Measures of patient satisfaction with dental care may provide useful information to those attempting to understand or to predict patient behaviour, and to those evaluating dental providers, services, and facilities. Patient satisfaction information can contribute to improved patient compliance and to improved access to dental services. Achieving and producing health and satisfaction, as defined for its individual members by a particular society or subculture, is the ultimate validator of the quality of care (Badner 1992).

Concern for cost was also expressed by a substantial number of respondents. This is to be contrasted with the reasons given for not utilising the dental service in a previous question (Question 14) where cost was stated by only 6% of the non-attenders.
Suggestions on how services could be improved

The need for more promotion on prevention was clearly expressed. Increasing knowledge about oral health and improving oral health behaviour are important in closing the gap brought about by social potition. A better management of resources was also suggested. This shows that the services are appreciated and improvement in the quality of care could greatly influence more people to visit the dentist regularly.

It could be concluded that the present study reveals that use of dental services and perceived need in this adult cohort are heavily related to relief of pain and discomfort. Preventive behaviour such as dental attendance for regular oral examination was low and therefore indicates a large need for dental health promotion. The present study sheds light on a huge discrepancy between demand as shown by intention of visiting the dentist and actual adult utilisation rate as measured by the study.

In view of economic constraints and limited infrastructure of the government oral health care system, screening and regular examination of a large proportion of the population are not possible. The majority of adults would have to continue to rely on the private dentists for provision of their dental care. The data collected in this study could be useful in estimating the needs for dental care for the adult population, in planning of an appropriate oral health care delivery system to meet those needs and in monitoring changes in oral health of adults in future studies.
7 RECOMMENDATIONS

In this concluding chapter, several recommendations based on the survey's findings are made. These could be considered when planning services and designing programmes aimed at promoting oral health for the adults.

If good dental health is related to regular consultation with a dentist, what can be done to encourage people to attend with appropriate regularity and frequency, rather than only when they are in pain or experiencing other emergencies?

Improving attitude

Most of the survey findings tend to indicate that there is a huge need in this population for dental health education and the promotion of positive oral health behaviour, and this is particularly true for the lower socio-economic class. The level of education appeared to be the single most valid determinant of oral health service utilisation in the survey. It is arguable whether it is the level of education per se or the extent of exposure to dental related matters which is the determining factor for utilisation.

In a review of results of the ICS, Cohen (1978) found that oral health status and the use of services are more closely related to consumer behaviour and beliefs than to manpower and delivery system
arrangements. Reducing oral disease risk through appropriate preventive activities and meeting residual treatment needs through services are perhaps the strategies to adopt in order to achieve maximum oral health in this population.

Perception of oral health status was poor among the adults in the sample. Because perception of oral health status is an important determinant of one’s beliefs and practices in the areas of preventive care, the implications of this perception are significant. It is difficult to motivate such people to seek dental care for the many ailments that are not severely handicapping. It is even more difficult to make preventive services meaningful for such persons.

It is therefore strongly recommended that the public must be educated about the causes, sequelae and need for an early management of dental diseases. Furthermore, they must be taught to appreciate the importance of oral health and its positive effects on general health. The achievement of this aim calls for concerned action by the dental profession, public health authorities, health educators and the mass media.

Anxiety and fear are important obstacles to satisfying the perceived need for dental care. In the survey fear was reported as the reason for not obtaining dental care by a low percentage of the sample. The dental profession and the public health authorities must endeavour to provide an
environment which prevents fear and anxiety. The mass media and many adults should beware of handing down to younger generations out-dated, fear-inducing attitudes about dentists and dental treatment (FDI 1986).

Improving availability and accessibility

Health services must be accessible to all, this means that a health service must serve isolated and rural groups as well as the poor and neglected. Health systems, including dentistry, must be geographically, functionally, financially and culturally within easy reach of the whole community (Sheiham 1982).

The number of adults in rural areas who visited for tooth extraction was double and those who went to have a check-up was less than one third of the urban figures. Unavailability of dentist and inaccessibility to proper oral health care, which are probable explanations, might have resulted from a maldistribution of dentists over the island. Less than 15% of the private dentists, who are the main care providers for adults, have their practices in the rural regions. The growing number of industries now implanted in the rural areas provide many opportunities for the private dentists to move to these areas. Dental associations should encourage professional initiatives to remove barriers caused by the uneven distribution of dentists.
Perhaps optimal manpower availability and accessibility of care do not necessarily ensure utilisation of the system or, more to the point, lower levels of unmet need. Whether people can be motivated to visit dental professionals often and consistently, and whether people can be made aware that preventive behaviour can preempt the need for rehabilitative care should be major concerns for the professional dental community and for public administrators.

Not having dental coverage is an important deterrent to seeing a dentist as was shown in the survey. An individual who normally has to pay the entire cost of the dental treatment by a private dentist may be discouraged from seeking treatment. The provision of dental coverage to adult workers and their dependents would greatly enhance access to dental care. Government subsidy in part or in whole is desirable for those with special needs, such as people on very low incomes or suffering from chronic diseases, the handicapped and people with anomalies and defects leading to abnormally high needs for treatment (FDI 1986). On the other side, if cost of dental care is reasonable or at least is felt to be reasonable relative to the local cost of living, then the public will be more likely to seek necessary dental services.
Problems of access exist even in countries which have abundant resources for oral health care. Special attention should be paid to non-ambulatory, home-bound and institutionalised patients who may need access to portable dentistry programmes and treatment facilities inside institutions (FDI 1986).

**Oral health promotion at worksites**

Perhaps it is now appropriate to consider oral health promotion at worksites, a system which has been vastly underused for oral health promotion. A review of the potentials and pitfalls of worksite health promotion stated that worksites are potentially the single most accessible and efficient site for reaching adults for health education (Conrad 1987). The dental profession should act as advocates for oral health promotion in the workplace as well as in other settings.

Numerous potential benefits exist. From the employer's point of view, the main arguments in favour of oral health promotion programmes are reduced health care costs, increased productivity and reduced absenteeism. The benefits to the dental profession are possible increases in utilisation of services and less restraint from fee payment structures and physical environments. The immediate advantages from the employees' point of view are reduced travel time, waiting time, e.g. easy access, no reduction in or loss of wages.
People who do not normally visit a dentist regularly, might for these reasons become regular attenders. There is a potential for reaching and motivating people who normally have a low dental health awareness. In addition, work-related dental hazards can be compensated for or prevented and screening activities can be more easily organised particularly benefitting denture wearers who normally would not seek a dentist. This would give an opportunity for early diagnosis of oral pathological conditions or oral manifestations of systemic diseases.

*Improving learning sources*

The dentist was preferred as the source for learning to take care of teeth by not less than two-thirds of the respondents of the study. But it is well known that a person with a good knowledge of a subject does not necessarily make a good teacher.

A number of other qualities are required, some of which are inborn, but most of which must be learned with training and experience. Dental health education has, in the past, been given mainly by personnel untrained in educational techniques. Such people are likely to make so many basic teaching errors that the message will be lost.

There is an urgent need for training in communication for dentists and others in the dental field. Effective communication is essential in order to encourage dental awareness, promote self-help and increase the
utilisation of dental services. Without improved communication, attitudes towards oral health and the uptake of dental care are unlikely to change, and the symptom-based approach to uptake of care will continue. Research illustrates the importance of factors in the practice environment and in attitudes of dentists and staff, more or less unrelated to the actual treatment provided, which influence inter-personal relationships. It is important therefore that the dental health workers improve their communication skills.

The dentist is responsible to keep abreast with the development of the science and art of dentistry both for his own interest and that of society. The changing patterns of oral health present a great challenge to the practitioner to adapt to the needs and demands of his future patients. Dental educators must be in the forefront of these changes. Continuing education should be an integral part of the professional's obligation to the public and society should be made aware of it.

The attack upon new and unsolved problems must lie through research, both basic and applied. Skilful researchers with adequate training in the basic sciences are all too scarce in the field of dentistry. It is a responsibility of dental public health authorities to foster the training of such individuals, then put them to work. More qualified full-time administrators are needed in dental health programs.
Television and radio were also mentioned by a substantial number in the sample as the preferred source for learning to take care of teeth. Research indicates that mass media, such as television and radio, can increase the public's immediate awareness of health issues, but also that printed materials have greater long-term impact (Barnum 1975).

Getzfrid (1979) found out that the role of television was to create or stimulate an interest rather than to motivate change in an individual's behaviour. Since the ultimate goal of dental health education is a change in behaviour and since the direct behavioural effects of campaigns based solely on mass media seem limited, an appropriate national approach to improvements of health could be mass media campaigns to increase awareness combined with active involvement activities directly aimed at behavioural change.

**Improving dental delivery system**

The dental delivery system in Mauritius is characterised mainly by tooth extraction, restoration and rehabilitation. However, the curative and restorative philosophy of treating oral diseases has been demonstrated by many researchers to be inadequate in maintaining the health of a population. It is therefore necessary to change the basis of the delivery system.
Both a short term and a long term goals should be set. The short term goal will meet the immediate demands of the public with emergency, palliative and restorative treatment. Planning services will require the oral health activities to be a combination of both curative and preventive approaches. The dental services should be preventively orientated but will require a curative service backup. The long term goal will endeavour to achieve oral health for everybody in the future.

Fundamental to these changes is the concept of primary health care, which must form the broad base of the oral health system through the use of education and promotion of preventive behaviour, emphasis on prevention by providers and community sectors and utilisation of low technology procedures delivered by such individuals as health auxiliaries and schoolteachers. Indeed a large proportion of adults in the study thought they needed preventive care and and the need for more promotion on preventive dentistry was clearly expressed.

When a base of such preventive services is secure, it is predicted that disease prevalence will diminish and a more rational and appropriate referral network and specialised dental manpower structures for more complex treatment problems can be organised. Distribution of preventive and treatment services according to risks would then conserve resources, reduce costs and improve oral health for the entire population (WHO 1985).
WHO has developed the idea of an International Collaborative Oral Health Development Programme (ICOHDP) aimed at using expertise from developed countries to introduce, more rapidly, the skills needed in developing countries to achieve optimal prevention of disease and organisation of dental services. Local health authorities take advantage of this opportunity for their health promotion.

**Improving programmes**

The development of a dental health educational component by appointing a full-time dental officer and a group of auxiliaries to direct and coordinate health education activities is strongly suggested. The training and utilisation of primary health care workers in the provision of dental health education is also advocated. Dental health education activities should be integrated with other socio-political organisations.

There is a need to develop specific programmes directed specifically to the adult group, and to develop specific guidelines for program implementation and evaluation. The efforts of the government, health department, professional organisations, and individuals will all be required if the objectives and targets are to be achieved.
Improving preventive measures

The habit of using fluoride toothpaste regularly have been shown to be widespread among the adults studied. It is known that adults are susceptible to both coronal and root caries and that fluoride is effective in reducing caries. While the routine use of fluoride toothpaste should continue, a systemic source of fluoride should be envisaged.

Water fluoridation should be considered as a method of providing a highly titratable, cost-effective, universal exposure to fluoride with little effort on the part of the beneficiary. Further, the benefit is extended to all socio-economic strata equally. The efficacy of water fluoridation in children has been well established for 50 years, caries prevention efficacy for adult coronal and root surface caries have also been observed.

As a public health measure, salt fluoridation can also be considered as an effective caries-preventive alternative to drinking water fluoridation. With a dosage of 250-350 mg F/kg and nationwide availability of domestic salt for households, a caries decline can be expected from its use. The FDI (1984) recommends the use of salt fluoridation for developing countries.

Today large population groups are in a slow transition from a native diet, to which they have been accustomed for many years, to a civilised diet with fast food and carbonated drinks. Education efforts to promote good nutrition and healthy dietary practices should be supported by dentistry in
the interests of promoting the health of the public, though the impact on oral disease may be related only to reduced frequency of consumption of sugar and between-meal snack foods.

Society should promulgate information and give examples which encourage positive attitudes to health. It should also give practical support to ways of achieving this which at the same time allows for the individual's own initiatives and legitimate wishes.

**Monitoring and evaluation**

Relevant epidemiological studies need to be conducted for the regular monitoring of dental diseases and the evaluation of preventive programmes. Administrators need to be informed about trends and should adjust their programmes accordingly.

With the age of informatics upon us, there is a need to consider adopting a standard approach to the collection and utilisation of information in order to identify and evaluate the oral health status of individuals and the community, and to monitor programme objectives, system implementation, and community participation.
Conclusion

Oral health problems are now at a stage when reasonable resources devoted to prevention would obviate the need for a huge expenditure in the future for restorative and rehabilitative services.

There is an urgent need to raise the value of oral care. Dentistry must have a high priority in the master plans of the Ministry of Health and must not be neglected when policies to meet other social issues, like education and housing, are being formulated. Politicians, as well as leaders of the profession, should take the obligation to implement successful oral health prevention programmes.

Today, the main challenge is to make dentistry more attractive and relevant to those using dental services less frequently. The manner in which barriers interact seems less well understood, but it is fairly clear that no single explanation will provide a solution to the low uptake of dental services. As Gift (1984) observed in her review of the literature:

'Various attempts to increase utilisation have been made over the years through the provision of funds, building clinics for accessibility, advertising and education to increase awareness. But no one approach has been successful in dramatically increasing utilisation among groups with poor initial visit patterns.'
8 REFERENCES


GEERTSON HR, GRAY RM (1970).
Familistic orientation and inclination toward adopting the sick role.
J Marriage and the Family 32:644.
London: Croom Helm.

GETZFRID L (1979).
Television: Its role in dental health education.

Utilisation of professional dental services.
In: Cohen LK, Bryant PS.
Social sciences and dentistry: A critical bibliography. Volume II.
Quintessence Publishing Co. Ltd.:203-266.

GIFT HC & NEWMAN JF (1979).
Socialisation and children's use of dental services: the impact of predisposing, enabling, and need factors.
(Paper presented at the 107th annual meeting of the APHA, New York)
In: Cohen LK, Bryant PS.
Social sciences and dentistry: A critical bibliography. Volume II.
Quintessence Publishing Co. Ltd.: 203-266.

Attempts to control dental health care costs: The US experience.

Adult attitudes towards dentistry among dental attenders in South Wales.

Attitude of some young female bank employees to dentistry.

Utilisation of dental services in the United States and an insured population.

The Mauritius Handbook.
Ministry of Information, Mauritius.

The health belief model and preventive dental behavior.
Health Education Monograph, 2.
London: Croom Helm.

HOCHSTEIN JR, ATHANASOPOULOS AND LARKINS JH (1968).
Poverty area under the microscope.


KEGELES SS (1961).  

KEGELES SS (1963a).  
Why people seek dental care: A test of conceptual formulation.  
J Health Human Behav 4: 166-173.

KEGELES SS (1963 b).  
Some motives for seeking preventive dental care.  

Why and how people use dental services.  
Int Dent J 24: 347-351.

Satisfaction with dental care: Its relationship to utilisation and allegiance.  

KIYAK HA (1980).  
Age difference in oral health attitudes and dental service utilisation.  
(Paper presented at the Symposium on Barriers to Dental Care for the Elderly,  
Gerontological Society, San Diego, California).  
In: Cohen LK, Bryant PS. Social sciences and dentistry:  
A critical bibliography. Volume II.  
Quintessence Publishing Co. Ltd.: 203-266.

Dental beliefs, behaviours and health status among Pacific Asians and Caucasians.  

KIYAK HA (1993).  
Age and culture: influences on oral health behaviour.  

Origins and characteristics of fear of dentistry.  

Health care need and actual use by age, race and income.  
In: Cohen LK, Bryant PS. Social sciences and dentistry:  
A critical bibliography. Volume II.  
Quintessence Publishing Co. Ltd.: 203-266.

KRIESBERG L & TREIMAN BR (1960).  
Socioeconomic status and the utilisation of dentists' services.  

KRIESBERG L & TREIMAN BR (1962).  
Preventive utilisation of dentists' service among teenagers.  


MECHANIC D (1968).
Medical sociology: A scientific view.
Free Press.

Sex, illness, illness behavior, and the use of health services.

MILLER J, ELWOOD PC AND SWALLOW JN (1975).
Dental pain: an incidence study.
Br Dent J 139: 327-328.

MILLER RR & KIYAK HA (1980).
Attitudes as predictors of dental service utilisation. Abstr

MILONE CL, STACEY DC, SCHONFELD HK (1973).
The social sciences and dentistry: patterns of utilisation of dental services in an urban
neighbourhood health center.

Disproportionate dental anxiety: Clinical and nosological considerations.

Racial similarities and differences in family dental care patterns .

Dental service at Teamster Comprehensive Care Program, Montefiore Hospital and
Medical Center.
J Am Dent Assoc 83: 608-613.

MULVIEHILL JE (1972).
Utilisation of a prepaid plan of commercial dental insurance.

NATHANSON CA (1977).
Sex roles as variables in Preventive Health Behaviour.
Community Health 3.

NATHANSON CA (1978).
Sex roles as variables in the interpretation of morbidity data:
a methodological critique.
Int J Epidemiol 7.
NEWMAN JF (1971). 
The Utilisation of dental services. 
Emory University, Atlanta, Georgia. 
In: Cohen LK, Bryant PS. Social sciences and dentistry: A critical bibliography. Volume II. 
Quintessence Publishing Co. Ltd.: 203-266.

NEWMAN JF & ANDERSON OW (1972). 
Patterns of dental service utilisation in the US: A nationwide social survey 
Research Series No. 30, Center for health Administration studies, 
University of Chicago, Chicago, Illinois. 
In: Cohen LK, Bryant PS. Social sciences and dentistry: A critical bibliography. Volume II. 
Quintessence Publishing Co. Ltd.: 203-266.

NEWMAN JF; LARSEN A (1979). 
US Department of HHS, PHS, HRA, DHHS Publication No. (HRA) 80-56. 
In: Cohen LK, Bryant PS. Social sciences and dentistry: A critical bibliography. Volume II. 
Quintessence Publishing Co. Ltd.: 203-266.

NIKIAS MK (1968). 
Social class and the use of dental care under prepayment. 
Med Care 6:5.

Prepaid dental care: Patterns of use and source of premium payment. 

Who does not seek dental care and why? 
(Paper presented at the 118th ADA annual meeting, Miami Beach, Florida). 
In: Cohen LK, Bryant PS. Social sciences and dentistry: A critical bibliography. Volume II. 
Quintessence Publishing Co. Ltd.: 203-266.

Attendance pattern and continuity of dental care of Finnish adults over a 5-year period. 

Dental Insurance, a successful model facing new challenges. 
Dental health status and dental knowledge, attitudes and behaviour in Irish adults.
In: Cohen LK, Bryant PS. Social sciences and dentistry: A critical bibliography. Volume II.
Quintessence Publishing Co. Ltd.: 203-266.

Comm Dent Oral Epidemiol 5: 156-159.

ORAL HEALTH CARE SYSTEMS (1985).
An International Collaborative Study coordinated by WHO.

PELTON WJ (1972).
Dental health program of the University of Alabama in Birmingham: A summary of seven years’ experience.

Dental health behavior, dental health status and treatment need among workers and staff members in a big Danish industrial firm.
Institute for Community Dentistry and Graduate Studies, Royal Dental College, Copenhagen, Denmark (Ph.D dissertation).
In: Cohen LK, Bryant PS. Social sciences and dentistry: A critical bibliography. Volume II.
Quintessence Publishing Co. Ltd.: 203-266.

PETERSON BB (1979).
Dental services utilisation in the United States Navy. (Unpublished MPH paper).
School of Public Health and Community Medicine, University of Washington.
In: Cohen LK, Bryant PS. Social sciences and dentistry: A critical bibliography. Volume II.
Quintessence Publishing Co. Ltd.: 203-266.

Dental status and needs in a poverty population of North Nashville, Tennessee.

Report on the dental program of the ILWU-PMA: The first three years.
In: Cohen LK, Bryant PS. Social sciences and dentistry: A critical bibliography. Volume II.
Quintessence Publishing Co. Ltd.: 203-266.


SMITH JM, SHEIHAM A (1980). 
Dental treatment needs and demands of an elderly population in England. 
Comm Dent Oral Epidemiol 8: 360-364.

Irregular users of dental services among Norwegian adults. 
Acta Odontal Scand 45: 371-381.

Racial differences in perception of oral health and oral health behaviours in Singapore. 

SPENCER A (1980). 
The estimation of need for dental care. 

Dental treatment, need, demand and utilisation, in D. Striffler, W. Young and B. Burt, 
Dentistry, Dental Practice and the Community: 293-339. 
Philadelphia: W. B. Saunders .

The utilisation of dental services. 
Mitibank Memorial Fund Quarterly, 49. 
In: Cohen LK, Bryant PS. Social sciences and dentistry: 
A critical bibliography. Volume II. 
Quintessence Publishing Co. Ltd.: 203-266.

TEE JH (1982). 
The patient recruitment pattern of general dental practice. 

Adult Dental Health, United Kingdom 1978. 
Introduction of the sociology of dentistry: a comparative perspective. 

Anticipated health behaviour of families in relation to Medicaid. 

The Ideal dentist. 

VOGAN WI (1970). 
Dental knowledge and attitudes. 
WAN TH, YATES AS (1975).  
Prediction of dental service utilisation:  
A multivariate approach. Inquiry 12: 143-156.  
In: Cohen LK, Bryant PS. Social sciences and dentistry:  

WARDLE J (1982).  
Fear of dentistry.  

Quintessence, London.

Oral Health Surveys; Basic Methods.  

Prevention of Oral Diseases. WHO Offset publication No. 103.  

Access to dental Health? An ethnic minority perspective of the dental services.  

WILSON AA, BRANCH LG (1986).  
Factors affecting dental utilisation of elders aged 75 years or older.  

Understanding dental attendance behaviour.  

YOUNG & WILLNOTT (1959)  
Marketing Dentistry: A pilot study in Dudley.  

YULE BF, RYAN ME AND PARKIN DW (1988).  
Patients charges and the use of dental services: some evidence.  

The dental appointment and patient behaviour.  
Differences in patient and practitioner preferences, patients’ satisfaction and adherence.  
Med Care 26:403-414.

ZOLA IK (1973).  
Pathway to the doctor: from person to person.  
APPENDICES

APPENDIX 1 Questionnaire form used for pilot study

A STUDY ON THE USE OF DENTAL SERVICES IN MAURITIUS
BY ADULTS OF THE AGE GROUP 35-44 YEARS

conducted by

DR B.R.KINNOO D.M.D
Ministry of Health, Mauritius

in collaboration with

Dr S Lahti
Associate Professional Officer, Oral Health WHO

Prof PD Barnard
Department of Preventive Dentistry, University of Sydney

Dear Sir/Madam,

Thank you for agreeing to participate in this study.
This is a survey on how Mauritians use dental services. The study is interested in
your views and the information you provide is confidential and will be used only for
research purposes.

Your cooperation would be greatly appreciated in assisting to complete the
questionnaire. Please tick the appropriate box(es) for the questions.
A STUDY ON THE USE OF DENTAL SERVICES IN MAURITIUS

PART 1 DEMOGRAPHIC DATA

1. What is your age? (Age last birthday) ..................... [ ] years

2. Sex ....................... Male [ ] Female ............... [ ]

3. Place of residence: ... Urban [ ] Rural ............... [ ]

4. Are you married? .... Yes [ ] No .................... [ ]

5. Population group
   1. Hindu ............................................... [ ]
   2. General Population ......................... [ ]
   3. Muslim ............................................... [ ]
   4. Sino-Mauritian ................................. [ ]
   5. Other (specify) ................................. [ ]

6. How long have you been living in this area? ....... [ ] years

7. What is your present occupation? ............................

8. What is your highest level of education?
   1. Primary ............................................... [ ]
   2. Secondary ............................................... [ ]
   3. More than secondary ............................... [ ]

9. In which category does your monthly family (i.e your and your spouse’s) income fall?
   1. Less than Rs 2000 ................................. [ ]
   2. Rs 2000 - Rs 4000 ......................... [ ]
   3. Rs 4000 - Rs 6000 ............................... [ ]
   4. Rs 6000 - Rs 8000 ............................... [ ]
   5. Rs 8000 - Rs 10,000 ......................... [ ]
   6. Above Rs 10,000 ................................. [ ]
PART 2 SERVICE UTILISATION

10. Did you obtain dental care in the last 12 months?
    Yes ............ [    ]  No ................. [    ]
    If answer is 'No', then go to Question 15

11. Number of months since last dental visit ............... [    ]

12. If YES to question 10; Number of visits in the past 12 months ...... [    ]

13. For what reason(s) did you obtain dental care at your last visit (within the past 12 months)?
    1. To get teeth cleaned ................. [    ]
    2. Something was hurting ............... [    ]
    3. To have tooth extraction .............. [    ]
    4. Went for a check-up ................... [    ]
    5. To get something fixed (e.g., filling repaired) ......... [    ]
    6. Don't know ......................... [    ]
    7. Other (specify) ____________________ [    ]

14. Where did you have dental treatment?
    1. Hospital dental clinic ................ [    ]
    2. Health centre dental clinic .......... [    ]
    3. Private dentist ........................ [    ]
    4. Other(specify) ____________________ [    ]
    5. Don't know ........................... [    ]

15. If you did not obtain dental care in the last 12 months, give reason(s) why not?
    1. Nothing wrong, no reason to go ............ [    ]
    2. Afraid of dentists, don't like dentists ...... [    ]
    3. Can't afford it, costs too much ............ [    ]
    4. Didn't want to spend money on dental care .... [    ]
    5. Was too busy ........................... [    ]
    6. No service available ................... [    ]
    7. Have no teeth or have false teeth .......... [    ]
    8. Other reason (specify) __________________ [    ]
PART 3 ATTITUDE AND BEHAVIOUR

16. Is there anything wrong with your teeth, gums or mouth now?
   1. Yes ........................................... [ ]
   2. No ........................................... [ ]
   3. If Yes, where? .............................. [ ]

17. Do you want any dental advice or treatment?
   Yes .............. [ ]  No ................. [ ]
   If answer is "NO" then skip to question 19.

18. If response to question 17 is Yes, what sort of advice or treatment do you want?
   1. Prevention ............................... [ ]
   2. Dentures ................................. [ ]
   3. Examination or cleaning .............. [ ]
   4. Orthodontic care ....................... [ ]
   5. Scaling or periodontal care .......... [ ]
   6. Tooth Extraction ...................... [ ]
   7. Filling, crown or bridge .............. [ ]
   8. Don't Know .............................. [ ]
   9. Other (specify) .......................... [ ]

19. Please tell me from whom and where you learned to care for your teeth?
   1. Friends/Relatives ....................... [ ]
   2. Newspapers/Magazines/Pamphlet ...... [ ]
   3. Medical doctor .......................... [ ]
   4. Advertisements in the media ......... [ ]
   5. T/V Radio .................................. [ ]
   6. Teachers at School ..................... [ ]
   7. Dentist ................................... [ ]
   8. Dental Assistant ....................... [ ]
   9. At home .................................. [ ]
  10. Others (specify) ....................... [ ]
20. Tell me from where would you like to learn to take care of your teeth?
   1. Medical Doctor ............... [ ]
   2. TV/Radio .................... [ ]
   3. Dentist ...................... [ ]
   4. Social meetings ............. [ ]
   5. Newspapers/Magazine ........ [ ]
   6. Advertisement in the media .. [ ]
   7. Dental Assistant ............ [ ]
   8. Others (specify) ____________ [ ]

21. Do you regularly use fluoride toothpaste?
   Yes ........ [ ]  No ...... [ ]

   Do you regularly use dental floss?
   Yes ........ [ ]  No ...... [ ]

22. How many times did you brush your teeth yesterday? .... [ ]

23. In general, how satisfied are you with the appearance of your natural teeth?
   1. Very satisfied .................. [ ]
   2. Fairly satisfied ............... [ ]
   3. Satisfied ...................... [ ]
   4. Not satisfied ................... [ ]
   5. Very dissatisfied ............. [ ]

24. What recommendations would you like to make, based on your own experience, for
    improving dental services in Mauritius?


THANK YOU FOR YOUR COOPERATION
APPENDIX 2 Questionnaire form of main survey

A STUDY ON THE USE OF DENTAL SERVICES IN MAURITIUS
BY ADULTS OF THE AGE GROUP 35-44 YEARS

conducted by

DR B.R.KINNOO  D.M.D
Ministry of Health, Mauritius

in collaboration with

Dr S Lahti
Associate Professional Officer, Oral Health WHO

Prof PD Barnard
Department of Preventive Dentistry, University of Sydney

Dear Sir/Madam,

Thank you for agreeing to participate in this study. This is a survey on how Mauritians use dental services. The study is interested in your views and the information you provide is confidential and will be used only for research purposes.

Your cooperation would be greatly appreciated in assisting to complete the questionnaire. Please tick the appropriate box(es) for the questions.
A STUDY ON THE USE OF DENTAL SERVICES IN MAURITIUS

DEMOGRAPHIC DATA

1. What is your age? (Age last birthday) ................................ [ ] years

2. Sex ................................ Male [ ] Female ................. [ ]

3. Place of residence: ........ Urban [ ] Rural ................. [ ]

4. Population group
   1. Hindu ................................................................. [ ]
   2. General Population ................................................. [ ]
   3. Muslim ............................................................... [ ]
   4. Sino-Mauritian ....................................................... [ ]
   5. Other (specify) ..................................................... [ ]

5. What is your present occupation? ...........................................

6. What is your highest level of education?
   1. Primary ............................................................... [ ]
   2. Secondary ........................................................... [ ]
   3. Tertiary ............................................................... [ ]
   4. None ................................................................. [ ]

7. In which category does your monthly family (i.e. your and your spouse's) income fall?
   1. Rs 0 - Rs 1999 ....................................................... [ ]
   2. Rs 2000 - Rs 3999 .................................................. [ ]
   3. Rs 4000 - Rs 4999 .................................................. [ ]
   4. Rs 5000 - Rs 5999 .................................................. [ ]
   5. Rs 6000 - Rs 6999 .................................................. [ ]
   6. Rs 7000 - Rs 7999 .................................................. [ ]
   7. Rs 8000 - Rs 8999 .................................................. [ ]
   8. Rs 9000 - Rs 9999 .................................................. [ ]
   9. Rs 10000 and above ............................................... [ ]
SERVICE UTILISATION

8. Which type of dental service do you use mostly?
   1. Hospital dental clinic .................................................. [ ]
   2. Health centre dental clinic .......................................... [ ]
   3. Private dentist ................................................................. [ ]
   4. Other (specify) ................................................................. [ ]

9. Did you obtain dental care in the last 12 months?
   Yes ................ [ ] No ........................................ [ ]

   If answer is 'No', then go to Question 14

10. Number of months since last dental visit ......................... [ ]

11. Number of dental visits in past 12 months ......................... [ ]

12. For what reason(s) did you obtain dental care at your last visit (within the past 12 months)?
   1. To get teeth cleaned ................................................... [ ]
   2. Something was hurting ................................................. [ ]
   3. To have tooth extraction .............................................. [ ]
   4. Went for a check-up .................................................... [ ]
   5. To get something fixed (e.g., filling repaired) ................. [ ]
   6. Don’t know ................................................................. [ ]
   7. Other (specify) ............................................................. [ ]

13. Where did you have dental treatment at your last visit (within the past 12 months)?
   1. Hospital dental clinic .................................................. [ ]
   2. Health centre dental clinic .......................................... [ ]
   3. Private dentist ................................................................. [ ]
   4. Other (specify) ................................................................. [ ]

14. If you did not obtain dental care in the last 12 months, give reason(s) why not?
   1. Nothing wrong, no reason to go .................................... [ ]
   2. Afraid of dentists, don’t like dentists ............................ [ ]
   3. Can’t afford it, costs too much ...................................... [ ]
   4. Didn’t want to spend money on dental care ..................... [ ]
   5. Was too busy ................................................................. [ ]
   6. No service available ..................................................... [ ]
   7. Have no teeth or have false teeth .................................. [ ]
   8. Other reason (specify) .................................................. [ ]
ATTITUDE AND BEHAVIOUR

15. Is there anything wrong with your teeth, gums or mouth now?
   1. No .................................... [ ]
   2. Yes, teeth only .......................... [ ]
   3. Yes, gums only .......................... [ ]
   4. Yes, teeth and gums ..................... [ ]
   5. Yes, other (specify) ________________ [ ]

16. If answer to Question 15 is YES, do you want any dental advice or treatment?
   Yes ................ [ ]  No ............... [ ]

17. If YES, what sort of advice or treatment do you want?
   (More than one response possible)
   1. Prevention ............................ [ ]
   2. Dentures ................................ [ ]
   3. Examination or cleaning ............... [ ]
   4. Orthodontic care ....................... [ ]
   5. Scaling or periodontal care ........... [ ]
   6. Tooth Extraction ....................... [ ]
   7. Filling, crown or bridge ............... [ ]
   8. Other (specify) ......................... [ ]
   9. Don’t Know ............................ [ ]

18. Do you intend visiting a dentist in the near future?
   Yes ........................................ [ ]
   No ......................................... [ ]
   Not sure ................................... [ ]

19. Please tell me from whom and where you learned to care for your teeth?
   (More than one response possible)
   1. Friends/Relatives ....................... [ ]
   2. Newspapers/Magazines/Pamphlet ...... [ ]
   3. Medical doctor .......................... [ ]
   4. Advertisements in the media .......... [ ]
   5. T/V Radio ............................... [ ]
   6. Teachers at School .................... [ ]
   7. Dentist .................................. [ ]
   8. Dental Assistant ....................... [ ]
   9. At home .................................. [ ]
   10. Others (specify) _________________ [ ]
20. Tell me from where would you like to learn to take care of your teeth?
   1. Friends/Relatives ................................ [ ]
   2. Newspapers /Magazines/Pamphlet ............. [ ]
   3. Medical doctor .................................. [ ]
   4. Advertisements in the media .................. [ ]
   5. T/V Radio ....................................... [ ]
   6. Teachers at School ............................. [ ]
   7. Dentist ......................................... [ ]
   8. Dental Assistant ............................... [ ]
   9. At home ........................................ [ ]
   10. Others (specify) __________________________ [ ]

21. Do you regularly use fluoride toothpaste?
    Yes ........ [ ]  No ................. [ ]

22. How many times did you brush your teeth yesterday?
    0 ........... [ ]
    1 ............ [ ]
    2 ............ [ ]
    3 or more ... [ ]

23. In general, how satisfied are you with the appearance of your natural teeth?
    1. Very satisfied ................................. [ ]
    2. Fairly satisfied .............................. [ ]
    3. Satisfied .................................... [ ]
    4. Not satisfied ................................. [ ]
    5. Very dissatisfied ............................. [ ]

24. What are your general comments about dental services in Mauritius?
    ____________________________________________
    ____________________________________________

25. Would you like to make any suggestion(s) on how these services could be improved?
    ____________________________________________
    ____________________________________________

THANK YOU FOR YOUR COOPERATION