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KENYA NATIONAL ORAL HEALTH SURVEY REPORT 2015

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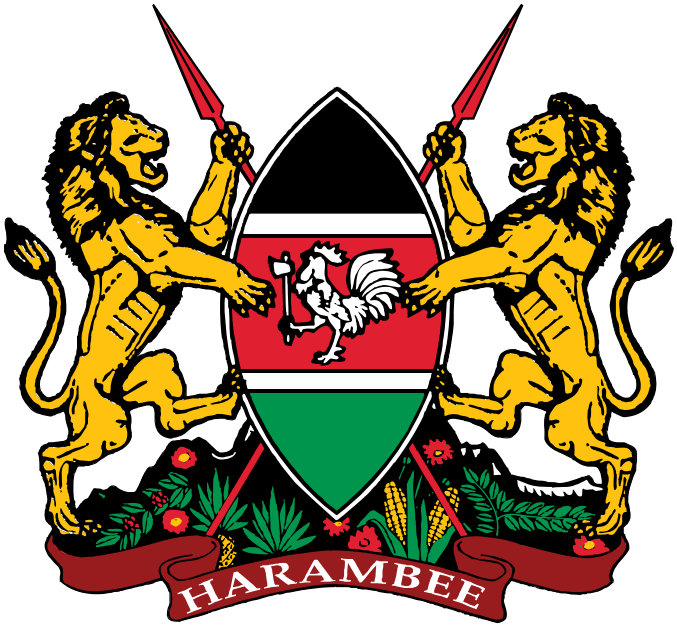


KENYA NATIONAL ORAL HEALTH SURVEY REPORT

2015

ACRONYMS

1.	AIDS	Acquired Immune Deficiency Syndrome
2.	dmft	Decayed, Missing, Filled Teeth-Deciduous Dentition
3	DMFT	Decayed, Missing, Filled Teeth-Permanent Dentition
4	HIV	Human Immune-deficiency Virus
5.	KDA	Kenya Dental Association
6.	KEMRI	Kenya Medical Research Institute
7.	KMTC	Kenya Medical Training College
8.	KNH	Kenyatta National Hospital
9.	NOHS	National Oral Health Survey
10.	W.H.O.	World Health Organization
11.	SPSS	Statistical Package for Social Sciences
12.	NOHS/RC	National Oral Health Survey Research Committee

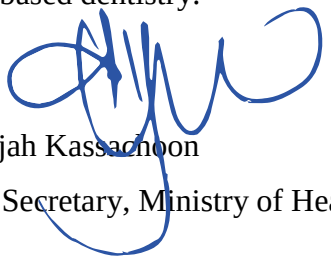
PREFACE

This is a report of Kenya's first National Oral Health Survey. Kenya's oral health statistics previously available was in the form of research articles from investigators who carried out research on specific populations. They studies were not representative of the country. This presented challenges in decision making because of limited evidence thus adversely affecting the provision of appropriate oral health care services. The information presented in this document provides a larger oral health profile of the Kenyan population collected in one study. The study sample was drawn to represent key strata of the population including urban, peri-urban and rural segments. Due consideration was given to include special groups like the pastoralist communities while at the same time ensuring that all regions of the country were represented as per the survey methods by the World Health Organization (WHO). The distribution of various oral conditions by age and gender in the sampled regions is presented. The report further presents information on oral health knowledge of the Kenyan population as well as oral health treatment seeking behaviour.

This survey report provides up-to-date information on Kenya's oral health status. The report is expected to draw the attention of oral health stakeholders including policy makers, health managers among others. Furthermore, it forms a benchmark for future research in oral health in Kenya and the East African region. Provision of oral health care services appropriately is important for a healthy population. Moreover information regarding the availability of insurance coverage among Kenyans is key in determining access to oral health services. The cost of dental health care is high and as such the government should allocate this health subsector significant funding.

This survey report is expected to be useful to the oral health stakeholders in Kenya and beyond. The information will be useful in planning oral health care delivery in Kenya and thus improve the oral health of the populations. The Ministry of Health, Ministry of Education, the University of Nairobi, Moi University, the Kenya Medical Research Institute (KEMRI), the Kenya Medical Training College (KMTC), the Kenya Dental Association (KDA), the World Health Organization (WHO), and the Kenyatta National Hospital (KNH) among others will particularly find this report useful in executing their oral health agenda.

I wish to congratulate the persons who made this document available for the job well done. Research is a dynamic area and therefore I encourage them and others to keep track of the emerging issues in oral health and further research on them. This is critical in the practice of evidence based dentistry.



Dr Khadijah Kassachoon

Principal Secretary, Ministry of Health

FOREWORD

Oral health is recognized as an integral part of general body health. A functional body is dependent on regular intake of food whose point of entry is the oral cavity. The mouth is central to communication through speech and other forms of expression.

The oral health care providers in Kenya are trained both locally and outside the country. These oral health care providers include general dental practitioners and specialists. Other cadres in the provision of oral health care include community oral health officers, dental technologists and dental hygienists. These oral health care providers in the country are overstretched by the large population they serve. Kenya has a dentist population of about 1000 for a population of 42 million people, giving a dentist: population ratio of 1:42,000. Moreover, 80% of these dentists are based in the large urban centres leaving large segments of populations based in the rural areas grossly underserved.

The sample for this survey was selected using the World Health Organization (WHO) pathfinder sampling method. This provided a comprehensive set of data for evaluation of oral health parameters of the Kenyan population. Data on oral health practices, knowledge, and oral health status was collected from participants in fifteen sites spread throughout the country. Oral health status and diseases are described between urban, peri-urban and rural populations as well among different age groups 5, 12, 15, 35-44 and adults over 65 years.

Provision of oral health care in Kenya has been sub optimal. Stakeholders in oral health continue to debate on the best arrangements of oral health care financing and the most viable means of organizing and delivering oral health care services. The Ministry of Health as a major stakeholder in the provision of oral health care services in this country has been at the forefront in ensuring that oral health services are available, accessible and affordable to the Kenyan population. The Ministry of Health will use the information provided in this report especially the recommendations to improve the oral health of Kenyans.

I appeal to all the providers of health care services in this country to support the Ministry of Health in the provision and continuous improvement of oral health care services in the country.

Dr Nicholas Muraguri
Director of Medical Services, Ministry of Health

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The Ministry of Health wishes to thank the various persons and institutions who participated in making this survey report available. The process of writing this document was done by persons from the University of Nairobi, Ministry of Health and KEMRI. These were Prof Loice Gathece, Dr Bernard Mua and Dr Regina Mutave of the University of Nairobi, School of Dental Sciences; Dr Cosmas Mugambi Gitobu, Dr Elizabeth Onyiego, Dr Jenipher Ober-Oluoch, Dr Makau Matheka and Dr Stephen Irungu all from the Ministry of Health and Dr Peter Wanzala from the Kenya Medical Research Institute.

The Ministry of Health further wishes to acknowledge the following for their contribution: WHO for the technical support during the entire process. Specifically, Poul Erik Peterson, WHO Chief Oral Health advisor and Charlotte F. Ndiaye, Regional Advisor for Oral Health, WHO/AFRO. Others include Dr George Ogonji and Dr Meshack Ong'uti (former Chief Dental Officers, Ministry of Health) for their guidance and support. Prof Jacob T. Kaimenyi, Prof Francis Macigo, and Dr Lucy Mutara played a key role in the formative stages of the process.

The Ministry of Health sincerely thanks The Wrigley Company (East Africa) Limited led by Wanjiru Nduati for the financial support for this survey.

Sincere gratitude goes to the following enumerators (Dentists and Community Oral Health Officers): Dr Veronica Atieno Abuto, and Joseph Mailu (Kajiado District Hospital - Kajiado County), Dr Hawa Kwamboka & Joseph Muasya (Kangundo District Hospital -Machakos County), Dr Patrick Maina Kibet & Winfred Muthoni Ndung'u (Muranga District Hospital - Murang'a County), Dr Abdihakimu Omar & Thomas Malila Wambua (Garrisa Hospital - Garissa County), Dr Elaine Kamere (Meru-Level 5 - Meru County), Ann K. Mbijiwe (Nyambene District Hospital - Meru County), Dr Priscilla Lelei & John Ndungu (Bahati District Hospital - Nakuru County), Dr Oliver Wata & Lavender Atieno (Kisumu East District Hospital - Kisumu County), Dr Andrew Okiriamu & Chrispinus Ouma (Busia District Hospital-Busia County), Dr Harriet Kamau, Gabriel Mark Momanyi (Lodwar District Hospital - Turkana County), Dr Adnan Said Swaleh & Lucas M. Chome (Lamu District Hospital-Lamu County), Dr Abdulkader Shaukat Bagha & Anderson Kai (Port Reitz District Hospital-Mombasa County), Dr Patricia

Chiuri (Mama Lucy Hospital-Nairobi County) and Anne M. Josiah Kayole (Sub-district Hospital, Nairobi County).

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The Ministry of Health further recognizes the various government and private institutions including, Helpage Kenya, school heads, school children and adults who participated in the survey. Sincere thanks go to Colgate Palmolive (East Africa) Ltd for their support in provision of toothpaste and tooth brushes for participants during the survey.

Dr Elizabeth W. Onyiego
Chief Dental Specialist, Ministry of Health

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EXECUTIVE SUMMARY

Planning and implementation of oral health care services and interventions relies on availability of benchmark information which prior to this survey was lacking in Kenya. Information available prior to this survey report was based on ad hoc surveys. The national oral health survey was carried out to provide an estimate of the burden of selected oral diseases, oral health seeking behavior, determinants of oral health, risk factors, as well as implication on oral health related quality of life.

This was a national cross-sectional pathfinder health survey conducted across various age segments in Kenya's population; 5, 12, 15, 35-44 and 60+ year olds. A total of 2,298 children and 1,462 adults participated in the study. The study areas included Nairobi (capital city), Kisumu and Mombasa (main urban centers), small towns and rural areas. Data was collected using modified World Health Organization (2013) questionnaires and clinical assessment forms. The tools were pre-tested and data enumerators trained and calibrated before the actual data collection.

Results: The prevalence of dental caries among children (5, 12, and 15 year olds) was 23.9% and an overall DMFT/dmft of 0.73. The children aged 5 years had a dental caries prevalence of 46.3% and a dmft of 1.87. Bleeding from the gums occurred in about three out of four children (75.7%) in the three age groups, while in 5 year olds it was 99.6%. The overall prevalence of dental fluorosis among children was 41.7%.

Gums and teeth were described as good by more than half of children, 61.9% and 55.6% respectively. However 53.8% of the children had experienced toothache and discomfort in the previous one year. Oral health problems affected children's quality of life in the year before with 31% being unable to chew hard food, 27.8% avoided smiling due to their teeth, while 18.9% missed school due to a tooth related problem. The proportion of children who had never been to a dentist was 46.7% and 18.3% having had visited a dentist in the year before. The major reason for visiting a dentist amongst the children was pain or discomfort at 70.2%.

Oral mucosal lesions were reported in 3.2% of the children. Conditions that were detected included mucosal ulceration (1.5%), abscesses (0.9%) and acute necrotizing gingivitis (0.8%).

Miraa was the most abused substance with 4.2% of the children reporting to have used it. Smoking of tobacco was at 0.4% amongst the children.

The prevalence of dental caries among the adult was 34.3%. This adult population had a DMFT of 0.72 and prevalence of gingival bleeding stood at 98.1%. Among the adults 72.3% had visited a dentist before. Of the 72.3%, 83% of them had a dental related problem while 3.3% had gone for routine dental checkup. Almost all (99.9%) reported having one form of dental related problem in the previous one year. Among the adults 45.7% reported to have abused at least one form of a substance. Tobacco was used by 17.4%, alcohol by 19.8% and Miraa by 18% of the adults.

Conclusion: The study concluded that the burden of oral diseases and conditions varied from low to high. Both children and the adult populations had unmet dental caries and gum related treatment needs. A significant population in Kenya was still exposed to fluoride levels above normal in their drinking water. The oral health seeking behaviour was found to be poor while the quality of life was adversely affected by oral diseases/conditions that existed. The oral hygiene practices of the population were poor.

Recommendations: The government of Kenya through the Ministry of Health needs to address the grossly underfunded oral health care services. Oral health care is capital intensive by its very nature and therefore adequate financing is critical for its success. The Ministry of Health should give oral health more visibility in its health priority profile. This is because poor oral health greatly affects the quality of life of the general population. The Ministry of Health and other stakeholders should put in place both preventive and promotive health care programs at strategic entry points of health care delivery systems both in public and private sectors such as maternal and child health clinics, Primary schools among others. The Ministry of Health will now use the information available in this report to lead the other stakeholders in oral health to draft a comprehensive national oral health policy to guide the delivery of oral health care services.

1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

Oral health is described as the absence of disease and optimal functioning of the mouth and its tissues in such a manner that preserves the highest level of self-esteem. It describes a standard of oral and related tissues, which enable an individual to eat, speak and socialise without active disease, discomfort or discouragement which then contributes to the general well-being. Good oral health is an important and essential component of the general body health and is a birth right of every person in the world[1].

Oral health was given prominence by the Kenyan government and as such included as the ninth element of primary health care in Kenya[2]. Oral health care services are capital intensive and the success in the provision of oral health care services is highly dependent on a number of factors such as qualified personnel, appropriate facilities including building, equipment and commodities. Over the years the demand for oral health care services has outstripped the financial provision from the exchequer: preventive and promotive oral health services require special emphasis. These services lead to a reduction in the demand for curative services, which are labour intensive and expensive.

The enactment of the Kenya constitution 2010 established two levels of government, the national and county government. Schedule four, part two (2) of the constitution devolved most health functions to the county governments among these are the Oral health care services. It is against these constitutional provisions that this document was written. Oral health care services have existed in this country for decades, however there has not been any survey to determine the situation of oral health in Kenya though the priorities in the delivery of oral health care have been adequately articulated[3]. As the country continues with the pursuance of the vision 2030, oral health should be packaged as an essential part of the population's lives[4].

1.2 Kenya's Demographic Profile

Kenya is situated in the Eastern part of Africa between latitudes 34° east and 42° west. The equator divides the country roughly into two halves. The neighbours of Kenya include: Somalia to the East, Ethiopia and Sudan to the North, Uganda to the West and Tanzania to the South border. The population is estimated at 42 million out of which 5% are under one year, 20% under five years and 50% under fifteen years. Women of reproductive age group (15-49) make 20% of the population. The population growth rate now stands at 2.8%. The total fertility rate is at 4.6 while life expectancy is currently estimated at 54 years[5].

1.3 Oral Health Service Delivery

Oral health care services are provided by both public and private institutions. A greater proportion of oral health care providers work in the urban centres making oral health care services difficult to access for majority of the Kenyan population. Provision of basic oral healthcare is capital intensive. This translates to a high cost in provision of oral health care. There is need for quality oral health care that is affordable, accessible and acceptable. The current dentists: population ratio is 1:42,000 which is far below the WHO recommended ratio of 1:7,000[6]. A scrutiny at the provision and distribution of dental equipment in the public health facilities indicate that most are not functional while the supply of dental materials is erratic. Most public health facilities in Kenya have no adequate physical infrastructure for dental clinics. This should be addressed at the earliest so that each public health facility has a dental clinic that can address dental health needs of the local population. Considering that health is now a devolved function, it is expected that the County governments will take up this challenge.

1.4 Oral Health Care Financing

The oral health department received an operational budget of KShs.392,400 in the 2014/2015 financial year. That was a gross underestimate of the country's needs considering that the oral health care is capital and labour intensive. This echoes the larger health sector financing which falls below the 15% requirement of the Abuja Declaration of 2001. However, following devolution of health services, oral health care financing is currently a function of the county government.

1.5 Data for Planning

Kenya Health information System (HMIS) 2014 captures information on oral diseases and conditions inadequately. Data for planning and implementation of the oral health care has been based on selective studies or on “ad hoc” basis. In the absence of a comprehensive national oral health policy, proper strategic planning and evaluation of oral health services had not been possible.

1.6 Manpower and Facilities

The current demand for curative services far outstrips the facilities and human resource available. The current Dentist: Population ratio stands at 1:42,000. The WHO recommends a ratio of 1:7000. On average, Kenya trains 60 dentists, locally and abroad, 100 community Oral Health Officers and 70 dental technologists annually. These numbers are not based on needs assessment. It therefore means a lot of effort needs to be directed towards the development of appropriate human resource and equitable distribution of facilities.

2.0 RATIONALE AND AIM OF THE NATIONAL ORAL HEALTH SURVEY

2.1 Rationale for the Survey

Arising from the aforementioned, it was apparent that the precise burden of oral diseases in Kenya was largely unknown. The data from this survey will thus be used for formulation of policy, planning, implementation of the actions as articulated in this report. As such the Ministry of Health and other stakeholders will be able to rationalize their resource allocation in terms of human, finance and infrastructure.

2.2 Aim of the Survey

The aim of this survey was to investigate the burden of oral diseases, their determinants and oral health related quality of life.

2.2.1 Specific Objectives

The specific objectives of this survey were:

1. To determine the burden of selected oral diseases and conditions.
2. To determine oral health seeking behavior.
3. To determine the oral health related quality of life.

2.2.2 Survey Variables

Data for this survey was collected based on the variables shown on Table 2.1 below:

Table 2.1 Study Variables

Variable	Measurement Unit (s)
Socio-demographic characteristics	
Age	Number of years
Sex	Male or female
Level of education	Highest academic qualification
Occupation	Career of the respondent
Ethnicity	Ethnic background
Place of residence	Rural , peri urban or urban
Oral health diseases and conditions	
Dental caries experience	Decayed, Missing, Filled Teeth (DMFT/dmft)
Periodontal diseases	Prevalence and severity of periodontal diseases
Malocclusion	Type (class 1,2 or 3)
Oral cancer and precancerous lesion	Type Size (lesion size, lymph nodes involved) Presence or absence of metastasis
Dental fluorosis	Prevalence and severity of fluorosis
Orofacial pain	Presence and severity
Edentulism	Prevalence and pattern of tooth loss
Oral Health Practices and Oral Health Seeking Behavior	
Dental visits	Whether visited dentist Frequency of visits per year Types of clinics/facilities visited Accessibility of services
Knowledge on oral Health	Level of awareness
Attitude towards oral Health	Perception of oral health
Oral Health Practices	Whether they brush teeth or not Frequency of brushing per day
Smoking	Whether they smoke or not
Quality of life	
Pain	Severity of pain
Discomfort	Level of discomfort when biting food/taking drinks
Social effects	Effect on social activities and work, School activities for children Embarrassment because of appearance Sleep disruption Speech disruption

3.0 MATERIALS AND METHODS

3.1 Study Design

Data for this survey report was collected within a short period of time from across the country. This was therefore a descriptive cross sectional study.

3.2 Study Area

The study was carried out in Kenya at various areas selected using WHO sampling criteria for National Oral Health Surveys[7]. The areas were Buruburu, Westlands, Kibera and Korogocho in Nairobi County, Changamwe in Mombasa County, Lamu island in Lamu County, Lodwar in Turkana County, Kianjai in Meru County, Shaabab in Nakuru County, Manyatta in Kisumu County, Kajiado town in Kajiado County, Garrissa town in Garrisa County, Mariira village in Murang'a County, Nangina village in Busia County and Matungulu location in Machakos County.

3.3 Study Population

The study population included 5 year olds, 12 year-olds, 15 year-olds, 35-44 year-olds and age 65+ year olds.

3.3.1 5 Year Olds

This age is of interest in relation to levels of caries in the primary dentition, which may exhibit changes over a shorter time span than the permanent dentition at other index ages. The participants for this age category were drawn from nursery schools.

3.3.2 12 Year Olds

This age is especially important as it is generally the age at which children leave primary school and therefore in many countries it is the last age at which a reliable sample may be obtained easily through the school system. The children for this age category were drawn from primary schools.

3.3.3 15 Year Olds

This age is important because their teeth have been exposed to the oral environment for between three and nine years. It is also important for the assessment of periodontal disease indicators in adolescence. The participants for this age category were drawn from secondary schools.

3.3.4 35-44 Year Olds

This age group is the standard monitoring group for health conditions of adults. The full effects of dental caries and levels of severe periodontal involvement and the general effect of the care provider can be monitored using data from this age group. The participants for this age category were drawn from the markets, places of worship, factories, offices and other work places.

3.3.5 65+ Year Olds

Data from this group is needed both for planning appropriate care for the elderly and for monitoring the overall effects of oral care services in a population. The participants for this age category were drawn from homes for the elderly, markets and churches.

Figure 3.1: Map of Kenya

3.4 Sampling

3.4.1 Study Areas

Using WHO oral health surveys basic methods criteria[7], Nairobi city, three main urban centers, three small towns and five rural areas were selected giving a total of 12 administrative units to provide information on population groups likely to have different levels of oral diseases and conditions (Table 3.1). Stratified cluster sampling technique was used to select the study subjects in each site for each index age or age group.

Table 3.1: Study areas

Region	**Town**	**Area**
Capital City	**Nairobi County**	
	2 formal settlements	Buruburu Estate
		Westlands
	2 informal settlements (slums)	Kibera
		Kahawa West
Main Urban centres		
Coast	Mombasa	Changamwe
Rift valley	Nakuru	Bahati
Nyanza	Kisumu	Manyatta
Small towns ***(Garissa and Kajiado towns were included due to the fact that the Somali, Pokot and Maasai tribes are likely to have different levels of disease)***		
Rift valley	Kajiado	Kajiado
North Rift	Turkana	Lodwar
North Eastern	Garrisa	Garrisa
Rural areas ***(Five villages in different regions in the remaining geophysical regions which are likely to have different prevalence of disease than the regions already selected)***		
Central	Murang'a	Mariira Village
Western	Busia	Nangina Village
Lower Eastern	Machakos	Matungulu Village
Central Eastern	Meru	Kianjai village
Coast	Lamu	Lamu Island
Total	**12 administrative units**	**15 areas**

3.4.2 Sample Size Determination

Using the WHO guidelines[7], 50 subjects were needed from each index age or age group for the fifteen sites. Using these criteria, a total of 3760 participants (2298 children and 1462 adults) were recruited into the study.

3.5 Data Collection and Techniques

3.5.1 Data Collection Instruments

The following data collection instruments were used

(i) WHO oral health clinical assessment form (2013) for Oral Health Diseases and conditions; occurrence, severity and treatment needs.

(ii) WHO questionnaire (2013) was used to collect data about Oral Health seeking behavior, knowledge, attitude, oral hygiene practices, oral health related quality of life.

3.5.2 Preliminary Phase

Preliminary visits were made to each of the selected study sites in order to confirm information and logistics. This included permission from school heads, establishing the market days and geographical mapping, recruitment and training of research assistants.

3.5.3 Pilot Phase

The data collection tools were piloted and pretested at Gatundu Sub-County Hospital which was not included in the study sites. All the necessary adjustments were made to the data collection tools following the piloting of the instruments.

3.5.4 Actual Data Collection Phase

The data collection phase took about one month. There were 12 dental officers and 12 Community Oral Health Officers involved in data collection. Examiners used objective indices and criteria in measuring and recording the oral diseases and conditions. Data was reviewed on daily basis in order to ensure that all relevant information was recorded accurately. There was field visit by supervisors to monitor and ensure quality of data.

3.5.5 Cross Infection Control

Instruments used in the study were sterilized in the respective public health facilities. The survey team used disposable gloves and masks.

3.6 Minimizing Error and Bias

All data collection tools were pre-tested. All investigators and research assistants attended a three days training at the University of Nairobi Dental School. On day two of the training, pretesting of the data collection tools was done at Gatundu Sub District hospital. The data collection tools were calibrated for inter and intra examiner reproducibility.

3.7 Ethical Considerations

The proposal for Kenya National Oral Health Survey was submitted to the Kenyatta National Hospital/University of Nairobi ethics and standards committee. Permission was sought from the relevant authorities. Informed consent was obtained from all the respondents/guardians. Assent was sought from participants under the age of eighteen years. The participants were at liberty to terminate participation at any time without victimization. All information collected was treated confidentially. Appropriate referrals were made for those who had urgent oral health intervention needs. Only permitted photographs were taken during training of the enumerators, pretesting of the data collection tool and during the actual data collection exercise. The results from this survey will be used for the benefit of the community.

3.8 Data Analysis

Data was double entered in EpiData and cleaned using the same. The data was analyzed using the Statistical Package for Social Sciences (SPSS) Version 21.

4.0 RESULTS

The survey results are presented in two sections. Presented in section 4.1 are the results for the children while results for the adults are presented in section 4.2.

4.1 Results for the Children

4.1.1 Socio-Demographic Characteristics

The data for the survey was collected from 2,298 children (51.4% males and 48.2% females) of ages 5 years, 12 years and 15 years. These respondents were from the urban areas (31.7%), peri-urban areas (28.9%) and rural areas (34.1%) (Table 4.1).

Table 4.1: Socio-demographic characteristics of children

Gender			**Total (N)**
Male	**Female**		
117 (51.4%)	1107 (48.2%)		2,279 (100%)
Location			
Urban	**Peri-urban**	**Rural**	
706 (31.7%)	642 (28.9%)	759 (34.1%)	2,225 (100%)
Age			
5 years	12 Years	15 years	
717 (32.2%)	752 (33.8%)	759 (34%)	2,228 (100%)

4.1.2 Perceived Status of Children's Teeth and Gums

Asked what they thought about the health status of their teeth and gums, 22.8% and 13.3% of the children described their teeth as being in average and bad state respectively while 59.1% said that their gums were in a good state, 18.4% and 7.5% described their gums as being in average and bad state respectively. From the survey, 54.3% of the children described their teeth as being in a good state. Children aged 5 years were more satisfied with their teeth and gums than 12 and 15 year olds ((Fig 4.1 and Table 4.2).

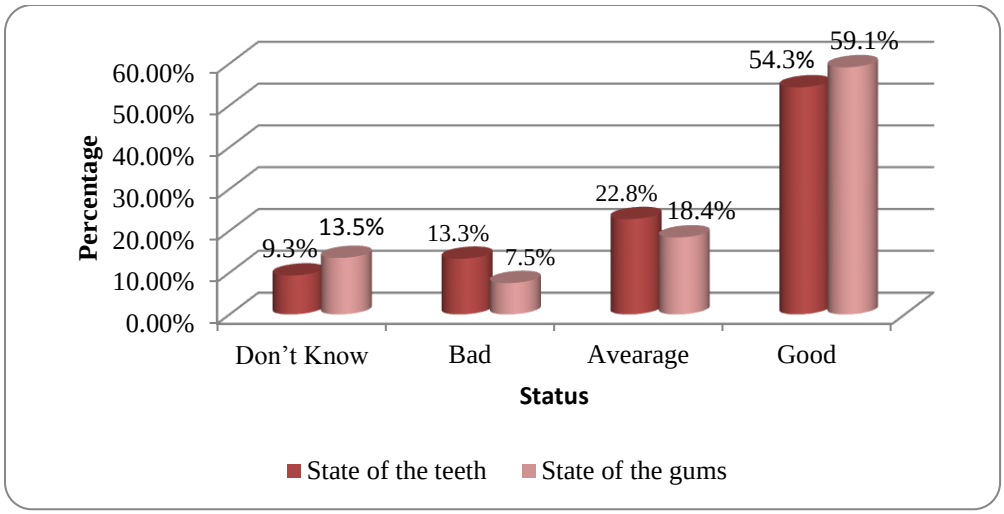


Figure 4.1: Perceived status teeth and gums

Table 4.2: Perceived status and gums by social demographic variable

Demographic Variable	**Perceived State of Teeth**				
Gender	**Good**	**Average**	**Bad**	**Don't know**	**Total**
Male	583 (53.4%)	254 (23.3%)	146 (13.4%)	108 (9.9%)	1091 (100%)
Female	566 (55.4%)	231 (22.6%)	137 (13.5%)	89 (8.5%)	1023 (100%)
Age					n=2114
5years Olds	437 (63.9%)	63 (9.2%)	122 (17.8%)	62 (9.1%)	684 (100%)
12 year olds	428 (60.5%)	144 (20.3%)	77 (10.9%)	59 (8.3%)	708 (100%)
15 year olds	283 (39.5%)	275 (38.4%)	84 (11.7%)	74 (10.4%)	716 (100%)
Location					n=2108
Urban	350 (49.7%)	208 (29.6%)	101 (14.3%)	45 (6.4%)	704 (100%)
Peri-urban	356 (55.8%)	121 (18.9%)	77 (12.1%)	84 (13.2%)	638 (100%)
Rural	456 (58.7%)	154 (19.8%)	100 (12.9%)	67 (8.6%)	777 (100%)
					n=2119
Demographic variable	**Perceived State of Gums**				
Gender					
Male	631 (59.2%)	188 (17.7%)	81 (7.6%)	165 (15.5%)	1065 (100%)
Female	622 (62%)	194 (31.2%)	73 (7.3%)	114 (11.4%)	1003 (100%)
Age					n=2068
5years Olds	486 (72.3%)	58 (8.6%)	50 (7.4%)	79 (11.7%)	673 (100%)
12 year olds	424 (62.2%)	103 (15.1%)	48 (7.1%)	107 (15.6%)	682 (100%)
15 year olds	337 (53.1%)	219 (34.7%)	57 (9.1%)	19 (3.1%)	632 (100%)
Location					n=1987
Urban	436 (62.6%)	159 (22.8%)	44 (6.3%)	58 (8.3%)	697 (100%)
Peri-urban	388 (60%)	83 (12.8%)	58 (9%)	118 (18.2%)	647 (100%)
Rural	416 (58.2%)	136 (19%)	60 (8.4%)	103 (14.4%)	715 (100%)
					n=2059

4.1.3 Previous Experience of Toothache or Tooth Discomfort

The survey findings showed that 53.2% of the respondents had not experienced any toothache or discomfort from their teeth for the 12 months preceding the study while 16.2%, 17.9% and 9.1% had experienced toothache or discomfort on rarely, occasionally and often respectively (Fig 4.2). A slightly higher proportion (62.4%) of children aged 5 years said they had not experienced any pain in the last one year when compared to the other two age groups (Table 4.3).

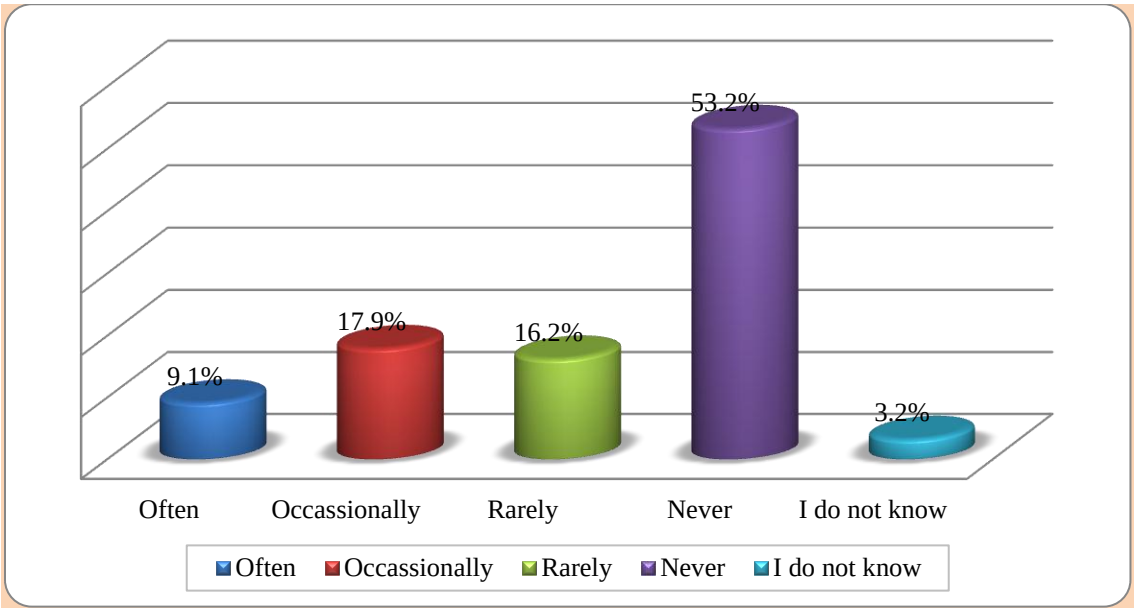


Figure 4.2: Experience of toothache and discomfort

Table 4.3: Experience of toothache and discomfort by social demographic variables

Experience of toothache and discomfort	Gender		Age			Location		
	Male N (%)	Female N (%)	5 years N (%)	12 years N (%)	15 year N (%)	Urban N (%)	Peri-urban N (%)	Rural N (%)
Often	109 (10.0)	85 (8.3)	61 (8.9)	80 (11.3)	53 (7.4)	50 (7.1)	79 (12.2)	62 (8.3)
Occasionally	188 (17.2)	192 (18.8)	108 (15.7)	142 (20.1)	128 (17.9)	131 (18.5)	117 (18.3)	130 (17.4)
Rarely	202 (18.5)	141 (13.8)	52 (7.6)	92 (13.0)	200 (27.9)	182 (25.9)	73 (11.4)	87 (11.6)
Never	555 (50.9)	574 (56.1)	427 (62.4)	37 6(53.1)	302 (44.7)	334 (47.4)	352 (54.9)	428 (57.3)
I do not know	37 (3.4)	31 (3.0)	36 (5.4)	18 (2.5)	15 (2.1)	8 (1.1)	20 (3.2)	40 (5.4)
Total (%)	1023 (100)	684 (100)	684 (100)	708 (100)	698 (100)	705 (100)	641 (100)	582 (100)

4.1.4 Previous Dental Visits

Among the children surveyed, only 9.0% said that they visited a dental clinic at least twice in the previous one year while 46.7% reported that they had never visited a dental clinic in their life time. Over a quarter (28.0 %) had not visited a dental facility in the previous one year (Fig 4.3). Amongst those who had never visited a dental facility, the majority (57.8%) were from the rural areas while 37.7% and 44.4% were from rural and peri-urban respectively residents (Table 4.4).

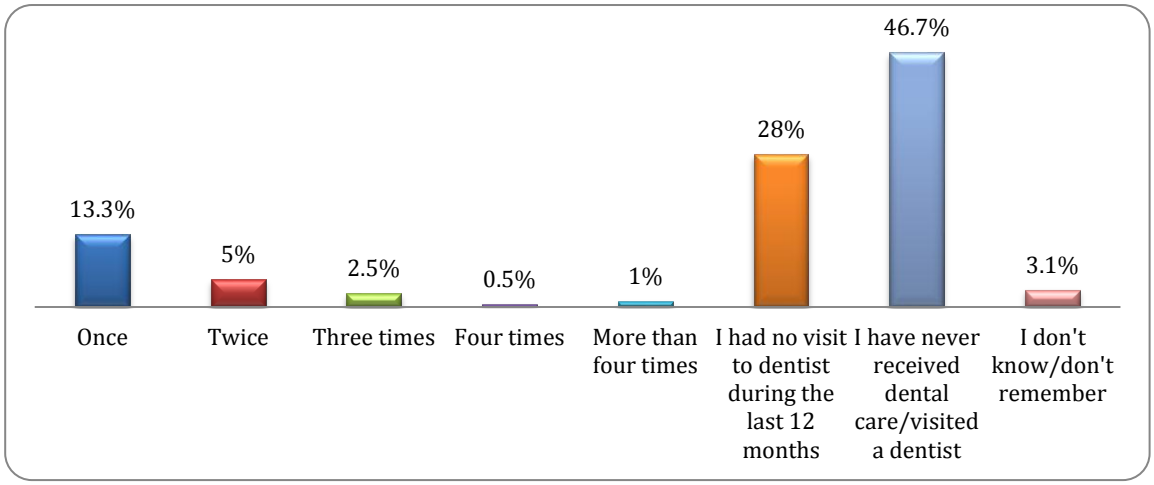


Figure 4.3: Dental visits

Table 4.4: Dental visits by social demographic variables

Dental visits	Gender		Age			Location		
	Male N (%)	**Female N (%)**	**5 Years N (%)**	**12 Years N (%)**	**15 Years N (%)**	**Rural N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Once	151 (13.9)	129 (12.3)	99 (14.5)	94 (13.4)	88 (12.4)	114 (16.2)	81 (12.6)	81 (11.0)
Twice	56 (5.2)	46 (4.4)	35 (5.1)	46 (6.5)	23 (3.2)	43 (6.1)	35 (5.5)	25 (3.4)
Three times	28 (2.6)	46 (4.4)	12 (1.8)	28 (4.00)	13 (1.8)	29 (4.1)	17 (2.7)	8(1.1)
Four times	2 (0.2)	7 (0.7)	3 (0.4)	4 (0.6)	2 (0.3)	4 (0.6)	4 (0.6)	1 (0.1)
More than four times	11 (1.0)	11 (1.0)	4 (0.6)	5 (0.7)	13 (1.8)	9 (1.3)	9 (1.4)	3 (0.3)
Had no visit to dentist during the last 12 months	288 (26.6)	304 (29.2)	153 (22.4)	222 (31.6)	214 (30.0)	228 (32.3)	192 (30.0)	162 (21.8)
Never received dental care/visited a dentist	509 (46.9)	475 (45.8)	343 (50.2)	284 (40.4)	350 (49.0)	266 (37.7)	284 (44.4)	427 (57.8)
Don't know/don't remember	39 (3.6)	24 (2.3)	34 (5.0)	20 (2.8)	11 (1.5)	12 (1.7)	18(2.8)	33 (4.5)
Total (%)	**1084 (100)**	**1042 (100)**	**683 (100)**	**703 (100)**	**714 (100)**	**705 (100)**	**640 (100)**	**740 (100)**

4.1.5 Reason for the Previous Dental Visit

Dental visits for routine checkups were found to be low (9.9%). The main reason for the previous dental visit was because something was wrong with the teeth/gum (70.2%) (Fig 4.4). Approximately a quarter (26.7%) of the children aged 5 years did not to know why they had visited a dental facility compared to those aged 12 years olds (15.2%) and 15 year olds (18.2%) respectively. More rural children (45%) than urban (3.8%) and peri-urban children (9.0%) did not know the reason for the previous dental visit (Table 4.5).

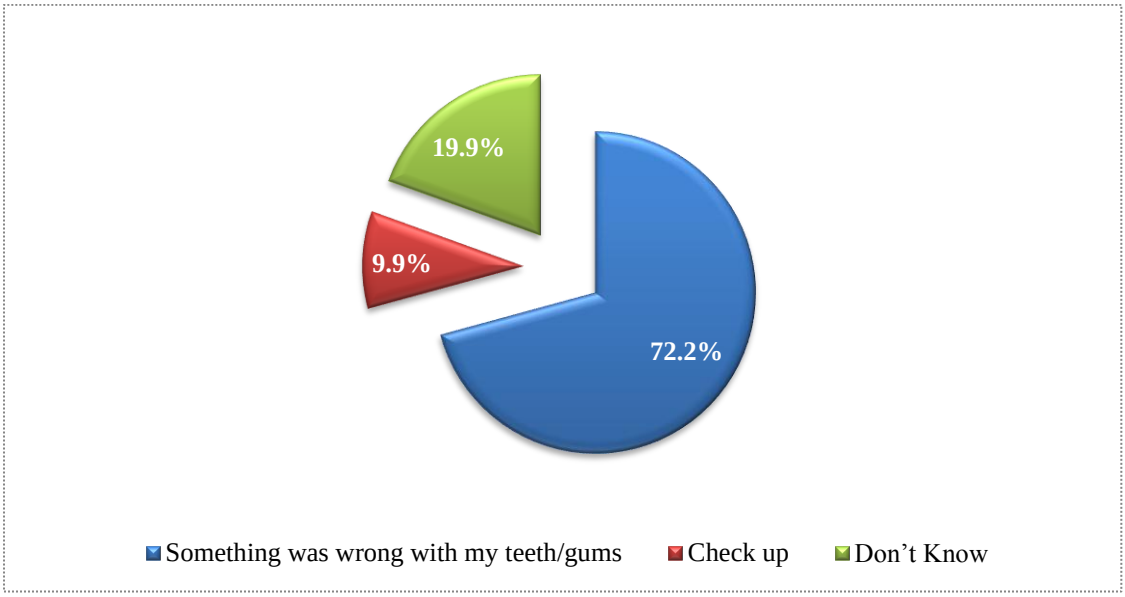


Figure 4.4: Reasons for visiting the dentist

Table 4.5: Reasons for visiting the dentist by demographic variables

Reason for visiting the dentist	Gender		Age			Local		
	Male N(%)	**Female N(%)**	**5 Years N(%)**	**12 Years N(%)**	**15 Years N(%)**	**Rural N(%)**	**Peri-urban N(%)**	**Rural N(%)**
Something was wrong with my tooth	214 (73.3)	187 (67.2)	132 (70.6)	155 (73.4)	116 (65.9)	170 (81.0)	134 (85.9)	94 (74.8)
Check up	47 (16.1)	65 (23.4)	50 (26.7)	32 (15.2)	32 (18.2)	8 (3.8)	14 (8.9)	16 (12.6)
I do not know	31 (10.6)	26 (9.4)	5 (2.7)	24 (11.4)	28 (15.9)	32 (15.2)	8 (5.2)	16 (12.6)
Total	**292 (100)**	**278 (100)**	**187 (100)**	**211 (100)**	**176 (100)**	**210 (100)**	**156 (100)**	**126 (100)**

4.1.6 Reason for not visiting a Dentist

The survey found out that 51.6% of the respondents had no specific reason for not visiting the dentist in the previous one year. In general the reasons given for not visiting the dentist were: long distance to the dental clinic (2.4%), unfriendly dental workers (0.8%), fear of getting infected with HIV (0.8%), fear of losing a tooth (7.7%), fear of painful treatment (8.3%), long waiting time (0.8%), high cost of treatment (6.5%) and various other unspecified reasons (22%) (Fig 4.5). Among the 15 year olds, 12.3% and 12.4% indicated high cost and pain respectively as the reasons for not visiting a dental clinic compared to 2.9% and 5.0% for the 5 years olds and 4.2% and 7.3% for the 12 year olds (Table 4.6).

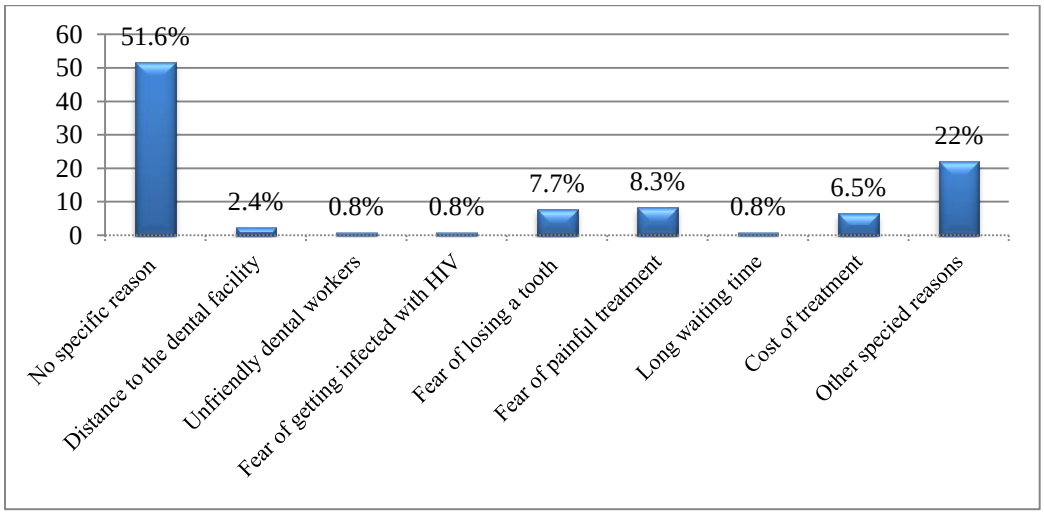


Figure 4.5: Reason for not visiting the dental facility

Table 4.6: Reason for not visiting the dental facility by demographic variables

Reason for not visiting the dentist	Location			Gender		Age		
	Urban	Peri Urban	Rural	Male	Female	5 Years	12 Years	15 Years
Distance to the dental clinic	19 (2.7)	14 (2.2)	12 (1.6)	32 (2.9)	14 (1.4)	2 (0.3)	11 (1.5)	33 (4.6)
Unfriendly dental worker	5 (0.7)	5 (0.8)	5 (0.7)	7 (0.6)	9 (0.9)	5 (0.4)	10 (1.4)	15 (0.4)
Fear of HIV Infection	7 (1.0)	6 (0.7)	3 (0.4)	9 (0.8)	7 (0.7)	0 (0.00)	8 (1.1)	8 (1.1)
Fear of losing a tooth	41 (5.8)	45 (7.0)	64 (8.6)	70 (6.4)	81 (7.9)	45 (6.6)	44 (6.2)	46 (8.7)
Fear of painful treatment	58 (8.2)	54 (8.4)	62 (8.3)	84 (7.7)	93 (9.0)	34 (5.0)	52 (7.3)	15 (12.4)
Long waiting time	9 (1.3)	3 (0.4)	3 (0.4)	9 (0.8)	6 (0.6)	1 (0.1)	9 (1.3)	5 (0.7)
Cost of treatment	48 (6.8)	52 (6.1)	38 (5.1)	83 (7.6)	56 (5.5)	20 (2.9)	30 (4.2)	88 (12.3)
Total (% of total respondents in sample)	**187(26.5)**	**179 (25.6)**	**187 (25.1)**	**294 (26.8)**	**266 (26)**	**107 (15.3)**	**164 (23)**	**210 (40.2)**

4.1.7 Oral Hygiene Practices

Tooth brushing was a common practice among the respondents, although the frequency per day was low. From the findings, 3.5% of the respondents had never brushed their teeth, while 32.4% of the respondents said they brushed their teeth two or more times a day. The survey revealed that 47.6% of the respondents brushed their teeth once a day while 9.7% brushed several times a week, 3.1% once a week and 3.8% several times a month (Fig 4.6).

A larger proportion (7.9%) of younger children had never brushed their teeth compared to older children (2.6%), and 45.5% of urban children brushed their teeth at least twice a day (Table 4.7%).

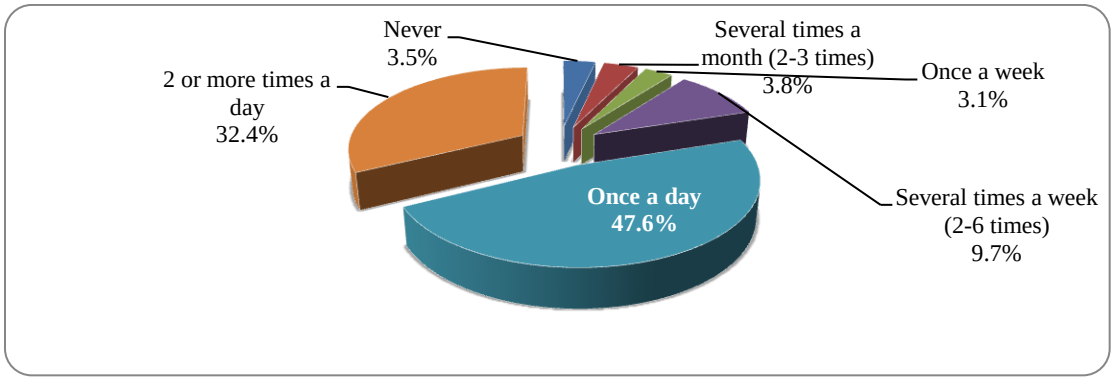


Figure 4.6: Frequency of teeth brushing

Table 4.7: Frequency of brushing by social demographic variables

Frequency of brushing	Location			Gender		Age		
	Urban	**Peri Urban**	**Rural**	**Male**	**Female**	**5 Years**	**12 Years**	**15 Years**
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Never	5 (0.7)	15 (2.4)	53 (7.1)	45 (4.1)	28(2.7)	54 (7.9)	18 (2.5)	1 (0.1)
Several times a month (2-3 times)	7 (1.0)	26 (4.1)	46 (6.2)	24(2.2)	56(5.5)	19 (2.8)	32 (4.5)	26 (3.6)
Once a week	6 (0.9)	17 (2.7)	41 (5.5)	44(4.1)	21(2.1)	29 (4.3)	26 (3.7)	11 (1.5)
Several times a week (2-6 times)	28 (4.0)	74 (11.6)	102 (13.7)	109(10.1)	96 (9.4)	55 (8.1)	84 (11.8)	66 (9.3)
Once a day	339 (48.2)	290 (45.4)	365 (48.9)	523 (48.3)	480 (46.9)	343(50.4)	297(41.9)	363(50.8)
2 or more times a day	318 (45.2)	216 (33.8)	140 (18.6)	339 (31.2)	343 (33.4)	180 (26.6)	252 (35.5)	248 (34.7)
Total (%)	**703 (100)**	**638 (100)**	**747 (100)**	**1084 (100)**	**1024 (100)**	**680 (100)**	**709**	**715 (100)**

4.1.8 Assisted Teeth Brushing

Overall, the survey established that 95.5% of the children brushed their teeth themselves while some reported that they were assisted in brushing their teeth as follows: 3.9% by their mothers, 0.2% by their fathers and 0.3% by others (Fig 4.7). All children aged 15 years brushed their teeth themselves, 99.3% of those aged 12 years and 86.3% of those aged 5 years brushed their teeth by themselves respectively.

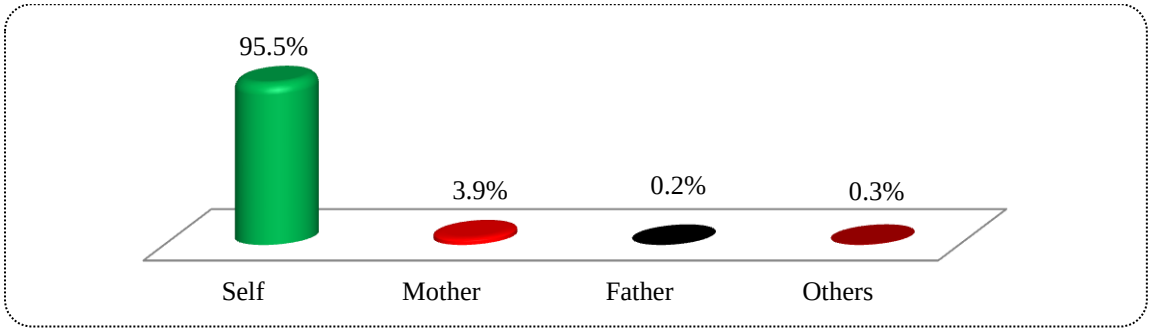


Figure 4.7: Person who brushes teeth

4.1.9 Brushing Devices

Use of tooth brushes was high among the respondents at 85.3%. Additionally, 20.2% of the respondents said they used wooden tooth picks to clean their teeth, while 6.2% used dental floss, 4.7% used charcoal and 38.2% chew stick/*Mswaki*. Seven percent (7.0%) used of other unspecified aids to clean their teeth (Fig 4.8). The findings established that more urban residents than rural and peri urban residents used toothbrushes while, more rural residents than urban and peri urban residents used chewing stick/*Mswak*i (Table 4.8).

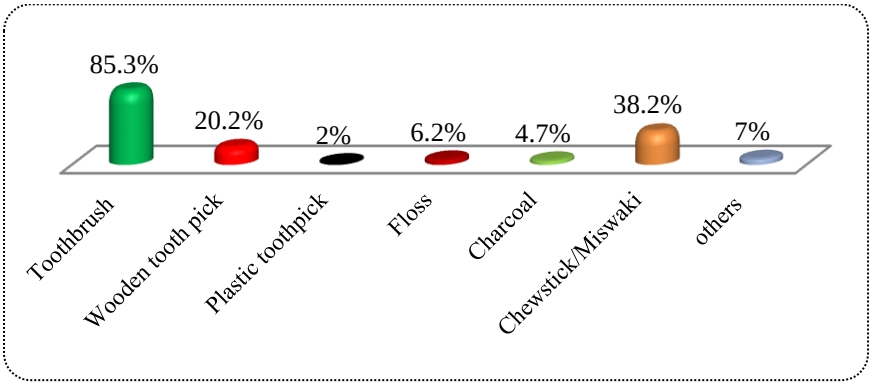


Figure 4.8: Devices used to clean teeth

Table 4.8: Devices used to clean teeth

	Gender		Age			Local		
Do you use any of the following to clean your teeth or gums?	**Male N (%)**	**Female N (%)**	**5 Years N (%)**	**12 Years N (%)**	**15 Years N (%)**	**Rural N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Toothbrush	876 (82.8)	888 (87.7)	876 (82.8)	628 (89.8)	628 (85.5)	659 (94.0)	535 (85.6)	553 (76.5)
Wooden tooth pick	228 (22.1)	180 (18.3)	56 (8.9)	156 (22.60	193 (28.1)	146 (20.9)	124 (20.3)	128 (18.7)
Plastic toothpick	22 (2.2)	18 (1.8)	1 (0.2)	13 (1.9)	26 (3.8)	10 (1.4)	13 (2.1)	17 (2.5)
Floss	58 (5.7)	65 (6.6)	2 (0.3)	54 (7.9)	68 (10.0)	73 (10.5)	23 (3.7)	27 (4.0)
Charcoal	50 (4.9)	45 (4.6)	15 (2.5)	28 (4.1)	52 (7.7)	26 (3.8)	42 (6.9)	27 (4.0)
Chew stick/*Miswaki*	424 (41.2)	343 (35.0)	183 (29.1)	257 (37.3)	325 (47.5)	130 (18.7)	261 (42.5)	363 (53.3)
Other	31 (7.5)	25 (6.6)	5 (3.0)	21 (8.8)	30 (7.7)	14 (8.3)	15 (9.3)	27 (6.0)
Total (Ratio of responses to respondents))	**1689 (1.66)**	**1564 (1.61)**	**1138 (1.27)**	**1157 (2.26)**	**1322 (1.90)**	**1058 (1.58)**	**1013 (1.70)**	**1142 (1.65)**

4.1.10 Use of Toothpaste

Use of toothpaste while brushing teeth was high among the respondents (82.7%). However, only 72.3% of those who used toothpaste said they used of a fluoridated tooth paste and 5.4% used unfluoridated toothpaste. Another 22.3% of the respondents were not sure whether the toothpaste they used was fluoridated or not (Fig 4.9 and Table 4.9).

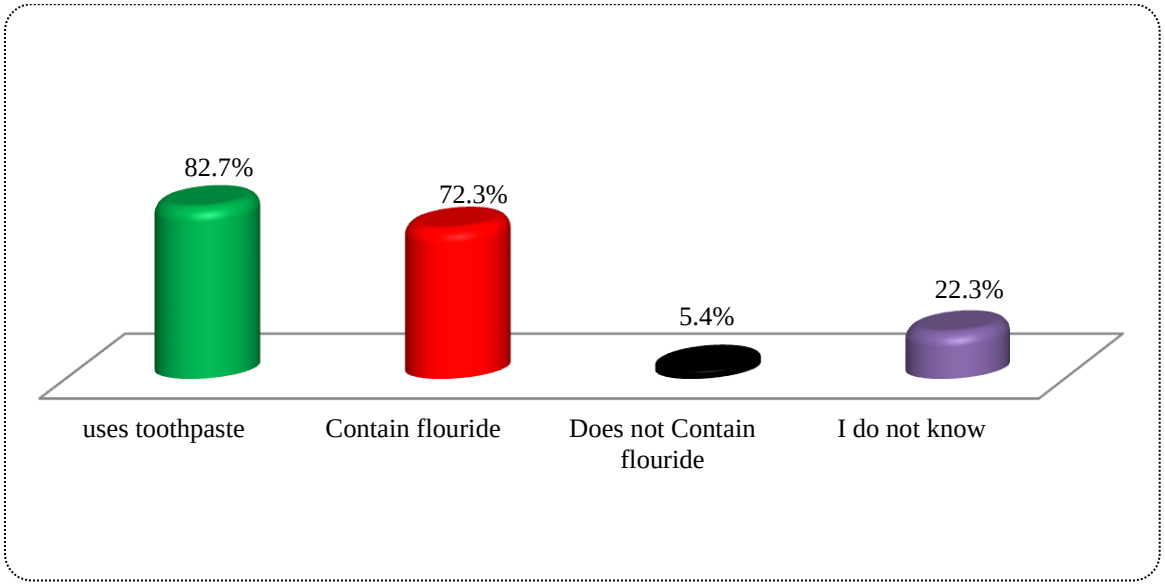


Figure 4.9: Use of fluoridated tooth paste

Table 4.9: Use of Fluoridated tooth paste by demographic variables

		Gender		Age			Location		
		Male N (%)	**Female N (%)**	**5 Years N (%)**	**12 Years N (%)**	**15 Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Do you use toothpaste to clean your teeth? Tooth		849 (79.6)	869 (86.1)	508 (77.4)	616 (87.3)	588 (82.9)	652 (93.3)	528 (84.1)	521 (71.7)
Contain Fluoride	**yes**	690 (71.5)	703 (72.8)	380 (66.3)	521 (77.0)	489 (72.6)	566 (83.5)	463 (85.1)	350 (50.9)
	No	57 (5.9)	48 (5.0)	20 (3.5)	44 (6.5)	41 (6.1)	10 (1.5)	20 (3.7)	71 (10.3)
	I do not know	281 (22.6)	214 (22.2)	173 (30.2)	112 (16.5)	144 (21.4)	102 (15.0)	61 (11.2)	267 (38.8)
Total(Ratio of responses to respondents)		**1877 (1.80)**	**1834 (1.86)**	**701 (1.77)**	**1293 (1.87)**	**1262 (1.83)**	**1330 (1.93)**	**1072 (1.84)**	**120 9(1.72)**

4.1.11 Oral Health Related Quality of Life

On assessment of the oral health related quality of life, 99.1% of the respondents had at least one negative oral attribute, thus 31% of them had a problem biting hard food due to their teeth, 27.8% avoided smiling and 18.9% missed school in the preceding year because of their teeth (Fig 4.10). Dissatisfaction with teeth appearance increased with age, thus 43.9% of 15 year old said that they were not satisfied with their teeth appearance compared to 17.5% of the 5 year olds. A higher proportion (36.9%) of urban based children said they were unsatisfied with their teeth appearance compared to peri urban children (28.8%) and rural (27.1%) children Difficulties in chewing was experienced more among rural based children than the urban and peri urban based children (Table 4.10).

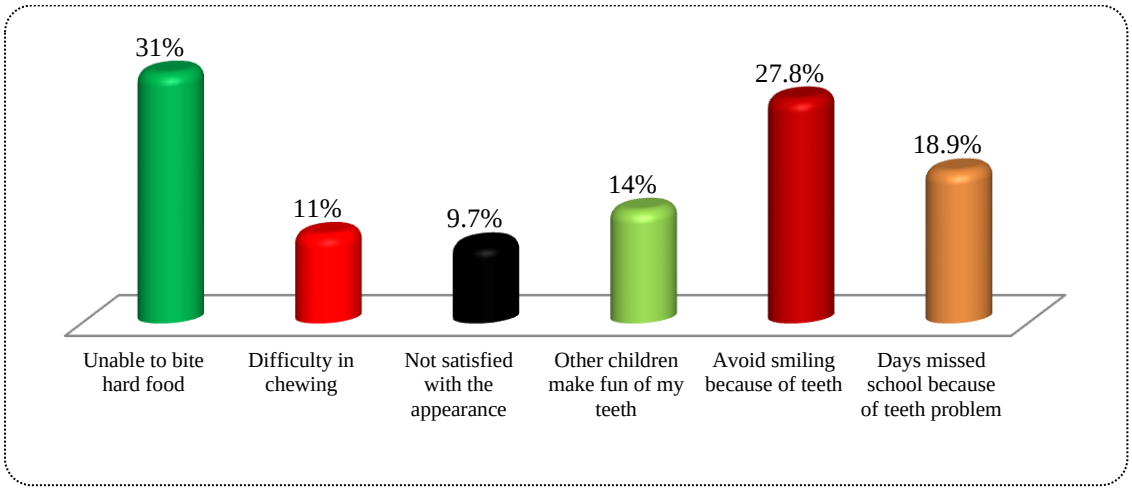


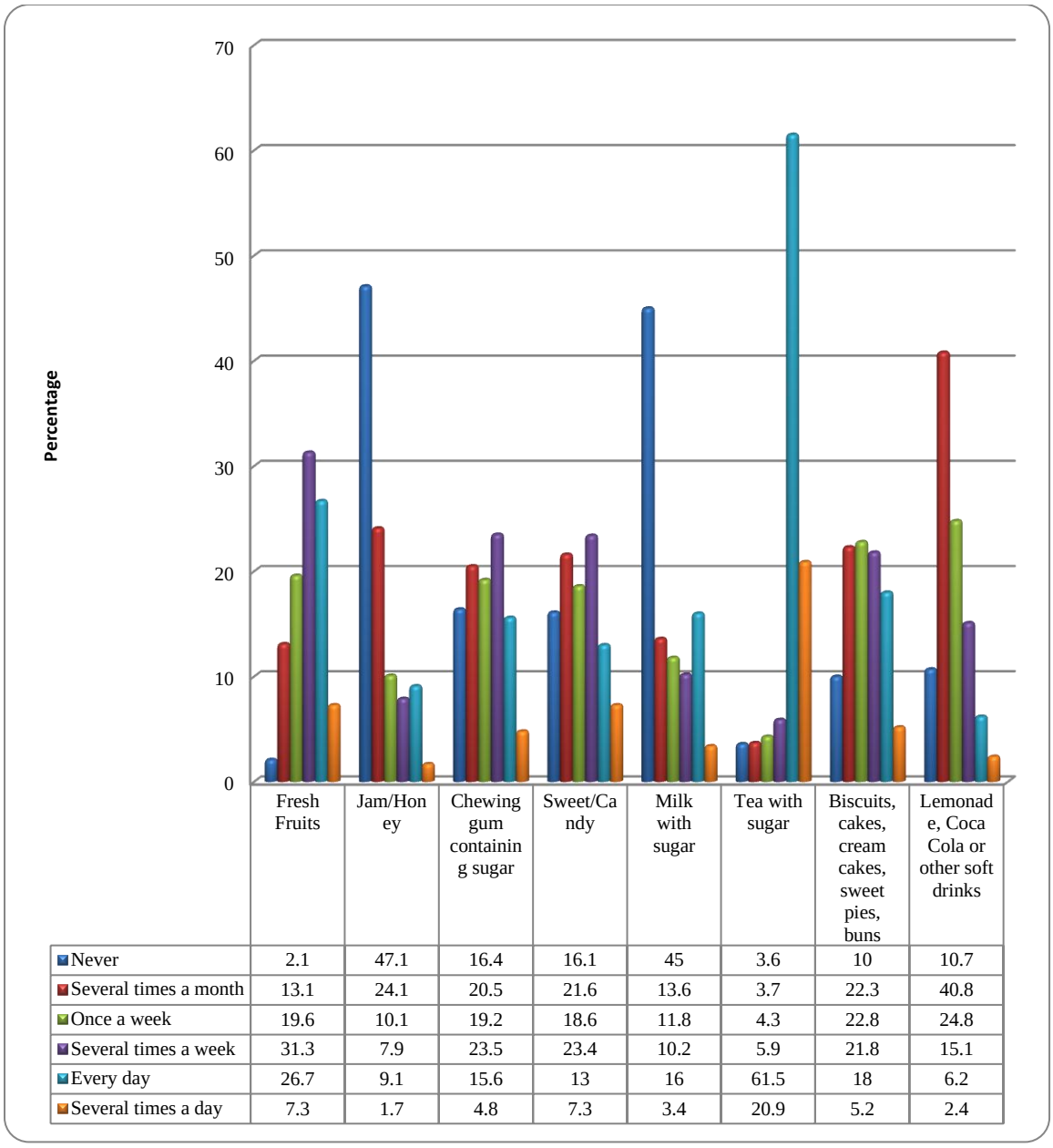
Figure 4.10: Oral health related quality of life

Table 4.10: Oral health related quality of life by demographic variables

	Gender		Age			Location		
Attribute	**Male N (%)**	**Female N (%)**	**5 years N (%)**	**12 years N (%)**	**15 years N (%)**	**Urban N (%)**	**Peri urban N (%)**	**Rural N (%)**
Unable to bite hard food	307 (28.7)	207 (26.7)	177 (30.4)	194 (33.3)	211(36.3)	17 4(30.2)	177 (30.7)	225 (39.1)
Difficulty in chewing	208 (19.4)	187 (18.6)	152 (38.6)	128 (32.5)	174 (28.9)	113 (16.4)	116 (18.3)	163 (22.2)
Not satisfied with the appearance	325 (30.4)	320 (31.6)	118 (17.6)	214 (30.5)	309 (43.9)	254 (36.9)	183 (28.8)	200 (27.1)
Other children make fun of my teeth	127 (11.9)	75 (7.5)	57 (8.5)	78 (11.2)	66 (9.4)	52 (7.6)	72 (11.4)	74 (10.1)
Avoid smiling because of teeth	126 (11.8)	102 (10.1)	69 (10.3)	75 (10.8)	82 (11.6)	62 (9.0)	78 (12.3)	85 (11.6)
Days missed school because of teeth problem	159 (14.9)	130 (12.9)	80 (12.0)	111 (15.9)	99 (14.0)	88 (12.8)	80 (12.7)	122 (16.7)
Ratio of responses to respondents	1252 (1.17)	1021 (1.07)	653 (1.17)	800 (1.34)	941 (1.44)	743 (0.83)	706 (1.14)	869 (1.27)

4.1.12 Consumption of Various Foods/Drinks

There was low consumption of jam/honey, sweet/candy, milk with sugar, although the majority of children (60.9%) drunk tea with sugar every day (Fig 4.11).



	Fresh Fruits	Jam/Honey	Chewing gum containing sugar	Sweet/Candy	Milk with sugar	Tea with sugar	Biscuits, cakes, cream cakes, sweet pies, buns	Lemonade, Coca Cola or other soft drinks
Never	2.1	47.1	16.4	16.1	45	3.6	10	10.7
Several times a month	13.1	24.1	20.5	21.6	13.6	3.7	22.3	40.8
Once a week	19.6	10.1	19.2	18.6	11.8	4.3	22.8	24.8
Several times a week	31.3	7.9	23.5	23.4	10.2	5.9	21.8	15.1
Every day	26.7	9.1	15.6	13	16	61.5	18	6.2
Several times a day	7.3	1.7	4.8	7.3	3.4	20.9	5.2	2.4

Figure 4.11: Consumption of snacks

4.1.13 Drug and Substance Abuse

Smoking of cigarettes, pipes or cigars was uncommon among the 12 and 15 year olds. Only 0.7 % of the children seldom smoked. Similarly, chewing of tobacco or snuff was also low at 0.6% while chewing of Miraa was 4.1% amongst the respondents (Fig 4.12). More males than females smoked and chewed Miraa (Table 4.11).

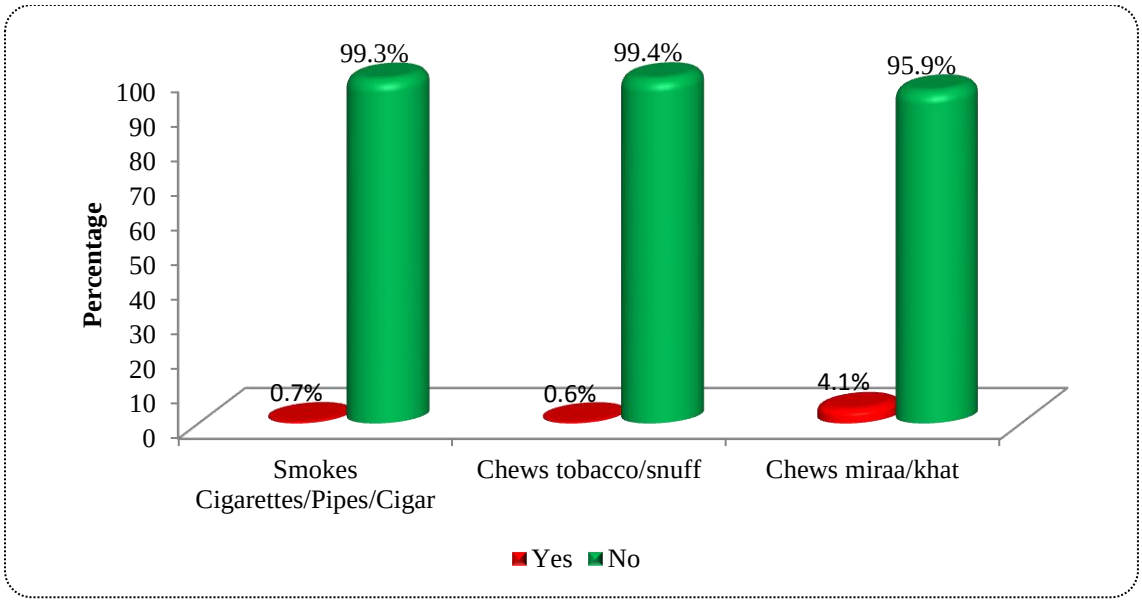


Figure 4.12: Alcohol and drug substance abuse

Table 4.11: Alcohol and drug substance abuse by demographic variable

		Gender		Age		Location		
Habit		**Male**	**Female**	**12 years**	**15 years**	**urban**	**Peri urban**	**Rural**
Smokes cigarettes/pipes/cigar	**Seldom**	8 (1.1)	1 (0.2)	1 (0.2)	8 (1.1)	2 (0.4)	5 (1.4)	2 (0.4)
	Once a week	1 (0.1)	0	0	1 (0.1)	0	1 (0.3)	0
Chews tobacco/snuff		2 (0.3)	6 (0.9)	2 (0.3)	6 (0.8)	1 (0.2)	0	7 (1.3)
Chews miraa/khat		37 (5.1)	20 (3.1)	15 (2.3)	42 (6.1)	14 (2.9)	18 (4.9)	25 (4.9)
Total (% of total respondents)		48 (6.6)	27 (4.2)	18 (2.8)	57 (8.1)	17 (3.5)	24 (6.6)	34 (6.6)

***NB 5 year olds did not respond to this question**

4.1.14 Education Level for the Father Figure in the Household

Figure 4.13 shows the level of education for the male figure (father, step father, guardian or other male) living with the child. About a fifth (20.2%) had tertiary level education, 4.7% had no education, 13.9% had primary level education, 17.8% secondary level education and 4.5% of the respondents had no male figure in the household.

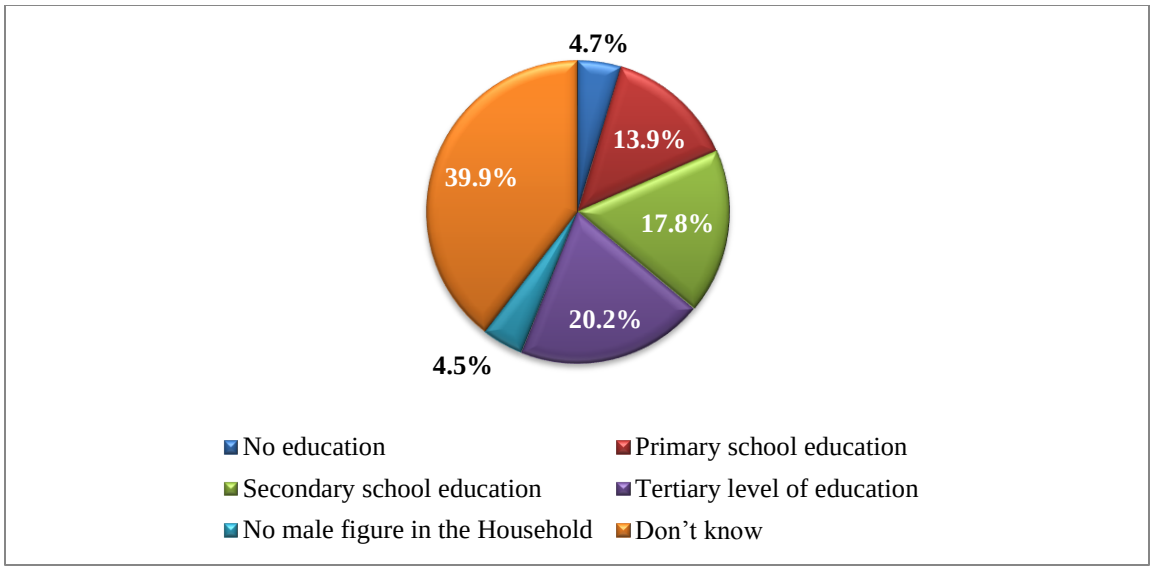


Figure 4.13: Education of the parent/guardian

4.1.15 Dental Caries

The prevalence of dental caries was 23.9% among the children. The number of teeth affected ranged from 1-14 teeth. A small proportion (3.4%) of the children had teeth missing due to caries while 0.5% had filled teeth. The prevalence of dental caries was higher among the 5 year olds (46.3%) when compared to the other age groups (Table 4.12).

Table 4.12: Number of children with decayed, missing and filled teeth

		Number of children with decayed, missing and filled teeth		
Variable		**Decayed n(%)**	**Missing due to caries n(%)**	**Filled n(%)**
Age	**5 years**	373 (46.3)	55 (6.8)	7 (0.9)
	12 years	143 (17.7)	20 (2.5)	3 (0.4)
	15 years	7 (8.8)	10 (1.2)	3 (0.4)
Gender	**Male**	283 (24.2)	45 (3.9)	2 (0.5)
	Female	276 (24.4)	37 (3.3)	5 (1.3)
Location	**Urban**	199 (22.9)	38 (4.4)	11 (1.3)
	Peri-	184 (29.2)	15 (2.4)	0 (0)
	urban	200 (22.4)	31 (3.5)	1 (0.1)
	Rural			

4.1.16 Dental Caries Experience

The overall DMFT/dmft for the children was 0.8. The mean dmft for the 5 year old children was 1.87, while the DMFT/dmft for 12 years old children was 0.42, children aged 15 years had a DMFT of 0.17. The major contributor of the dmft/DMFT was tooth decay indicating unmet need, followed by missing teeth due to caries indicating that the main form of treatment was tooth extraction. Females recorded a higher dmft/DMFT of 1.38 compared to 0.82 recorded for males. The dental caries experience was highest (0.86) among the peri urban children and lowest (0.65) among the urban children. The rural children had a dental caries experience of 0.76. There was no variation in the caries experience in the rural, urban and peri-urban respondents (Table 4.13)

Table 4.13: Dental caries experience by demographic variables

Variable		Mean decayed	Mean missing	Mean filled	dmft/DMFT
Age	5 years	1.73	0.12	0.02	1.87
	12 years	0.37	0.04	0.01	0.42
	15 years	0.14	0.02	0.01	0.17
Gender	Male	0.75	0.06	0.01	0.82
	Female	0.75	0.61	0.02	1.38
Location	Urban	0.65	0.08	0.03	0.76
	Peri-urban	0.86	0.03	0.00	0.89
	Rural	0.76	0.00	0.00	0.76
Overall		0.73	0.01	0.06	0.80

4.1.17 Gum Health Status

The overall prevalence of gingival bleeding among the children was 75.7%. The children aged 5 years had the highest (99.6%) prevalence of gingival bleeding. There was no major difference in gingival bleeding between the males and females. The rural children had a lower prevalence of gingival bleeding (70.2%) compared to the peri-urban and urban children (Table 4.14).

Table 4.14: Prevalence of gingival bleeding by demographic variables

Variable	Category	Prevalence of bleeding
Age	5 years	803 (99.6%)
	12 years	603 (74.4%)
	15 years	457 (54.1%)
Gender	Male	907 (77.7%)
	Female	870 (76.9%)
Location	Urban	693 (79.7%)
	Peri-urban	504 (80.0%)
	Rural	628 (70.2%)

4.1.18 Oral Mucosal Lesions in Children

On clinical examination, 3.2% of the children were found to have oral mucosal lessions. Oral ulcerations were found in 1.5% and abcesses in 0.9% of the children. Other oral mucosal lesions were found in 2.0% of the children (Figure 4.14).

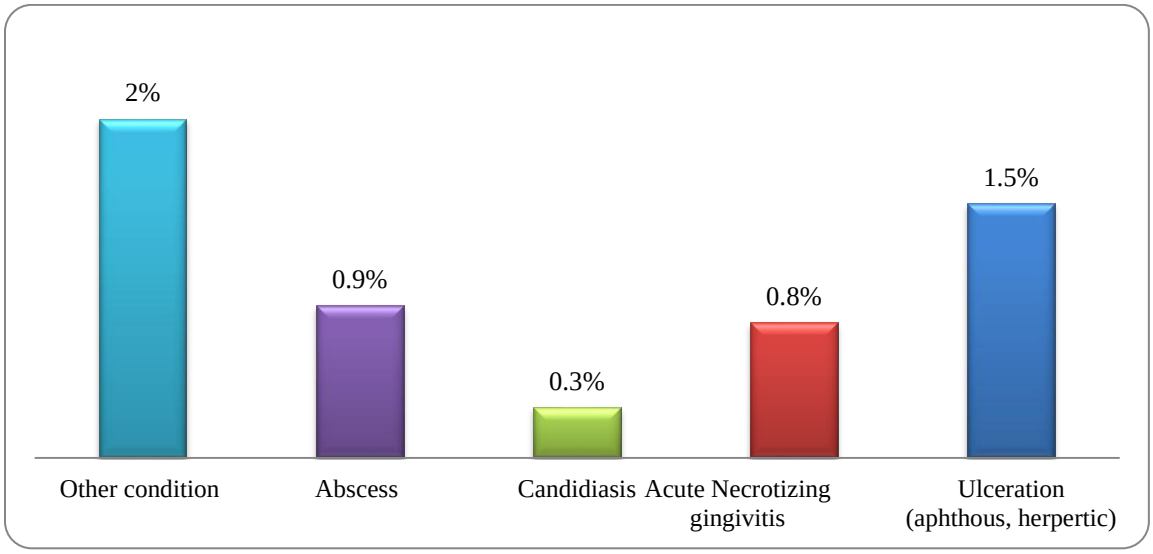


Figure 4.14: Prevalence of oral lesions

4.1.19 Dental Fluorosis

The overall prevalence of dental flourosis was 41.4%. It was higher among the males (41.3%) than the females (38.5%). The 12 year olds and the rural residents had a higher prevalence of dental flourosis. (Fig 4.15).

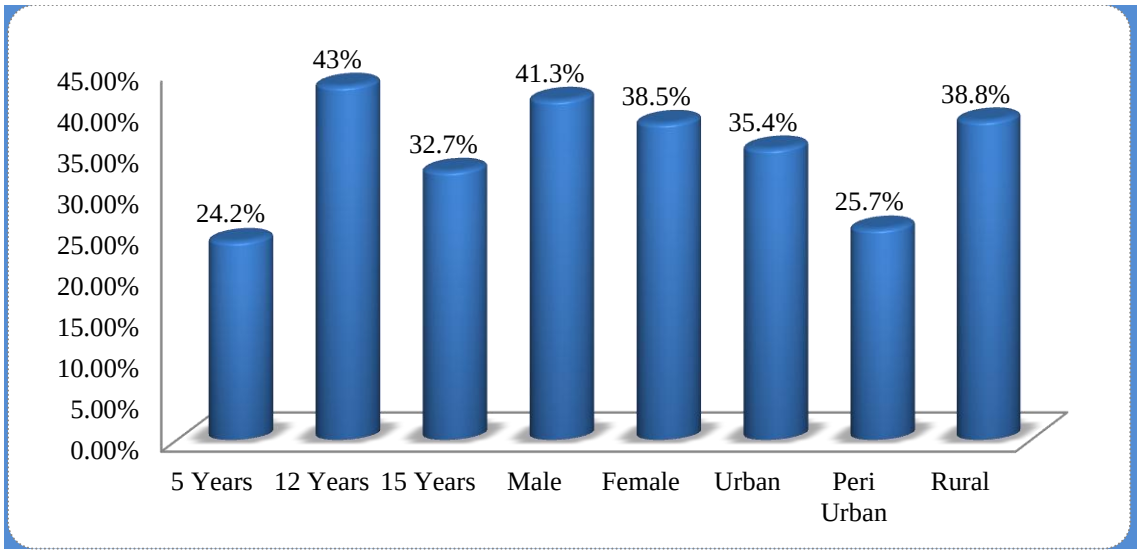


Figure 4.15: Prevalence of dental fluorosis by demographic variables

4.2 Results for the Adults

4.2.1 Distribution of Adult Participants by County

A total of 1,462 adult respondents participated in the survey. Most of the respondents (30.0%) were from Nairobi County. There was almost equal number of males and females while more respondents were from the rural areas (Table 4.15 and Fig 4.16).

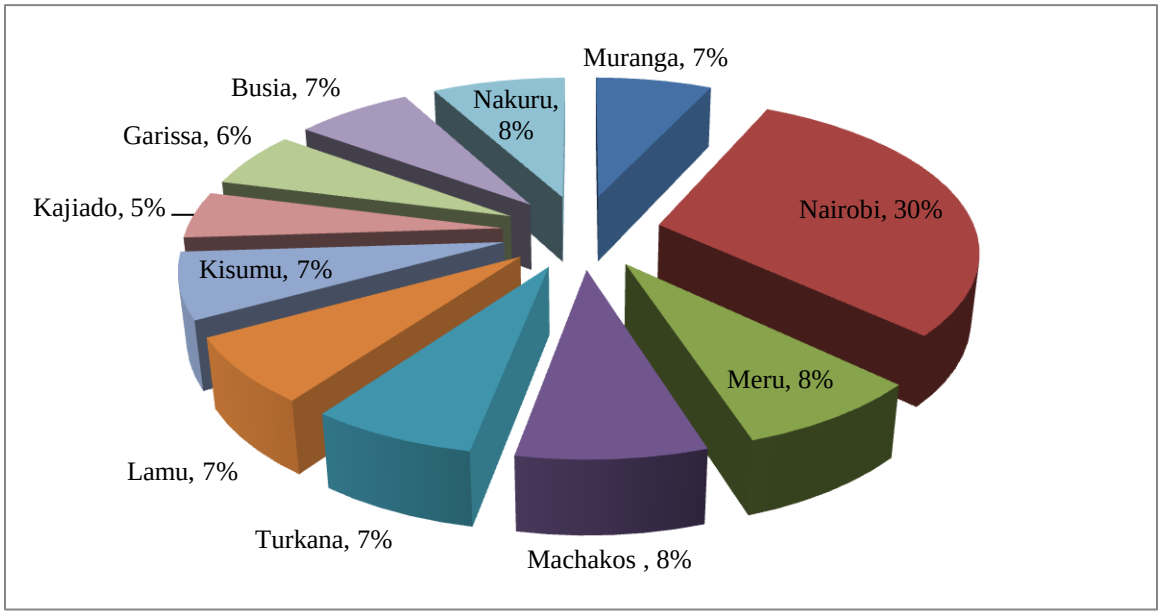


Figure 4.16: Distribution of the participants by county

Table 4.15: Demographic characteristics of the adults

		Male N %	Females N %	Frequency	Percentage (%)
Age	**35-44 years**	305 (43.7)	393 (56.3)	602	100
	60+ years	297 (43.4)	387(56.6)	780	100
Total				1382	
Location	**Urban**	238 (49.7)	241 (50.3)	479	100
	Peri urban	133 (48.2)	143 (51.8)	276	100
	Rural	318 (51.7)	297 (48.3)	615	100
Total				1370	
Overall		**633 (44.1)**	**804 (55.9%)**	**1437**	**100**

4.2.2 Presence of Natural Teeth

From the survey, 94% of the respondents said that they had their natural teeth in the mouth while a small proportion of 6% said they did not to have any natural teeth in their mouth (Fig 4.17).

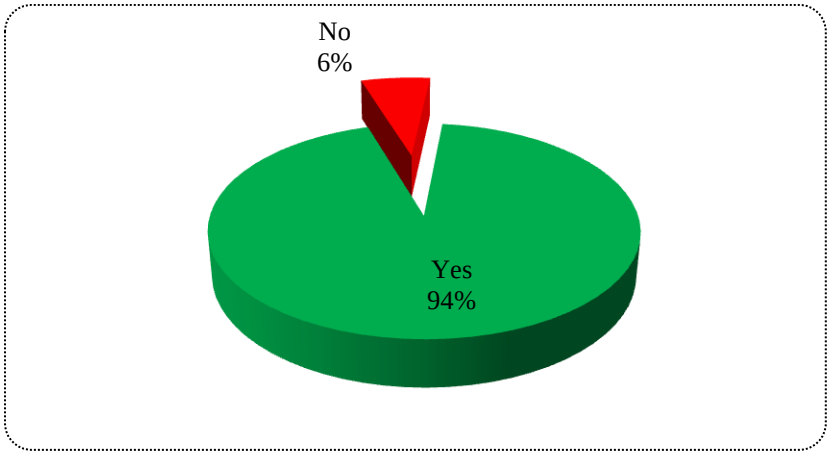


Figure 4.17: Presence of natural teeth

4.2.3 Level of Education

The survey findings revealed that 40.8% of the respondents had not finished primary level of education and only 17.6% % had completed the tertiary school level of education (Fig 4.18).

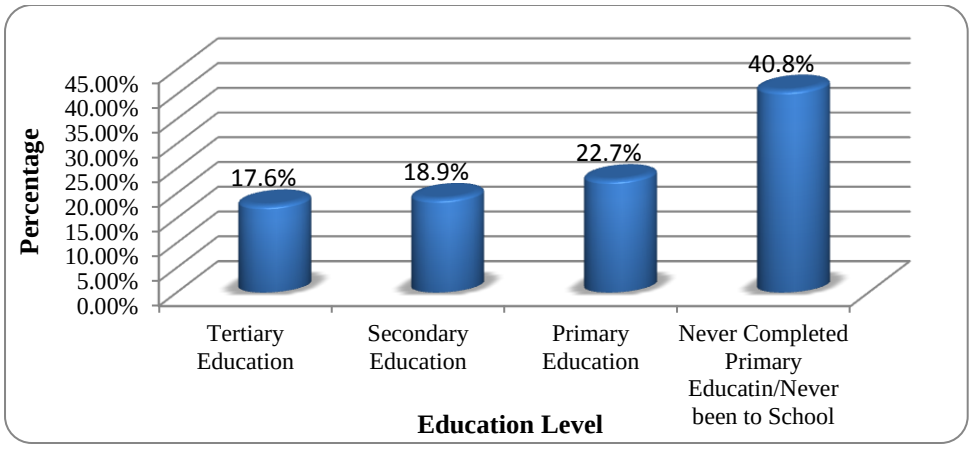


Figure 4.18: Level of education

4.2.4 Perception of the Status of Teeth and Gums

Overall, most adult respondents pervceived their teeth to be good, very good or excellent (55.8%) while 56.0% percieved their gums to be in a similar status (Fig 4.19).

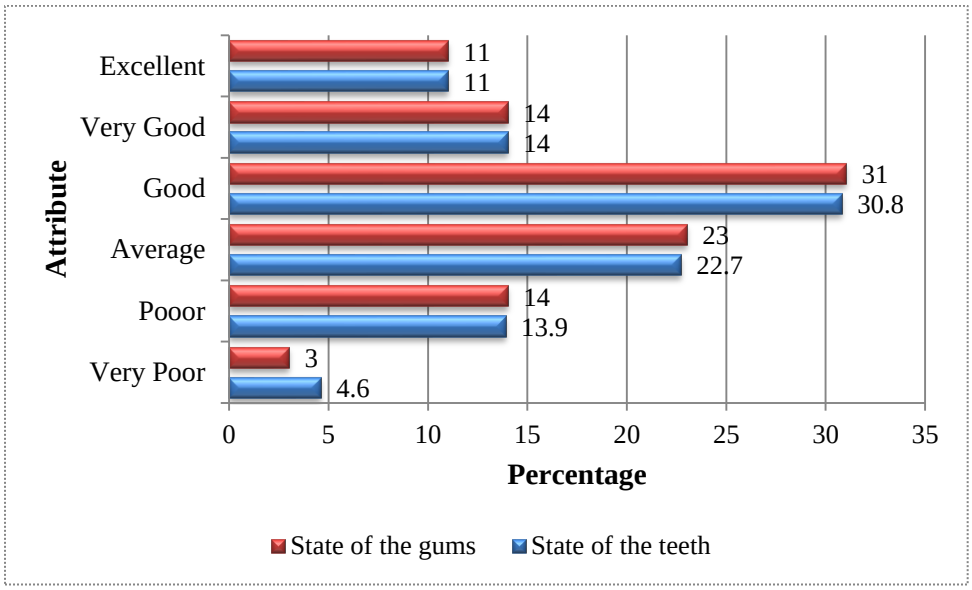


Figure 4.19: Perceived status of teeth and gums

4.2.5 Brushing of Teeth

The survey showed that 36.9% of the respondents brushed their teeth twice or more in a day while 43.1% brushed their teeth once a day, 9.4% brushed their teeth 2-6 times per week, and 4.3% said they had never brushed their teeth (Fig 4.20). Those aged 35-44 years were more likely to brush their teeth at least twice a day (44.1%) compared to those

aged 60+years (29.7%). A large proportion (44.2%) of urban residents brushed their teeth at least twice a day compared peri-urban (34.6%) and rural (33.3%) residents (Table 4.16).

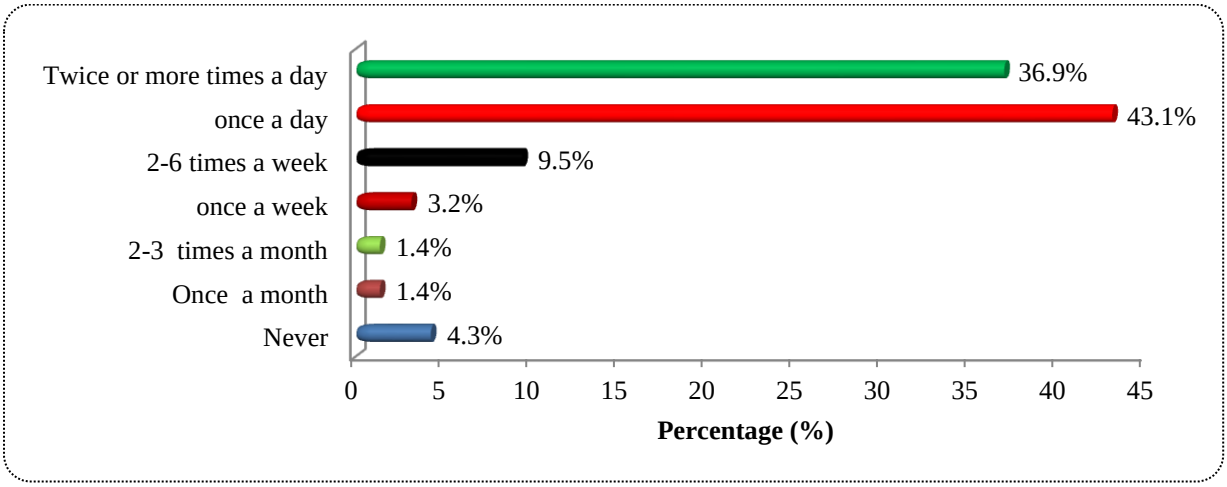


Figure 4.20: Frequency of brushing teeth

Table 4.16: Frequency of brushing teeth by demographic variables

	Gender		Age		Location		
	Male N (%)	**Female N (%)**	**35-44 Years N (%)**	**60+ Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Never	31 (4.9)	31 (3.9)	11 (1.6)	49 (7.2)	26 (5.2)	6 (2.1)	30 (4.8)
Once a month	10 (1.6)	10 (1.3)	8 (1.1)	12 (1.7)	9 (1.8)	3 (1.1)	8 (1.2)
2-3 times a month	10 (1.6)	11 (1.3)	9 (1.3)	11 (1.6)	3 (0.06)	5 (1.8)	3 (0.5)
Once a week	27 (4.3)	19 (2.4)	25 (3.5)	22 (3.2)	7 (1.4)	8 (2.8)	31 (5.2)
2-6 times a week	70 (11.1)	65 (8.1)	69 (9.0)	72 (10.5)	32 (6.4)	28 (9.8)	76 (12.2)
Once a day	268 (42.7)	348 (43.6)	279 (39.4)	316 (46.1)	212 (42.44)	138 (48.4)	262 (42.4)
Twice or more times a day	212 (33.8)	315 (39.4)	313 (44.1)	204 (29.7)	211 (42.2)	97 (34)	209 (33.7)
Total(%)	628 (100)	799 (100)	714 (98.4)	686 (100)	500 (100)	285 (100)	619 (100)

4.2.6 Device Used for Cleaning Teeth

The most common device used to clean teeth was the conventional toothbrush (72.1%), followed by chewing stick at 43.7% and toothpick (36.8%) (Fig 4.21). Use of toothbrush

was more common among the urban residents (81.1%) than rural residents(58.3%). Particants aged 35-44 years were more likely to use a tooth brush (78.7%) than those aged 60+ years (66.6%). More rural residents(54.7%) than urban residents(25.8%) used chewing stocks (Table 4.17).

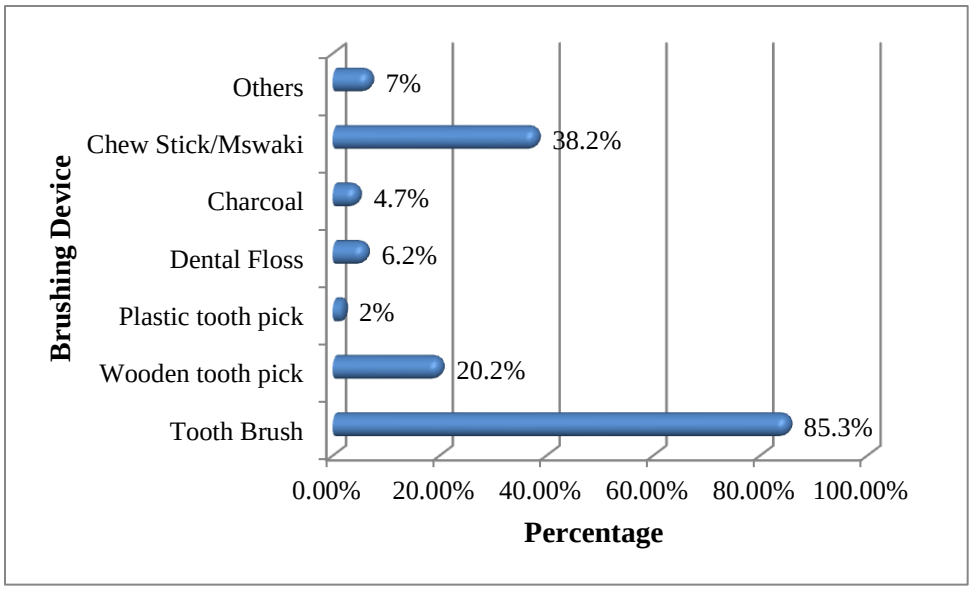


Figure 4.21: Devices used for cleaning teeth

Table 4.17: Use of tooth cleaning devices by demographic variables

	Gender		Age		Location		
	Male N (%)	**Female N (%)**	**35-44 Years N (%)**	**60+ Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Use of toothbrush	435 (71.1)	572 (73.3)	546 (78.7)	434 (65.6)	435 (81.1)	312 (75.2)	355 (58.3)
Use of wooden toothpicks	231 (38.4)	273 (35.8)	297 (43.9)	187 (28.6)	233 (48.5)	120 (44.0)	150 (25.0)
Use of plastic toothpicks	8 (1.3)	8 (1.1)	14 (2.1)	2 (0.3)	10 (2.1)	3 (1.1)	3 (0.5)
Use of thread (dental floss)	11 (1.8)	27 (3.6)	28 (4.2)	9 (1.4)	24 (5.0)	3 (1.1)	11 (1.8)
Use of charcoal	22 (3.7)	20 (2.6)	23 (3.4)	19 (2.9)	12 (2.5)	9 (3.3)	21 (3.5)
Use of chew stick/miswaki	278 (45.6)	314 (41.0)	296 (43.0)	287 (43.7)	124 (25.8)	124 (45.9)	336 (54.7)
Total(Ratio of responses to respondents)	985 (1.62)	1214(1.57)	1204 (1.75)	938 (1.43)	838 (1.65)	571 (1.71)	876 (1.43)

4.2.7 Use of Toothpaste

Tooth paste was used by 77% of the respondents while brushing their teeth, urban residents (86.2%) used toothpaste more than either the rural or the peri urban residents.

Those aged 35-44 years used toothpaste the most at 84.7%. Overall, 69.5% used flouridated tooth paste, 13.4% used unflouridated tooth paste and 17.0% did not know whether the toothpaste was flouridated or not. Use of fluoridated tooth paste was higher among peri urban residents (80.7%) compared to urban 75.2%) and rural residents(57.6%) (Table 4.18 and Fig 4.22).

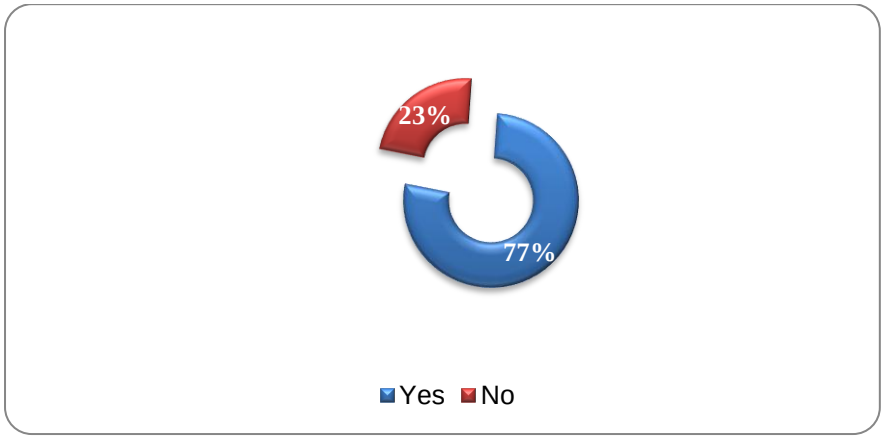


Figure 4.22: Use of toothpaste

Table 4.18: Use of fluoridated toothpaste

		Gender		Age		Location			
		Male N (%)	**Female N (%)**	**35-44 Years N (%)**	**60+Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**	**Total**
Use of toothpaste		435 (75.8)	585 (79.1)	552 (84.7)	438 (69.2)	426 (86.2)	221 (78.4)	368 (68.7)	
Contains fluoride	**Yes**	300 (66.1)	444 (72.3)	430 (75.4)	215 (57.6)	325 (75.2)	180 (80.7)	236 (57.6)	715 (68.5)
	No	61 (13.4)	80 (13.0)	62 (10.9)	56 (15)	59 (13.7)	25 (11.2)	57 (13.9)	145 (13.8)
	Don't know	93 (20.5)	90 (14.7)	78 (13.7)	102 (27.3)	48 (11.1)	18 (8.1)	117 (28.5)	184 (17.7)
		454 (100)	614 (100)	570 (100)	373 (100)	432 (100)	223 (100)	410 (100)	1044 (100)

4.2.8 Dental Visit (s)

The survey findings revealed that 72.3% of the respondents had ever visited a dentist before, of these 13.7% did so in the previous six months and 16.4% in the previous 6-12 months (Fig 4.23).

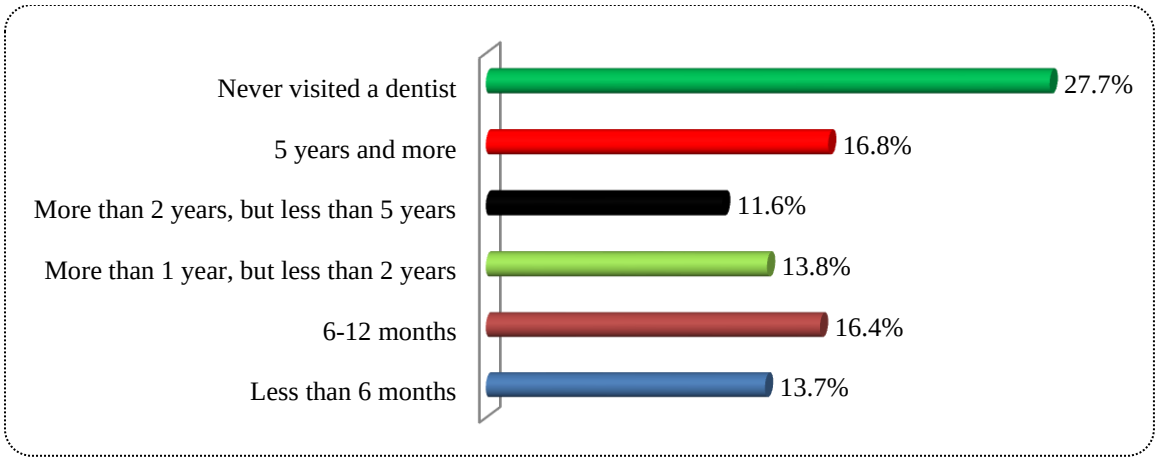


Figure 4.23: Frequency of visit to dentist

Table 4.19: Frequency of visit to dentist by demographic variables

	Gender		Age		Location		
	Male N (%)	**Female N (%)**	**35-44 Yrs N (%)**	**60+Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
5 years or more	111 (15.8)	82 (11.9)	86 (13.7)	108 (13.6)	72 (14.5)	32 (11.3)	90 (14.4)
More than 2 years but less than 5 years	116 (16.5)	115 (16.7)	97 (15.5)	137 (17.3)	84 (16.9)	3 2(11.3)	119 (19.0)
More than one year but less than 2 years	90 (12.8)	101(14.7)	83 (13.2)	114 (14.4)	60 (12.0)	46 (16.2)	57 (9.1)
6-12 months	93 (13.3)	66 (9.6)	65 (10.4)	99 (12.5)	60 (12.0)	38 (13.4)	100 (16.0)
Less than six months	94 (13.3)	141 (20.5)	105 (16.7)	134 (16.9)	114 (22.4)	74 (26.1)	50 (8.0)
Never visited a dentist	197 (28.1)	183 (26.6)	191 (30.5)	201 (25.3)	108 (21.7)	62 (21.8)	208 (33.4)

4.2.9 Reason for the Last Visit to the Dentist

Among the adults, 83% had previously visited a dentist because something was wrong or had pain in the mouth. Only 3.3 % and 4.6 % went for routine check up or follow up treatment respectively (Fig 4.24). Table 4.21 shows the reasons for dental visit by socio-demographic variables.

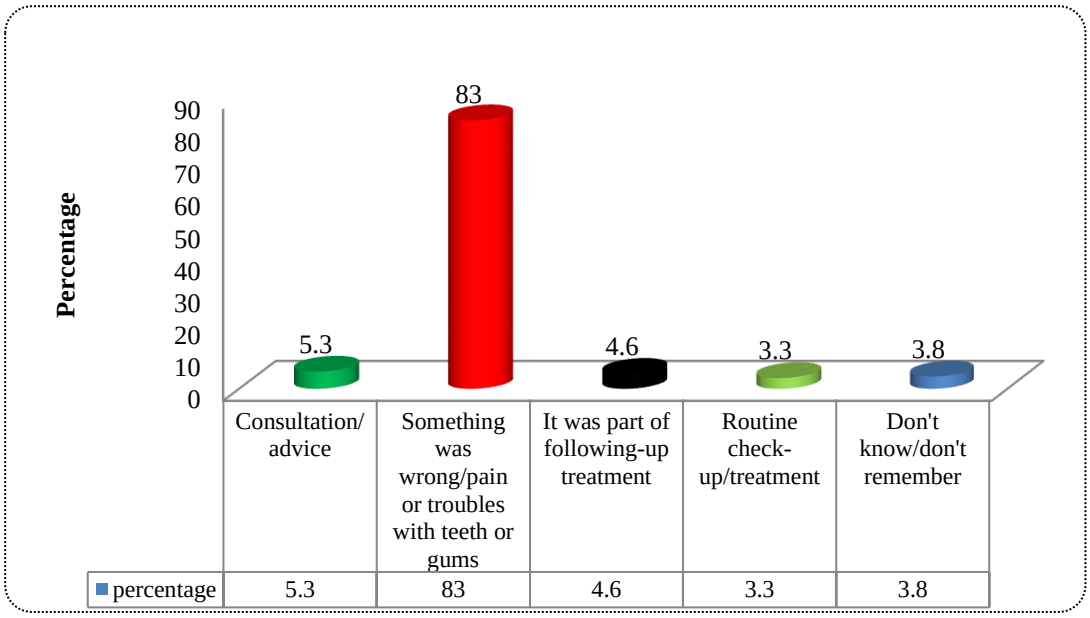


Figure 4.24: Reason for visiting dentist

Table 4.20: Reason for visiting dentist by demographic variables

	Gender		Age		Location		
Reason for last visit to a dentist	**Male N (%)**	**Female N (%)**	**35-44 Years N (%)**	**60+ Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Consultation/advice	26 (5.8)	25 (4.3)	34 (6.7)	20 (3.9)	22 (5.7)	8 (3.7)	23 (5.5)
Something wrong/pain with teeth/gums	372 (82.9)	485 (83.6)	426 (84.5)	413 (81.3)	314 (80.9)	193 (88.5)	348 (82.5)
Follow up treatment	15 (3.3)	32 (5.5)	27 (5.4)	20 (3.9)	23 (5.9)	8 (3.7)	16 (3.8)
Routine checkup/treatment	9 (2.0)	25 (4.3)	11 (2.2)	21 (4.1)	18 (4.6)	6 (2.8)	34 (2.4)
Total (%)	**422 (94)**	**567 (97.7)**	**498 (98.8)**	**474 (93.2)**	**377 (97.1)**	**215 (95.9)**	**421 (94.2)**

*****Don't know/Don't remember not included in the table**

4.2.10 Satisfaction during Dental Visit

Asked how satisfied they were after their previous visit to the dentist, 57.6% said they were very satified and 5.2% were satified while 11.3% said they were disatisfied with their last dental visit (Fig 4.25 and Table 4.21).

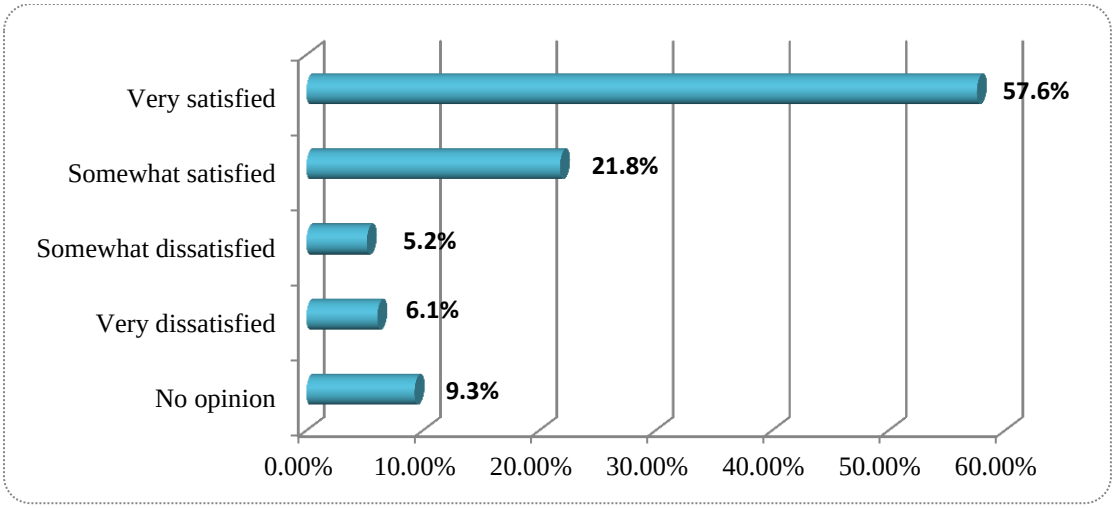


Figure 4.25: Satisfaction during dental visit

Table 4.21: Level of satisfaction with the previous dental visit by demographic variables

	Gender		Age		Location		
	Male N (%)	**Female N (%)**	**35-44 years N (%)**	**60+ years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Very satisfied	264 (55.0)	375 (59.4)	297(54.3)	326 (59.9)	223 (57.0)	136 (60.7)	282 (58.3)
Somewhat satisfied	111 (23.1)	131 (20.7)	122 (22.3)	119 (21.9)	108 (27.6)	36 (16.1)	96 (19.8)
Somewhat dissatisfied	25 (5.2)	33 (5.2)	39 (7.1)	20 (3.7)	22 (5.6)	24 (10.7)	12 (2.5)
Very dissatisfied	28 (5.9)	41(6.5)	43 (7.9)	25 (4.6)	30 (7.7)	22 (9.8)	17 (3.5)
No opinion	52 (10.8)	52 (8.2)	46 (8.4)	54 (9.9)	8 (2.1)	6 (2.7)	77 (15.9)
Total (%)	480 (100)	632 (100)	547 (100)	544 (100)	391(100)	224 (100)	484 (100)

4.2.11 Types of Dental Facilities Visited

The survey results revealed that 49.7% of the respondents visited public dental facilities while 39% visited private dental faciltiies and 4.1% received treatment from free dental camps (Fig 4.26). A higher proportion of urban and Peri-urban residents visited private facilities than rural residents (Table 4.22).

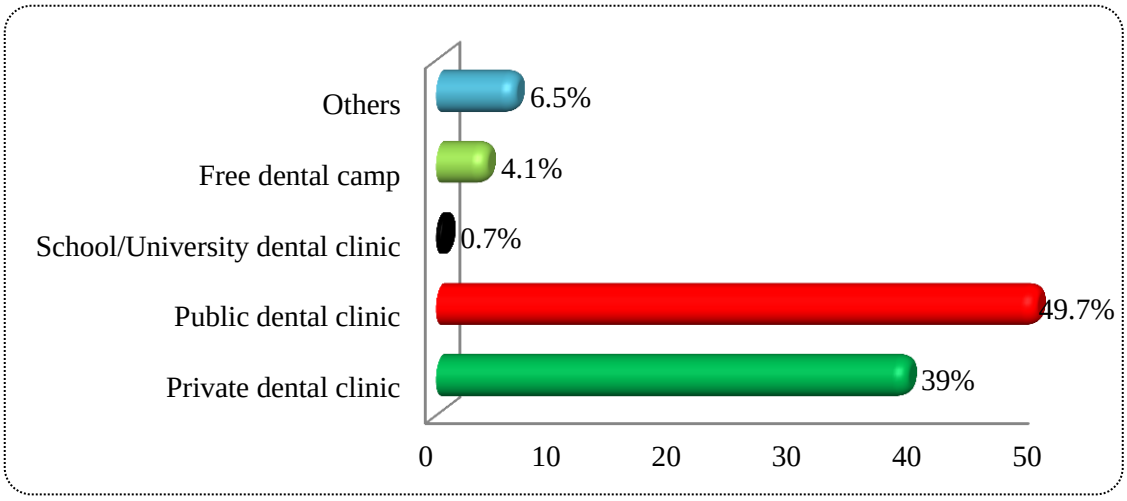


Figure 4.26: Type of facility visited during the last dental treatment

Table 4.22: Type of facility visited during the last dental treatment by demographic variables

	Gender		Age		Location		
	Male N (%)	**Female N (%)**	**35-44 Years N (%)**	**60+Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Private clinic	176 (36.7)	259 (41.2)	240 (44.0)	179 (33.0)	198 (50.5)	125 (55.8)	108 (22.6)
Public dental facility	242 (50.5)	306 (48.6)	254 (46.60	294 (54.10	169 (43.1)	87 (38.8)	296 (61.8)
University dental clinic	4 (0.80	4 (0.6)	2 (0.4)	4 (1.1)	6 (1.5)	2 (0.9)	0
Free dental camp	20 (4.2)	25 (4.0)	14 (14 (2.6)	30 (5.5)	18(4.6)	10 (4.5)	17 (3.5)
Others	37 (7.8)	35 (5.6)	35 (6.4)	34 (6.3)	1 (0.3)	0	58 (12.1)
Total (%)	479 (100)	629 (100)	545 (100)	541 (100)	392 (100)	224 (100)	479 (100)

4.2.12 Perception of the Charges of Last Dental Visit

The respondents who said that they had ever visited a dentist were asked to rate the cost of dental treatment. Dental charges were rated as reasonable by 37.6% of the respondents, while 18.1% rated the charges as high, while 7.6% rated the the charges as cheap (Figure 4.27).

Respondents (64.1%)from the the urban areas, peri-urban areas (48.2%) and rural areas (61.7%) felt the charges were cheap/reasonable (Fig 4.28). Residents in the peri urban (31.2%) felt the treatment was costly compared to urban (26.3%) and rural areas (19.3%). Adults aged 60+ (26.3%) and those aged 35-44 years (20.8%) felt the treatment was costly (Table4.23).

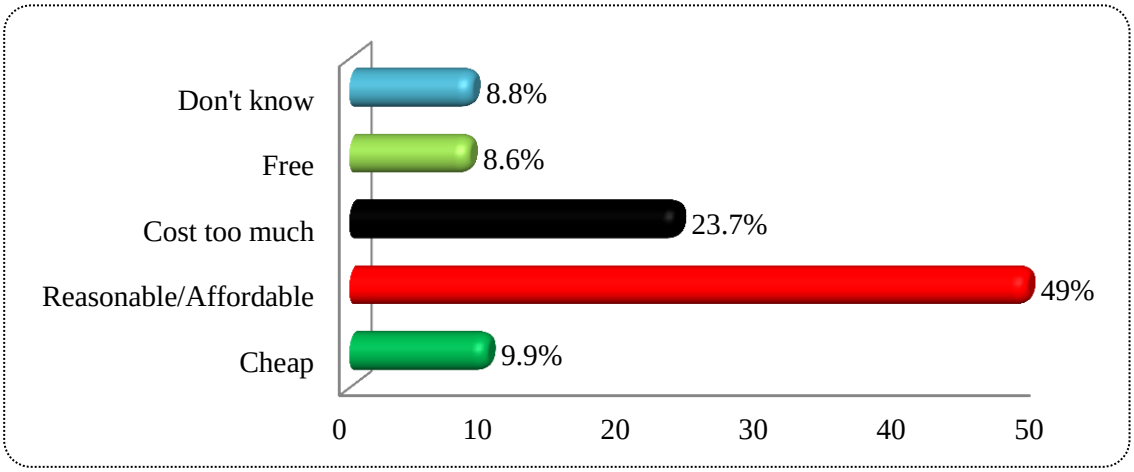


Figure 4.27: Participants perception about charges during previous visit

Table 4.23: Participants perception about charges during the previous visit by demographic variables

	Gender		Age		Location		
Rate of charges for last visit	**Male N (%)**	**Female N (%)**	**35-44 Years n (%)**	**60+ Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Cheap	44 (9.3)	62 (9.9)	56 (10.3)	46 (8.5)	48 (12.3)	26 (11.6)	31(6.5)
Reasonable	230 (48.5)	311 (49.4)	306 (56.4)	288 (42.2)	202 (51.8)	82 (36.6)	258 (54.2)
Cost too much	114 (24.1)	150 (23.8)	113 (20.8)	148 (27.4)	102 (26.3)	70 (31.2)	92 (19.3)
Free	41 (8.6)	53 (8.4)	21 (3.9)	71 (13.1)	30 (7.7)	38 (17.0)	26 (5.5)
Total (%)	429 (90.5)	576 (91.5)	496 (91.4)	553 (91.2)	382 (98.1)	216 (96.4)	407 (85.5)

*****Don't know not included in the table**

4.2.13 Reason for not Visiting a Dentist in the Last Six Months

The main reason for not visiting a dentist was fear of loosing a tooth (9.2%), followed by high cost of treatment (8.2%) and fear of painful treatment (7.4%) (Fig 4.28). Rural

residents (10.8%) were more likely not to visit a dentist due to distance compared to 3.6% of the urban and 2.8% of the peri-urban residents (Table 4.24)

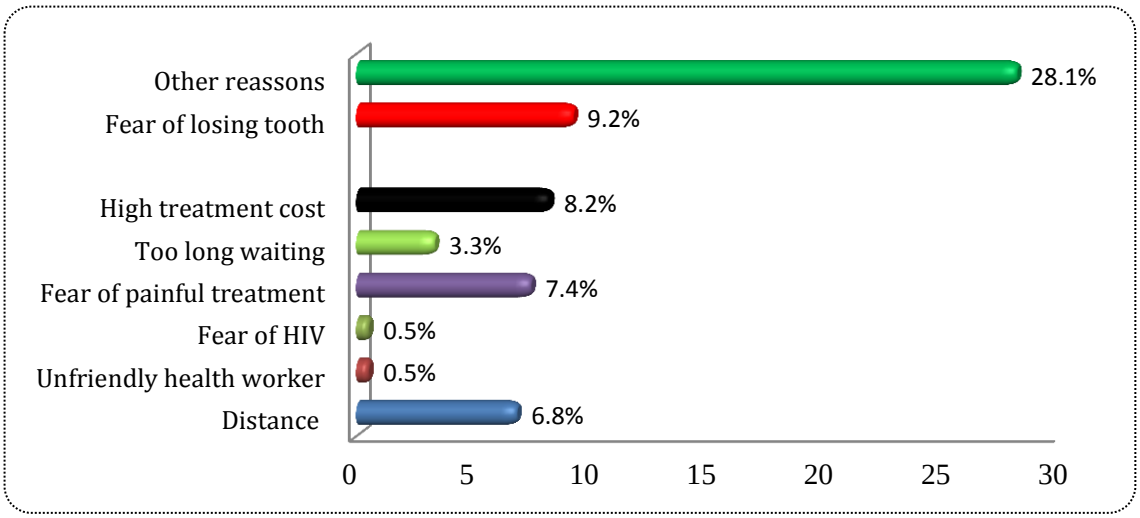


Figure 4.28: Reason for not visiting dentist

Table 4.24: Reason for not visiting dentist by demographic variables

	Gender		Age		Location		
Reason for not visiting dentist for the last 6 months	**Male N (%)**	**Female N (%)**	**35-44 Years N (%)**	**60+ Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
distance	38 (6.6)	48 (6.4)	40 (6.1)	49 (7.6)	18 (3.6)	8 (2.8)	58(10.8)
Presence of unfriendly dental workers	2 (0.3)	5 (0.7)	6 (0.9)	1 (0.2)	1 (0.2)	2 (0.7)	4(0.7)
Getting infected with HIV	4 (0.7)	3 (0.4)	4 (0.6)	3 (0.5)	2 (0.4)	3 (1.0)	2 (0.4)
Fear of losing a tooth	61(10.5)	60 (8.0)	75 (11.4)	41(6.4)	56 (11.2)	10 (3.5)	52 (9.6)
Painful treatment	38 (6.5)	45 (6.0)	39 (5.9)	41 (6.4)	50 (10)	7 (2.4)	23 (4.3)
Long waiting time at the clinic	25 (4.3)	19 (2.5)	27 (4.1)	17 (2.6)	12 (2.4)	7 (2.4)	2 5(4.6)
Treatment too costly	45 (7.7)	65 (8.6)	46(7.0)	61(9.4)	42 (8.4)	21(7.3)	47(8.7)
Painful treatment	9 (1.6)	8 (1.1)	7 (1.1)	9 (1.4)	5 (1.0)	2 (0.7)	10 (1.9)
Total(% of total respondents)	**222 (38.2)**	**253 (33.7)**	**244 (37.1)**	**222 (34.5)**	**186 (87.2)**	**60 (20.8)**	**221 (41)**

4.2.14 Dental Visits by Family Members in the Previous 12 Months

Seventy three percent of the respondents said that none of their family members had missed dental treatment in the prevoius 12 months. Seventeen percent said that a family member had missed, and 10% percent did not know whether any family member had missed dental treatment (Fig 4.29).

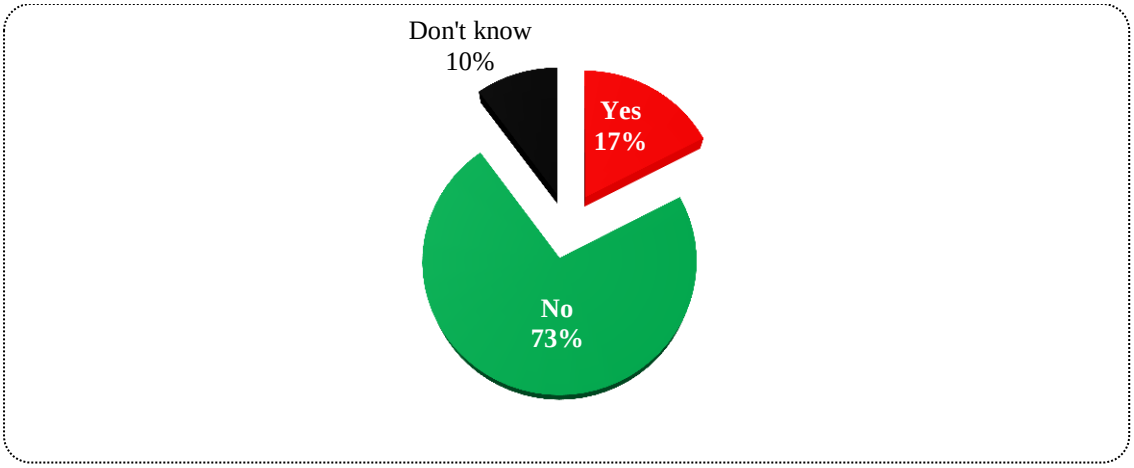


Figure 4.29: Family member missed dental treatment in last 12 months

4.2.15 Dental and Medical Insurance Covers

Medical insurance cover was more common among the respondents (20.6%) compared to dental insurance cover (12.8%). These insurance cover included the National Hospital Insurance Fund (Fig 4.30).

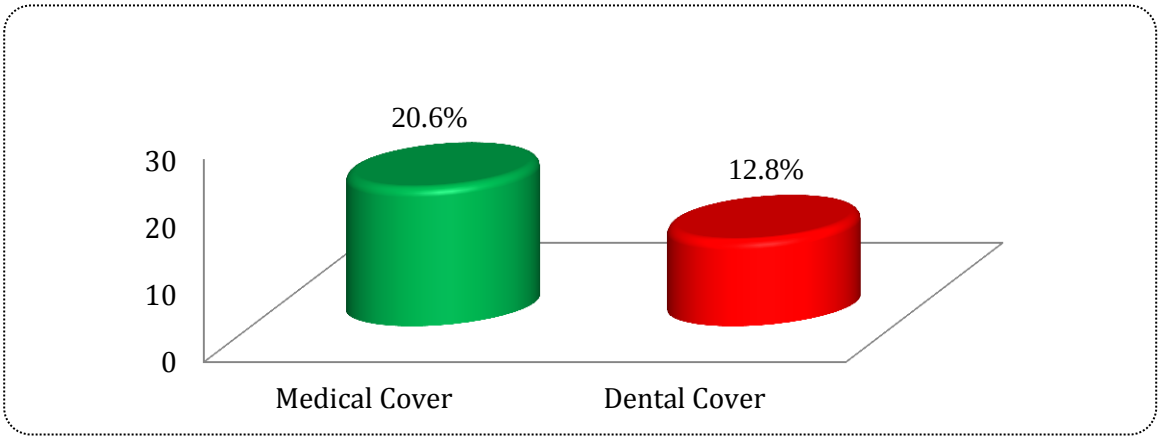


Figure 4.30: Possession of medical and dental insurance covers

4.2.16 Oral Health Related Quality of Life

Pain in the teeth or mouth was experienced by 57% of the respondents while 40% said they did not have any form of discomfort either in the teeth or the rest of the mouth at the time of the interview (Fig 4.31). Problems attributed to oral health, were experienced by almost all the respondents.

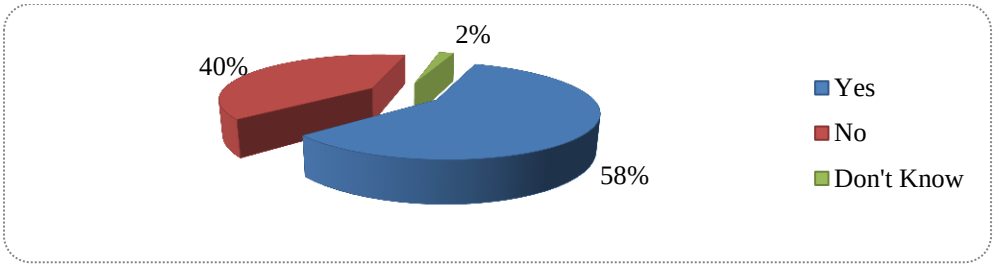


Figure 4.31: Whether or not respondents experienced pain in the mouth

4.2.17 Discomfort and/or Difficulty in Chewing

Of those interviewed, 52.8% said that they experienced difficulty while chewing, 47.9% said they could not bite hard food while 27% said that they experienced sleep disruptions in the previous year. Those aged 60+ years were more likely to experience difficulty in chewing at 54.45, biting hard food at 57.4% compared to 35-44 year olds at 41.55 and 48.45 respectively (Table 4.25).

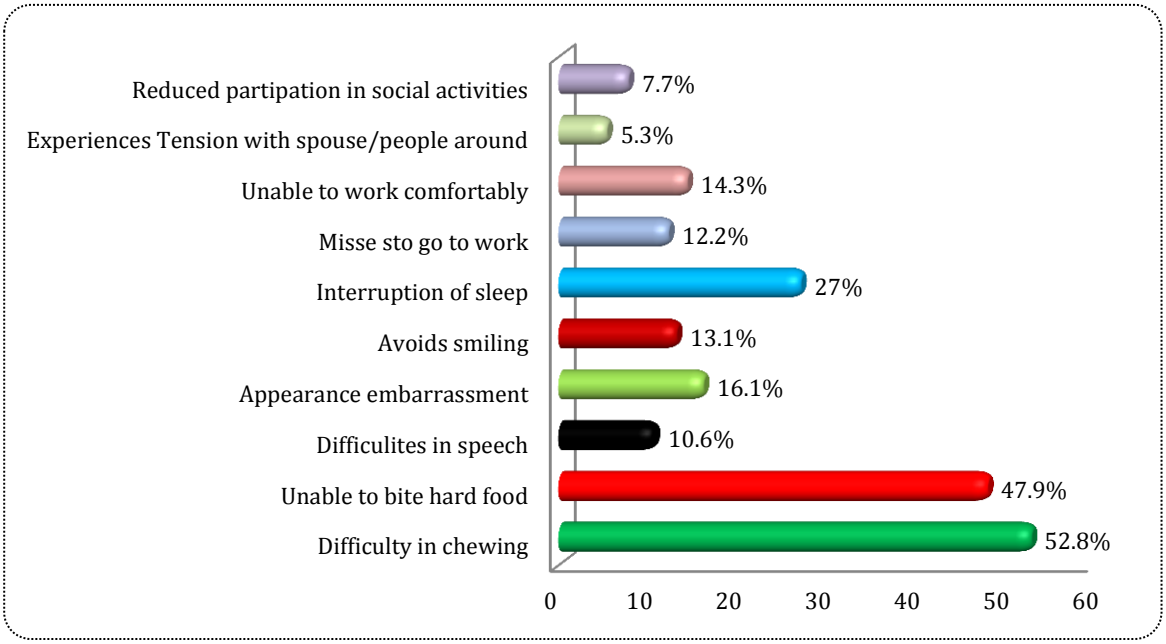


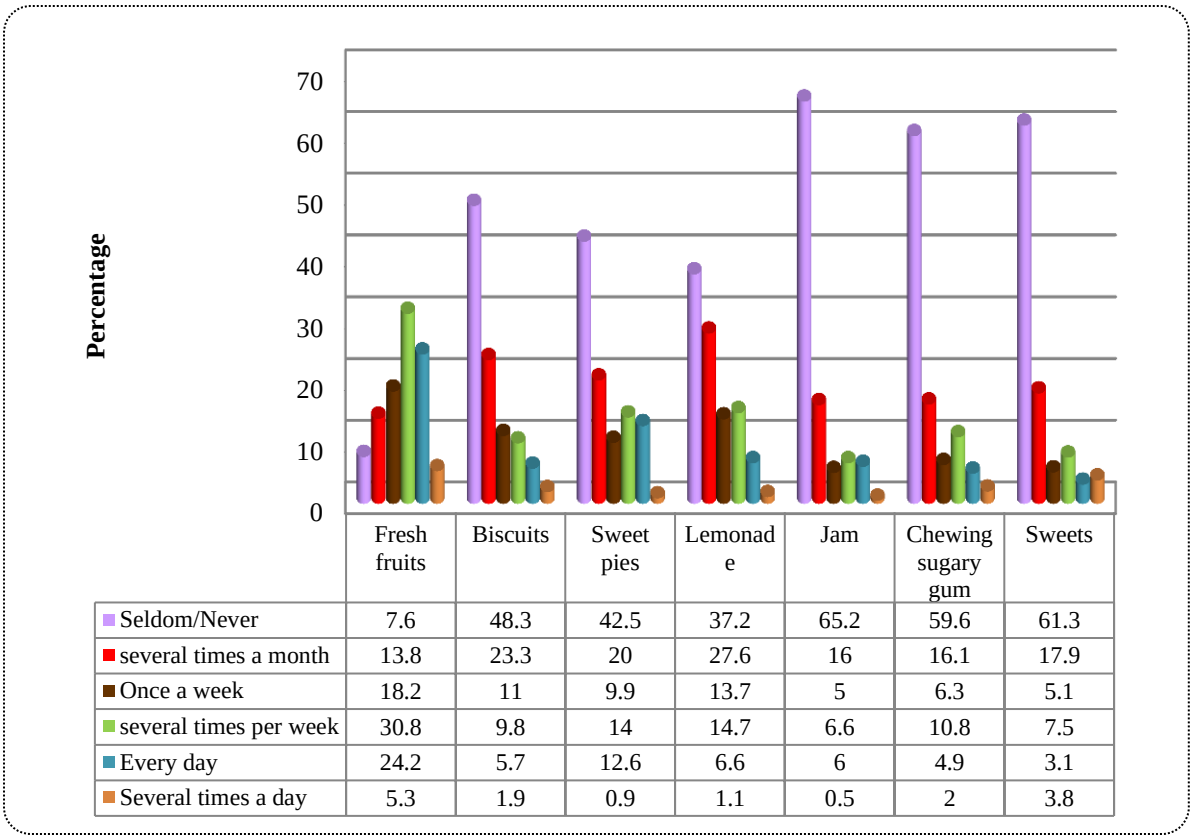
Figure 4.32: Oral health related quality of life

Table 4.25: Oral health related quality of life by socio-demographic variables

	Gender		Age		Location		
	Male N (%)	**Female N (%)**	**35-44 Years N (%)**	**60+Years N (%)**	**Urban N (%)**	**Peri-urban N (%)**	**Rural N (%)**
Difficulty in chewing	275 (44.1)	402 (50.6)	292 (41.5)	372 (54.4)	251(50.4)	147 (51.4)	279 (44.9)
Unable to bite hard food	314 (50.2)	436 (54.8)	341 (48.4)	393 (57.4)	274 (55.0)	156 (54.5)	318 (51.1)
Difficulties in speech	70 (11.3)	81 (10.3)	55 (7.9)	94 (13.8)	69 (13.9)	26 (9.2)	55 (8.9)
Appearance embarrassment	87 (14.4)	142 (17.9)	118 (16.9)	108 (15.9)	83 (16.8)	71 (24.9)	74 (12.0)
Avoids smiling	73 (11.8)	113 (14.3)	101 (14.4)	83 (12.2)	74 (14.9)	39 (13.8)	72 (11.6)
Interruption of sleep	14 (22.6)	243 (30.6)	193 (27.6)	183 (26.8)	122(24.6)	112 (39.2)	148 (24.0)
Misses to go to work	68 (11.0)	105 (13.3)	114 (16.2)	59 (8.7)	51 (10.3)	48 (16.9)	75 (12.1)
Unable to work comfortably	70 (11.3)	132 (16.6)	115 (16.4)	89 (13.0)	39 (7.9)	63 (22.0)	101 (16.3)
Experiences tension with spouses/people around	26 (4.2)	50 (6.3)	35 (5.0)	39 (5.7)	10 (2.0)	15 (5.2)	51 (8.3)
Reduced participation in social activities	40 (6.5)	68 (8.6)	48 (6.9)	60 (8.8)	23 (4.7)	23 (8.1)	64 (10.4)
Total(Ratio of responses to respondents)	1037(1.87)	1772(2.23)	1412(2.01)	1480(2.17)	996(2.01)	700(2.45)	1237(2.00)

4.2.18 Taking of Snacks

Taking of snacks in this population was dependent on the type of snack, 48.3% said they took biscuits, 42.5% ate sweet pie and 30.8% ate fresh fruits several times a week. Chewing sugarly gums several times a day was low (2%), taking sweets several times a day was done by 3.8%. Respondents (30.8%) while 30.8% of them took fresh fruits several times a day (Fig 4.33).



	Fresh fruits	Biscuits	Sweet pies	Lemonade	Jam	Chewing sugary gum	Sweets
Seldom/Never	7.6	48.3	42.5	37.2	65.2	59.6	61.3
several times a month	13.8	23.3	20	27.6	16	16.1	17.9
Once a week	18.2	11	9.9	13.7	5	6.3	5.1
several times per week	30.8	9.8	14	14.7	6.6	10.8	7.5
Every day	24.2	5.7	12.6	6.6	6	4.9	3.1
Several times a day	5.3	1.9	0.9	1.1	0.5	2	3.8

Figure 4.33: Snacks consumption

4.2.19 Alcohol and Substance Abuse

Abuse of drugs and other substances was relatively high, up to 45.7% of the respondents abused at least one type of drug, with 17.4% using tobacco, 19.8% used alcohol, 8% chewed Miraa and 0.5% smoked bhang (Fig 4.34).

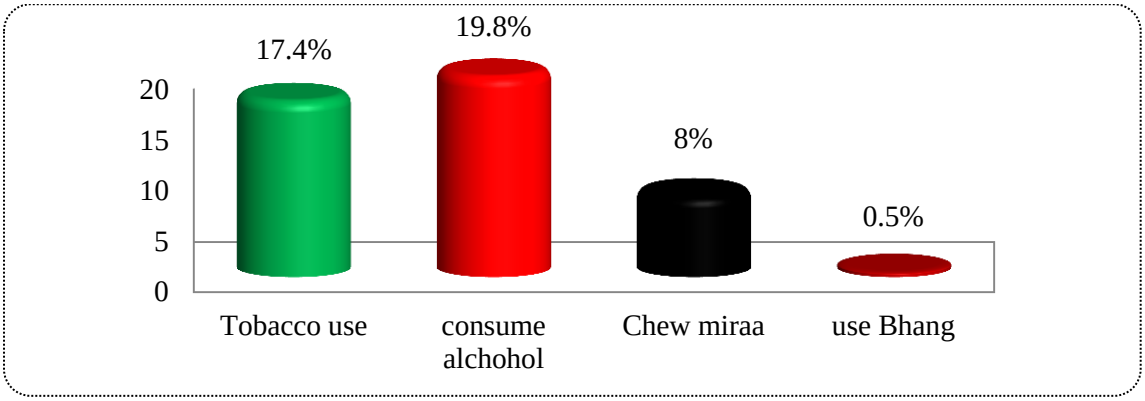


Figure 4.34: Drug abuse

Table 4.26: Tobacco smoking

Gender	Region	Tobacco Smoking	Age group n (%)		Total N(%)
			35-44years	>60 years	
			N(%)	N(%)	N(%)
Male	Urban	Yes	20 (20.0)	49 (46.7)	69 (33.7)
		No	80 (80.0)	56 (53.3)	136 (66.3)
	Peri-urban	Yes	10 (17.5)	17 (28.8)	27 (23.3)
		No	47 (82.5)	42 (71.2)	89 (76.7)
	Rural	Yes	46 (33.3)	44 (35.5)	90 (34.4)
		No	92 (66.7)	80 (64.5)	172 (65.6)
Female	Urban	Yes	2 (1.5)	15 (11.4)	17 (6.4)
		No	133 (98.5)	117 (88)	250 (93.6)
	Peri-urban	Yes	0 (0)	6(0.2)	6 (3.8)
		No	74 (100)	77 (92.8)	151 (96.2)
	Rural	Yes	11 (6.5)	17 (10.4)	28 (8.4)
		No	159 (93.5)	147 (89.6)	306 (91.6)

4.2.20 Consumption of Alcohol

When asked of the amount of alcohol (units) they had consumed 30 days preceding the survey 10% of the respondents reported to have consumed 1 unit, 20% had consumed 2 units while 10% had consumed 3 units and 5% had consumed 5 or more units (Figure 4.35).

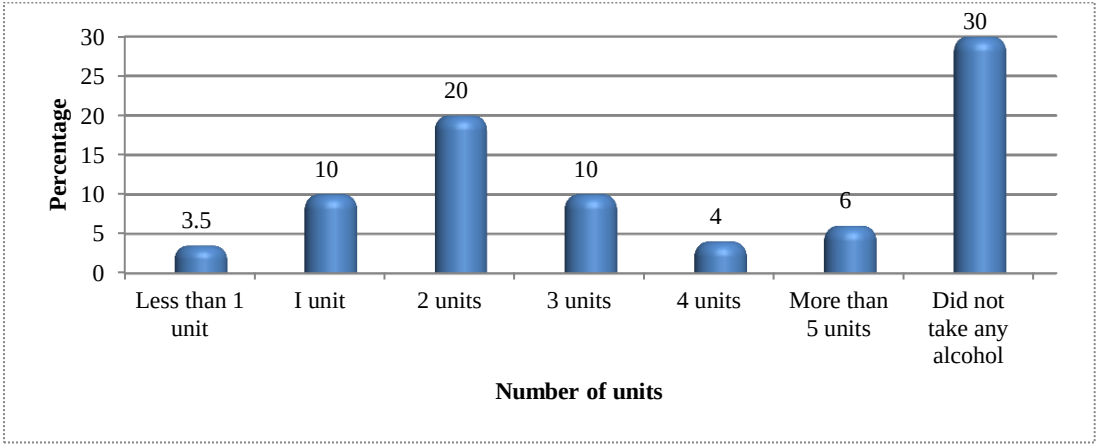


Figure 4.35: Alcohol consumption by the respondens 30 days preceding the survey

4.2.21 Gum Health Status

Gingival inflammation was found in 98.1% of the persons examined. The age group 35-44 years (96.1%) had gingival inflammation while it occurred in 99.3% of those aged above 60+ years. The prevalence of gingival inflammation was high in both males (98.4%) and females (97.7%) (Fig 4.37).

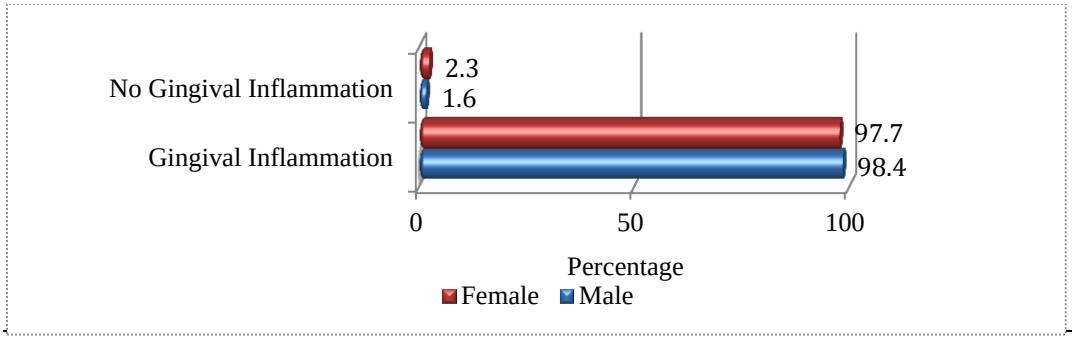


Figure 4.36: Prevalence of gingival inflammation

4.2.22 Dental Caries

Dental caries was detected in 34.3% of the adults examined while 0.4% had missing teeth due to caries and 1.9% had filled teeth. The number of decayed teeth ranged between 1-11 teeth per person. Females had a higher prevalence (35%) of tooth decay compared to males at 33.1%. The proportion (37.9%) of decayed teeth was higher for persons aged 60+ years compared with those aged 35-44 years (31%). The prevalence of dental caries was higher among persons in the peri-urban areas (38.1%) than urban and rural areas (33.6%) (Table 4.27).

Table 4.27: Dental caries distribution

		Decayed N(%)	Missing due to caries N(%)	Filled N(%)
Gender	Male	211 (33.1%)	3 (0.5%)	8 (1.3%)
	Female	280 (35.0%)	3 (0.4%)	14 (1.8%)
Age	34-44 years	247 (31.0%)	4 (0.5%)	18 (2.3%)
	60+years	279 (37.9%)	2(0.3%)	4 (0.5%)
Location	Urban	184 (31.1%)	3 (0.5%)	11 (1.9%)
	Peri-urban	116 (38.1%)	0 (0%)	2 (0.7%)
	Rural	216 (33.6%)	3 (0.5%)	9 (1.5%)
Overall		**1020 (34.3%)**	**6 (0.4%)**	**22 (1.4%)**

4.2.23 Dental Caries Experience

The mean Decayed, Missing, Filled Teeth (DMFT) was 0.72. Decayed teeth formed the major component of the DMFT (0.69). The components due to missing secondary to caries and filled teeth were very low at 0.0 and 0.02 respectively. The mean DMFT was higher among the persons aged 60+ than those between 35-44 years at 0.9 and 0.56 respectively.

Table 4.28: Dental caries experience

		Mean Decayed	Mean Missing due to caries	Mean Filled	Mean Decayed, Missing Filled teeth (DMFT)
Gender	Male	0.72	0.00	0.02	0.74
	Female	0.70	0.00	0.02	0.73
Age	35-44 years	0.53	0.01	0.02	0.56
	60+years	0.87	0.00	0.02	0.90
Location	Urban	0.64	0.01	0.02	0.67
	Peri-urban	0.89	0.00	0.00	0.89
	Rural	0.68	0.00	0.01	0.69
Overall		0.69	0.00	0.02	0.72

4.2.24 Dental Fluorosis

The overall prevalence of enamel fluorosis was 23.7% in all the locations of this 25.9% was among the rural residents, 23.1% from the urban and 20.0% in the peri-urban areas. (Fig 4.37).

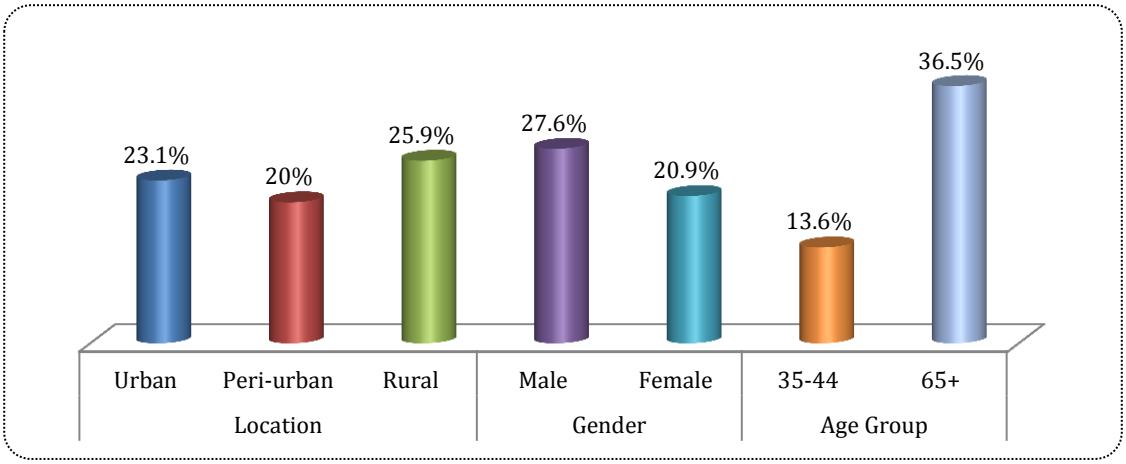


Figure 4.37: Dental fluorosis

4.2.25 Tooth Wear

The prevalence of tooth wear was 14.6% among the adults, of these 9.3% had enamel erosion and 5.3% had dentine erosion.

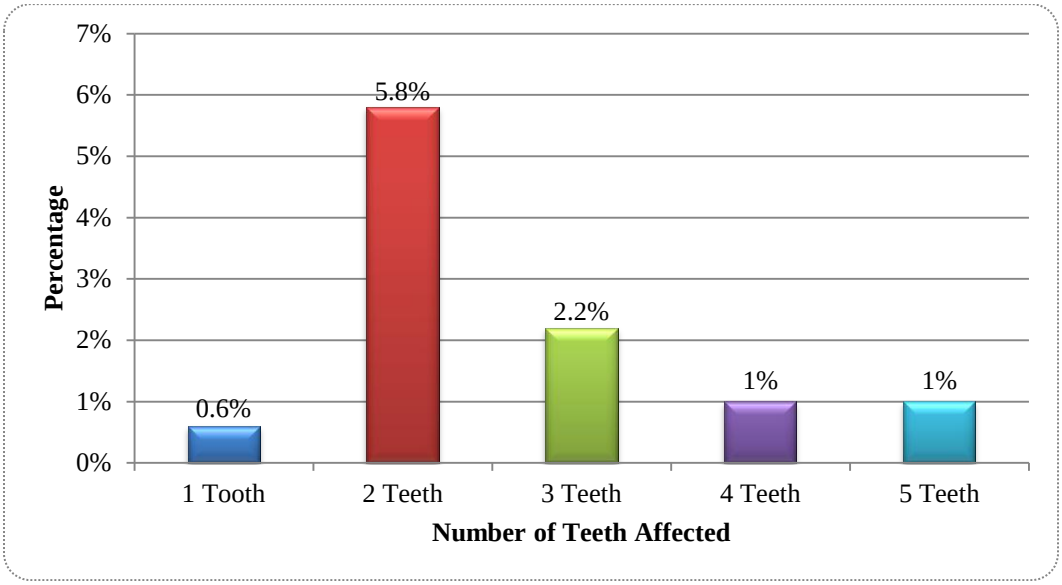


Figure 4.38: Tooth wear

4.2.26 Dental Trauma

Enamel fractures were detected in 1.6% of the persons examined, combined dentine and enamel fractures were found in 3.4% of the participants while trauma involving the pulp was present in 3.6% of the participants.

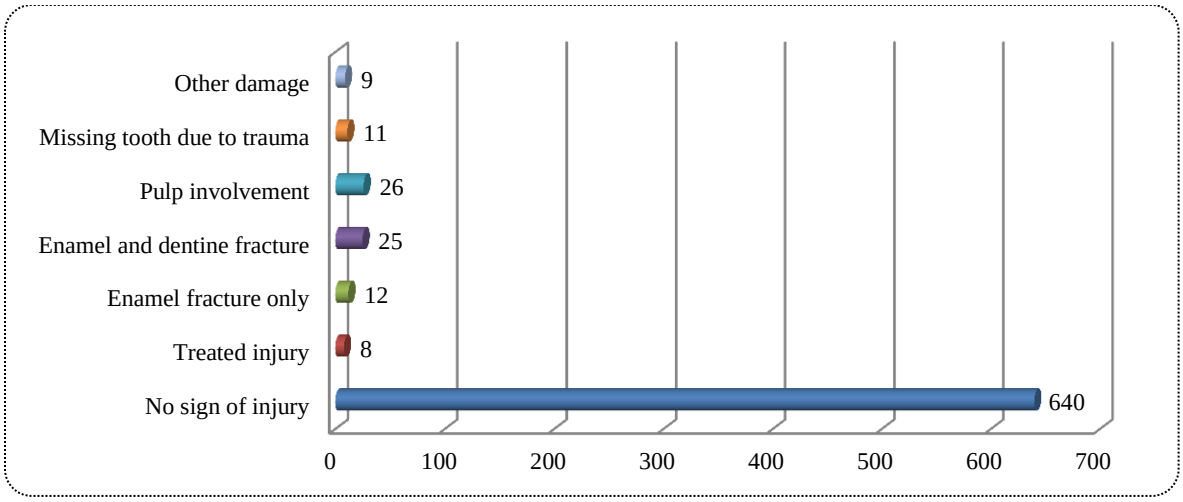


Figure 4.39: Dental trauma status

4.2.27 Oral Mucosal Lesions

The prevalence of oral mucosa lesion amongst the adults was 20.8% (Fig 4.40).

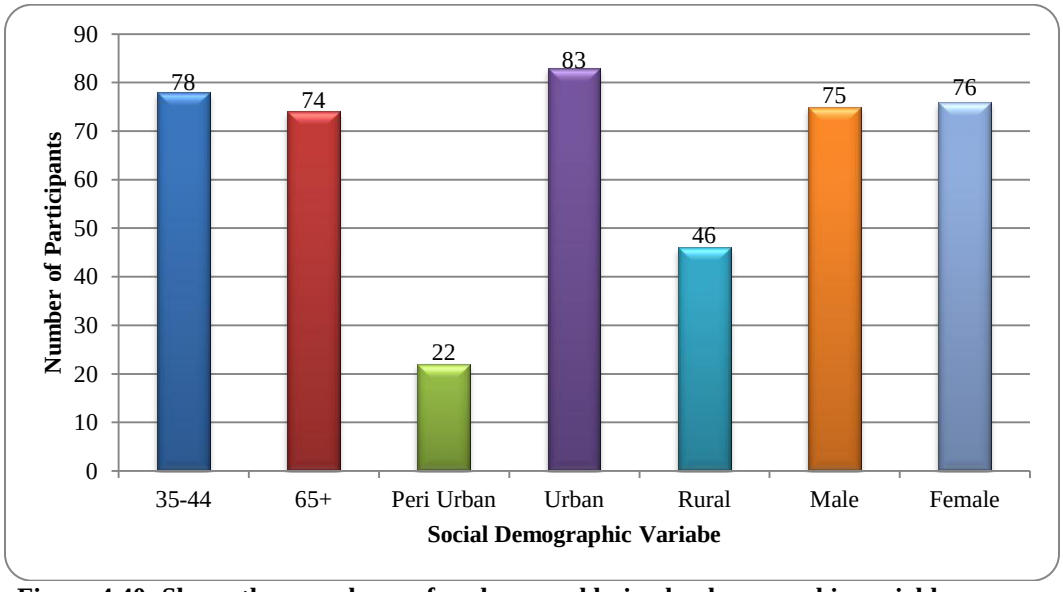


Figure 4.40: Shows the prevalence of oral mucosal lesion by demographic variables

4.2.28 Types of Mucosal Lesions

Abscesses were found in 6.1% of the participants, ulcerations were present in 8.2% of the persons examined, and lichen planus was at 5.5% of the adults while leukoplakia was found in in 6.7% of the participants. In addition malignant lesions were detected in 0.3% of the participants (Fig 4.41).

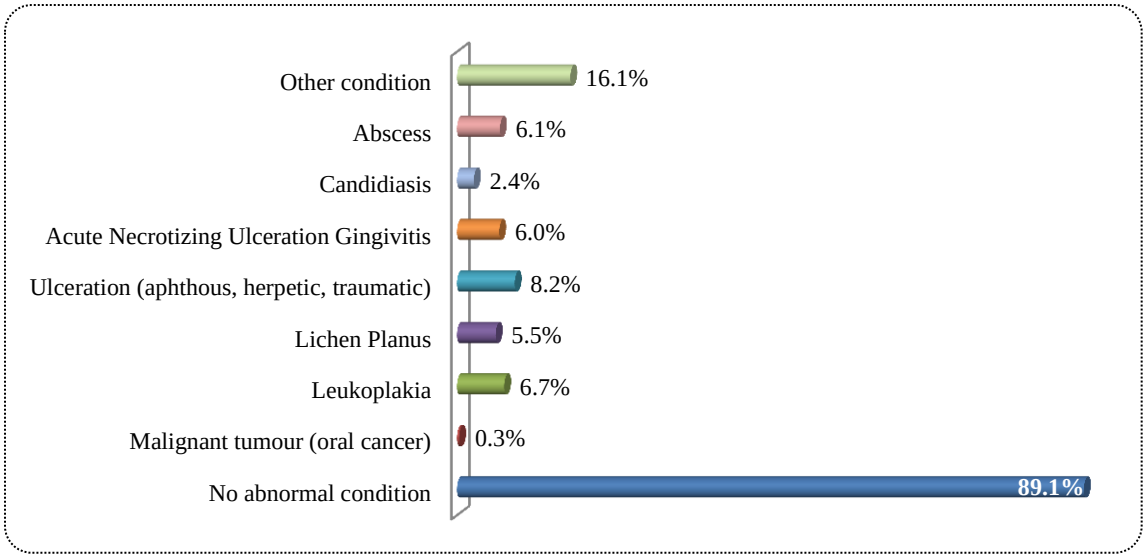


Figure 4.41: Types of oral mucosal lesions amongst the adults

4.2.29 Types of Intervention Needed/Suggested

Prompt curative treatment and scaling was required in 39.9% of the adults while immediate treatment was needed in 31.8%. Further, 24.5% of the adults examined needed preventive or routine curative treatment.

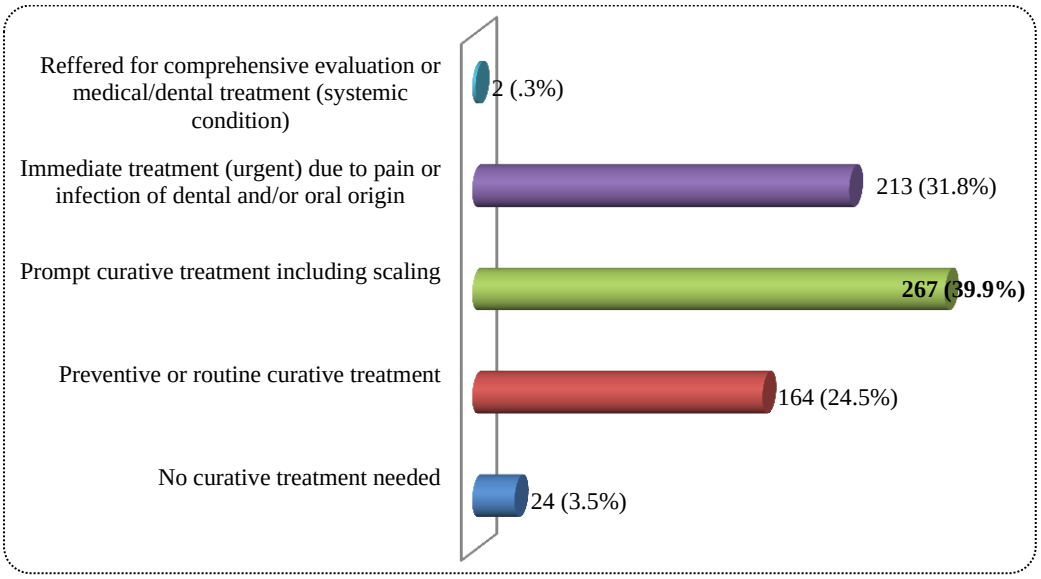


Figure 4.42: Intervention urgency needed

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the findings of the survey, the following conclusions were made.

The Burden of Oral Diseases

The burden of oral diseases and conditions varied from low to high.

Dental Caries

The overall prevalence of dental caries among children (5, 12, and 15 year olds) was 23.9%. The dmft for 5 year old children was 1.87 while the prevalence of dental caries in this population was 46.3%. The main contributor to this dmft was tooth decay. This meant that half of the children had unmet dental caries related treatment needs.

The prevalence of dental caries among the adult population was 34.3%. On average, every adult had one decayed tooth with a DMFT of 0.72. This meant that the adult population also had unmet dental caries related treatment needs.

Gum Disease(s)

Three out of every four children had signs of gum disease (s) with nearly all children aged 5 years being affected.

Among adult population, almost all of them (98.1%) had signs of gum disease(s). This implied that there was a very high unmet treatment needs for gum disease(s).

Fluorosis

The adult population had a 23.7% prevalence of fluorosis while 41.4% of the children had fluorosis. This meant that this population had been exposed to water which had fluoride levels beyond the recommended level.

Oral Mucosal Lesion

The prevalence of oral mucosal lesions amongst the children was 3.2% while among the adults it was 20.8%. This meant that there were underlying or other unmet treatment needs associated with oral mucosal lesions.

Tooth Wear

The prevalence of tooth wear among the adult population was 14.6%. This implied that this population practiced injurious habits or took diets that predisposed them to tooth wear as well as inherent predisposing factors.

Oral Health Seeking Behavior

Inspite of the high unmet treatment needs among the adult and children population, only a small proportion had sought dental treatment and the majority did so only when there was pain or discomfort.

Oral Health-Related Quality of Life

The quality of life for both adults and children was not optimal. Over 99% of children said they had at least one dental problem. All adults indicated they had at least one current dental problem which needed attention.

Oral Hygiene Practices and Harmful Habits

The high prevalence of gum related diseases and dental caries among both adult and children populations was an indication of poor oral hygiene practices.

There was an unacceptable high level of harmful drug and substance abuse in this population. Miraa, tobacco and alcohol were among those substances/drugs.

5.2 Recommendations

Based on the findings of this study the following recommendations were made:

1. The government of Kenya through the Ministry of Health needs to address the grossly underfunded oral health care services. Oral health care is capital intensive by its very nature and therefore adequate financing is critical for its success.
2. The Ministry of Health as the health caring authority in the country should give oral health more visibility in its priority health profile. This is because poor oral health greatly affects the quality of life of the general population.
3. To address the oral health diseases at early stages of life it is recommended that the Ministry of Health and other stakeholders put in place both preventive and promotive health care programs at strategic entry points of health care delivery

systems both in public and private sectors. Such entry points include maternal and child health clinics, primary schools among others.

4. It is recommended that the Ministry of Health will now use the information available in this report to lead the other stakeholders in oral health to draft a comprehensive national oral health policy to guide the delivery of oral health care services.

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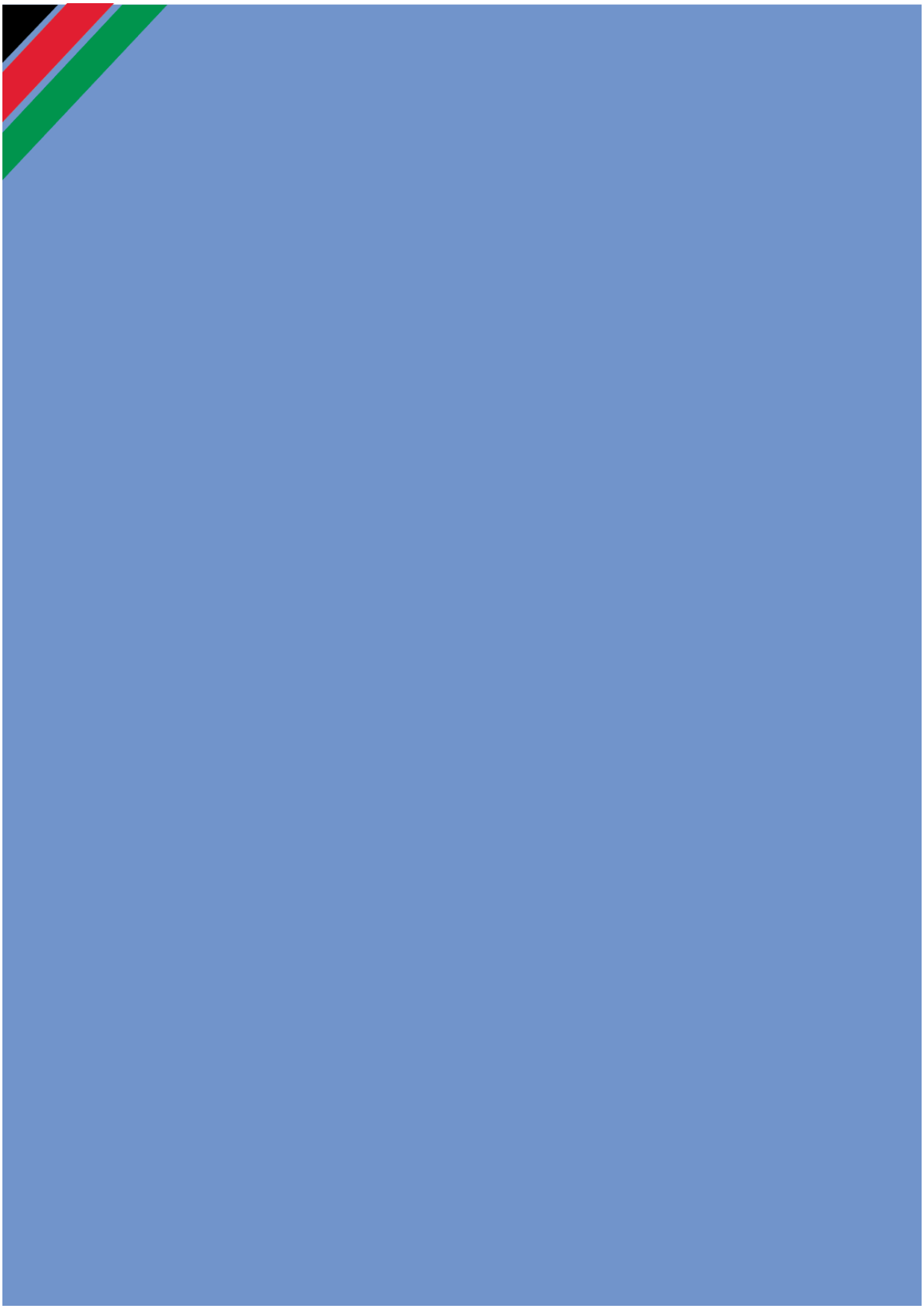

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