

**FACTORS INFLUENCING UTILIZATION OF DENTAL CONSERVATION
METHODS IN ADULTS IN GATANGA DIVISION THIKA DISTRICT, KENYA**

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Reg. no. 157/12637/2005

A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF PUBLIC
HEALTH IN THE SCHOOL OF HEALTH SCIENCES, KENYATTA UNIVERSITY

OCTOBER, 2010

DECLARATION

This thesis is my original work and has not been presented for a degree or any other award in any other university.

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This thesis is dedicated to my late husband Dr Rufus Muriuki, to my children Dennis, Sammy, Lisa, Carol, Moshe and to my mother Charity Njeri.

ACKNOWLEDGEMENTS

First and foremost I thank my Creator for seeing me through the study and making it a reality. My appreciation also goes to my supervisors Dr (Mrs) Jemimah A Simbauni (PhD) and Dr Wilson A P Otengah (PhD) for their patience and dedicated professional guidance during my study. It would not have been a success without their help. My gratitude goes to the Chief of Mugumoini Location Mr Kariuki Kuria for his support during my data collection. My family was very understanding and supportive during the entire course of my study, thank you so much. My gratitude also goes to my data analysis guide Mr Morris Gitau for his support during my analysis. Last but not least I thank the people of Mugumoini Location who agreed to take part in the research. “God bless you all.”

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DEFINITION OF OPERATIONAL TERMS

- Rural Community:** A non-urban population living on small scale farms.
- Dental conservation:** Maintenance and restoration of proper masticatory function of teeth.
- Adult:** By Kenyan law, anyone who is 18 years old and above
- Oral health:** Absence of disease and optimal functioning of the tooth and its tissues in such a manner that preserves the highest level of self esteem.
- Dental conservation methods:** Those methods that can be utilized to maintain and restore proper masticatory function of teeth.
- Professional dental conservation methods:** Those methods that are instituted professionally; for example, fillings.
- Individual dental conservation methods:** Methods that are utilized at individual level; for example, brushing of teeth.
- Edentulism:** Complete loss of all the teeth.
- Dental caries:** Tooth decay
- Periodontal disease:** Disease of the gums and surrounding tissues.
- Denture:** A complete set of artificial teeth placed in an edentulous mouth to restore the masticatory function of natural teeth.

ACRONYMS AND ABBREVIATIONS

AIDS:	Acquired Immune Deficiency Syndrome
ART:	Atraumatic Restorative Treatment
BC:	Before Christ
CBS:	Central Bureau of Statistics
CDA:	Commonwealth Dental Association
DMFT:	Decayed, Missing, Filled Tooth/Teeth
GOK:	Government of Kenya
HIV:	Human Immunodeficiency Virus
KNOHP:	Kenya National Oral Health Policy
MOH:	Ministry of Health
NOHP:	National Oral Health Policy
NIDR:	National Institute of Dental research
PHC:	Primary Health Care
ppm:	parts per million
SPSS:	Statistical Package for Social Sciences
UoN:	University of Nairobi
WHO:	World Health Organization

ABSTRACT

Like most other diseases, oral diseases affect all people irrespective of nationality, race, colour and creed. Despite great achievements in the oral health of populations globally, problems still remain in many communities around the world. Dental conservation methods are those methods that can be utilized to maintain good oral health. They can be instituted at both individual and professional levels. Good oral health is an essential and important component of general health. Some of the conservation methods include amalgam fillings, tooth coloured fillings, crowns and inlays. While these conservation methods are available to Kenyans in the event of pain from dental caries, most of the teeth are reportedly extracted rather than filled. The Kenyan population has received relatively few fillings. Dental caries has been cited as the most common cause of tooth mortality. As the prevalence of dental caries increases due to the use of refined sugars which are cariogenic in nature, tooth mortality also increases. The main objective of this study was to determine factors that influence utilization of dental conservation methods. An analytic cross-sectional study was carried out in Gatanga Division of Thika District. Gatanga Division was selected purposively. Random sampling technique was used to get one location. Individual study participants were sampled using systematic random sampling method with a desired sample size of 384 individuals. Data were collected using structured interview schedules and key informant interviews. Data were analyzed using SPSS Version 11.5. Chi-square test was used to determine the strength and significance of the association between the variables. The study findings revealed the prevalence of dental extractions as 73.9% and that of utilization of professional dental conservation methods as 7.9%. The significant factors associated with utilization of dental conservation methods included; age ($\chi^2=70.991$, $df=50$, $p=0.027$), level of formal education ($\chi^2 = 13.635$, $df=4$, $p=0.009$), earlier fillings ($\chi^2=24.260$, $df=1$, $p=0.0001$) and social cultural beliefs ($\chi^2=83.539$, $df=68$, $p=0.047$). The study shed light on some of the reasons behind continuous loss of teeth among Kenyans when dental conservation methods are available. With the dissemination of the study findings and recommendations to the Ministry of Health, the oral health policy may be improved to the benefit of the Kenyan society.

CHAPTER 1

INTRODUCTION

1.1 Background Information

Like most other diseases, oral diseases affect all people irrespective of their nationality, race, colour and creed (WHO, 1999). Oral health describes a standard of health of dental and related tissues which enable an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to the general well being. This is stressed further by the Commonwealth Dental Association (CDA) which states that “good oral health is an essential and important component of general health and it is a birthright of every individual in the world” (NOHP, 2002). The psychosocial impact of oral disease often significantly diminishes quality of life (WHO, 2003). Despite great achievements in the oral health of populations globally, problems still remain in many communities around the world. This is particularly among underprivileged groups in both developed and developing countries. Dental caries and periodontal diseases have historically been considered the most important global oral health burdens (WHO, 2003).

The precise burden of oral diseases in Kenya is unknown because there has never been any National Oral Health survey (NOHP, 2002). There is therefore no precise knowledge on the distribution pattern and magnitude of oral diseases in Kenya. However several epidemiological studies on oral diseases in Kenya have been carried out in the last few decades and these form the basis of the status of oral diseases in Kenya (NOHP, 2002). The two major causes of tooth loss in Kenya are dental caries and periodontal disease. Most of the studies on dental caries in Kenya have been carried out in the capital city,

Nairobi. Dental caries has been cited as the most common cause of tooth mortality at Kenyatta National Hospital which is the largest hospital in Kenya (Kaimenyi *et al.*, 1988) and the main cause of tooth loss in Kenya in general (Sanya *et al.*, 2004). Periodontal disease is present from the first decade of life to old age and results in tremendous economic and social burdens both to the individual and society. The disease has been reported as the second major cause of tooth loss at Kenyatta National Hospital (Kaimenyi *et al.*, 1988) and in Kenya in general (Sanya *et al.*, 2004). Most of the teeth that have caries are reportedly extracted rather than filled (Ng'ang'a, 2000). Other diseases and conditions that affect the oral cavity include dental fluorosis, oral cancer, edentulism, cranial facial birth defects and malocclusion of teeth. Dental caries is the most common disease of mankind (Soben, 2006).

In Kenya, over the years, the demand for oral health has outstripped the financial provision from the exchequer. The majority of the oral health personnel, are dentists. The ratio of dentist to the general population in the public sector is 1:378,000 with only 20% in the rural areas and 80% in the urban areas. Those in the urban areas take care of only 10% of the country's population (WHO, 1999). The number of registered dentists in Kenya is 700. When all the sectors are combined, the ratio of dentists to the general population is 1: 60,000.

Different conservation methods can be used to prevent or treat dental disease. Oral health diseases such as dental caries constitute a major proportion of the health problem in Kenya. There is also an indication of more edentulous people above 50 years old mainly

due to dental caries (NOHP, 2002). In this study conservation methods were analyzed in two dimensions, those that an individual can practise in order to maintain good oral hygiene and those methods that can be instituted professionally. The factors that influence utilization of these different conservation methods were established.

By tradition, dentistry has been largely a reparative profession. However, reparative dentistry alone cannot bring about the control of dental disease. Plaque control is vital in maintenance of good oral health. At individual level the toothbrush and the chew stick are the basic instruments for maintaining good oral hygiene. They are the principal instruments in general use for accomplishing goals of plaque control (Soben, 2006). The use of dentifrices also plays a role in plaque control as they have abrasive properties. Dentifrices particularly toothpastes and mouthwashes are known to play a significant role as adjuncts to toothbrushing in plaque control procedures (Garcia-Godoy *et al.*, 1990). Refined sugars also have a role in dental caries and inhibition of major dental problems can be realized by reducing its intake (Pine, 1997). High consumption of refined foods and snacks goes hand in hand with high prevalence of dental caries (Ngatia *et al.*, 2001).

Restorative dentistry at professional level is valuable in controlling dental caries. This also includes Atraumatic Restorative Treatment (ART) whereby carious tooth tissues are removed using hand instruments alone and restoring the cavity with an adhesive restorative material; usually glass ionomer (Pratip *et al.*, 1997). Other restorations include amalgam and tooth coloured fillings, crowns and inlays.

The prevalence of dental caries in Kenya is highest amongst the middle socio-economic groups and relatively few people have fillings (Ng'ang'a, 2000). Bearing in mind the effect loss of teeth has in determining the kind of nutrition one takes which in turn reflects the health status of an individual, it is important to establish why people continue losing teeth as if these conservation methods never existed. This study was aimed at establishing the missing link between the people and the dental conservation methods. Different factors may influence utilization of dental conservation methods; this includes socio-economic, socio-demographic and socio-cultural factors and knowledge. These factors were looked into as the independent variables. Dental conservation methods were the dependent variables.

1.2 Statement of the Problem

Despite there being conservation methods in Kenya that can both prevent and restore tooth damage, most of the teeth that have caries are reportedly extracted rather than filled, thereby losing the masticatory functions of teeth (Ng'ang'a, 2000).

People who have many missing teeth face a diminished quality of life. Not only do they have to limit food choices because of chewing problems which may result in nutritionally poor diets, but they may feel some embarrassment and self-consciousness that limits good social interaction and communication (NOHP, 2002).

With the dental caries being reported to be the main cause of tooth loss in Kenya (Sanya *et al.*, 2004), it is important to determine the factors that may be influencing the utilization of conservation methods that will stop this trend.

1.3 Justification

The commonest cause of tooth mortality in Kenya is dental caries followed by periodontal disease (Sanya *et al.*, 2004). Dental caries has been cited as the most common cause of tooth mortality at the largest hospital in Kenya (Kenyatta National Hospital) (Kaimenyi, 1988). The second major cause of tooth loss at the same institution is periodontal disease. At the same time, caries on adults in Kenya has received little attention, most of the studies being carried out on children in the capital city, Nairobi. Only a few studies have been done in the rural areas and none has been done in Gatanga Division either. No study has been done on utilization of dental conservation methods.

The studies that have been carried out show that relatively few fillings have been done (Ng'ang'a, 2000). Most of the teeth that have caries are reportedly extracted. It is therefore evident that there is an existing problem whereby the population continues to lose their teeth due to dental caries. It is therefore important to determine why this trend is apparent when there are dental conservation methods available in the country.

1.4 Research Questions

- a) What is the level of knowledge and awareness on dental conservation methods among adults in Thika District?
- b) What factors influence the seeking of dental conservation methods among adults in Thika District?
- c) What socio-cultural factors influence the uptake of dental conservation methods among adults in Thika District?

1.5 Null Hypothesis

H₀: There are no factors influencing utilization of dental conservation methods in adults in Gatanga Division, Thika District, Kenya.

1.6 Objectives

1.6.1 General objective

To investigate the factors that influence utilization of dental conservation methods in Gatanga Division of Thika District.

1.6.2 Specific Objectives

- (i) To establish the level of knowledge and awareness on dental conservation methods among adults in Thika District.
- (ii) To determine the factors that influence the seeking of dental conservation methods among adults in Thika District.
- (iii) To establish the socio-cultural factors influencing the uptake of dental conservation methods among adults in Thika District.

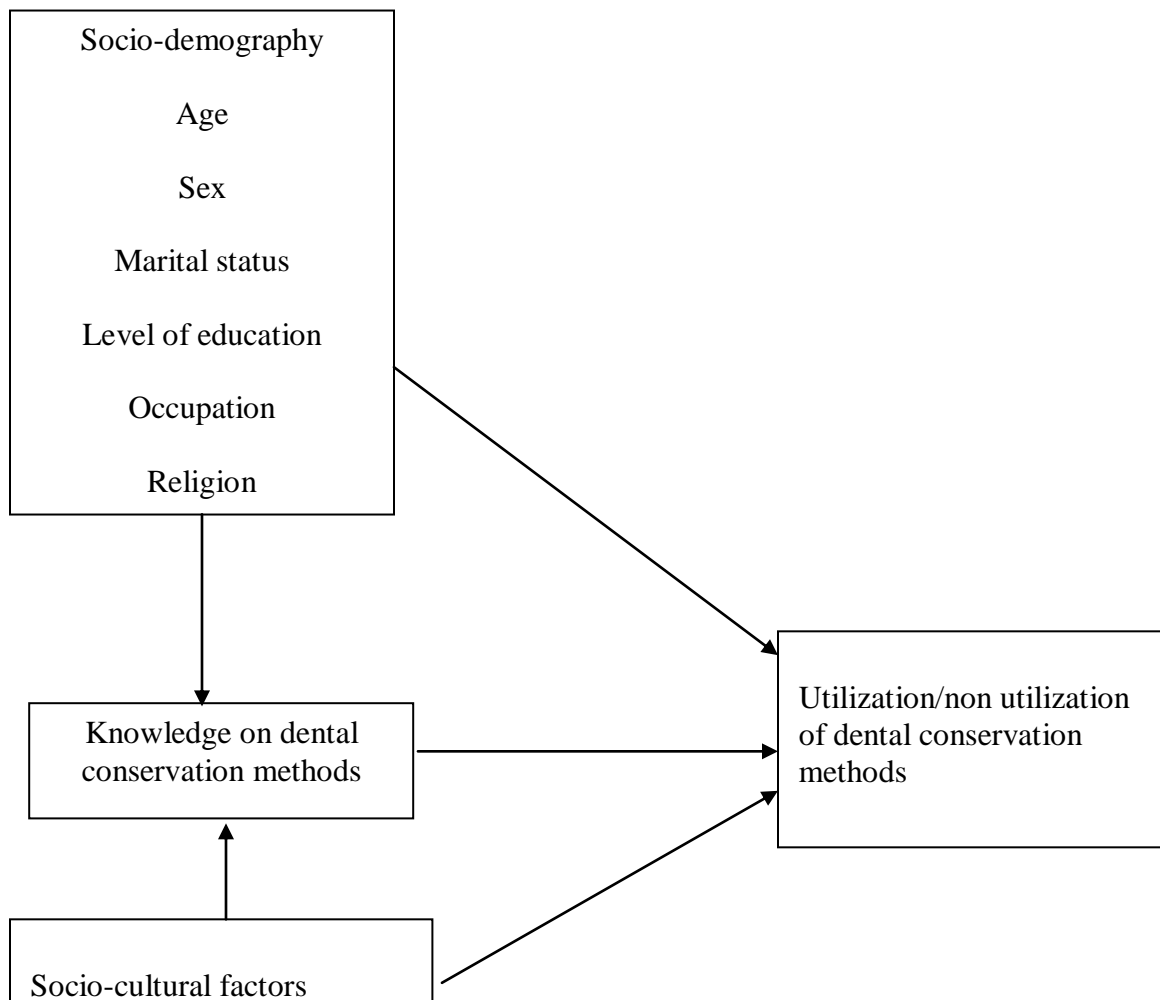
1.7 Benefits of the Study

The study has shed light into the reasons behind continuous loss of teeth in people even when there are dental conservation methods available. With the dissemination of the study and its findings, it is hoped the recommendations will go a long way towards the improvement of the oral health policy. The study findings will also be beneficial to other academicians for knowledge purposes.

1.8 Conceptual frame-work

INDEPENDENT VARIABLES

DEPENDENT VARIABLES



This original theoretical conceptual framework shows how different variables may affect the utilization of dental conservation methods. Social demographic factors may influence the chance to acquire knowledge. Knowledge in itself will influence the utilization of dental conservation methods. Socio-demographic factors may influence utilization or non utilization of dental conservation methods directly. Socio-cultural factors may determine acquisition of knowledge and may also influence utilization of dental conservation methods.

CHAPTER 2

LITERATURE REVIEW

2.1 Historical background of dental care

Dental disease has affected mankind for a very long time. The disease occurred many thousands of years ago in people living on a diet that could be regarded today as ‘non-cariogenic’. Probably the earliest established dating of the occurrence of dental disease (caries) is that reported in hominoid skulls of some half a million years ago (Arthur, 1938). The resistance of teeth to post-mortem destruction allows a study of the prevalence of dental caries through history. Dental decay (caries) is the most common disease of mankind (Soben, 2006).

Going by history, dentistry has been resolved into two conceptions; maintenance of health of teeth and surrounding tissues and repair and replacement of damaged or lost teeth (Arthur, 1938). The foundations for the science of dentistry were established during

the period 1600 - 1840. By the end of the 16th century limited knowledge of dentistry had spread to most countries in Europe, France and England. Carved bone from animal and ivory teeth held to neighbouring teeth with gold and silver wire were used in France, Germany and Italy (Robert, 1997).

Among the earliest recorded examples of dental prosthesis are the gold structures of the Phoenicians, the Etruscans and a little later the Greeks and the Romans. The physicians and barber-surgeons probably performed the treatment and extractions whereas goldsmiths and other artisans constructed the artificial restorations. Carious teeth were filled with ground mastic, alum and honey or other substances during the period from about 1050 A.D. to 1122 A.D. Oil of cloves was used to alleviate toothache (Robert, 1997).

Toothache must be a long standing burden man has borne. The Ebers Papyrus compiled about 1500 B.C and dating probably to about 4000 B.C contained reference to conditions similar to periodontal diseases and preparations to use as mouthwashes and dentrifices (Esther 1977). By about 3000 B.C. gold tooth picks were found in excavations at Ur and various herbal medicine used for periodontal disease (Soben, 2006). The writings of Hippocrates (about 300 B.C.) include descriptions of diseased gums related to calculus and of complex preparations for the treatment of unhealthy mouths. The earliest record of chew stick dates back in Chinese literature to about 1600 B.C. The tooth brush was introduced in the western world in 1640. Wild boar, horse or hog bristles were used with

handles made from gold, ivory, ebony or oxbone. Nylon came into use in toothbrush construction in 1938 (Esther, 1977).

Combination of silver and mercury to form amalgam was announced by O Taveau of Paris in 1826. This was the beginning of dental amalgam which is recognized as one of the outstanding development in the field of restorative materials. In China, as early as the 7th century amalgam was used as a restorative material. By the 10th Century bristled toothbrushes using horse hair had been invented (NIDR, 1989). By 1900 many of the major present day materials had been introduced to the profession. With the beginning of the 20th and 21st century came many refinements and improvements in the quality of various materials in dentistry. Currently, toothbrushes are made of synthetic materials (Robert, 1997).

2.2 Dental disease as a public health concern

Most people experience some form of dental disease in their lifetime. If adequate and prompt care for those conditions is not instituted, it may result in the total loss of the natural teeth (edentulism) thus disabling and disfiguring the individual (NOHP, 2002). Of the diseases that afflict man, dental caries (decay of teeth) is of major importance because it attacks and frequently destroys the dentition early in life. The magnitude of the problem due to the major dental diseases (dental caries and periodontal disease) is evidenced by the universality of the diseases and the extensive levels of untreated pathology results in a public health problem of major proportions (Jong, 1993).

Although many oral diseases are not always life-threatening, they too are important public health problems because of their high prevalence and impact on individuals and society in terms of pain, discomfort, social and functional limitations and handicap and the effect on the quality of life (WHO, 1999). Tooth loss is still regarded incorrectly as a normal consequence of ageing. The public health impact of dental diseases is seen in the fact that dental diseases are not reversible and are not self-curing. Though preventive measures are highly successful in reducing the major dental diseases (Jong, 1993), they have not been able to eliminate the diseases. Studies of the prevalence of dental diseases in recent decades have placed problems of dental health in a position of major importance with regard to health needs of nations.

2.3 Dental conservation methods

The toothbrush is the principal instrument in general use for accomplishing plaque removal as a necessary part of good oral hygiene at an individual level. Modern synthetic bristled toothbrushes are in use and also the traditional chew stick. Earliest record of chew stick dates back in Chinese literature to about 1600 B.C. (Styers and Reynolds, 1977). Indigenous oral hygiene aids used included Mango leaves, coconut leaves, twigs and stems of Neem and Bamboo plants and Walnut barks. Sand, ash, common salt, charcoal and burnt coconut shell powder were also used as oral hygiene aids.

The use of dentrifices goes hand in hand with the use of the toothbrush. The dentrifices having abrasive properties play a role in plaque control. Fluoride containing dentrifices have a caries inhibitory effect (Embery and Rolla, 1992). The tooth brushing techniques used are also important for effective plaque removal. These include the Bass, roll, scrub brush and charters method. Interdental cleaning agents are also important in plaque control in that they remove plaque interdentally (Pine, 1997). These include dental floss, toothpicks, rubber and plastic tips. Fermentable carbohydrates also have a role in dental caries and research has shown that partial inhibition or arrest of major problems in dental practice can be realized by dealing with the food factor (Pine, 1997). Restriction in the use of deleterious food factors and promotion of beneficial foods can negate disease effect (Pine, 1997).

Professionally restorative dentistry is valuable in controlling dental caries. Restoration of carious lesions prevents the loss of teeth from progression of decay into the pulp. Atraumatic Restorative Treatment (ART) is a dental conservation method whereby carious tissues are removed using hand instruments alone and restoring the cavity with an adhesive restorative material usually glass ionomer (Pratip *et al.*, 1997). This method is of low cost and can prevent extractions in most cases. It is useful in places where there is no electricity and where people cannot afford other costly methods. The glass ionomer adheres to the tooth and halts or slows the progression of the carious lesions as it slowly releases fluoride (Soben, 2006).

Amalgam is the most widely used material in restorative dentistry. It is easily manipulated, adapts well to the cavity walls and can withstand the stresses of mastication (Robert, 1977). Composite fillings are usually used in the anterior teeth because of esthetics. Artificial crowns are used to replace badly damaged natural crowns in teeth. They are made of porcelain, acrylic material or metal, or a combination of metal and acrylic or metal and porcelain. Fixed and removable bridges prevent further decay, malocclusion and loss of function. Glass ionomer cement can also be used in cervical restorations where esthetics is not critical. It is specifically recommended for patients with high caries risk because of its documented slow release of fluoride (John and Ronald, 2006). Other conservation methods include pulp therapy in treatment of deep caries, vital pulp, exposed pulp and pulpless teeth (Robert, 1997).

The use of fluoride in water or in the dentrifices also has a caries-reducing effect as a more resistant tooth is formed. The fluoride has the ability to decrease acid dissolution of enamel. Protection against caries increase markedly with an increase of fluoride in the drinking water to a level of about 1 ppm (part per million).

Enamel mottling can occur at 2ppm and become severe as concentration increases (Collins *et al.*, 1999). Professionally, fluoride can be applied topically or in use of fluoride containing prophylaxis paste.

2.4 Global perspective of dental disease

From the United States of America perspective, there has been a lot of progress in dental science. Recent surveys indicate major improvements in the oral health of Americans

reflecting forty years of advances in dental research (Simon, 1989). Dramatic shifts in the patterns of dental diseases are evident from the latest national surveys conducted by the National Institute of Dental Research. In this survey that employed adults and older Americans in 1985-1986, only 4 % of the working adults had lost all their teeth. The employed group averaged 23 decayed or restored tooth surfaces of which 95% were already restored. In a survey done by the same institute between 1986-1987 on school-age children, the overall caries prevalence rate dropped from a mean decayed, missing, filled tooth (DMFT) of 4.8 in 1980 to a mean of 3.1 in 1987 (NIDR, 1989).

Although Fluoride, fluoridation and emphasis on community and personal preventive practices have resulted in a marked decrease in caries in children in the United States and in many developed countries, dental diseases are not disappearing (NIDR, 1989). From 1971 to 1980 approximal caries decreased by about 50 % in the 5-7 year-old age group. In 1980, 37 % of these children were free from caries and in 1987 almost 50% were caries-free. Still 25% of children had very high dental decay rates (NIDR, 1989).

In the USA there are fewer extractions as a result of the reduction in dental decay. Caries improvement has also been shown in younger adults and in persons aged 18 – 64 years 95% of coronal caries have been restored (NIDR, 1989). In developed nations the caries rate has decreased dramatically. In the early 1980's the WHO proposed a goal to decrease the DMFT index to less than 3.0 for 12 year old children by the year 2000. In 1980, the DMF index for the United States dropped by 50% to 2.6 (Simon, 1989).

In the United Kingdom the caries rate has also decreased dramatically. In 1980 the DMFT dropped to 2.55. This has been attributed to fluoridation of water and use of fluorides in toothpastes in the western nations. The fluoride creates a more resistant hydroxyapatite tooth surface and suppresses acid production (NIDR, 1989).

In 1983, in a national survey on 130,000 students in China, the mean DMFT of 12 year old was 0.67. However following the increase in sugar consumption in recent years, the caries incidence has increased. From 1982-1987 a longitudinal study on primary and middle school students in a city of Sheryang showed the DMFT of the 12 year-olds had increased from 0.9 to 1.2 and caries prevalence from 36.7 % to 52%. In Chile the DMFT increased from 2.8 to 6.3 over 18 years, 0.7 to 4.4 over 15 years in Thailand (WHO, 2000).

2.5 The African perspective of dental disease

In Africa, prevalence and severity of dental caries is rising rapidly (WHO, 2000). In Uganda the DMFT rate increased from 0.4 to 1.5 between 1966 and 1982, 0.2 to 1.6 over 17 years in Ethiopia and in Kenya 0.1 to 7.1 over 21 years. There is overwhelming evidence that refined sugars, especially sucrose, are the principal cause of dentals caries (WHO, 2000).

2.6 The Kenyan perspective of dental disease

Although oral health services have existed in Kenya for decades, there has never been any oral health survey to determine the exact situation of oral health. However, several

epidemiological studies on oral disease in Kenya have been carried out in the last few decades. In urban populations the under 18 year- olds had a mean DMFT of 0.2 – 1.8 and 12 to 15- year- olds had a mean DMFT of 1.2 – 1.9 (Ng'ang'a, 2000). Handicapped children aged between 5 – 15 years had a mean DMFT of 0.8 (Ohito *et al.*, 1993). Most of these studies have been conducted in the capital city of Kenya, Nairobi (Ng'ang'a, 2000). For unknown reasons, caries status of adults has received very little attention. In one study, 26 – 59 year-olds in a rural population were found to have a mean DMFT of 5.8 (Manji *et al.*, 1989).

In a study of randomly selected rural population with limited health care, dental caries was found to be the main cause of tooth loss. The greatest incidence increase was among the 29-35 year olds (Manji *et al.*, 1989). In another study on school children in Nairobi, Kenya, the DMFT was 2.95 and the decayed teeth constituted 96% of the total DMFT. Only 1.3 % of the children had filled teeth (Ngatia *et al.*, 2001). The high consumption of refined foods and snacks as well as high prevalence of dental caries raises a strong public health concern. Dental caries has also been cited as the most common cause of tooth mortality at Kenyatta National Hospital which is the largest hospital in Kenya (Kaimenyi *et al.*, 1988).

In many studies on caries in Kenya the striking finding is the relatively few fillings that the population has received. In the event of pain from dental caries most of the teeth are reportedly extracted rather than filled (Ng'ang'a, 2000). According to several annual reports in Thika District Hospital, most of the patients who attend the dental clinic end up

losing their teeth (Annual Report, 2002). According to the report of January 2006, out of 627 attendances 517 (82.4%) ended up losing their teeth.

Some of the known factors that may be influencing utilization of dental conservation methods are the high poverty levels and inadequate resources in the provision of oral health care services and non-involvement of the public in their oral health care (NOHP, 2002). The high cost of oral health-care is mainly met from out-of-pocket expenses. There are also no safety nets or organized insurance schemes for subsidizing these costs which have proved to be fundamental barrier to essential quality oral health care (NOHP, 2002). Oral health has traditionally been segregated from the general health and there is lack of appreciation of the importance of oral health to general health and welfare (Kaimenyi, 2004). There is also a growing disparity in oral health status between the urban populations, the rich and the poor, the young and the elderly. Oral health education and prevention programmes, are non-existent (NOHP, 2002). The number of oral health personnel has also not matched the increasing oral health care needs of the population (NOHP, 2002).

2.7 Dental services in Kenya

In Kenya, the history of the department of dental surgery based at the University of Nairobi spans from 1974 and the first graduates completed studies in the year 1978. The dental hospital was set up in 1977 and professional conservation methods have been practised since then. The absence of an oral health policy in Kenya before the year 2002 has made it difficult to provide sustainable quality oral health within a framework of

ever-increasing poverty levels and scarce resources. The government has in the past responded by providing oral health services at the provincial and district hospitals (NOHP, 2002). Thika District Hospital is such a centre where oral health services are offered.

The Government of Kenya (GOK) recognizes that good oral health is an integral part of general health and its commitment to the provision of oral health services is evident from the expansion of oral health infrastructure across the country. It also recognizes the fact that good oral health is an important and essential component of the general body health and is a birthright of every person in the world (WHO, 1978). This is also in line with the slogan “No health without good oral health” (KNOHP, 2001). Oral health is the 9th element of primary health care (PHC) in Kenya. Good oral health includes utilization of conservation methods both at individual level and at professional level to fight the most common cause of tooth loss (dental caries).

The Government of Kenya also supports training of dental doctors, dental auxiliary personnel (dental technologist and community oral health officers) at undergraduate, postgraduate and diploma levels respectively. The National Oral Health Policy facilitates a systematic identification of oral health priorities and use of viable interventions particularly at the district level to meet specific oral health needs of the community (NOHP, 2002).

CHAPTER 3

MATERIALS AND METHODS

3.1 Study area

The study was conducted in Thika District (Appendix I), located in the Southern part of Central Province. It lies between latitude 3°53" and 1°45" south of the Equator and longitude 36°35" and 37°25" east. It is situated approximately 40 kilometres north-east of the city of Nairobi and covers an area of 2,024 square kilometers. It borders Nairobi to the south, Maragua District to the north and Machakos District to the east. It is divided into six administrative divisions: - Thika Municipality, Kakuzi, Gatanga, Gatundu North (Kamwangi) Gatundu south and Ruiru (Appendix I).

In 2005 the population projection of the district stood at 677,334. The district is the second most populated district in the province after Kiambu. Its population density is 329 people/Km². The focus of the study was Gatanga Division which is one of the divisions of Thika District. In the last census Gatanga had a population of 30,000 people in 6,846 households (CBS, 1999). It covers an area of 38 square Kms with a density of 805 people/Km². Since the study has not been carried out elsewhere in Kenya, the division was purposively chosen. Gatanga Division is a rural community that depends wholly on Thika District Hospital for dental services due to the close proximity to the hospital. Other divisions like Ruiru may have the dental needs of the population met in other facilities in Nairobi. All the other divisions are further from the hospital and may get their dental needs met elsewhere. This makes Gatanga Division the best choice for the location of the study.

3.2 Research Design

An analytic cross-sectional study was conducted where both qualitative and quantitative data were collected. In a cross-sectional study, both the dependent and independent variables are measured at the same time. The design attempts to explain the observed patterns of occurrences of a disease-related phenomenon and its association with other factors.

3.3 Variables

A dependent variable attempts to indicate the total influence arising from the effects of the independent variables (Mugenda and Mugenda, 1999). The dependent variable was utilization of dental conservation methods. An independent variable is a variable that a researcher manipulates in order to determine its effects or influence on another variable (Mugenda and Mugenda, 1999). The independent variables included age, level of education, knowledge and socio-cultural factors.

3.4 Target Population

The target population is that population to which a researcher wants to generalize the results of the study (Mugenda and Mugenda, 1999). The target population was all adults in Kenya at the risk of tooth mortality.

3.5 Study Population

The study population is the experimentally accessible population (Mugenda and Mugenda, 1999). The study population was adults living in Gatanga Division (677,334).

3.6 Inclusion criteria

- a) All individuals who had lived in Gatanga Division for more than 1 year and were aged 18 years and above.
- b) Those people who had some experience with dental problems.
- c) Those who consented to participate in the study.

3.7 Exclusion criteria

- a) Those people who could not give sound judgement like the mentally challenged.
- b) People who were aged 18 years and above but were too sick to be interviewed.
- c) People who were aged 18 years and above but did not consent to the study.

3.8 Sample size determination

This was determined by using the formula by Kothari (2003)

$$\begin{aligned}n &= \frac{z^2 P q}{e^2} \\z &= 1.96 \quad \text{at 95\% Confidence Interval (C.I)} \\p &= 0.5 \quad \text{(no prevalence rate available)} \\q &= 0.5 \\e &= \text{error margin usually 0.05} \\n &= \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} \\&= 384.16\end{aligned}$$

Hence a sample size of 384 was used.

(No attrition consideration because interview schedules were used).

3.9 Sampling technique

There are seven locations in Gatanga Division namely:

- Mugumoini
- Gatanga
- Kariata
- Kigoro
- Kihumbuini
- Mukarara
- Kiriani

Gatanga Division was chosen purposively. Purposive sampling technique allows a researcher to use cases that have the required information with respect to the objectives of his/her study (Mugenda and Mugenda, 1999). Simple random sampling was used to get one location. This method of sampling involves giving a number to every subject and placing the numbers in a container and then picking any number at random. The subjects corresponding to the number picked are included in the sample (Mugenda and Mugenda, 1999). The location chosen was Mugumoini and was hence the study area.

Individual study participants were sampled using systematic random sampling method. In systematic random sampling, the sampling interval (K) is obtained by dividing the sampling frame (N) by the sample size (n) (Mugenda and Mugenda, 1999). There were 2,104 households in Mugumoini location and hence the sampling frame was 2,104.

$$\begin{aligned}\text{Sampling interval (K)} &= \frac{\text{Sampling frame (N)}}{\text{Sample size (n)}} \\ &= \frac{2,104}{384} \\ &= 5.46\end{aligned}$$

Therefore every 5th household was identified. One household member who was aged 18 years and above was randomly sampled from each household. This continued until the sample size of 384 participants was realized. Key informants were sampled conveniently as the dentists and community oral health officers were few. Only those who consented were interviewed.

3.10 Research instruments

A structured interview schedule with open and closed-ended questions was used to collect the data. A rough draft was prepared keeping in mind the appropriate sequence of putting questions. Technical defects were minutely scrutinized and removed after re-examining. The questions were simple and straight-forward so that the respondents could not find any difficulty in answering them. This instrument captured socio-economic, socio-demographic and socio-cultural factors that influenced utilization of dental conservation methods. Key informant interview was applied to both dentists and community oral health officers with questions targeting affordability and the challenges faced by the community. These responses were used to supplement the findings of the study.

3.11 Pre-testing

Pre-testing of the research instruments was done before the actual data collection to enhance the validity and reliability of the responses. This was done using a purposive sample of 25 respondents from Kigoro Location. This included people who had similar characteristics to those in the study area. Vague questions were rephrased to convey the same meaning to all participants. Some comments made by the respondents were also incorporated into the final questionnaire.

3.12 Validity

Validity is the accuracy and meaningfulness of inferences, which are based on research results. It is the degree to which results obtained from the analysis of the data actually represent the phenomenon under study (Mugenda and Mugenda, 1999).

The information on the research instruments was cross-checked, inspected and scrutinized to ensure accuracy, relevance, completeness, consistency and uniformity of the collected data.

3.13 Reliability

Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda and Mugenda, 1999). The conditions under

which the measurements took place were standardized by minimizing external variations such as fatigue and boredom. Broadening the sample of respondents improved the equivalence aspect.

3.14 Data collection tools and method

The data was realized through interviewing of adults in the study area.

Structured interview schedules with closed and open-ended questions were designed to assist in the interviewing (Appendix II). The structured interview schedules provide quantitative data that is objective and reliable for hypothesis testing. The principal researcher co-ordinated and ensured the interview schedules were properly followed. The research assistants were trained before hand on how to interview effectively. The interview schedules were worded in English and proper translation to Kiswahili and Kikuyu languages was discussed in the training in case of language barrier. This involved the use of two experts of Kiswahili and Kikuyu languages. Each adult was interviewed separately so as to give an independent answer to questions. Unstructured interview was applied to key informants using an interview guide (Appendix III).

3.15 Data analysis

The statistical package for social sciences (SPSS) was used for data analysis. The responses in the administered interview schedules were edited, coded and entered into a computer and processed using SPSS software version 11.5. Descriptive statistics

(measures of central tendency) such as mean was used. Frequencies, percentages, bar graphs and pie charts were used to describe, organize and summarize collected data.

The variables were subjected to correlation analysis. The significant variables were then subjected to Chi-square statistics to determine the strength and significance of association between the variables. Responses from key informants and the open -ended questions were analyzed qualitatively according to emerging themes and then used to explain and interpret quantitative data.

3.16 Ethical considerations

Permission to carry out the study was sought from the relevant authorities and institutions which are; Office of the President, Ministry of Science and Technology and Kenyatta University Graduate School. The Medical Officer of Health (MOH) of Thika District was also notified and permission sought to carry out the study. The District Commissioner of Thika District, District Officer and the Chief of Mugumoini location which was the study area, were all informed of the intended study and their permission and co-operation requested. Confidentiality of information and anonymity in data recording was assured. Participants were also informed about the study before commencing the interview. Only people consenting to take part in the study were interviewed. The very sick who were excluded from the study were advised accordingly and where necessary referred by the principal researcher to the appropriate facility with a letter.

CHAPTER 4

RESULTS

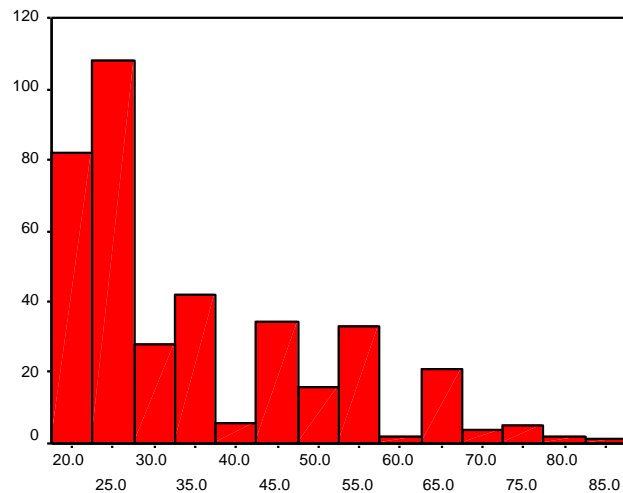
4.1 Socio-demographic factors

The socio-demographic factors looked into included age, gender, marital status, level of formal education, occupation and religion of the respondents.

4.1.1 Age distribution

The age of the respondents varied from 18 to 86 years. The age bracket of 22-27 years provided 28% of the respondents.

Figure 4.1 The age distribution of the respondents

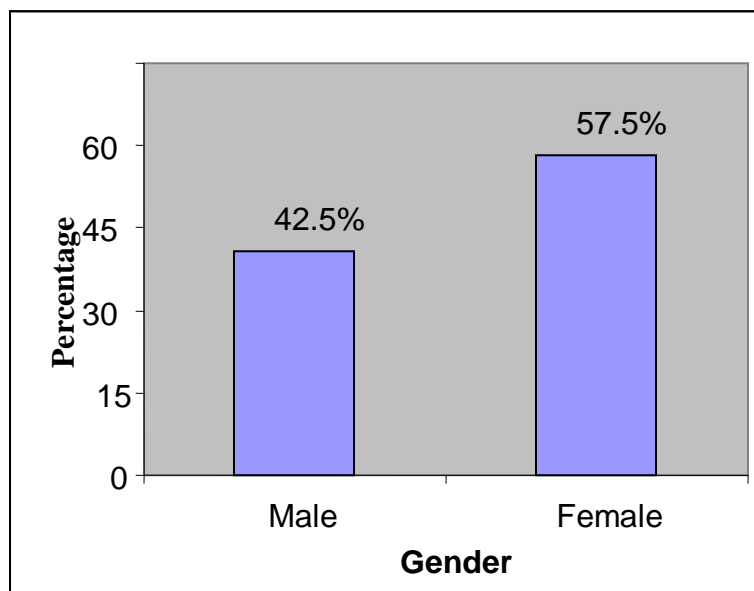


Age of respondent (years)

4.1.2 Gender

There were 221 (57.5%) females and 163 (42.5%) males (Fig 4.2). The majority of the respondents were females.

Figure 4.2 Gender distribution



4.1.3 Marital status

Two hundred and seventy seven (72.1%) of the respondents were married, 93 (24.2%) were single, 4 (1.1%) were divorced or separated while 10 (2.6%) were widows (Table 4.2).

Table 4.2 Marital status

Marital status	Frequency	Percent (%)
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Married	277	72.1
Single	93	24.2
Divorced/Separate	4	1.1
Widow	10	2.6
Total	384	100

4.1.4 Level of formal education of the respondents

Eighteen (4.7%) of the respondents had no formal education. One hundred and seventy eight (46.3%) had primary level, 158 (41.1%) had secondary level while 26 (6.8%) had diploma level. Only 4 (1.1%) had university education (Table 4.3). Hence the majority of the respondents had primary and secondary level of education. Respondents with a higher level of formal education were likely to mind losing all their teeth at old age ($\chi^2 = 12.964$, $df = 4$, $p = 0.013$). Respondents with a lower level of formal education were less likely to know any other form of treatment apart from extractions ($\chi^2=13.635$, $df=4$, $p=0.009$). Older respondents were likely to have a lower level of formal education ($\chi^2=298.656$, $df=200$, $p=0.0001$). Older respondents were also less likely to know any other form of treatment apart from extractions ($\chi^2=70.991$, $df=50$, $p=0.027$).

Table 4.3 Level of formal education

Level of formal education	Frequency	Percent (%)
None	18	4.7
Primary level	178	46.3
Secondary level	158	41.1

Diploma level	26	6.8
University	4	1.1
Total	384	100.0

4.1.5 Occupation

One hundred and forty (36.5%) of the respondents were farmers, 77 (20.1%) were unskilled labourers, 37 (9.6%) were in business, 103 (26.8%) were unemployed while 27 (7.0%) were in skilled employment (Table 4.4). The majority of the respondents were farmers and a big percentage were unemployed.

Table 4.4 Occupation of the respondents

Occupation	Frequency	Percent (%)
Farmer	140	36.5
Employed (unskilled)	77	20.1
Business	37	9.6
Unemployed	103	26.8
Employed (skilled)	27	7
Total	384	100

4.1.6 Religion

One hundred and sixty six (69.3%) of the respondents were Catholics, 98 (25.5%) were Protestants, 3 (0.8%) were Muslim while 17 (4.4%) were not affiliated to any religion (Table 4.5).

Table 4.5 Religion of the respondents

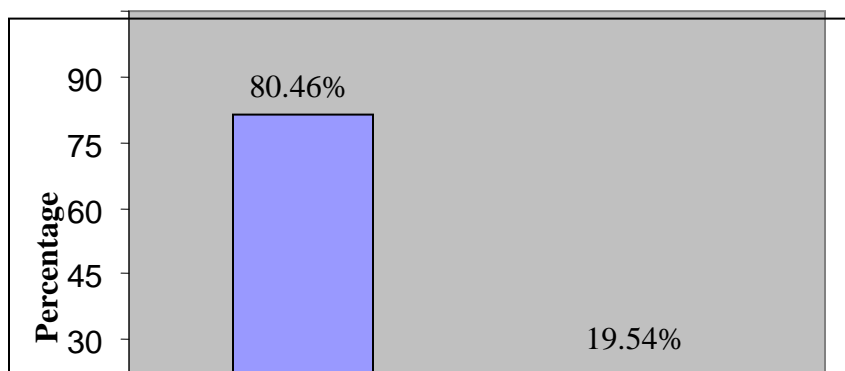
Religious background	Frequency	Percent (%)
Catholic	266	69.3
Protestant	98	25.5
Muslim	3	0.8
No affiliation to any religion	17	4.4
Total	384	100.0

4.2 Knowledge and awareness of dental conservation methods

4.2.1 Experience of dental problem

Three hundred and nine (80.46%) of the respondents had experienced a dental problem before while seventy five (19.54%) had never had any dental problem (Fig 4.3).

Figure 4.3 Experience of dental problem

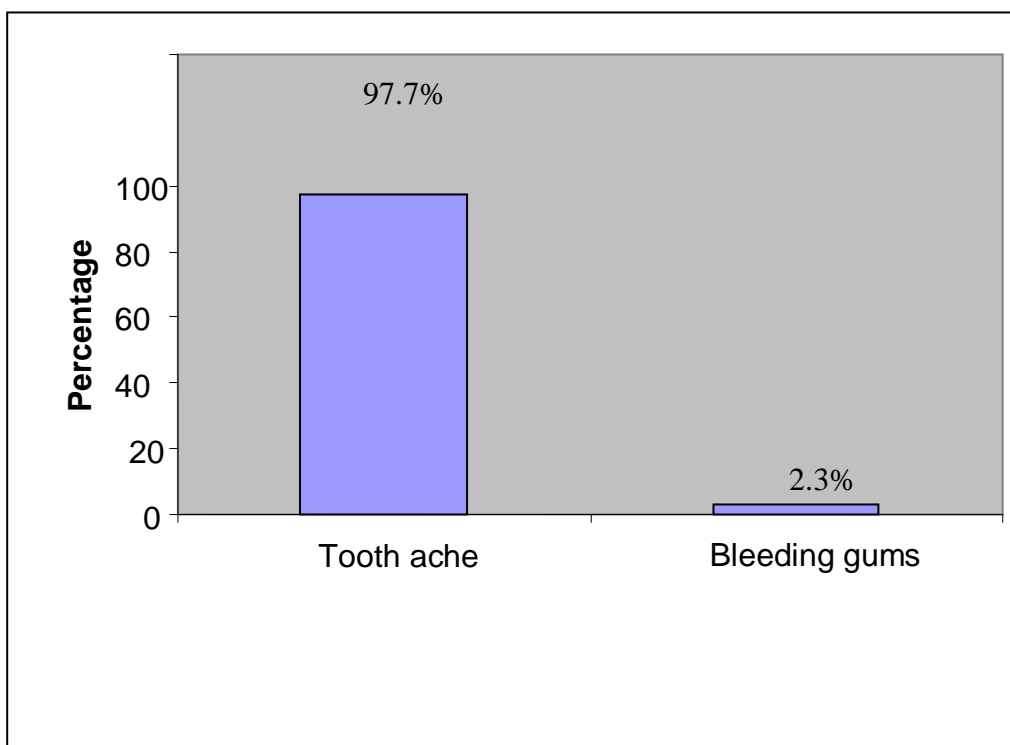


Experience of dental problem

4.2.2 Dental problems of the respondents

Three hundred and two (97.7%) of the respondents had experienced tooth ache while 7 (2.7%) had experienced bleeding gums (Fig 4.4).

Figure 4.4 Type of dental problem

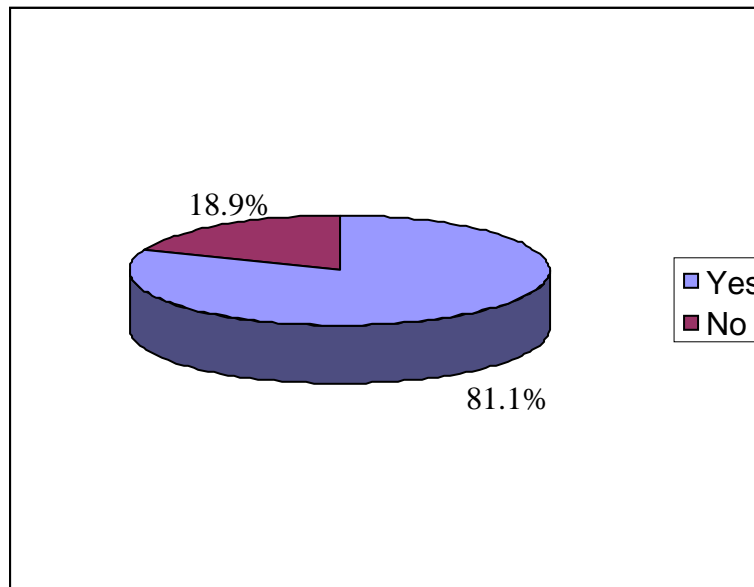


Dental problem

4.2.3 Respondent who sought help for toothache

Two hundred and forty five (81.1%) of the respondents who had a toothache sought help for the problem. Fifty seven (18.9%) did not seek help (Fig 4.5).

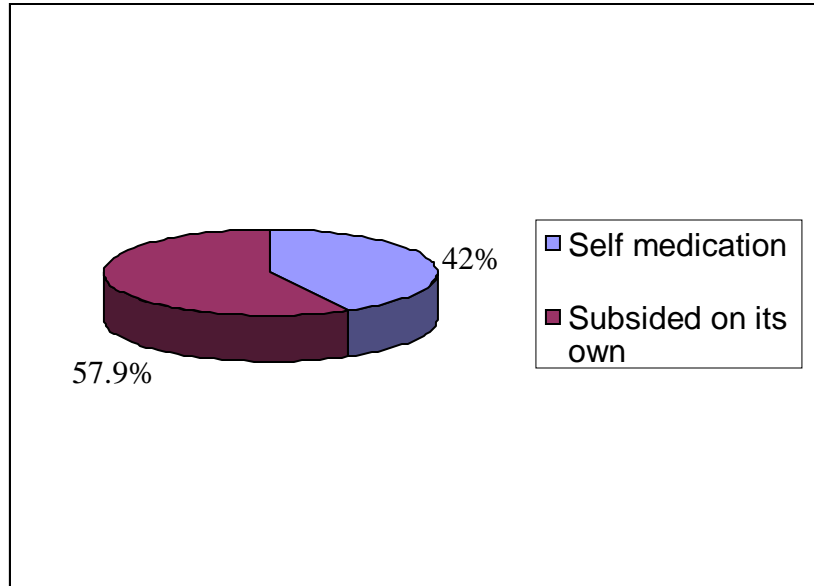
Figure 4.5 Respondent sought help for toothache



4.2.4 Reasons for not seeking help for toothache

Of the respondents who did not seek help 24 (42.1%) took mainly pain killers as medication. In 33 (57.9%) of the respondents the pain subsided on its own.

Figure 4.6 Reasons for not seeking help for toothache



4.2.5 Facility visited by respondents with toothache

Two hundred and two (82.5%) of the respondents with a toothache sought help from a government hospital, 37 (15.1%) sought help from private clinics and 6 (2.4%) chose to use herbal/traditional medicine (Table 4.6).

Table 4.6 Facility visited by respondents with toothache

Facility	Frequency	Percent (%)
Government hospital	202	82.5
Herbal medicine Clinic	6	2.4
Private clinic	37	15.1
Total	245	100

4.2.6 Dental care carried out at the facility

One hundred and eighty one (73.9%) of the respondents had tooth extraction, 29 (11.8%) were given medication, 30 (12.3%) had their teeth filled while 5 (2%) were referred to other facilities (Table 4.7).

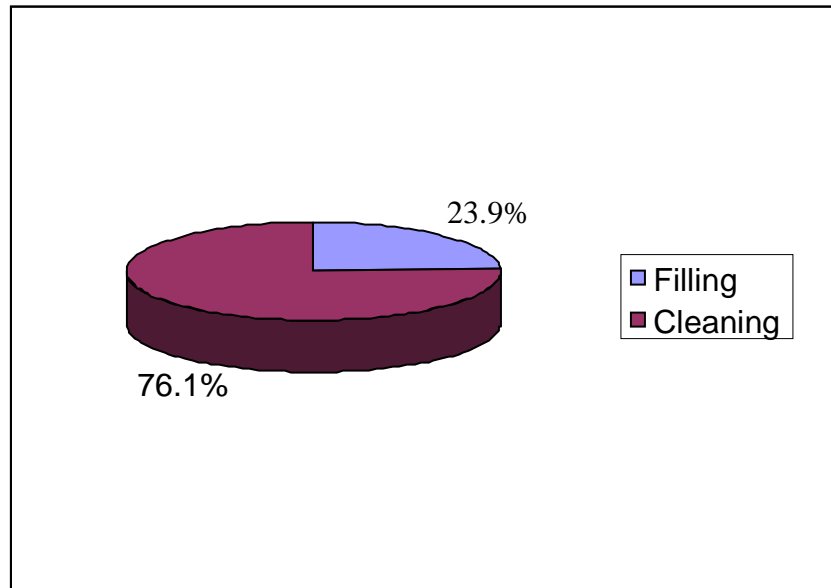
Table 4.7 Dental care carried out at the facility

Procedure	Frequency	Percent (%)
Referral	5	2
Medication	29	11.8
Filling	30	12.3
Extraction	181	73.9
Total	245	100

4.2.7. Procedure preferred by the respondent

One hundred and sixty (76.1%) of the respondents who preferred any other form of treatment apart from extractions said they preferred cleaning while 50 (23.9%) preferred fillings (Fig, 4.7). Respondents with a filled tooth were likely to know any other form of treatment apart from extractions ($\chi^2=24.260$, $df=1$, $p=0.0001$).

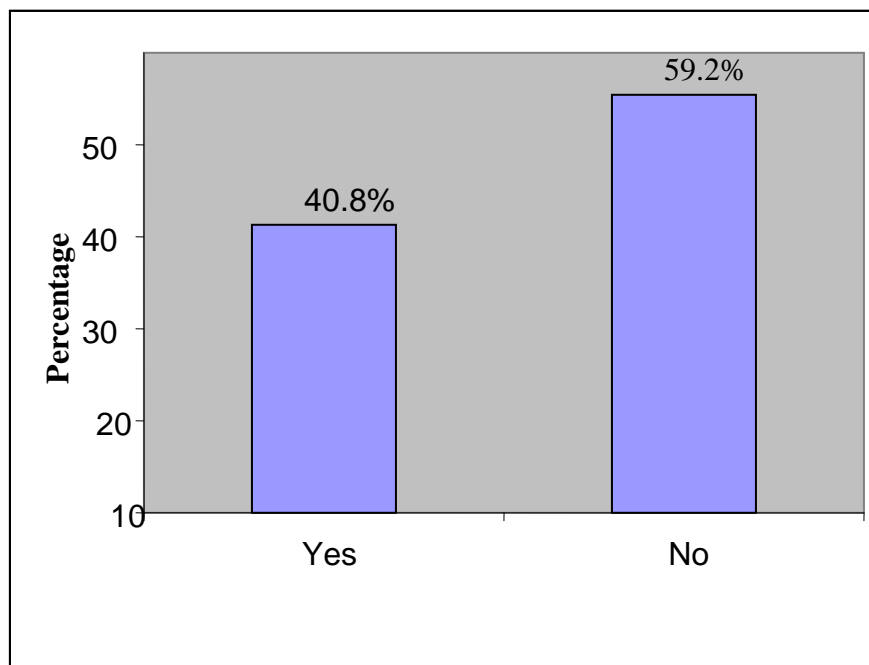
Figure 4.7 Procedure preferred by the respondent



4.2.8 Alternative dental treatment

One hundred and fifty seven (40.8%) of the respondents said they knew of other methods of treating teeth apart from tooth extraction whereas 227 (59.2%) did not know of other methods (Fig 4.8). Respondents who knew of other methods of treating teeth apart from extractions were likely to utilize professional dental conservation methods like fillings and this was a significant factor ($\chi^2=24.260$, $df=1$, $p=0.0001$).

Figure 4.8 Alternative dental treatment

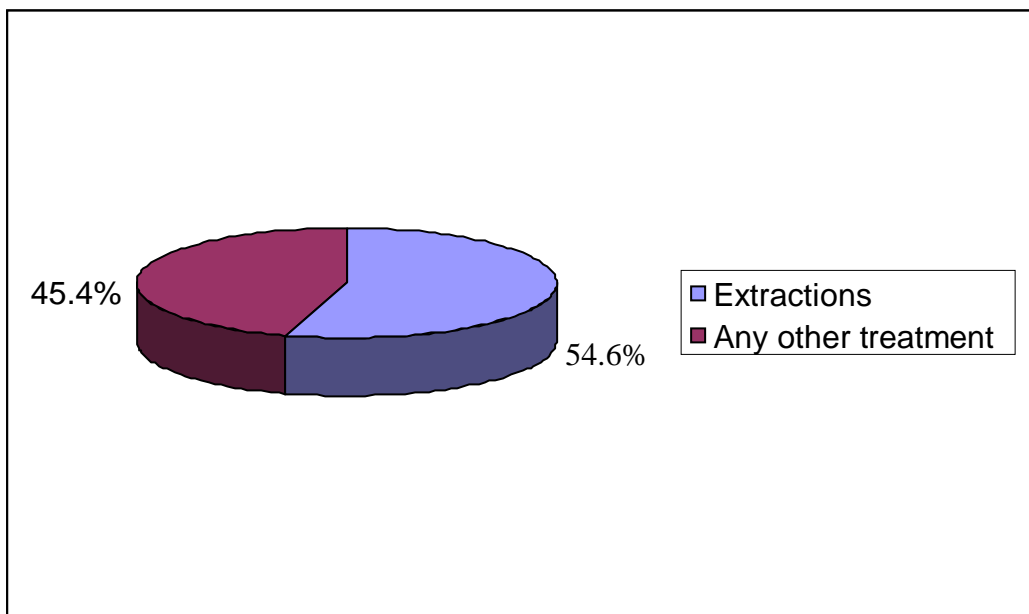


Knowledge on alternative dental treatment

4.2.9 Respondents' preferred treatment

Two hundred and ten (54.6%) of the respondents would not have preferred another form of treatment apart from extractions whereas 174 (45.4%) would have preferred another form of treatment (Fig 4.9). Respondents who felt that tooth extraction would lead to bad appearance were likely to have preferred any other form of treatment apart from tooth extractions ($\chi^2=5.277$, $df=1$, $p=0.022$).

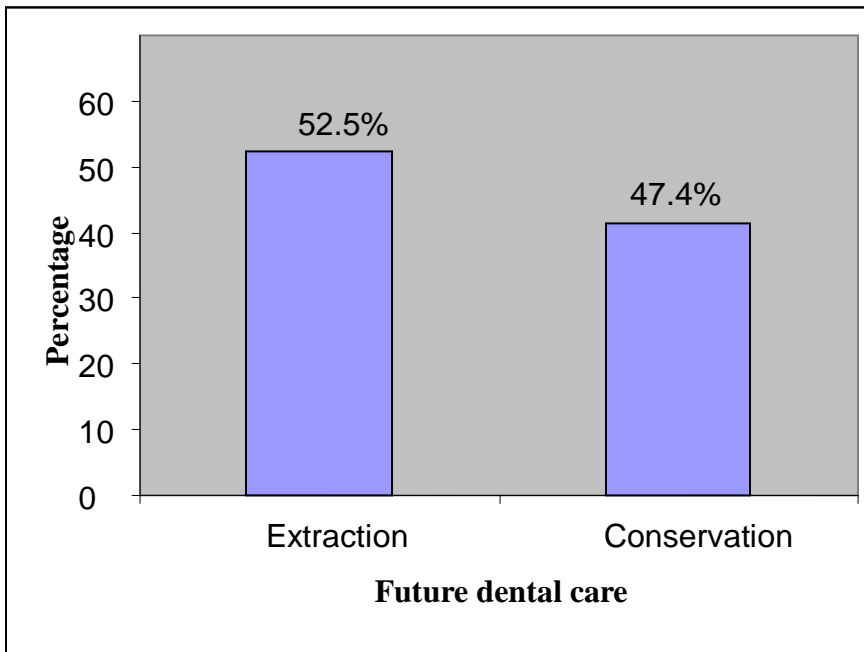
Figure 4.9 Respondents' preferred treatment



4.2.10 Future dental care

Two hundred and two (52.5%) of the respondents still preferred extraction of a tooth in case of a future dental problem. One hundred and eighty two (47.4%) preferred conservation (Fig 4.10).

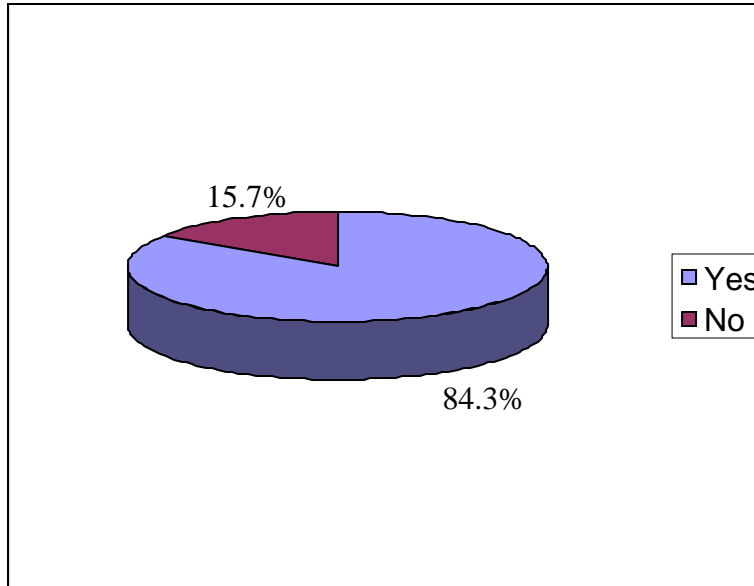
Figure 4.10 Future dental care



4.2.11 Knowledge of anybody with dental problem

Three hundred and twenty four (84.3%) of the respondents knew somebody who had ever had a dental problem while 60 (15.7%) did not (Fig 4.11).

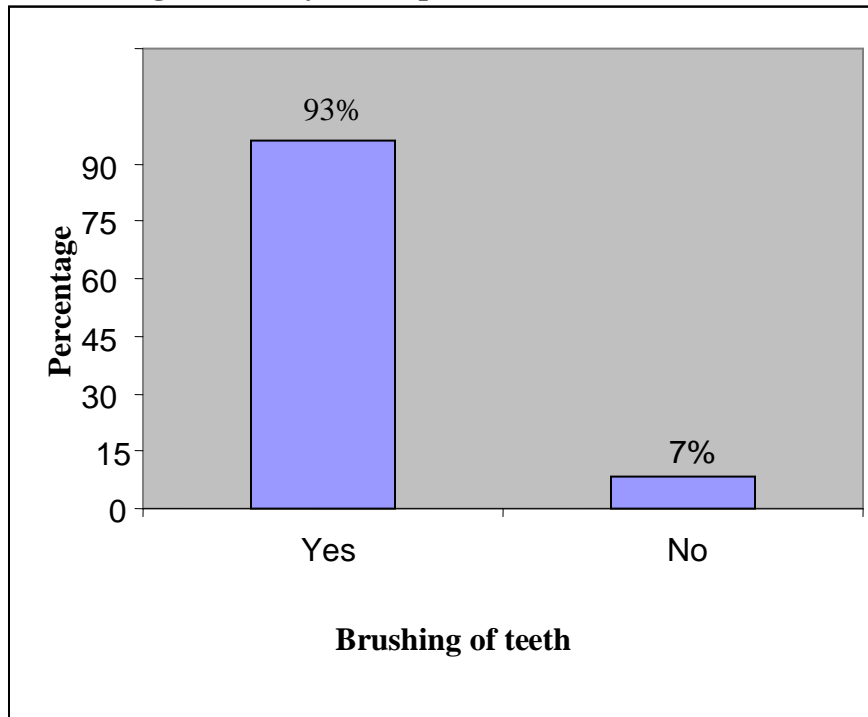
Figure 4.11 Knowledge of anybody with dental problem



4.2.12 Brushing of teeth by the respondents

Three hundred and fifty seven (93%) of the respondents said that they brushed their teeth while 27 (7%) said they did not (Fig 4.13).

Figure 4.12 Brushing of teeth by the respondent



4.2.15 Knowledge on brushing of teeth

The results presented in table 4.8 above indicate that two hundred and forty one (62.8%) of the respondents who brushed their teeth said they did it to avoid decay. One hundred and sixteen (30.2%) said they brushed their teeth to remain clean. Six (1.6%) of the respondents who did not brush their teeth said it was not important while 21 (5.4%) said they did not have a toothbrush. Three hundred and seventy one (96.6%) of the respondents thought it was important to brush one's teeth while 13 (3.4%) thought it was not important. Two hundred and ninety five (76.8%) of the respondents said they brushed their teeth after eating. Eighty nine (23.2%) said they brushed before eating. Fifty one (57.3%) of the respondents who brushed their teeth before meals in the morning said they did it so that food does not stick to the teeth. Thirty three (37.1%) said they did it to avoid bad breath and 5 (5.6%) gave other reasons like forgetting to brush at night. Two hundred and six (69.8%) of the respondents who brushed their teeth after meals said they did so to remove food particles while 89 (30.2%) said they did it to have fresh breath.

Table 4.8 Knowledge on brushing of teeth

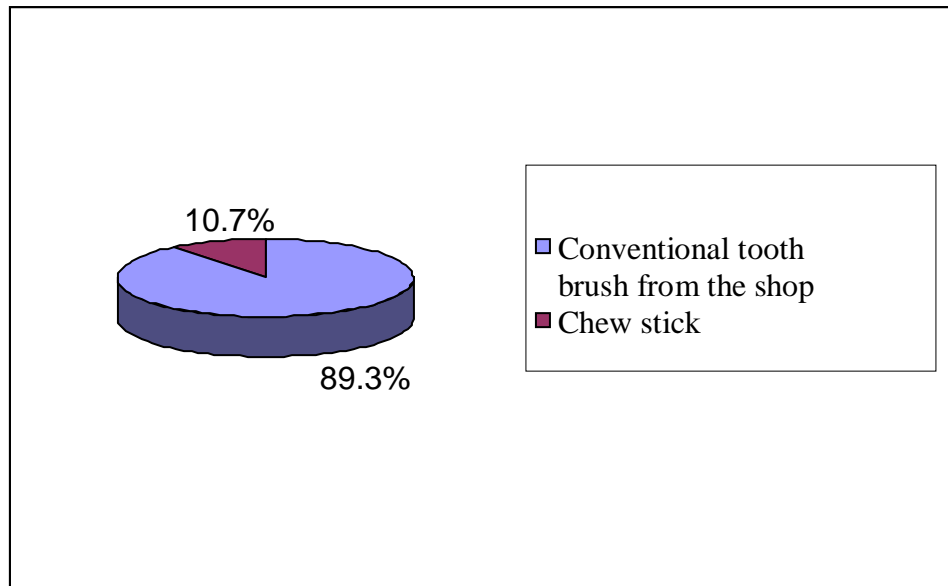
Reason	Knowledge/inappropriate knowledge	Frequency	%
Reasons for brushing teeth	To avoid decay	241	62.8
	To remain clean	116	
Reasons for not brushing teeth	Not important to brush	6	384
	No toothbrush	21	
Importance of brushing teeth	Not important	13	384
	Important	371	
Period of brushing	Before eating	89	384

teeth	After eating	295	76.8
Reasons for brushing before meals	Food does not stick to teeth	51	57.3
	To avoid bad breath	33	37.1
	Forgetting to brush at night	5	5.6
Reasons for brushing after meals	To remove food particles	206	69.8
	To have fresh breath	89	30.2

4.2.14 Object used for brushing teeth

Three hundred and forty three (89.3%) of the respondents used a conventional tooth brush from the shop. Forty one (10.7%) used a chew stick to brush their teeth (Fig 4.13).

Figure 4.13 Object used for brushing teeth



4.2.15 Reasons for using chew stick

Eighteen (43.9%) of the respondents who used a chew stick to brush their teeth said they did so because they could not afford a toothbrush from the shop. Six (14.6%) said the

chew stick cleans better while 14 (34.1%) said the toothbrush from shop injures gums. Three (7.4%) gave other reasons like the chew stick has medicinal properties (Table 4.9).

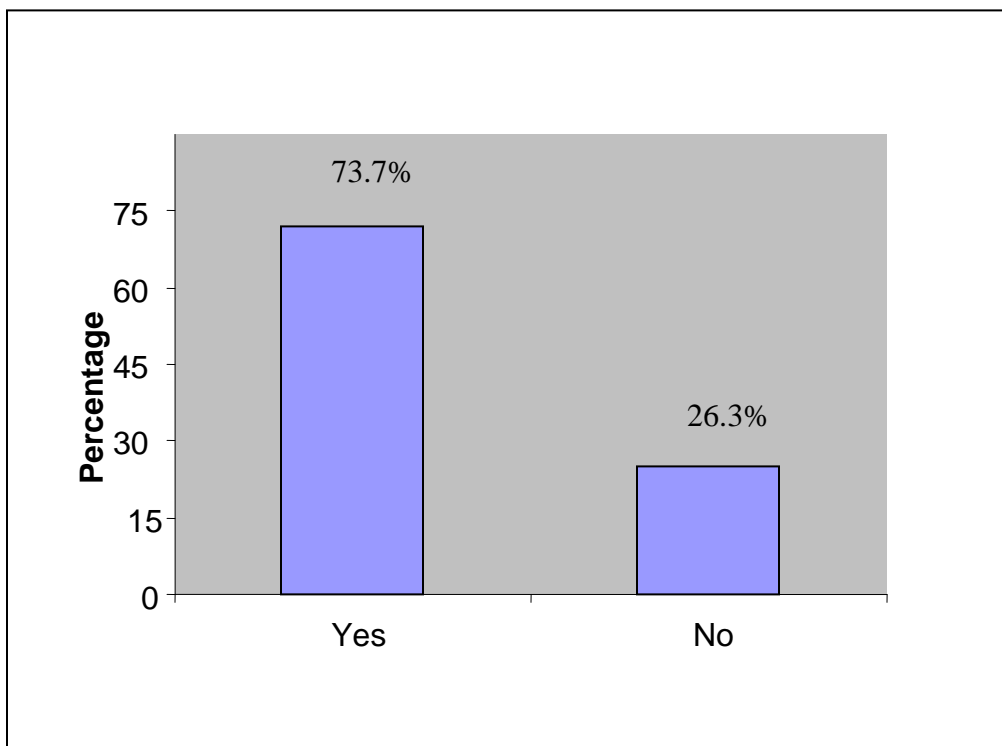
Table 4.9 Reasons for using chew stick

Reasons	Frequency	Percent (%)
Cannot afford tooth brush from shop	18	43.9
Chew stick cleans better	6	14.6
Tooth brush from shop injures gums	14	34.1
Other	3	7.4
Total	41	100

4.2.16 Use of tooth paste

Two hundred and eighty three (73.7%) of the respondents said they used toothpaste while brushing their teeth while 101 (26.3%) did not use toothpaste (Fig 4.14).

Figure 4.14 Use of toothpaste



Use of tooth paste

4.2.17 Reasons for using toothpaste

One hundred and ninety eight (70%) of the respondents used toothpaste when brushing teeth for fresh breath while 80 (28.3%) said teeth get cleaner. Five (1.7%) gave other reasons like the toothpaste contains fluoride (Table 4.10).

Table 4.10 Reasons for using tooth paste

Reasons	Frequency	Percent (%)
For fresh breath	198	70
Teeth get cleaner	80	28.3
Other	5	1.7
Total	283	100

4.2.18 Respondents' awareness on toothpaste fluoride content

Two hundred and forty three (63.3%) of the respondents knew that the toothpaste contains fluoride. One hundred and forty one (36.7%) did not know whether toothpaste has fluoride (Table 4.11). Respondents with a lower level of formal education were less likely to know that toothpaste contains fluoride ($\chi^2 = 17.094$, $df=8$, $p=0.029$). This was significant.

Table 4.11 Respondents' awareness on toothpaste fluoride content

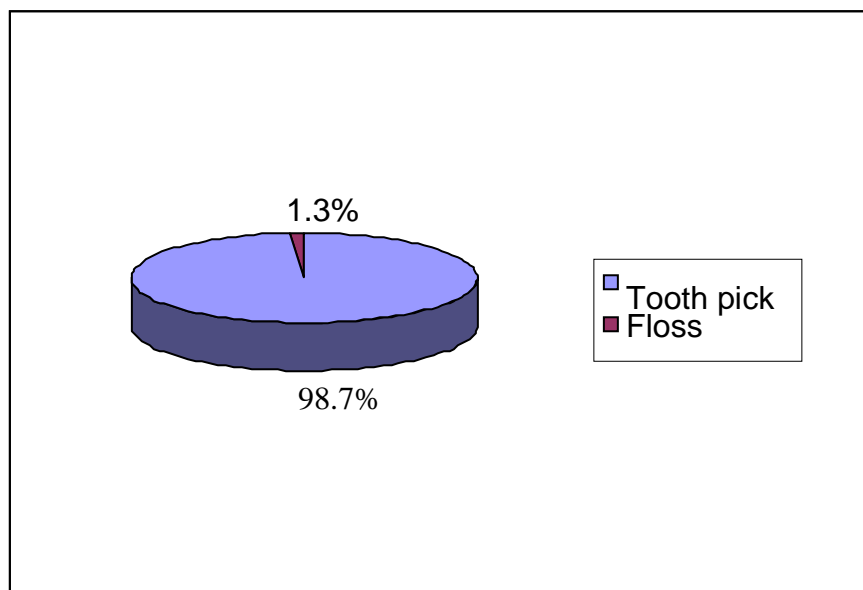
Response	Frequency	Percent (%)
Yes	243	63.3
Don't know	141	36.7

Total	384	100
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4.2.19 Use of interdental cleaning instruments

Three hundred and seventy nine (98.7%) of the respondents used tooth pick as a interdental cleaning instrument while 5 (1.3%) used floss (Fig 4.15).

Figure 4.15 Use of interdental cleaning instruments



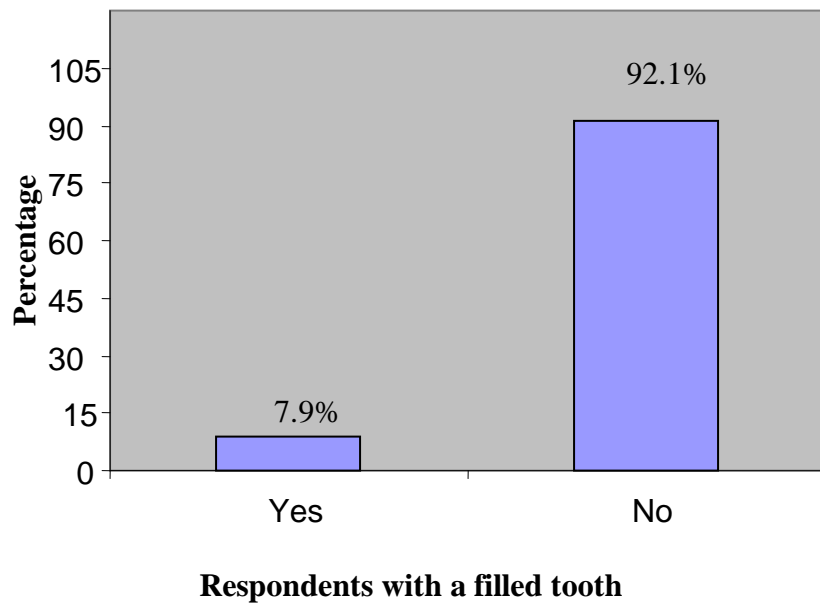
4.3 Factors influencing seeking of dental conservation methods

4.3.1 Respondent with a filled tooth

Three hundred and fifty four (92.1%) of the respondents had no filled tooth while 30 (7.9%) had a filled tooth (Fig 4.16). This finding signifies the very few fillings that have been done on the population as compared to the high number of people who have had extractions. One hundred and eighty one (73.9%) of the respondents had tooth extraction (Table 4.7)

Figure 4.16 Respondent with a filled tooth

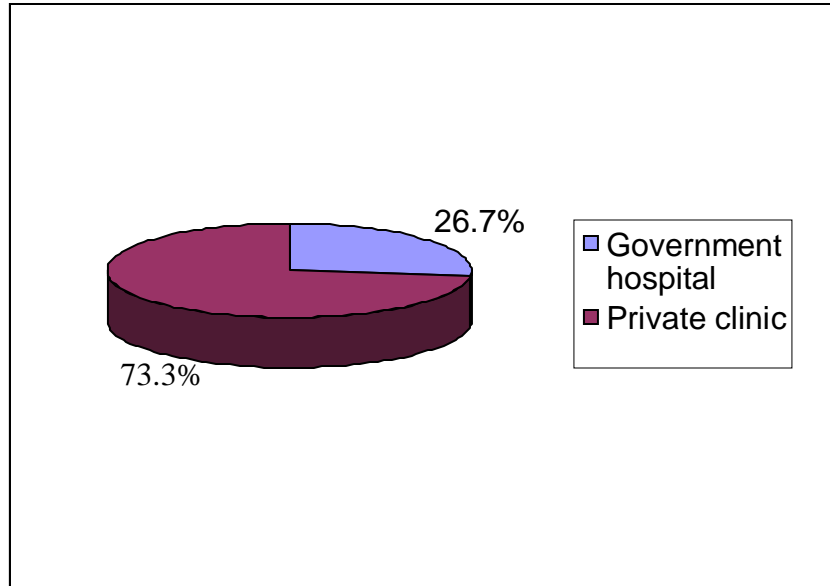




4.3.1.1 Facility where filling procedure was done

Twenty two (73.3%) of the respondents with a filling had it done in a private clinic while 8 (26.7%) had it done in a government hospital (Fig 4.17). Respondents with a filled tooth were likely to have sought help from a private clinic facility ($\chi^2=10.130$, $df=2$, $p=0.006$). Respondents who sought help from a private clinic were likely to utilize professional dental conservation methods like fillings ($\chi^2=10.130$, $df=2$, $p=0.006$).

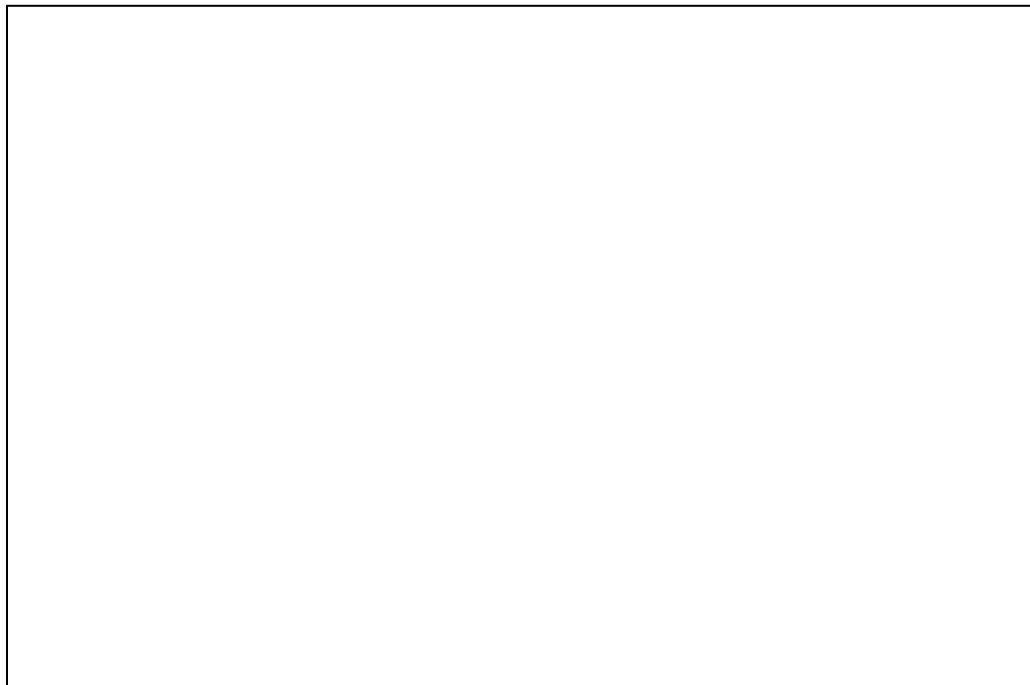
Figure 4.17 Facility where filling procedure was done

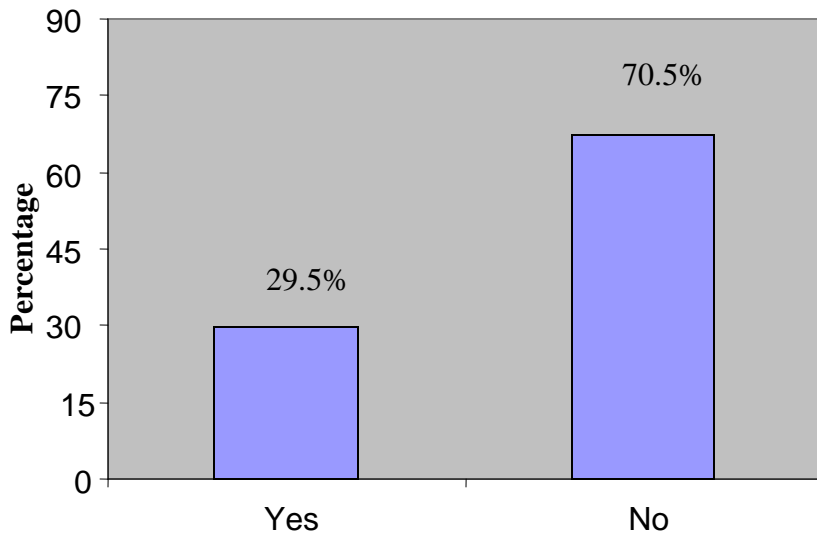


4.3.1.2 Usefulness of dental fillings

Two hundred and seventy one (70.5%) of the respondent thought that dental fillings were not useful while 113(29.5%) thought they were useful (Fig 4.18). Respondents with a filled tooth were likely to think that dental fillings are useful ($\chi^2=34.968$, $df=1$, $p=0.0001$).

Figure 4.18 Usefulness of dental fillings





Usefulness of dental fillings

4.3.1.3 Reasons against dental fillings

Fifty two (19.2%) of the respondents who thought dental fillings are not useful said it was because the filling falls off. One hundred and ten (40.6%) said the tooth continues to pain while 99 (36.5%) said the tooth will finally be extracted. Ten (3.7%) gave other reasons like they destroy tooth structure (Table 4.12).

Table 4.12 Reasons against dental fillings

Reasons	Frequency	Percent (%)
The filling fall off	52	19.2
Tooth continues to pain	110	40.6
Tooth will finally be extracted	99	36.5
Other	10	3.7
Total	271	100

4.3.1.4 Painful dental filling procedure

Two hundred and seventeen (56.5%) of the respondents thought that a dental filling procedure is painful. Thirty seven (9.6%) thought it was not painful whereas 130 (33.9%) did not know whether it was painful or not (Table 4.13).

Table 4.13 Painful dental filling procedure

Response	Frequency	Percent (%)
Yes	217	56.5
No	37	9.6
Do not know	130	33.9
Total	384	100

4.3.1.5 The perceived cost of dental fillings

Only seven (1.8%) of the respondents thought a dental filling costs less than one hundred, 14 (3.6%) thought the cost was two hundred, 114 (29.7%) thought it cost three hundred while 249 (64.9%) thought it cost above four hundred (Table 4.14). Majority of the respondents thought the cost of a dental filling was above four hundred shillings which is expensive in a rural setting.

Table 4.14 The perceived cost of dental fillings

Perceived cost (Ksh)	Frequency	Percent (%)
Less than 100	7	1.8
200	14	3.6
300	114	29.7
Above 400	249	64.9

Total	384	100
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4.4 Socio-cultural factors and dental conservation methods

Results presented here are the socio-cultural factors (attitudes and perceptions) that affect utilization of dental conservation methods.

4.4.1 Respondents' feelings about losing a tooth due to extraction

Sixty two (16.1%) of the respondents said they do not mind losing a tooth due to extraction, 209 (54.4%) wished it could be avoided while 113 (29.5%) said they would feel bad about it (Table 4.15).

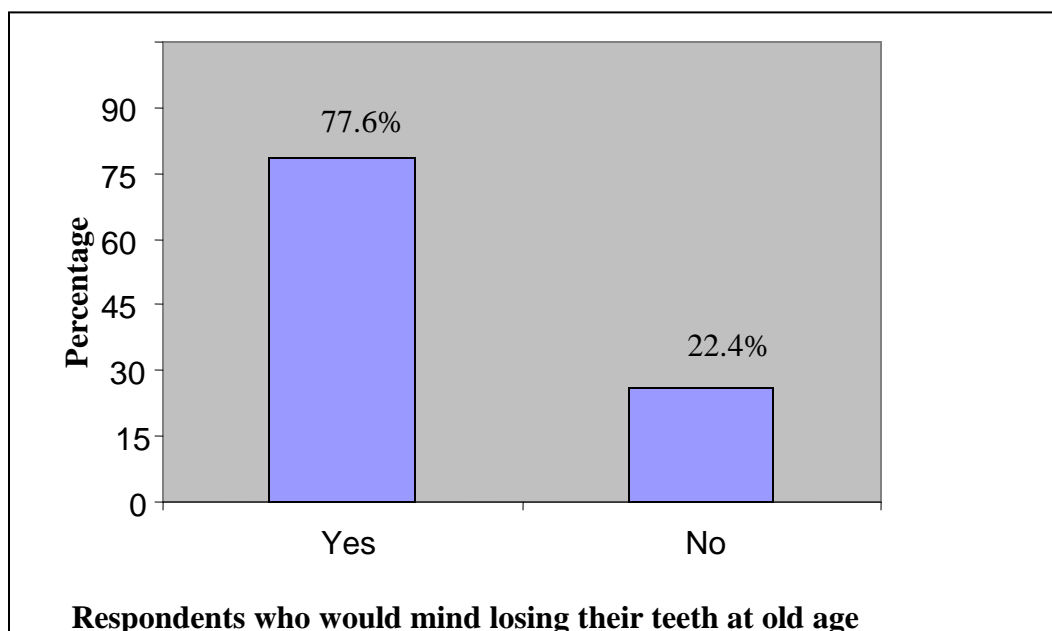
Table 4.15 Respondents' feelings about losing a tooth due to extraction

Feelings	Frequency	Percent
Don't mind	62	16.1
Wish it can be avoided	209	54.4
Feel bad about it	113	29.5
Total	384	100

4.4.2 Respondent who would mind losing all the teeth at old age

Two hundred and ninety eight (77.6%) of the respondents, said they would mind losing all their teeth at old age while 86 (22.4%) said they would not mind (Fig 4.19).

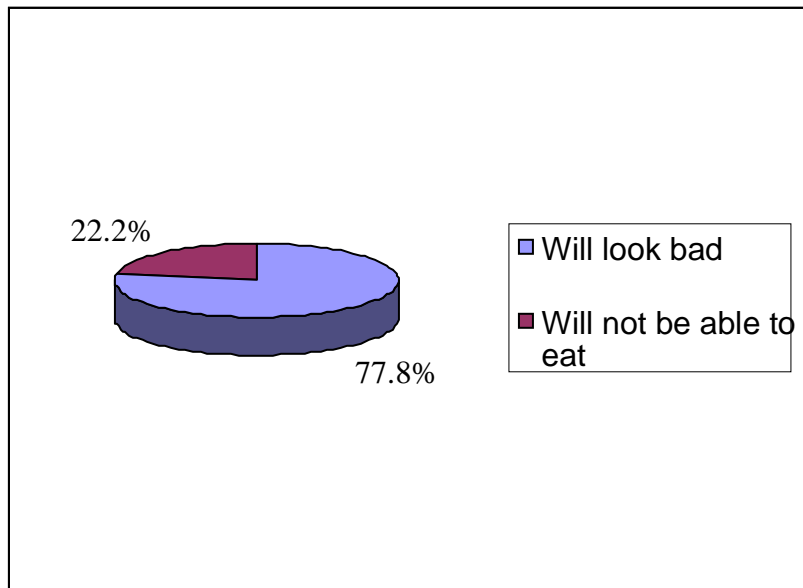
Figure 4.19 Respondents who would mind losing all the teeth at old age



4.4.3 Reasons for minding to lose all the teeth at old age

Two hundred and thirty two (77.8%) of the respondents who would mind to lose all their teeth at old age said it is because they would look bad while 66 (22.2%) said it is because they will not be able to eat (Fig 4.20). Older respondents were less likely to mind losing all their teeth compared to the young respondents ($\chi^2=74.807$, $df=50$, $p=0.013$).

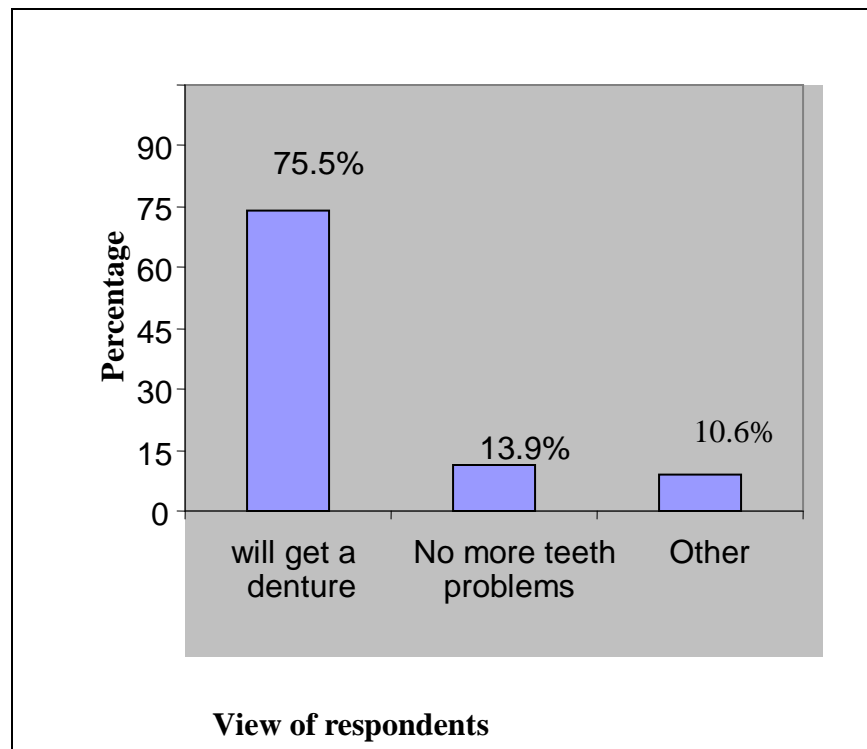
Figure 4.20 Reasons for minding to lose all the teeth



4.4.4 Reasons for not minding to lose all the teeth at old age

Sixty five (75.5%) of the respondents who would not mind losing all their teeth at old age said it is because they would get a denture, twelve (13.9%) said it is because they would get no more teeth problems. Nine (10.6%) gave other reasons like it is expected at old age (Fig 4.21). Older respondents (above 60 years) would not mind to lose all the teeth because they would get a denture and this was a significant factor. ($\chi^2=83.539$, $df=68$, $p=0.047$).

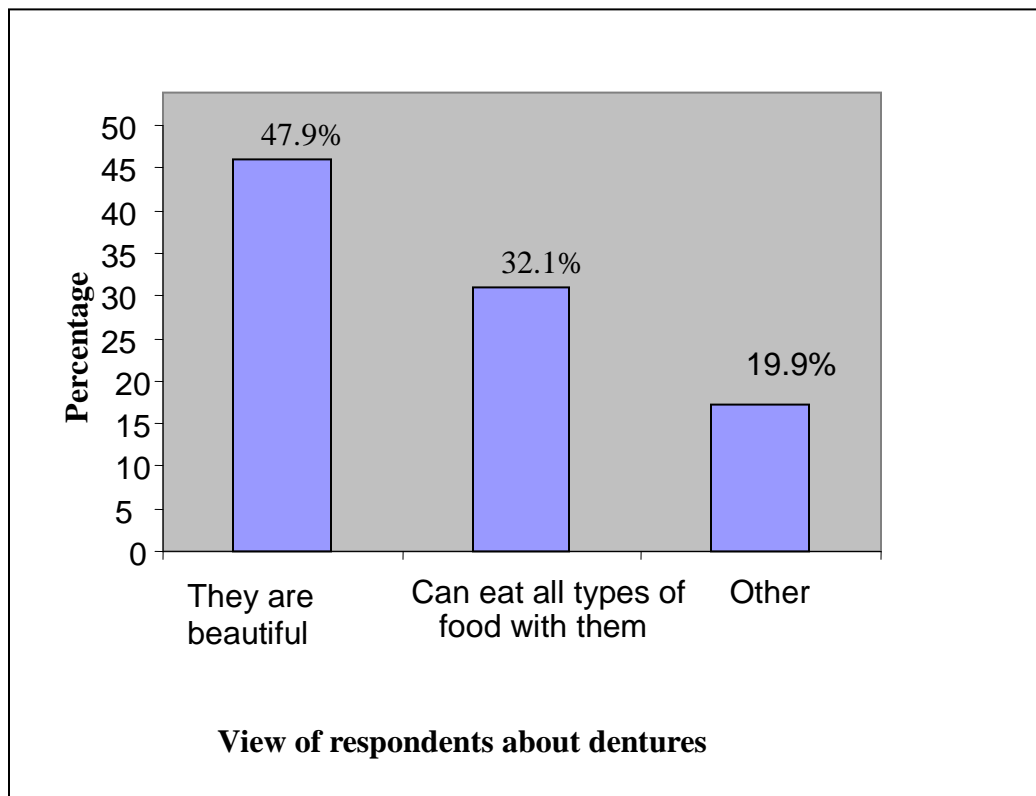
Figure 4.21 Reasons for not minding to lose all the teeth at old age



4.4.5 General view of respondents about dentures

One hundred and eighty four (47.9%) of the respondent said dentures are beautiful, 124 (32.1%) said dentures can be used to eat all types of food while 76 (19.9%) gave other reasons like they do not break easily (Fig 4.22).

Figure 4.22 General view of respondents about dentures



CHAPTER 5

DISCUSSION

This study was carried out in Thika District with the aim of investigating the factors that influence utilization of dental conservation methods in a rural community. The findings of the study revealed that several factors may influence utilization of dental conservation methods including socio-demographic factors, knowledge and socio-cultural factors.

5.1 Demographic characteristics of the respondents

The age of the respondents varied from 18-86 years and this gave a good age distribution to assess the effects of age on utilization of dental conservation methods. Age may affect utilization of dental conservation methods in that old respondents (above 60 years) were likely to have a lower level of formal education ($p=0.0001$). Older respondents were also less likely to know any other form of treatment apart from extraction ($p=0.027$). This can be attributed to the fact that when one has a lower level of formal education one will also be less informed especially on health matters.

The level of education plays a big role as far as health and effective communication is concerned. Respondents who were more educated (beyond primary level) were more likely to be informed on dental health. The results indicated that respondents with a higher level (beyond primary level) of formal education were likely to mind losing all their teeth ($\chi^2 = 12.964$, $df = 4$, $p = 0.013$). Respondents with a lower level of formal education were less likely to know any other form of treatment apart from extractions ($p=0.009$). This finding corresponds to a study done in North Eastern Kenya whereby the percentage of those who were illiterate and had dental caries was higher than that of the literate (Kassim *et al.*, 2007). Oral health education and prevention programmes are non-existent in Kenya and this contributes to the lack of oral health knowledge in the community. This is in contrast to the general health where community health workers are useful in giving information on health matters to the community. The more educated an individual is the more knowledgeable he is likely to be and consequently, the stronger the power to make informed decisions; for example one who is more educated will know that conservation of a tooth is better than its extraction.

The occupation of an individual is likely to affect utilization of dental conservation methods because it touches on affordability of the services. One of the key informants, a dentist, had this to say when asked about the challenges the community faces on the uptake of dental conservation methods; *“One of the major problems why the uptake of dental conservation methods is low especially in the rural areas is because the people come to hospital only when the dental pain is too much to bear. We find that by then the tooth may be completely decayed and cannot be conserved. Sometimes lack of funds to*

come to hospital contributes to the delay.” This finding corresponds to a study done in Nairobi, Kenya where it was found out that patients tend to visit a dentist only when in pain (Chindia *et al.*, 1992). In another study done among Nairobi University students in Kenya, lack of money was given as reason for failing to see a dentist (Wakiaga *et al.*, 1996). In the same study, the cost of dental treatment was considered to be very high.

5.2 Knowledge and awareness of dental conservation methods

The results indicated that the level of knowledge and awareness of dental conservation methods was low. Majority of the respondents had experienced a dental problem in their life (80.4%). The most common problem was toothache (97%). When not attended to in good time toothache leads to the tooth being extracted. This corresponds with the earlier annual reports in Thika District Hospital where most of the patients ended up losing their teeth (Annual Report, 2002). In this study most of the respondents sought help for their toothache in a government hospital (82.5%) and out of these, 73.9% had tooth extraction. This corresponds with the finding that in the event of pain from dental caries most teeth are reportedly extracted rather than filled (Ng’ang’a, 2000). This can be attributed to the fact that most people go to the government hospitals because the services are cheaper. They however get disappointed especially if the care needed cannot be provided either because of breakdown of facilities or lack of necessary materials, for example in the case of fillings. Few who can afford normally go to the private clinics.

In a study done in Dar-es-Salaam, Tanzania, 96.7% of the treatment carried out in public dental clinics was tooth extractions (Matee *et al.*, 2006). The finding is also consistent with a study done in Gauteng Province, South Africa where the main type of dental treatment was found to be tooth extraction (Mickenautsch *et al.*, 2007). Majority of the patients (84.3%) said they knew of other people with dental problems. This corresponds with the report that although many oral diseases are not always life threatening, they too are important public health problems because of their high prevalence (WHO, 1999).

Majority of the respondents said they practised some good oral health habits like brushing of teeth (93%). Most of the respondents in the study (67.5%) knew that brushing assists in preventing tooth decay. Majority of the respondents (89.3%) used conventional toothbrush from the shops while 10.7% used a chew stick. However these claims of tooth brushing are not reflected in the tooth mortality as it is still very high (73.4%). This finding can be attributed to the fact that the respondents may not be brushing their teeth effectively and hence still end up with tooth decay. These findings also correspond to a study done in Nairobi, Kenya where 66.8% of the respondents claimed they brushed their teeth at least once a day. Conventional toothbrush was most commonly used (54%) and the chewstick was used by 9.7% of the respondents (Macigo *et al.*, 2006).

In this study 7.4% of the respondents said they used a chewstick because it had some medicinal properties. This corresponds to the study whereby some traditional chewsticks like those from the Neem tree are claimed to have an added advantage in that they have antibacterial effects which may be useful in plaque control (Wolinsky *et al.*, 1996).

Although the majority of the respondents (73.7%) reported that they used toothpaste while brushing their teeth, they were not aware of the important abrasive properties dentrifices have. Most of the respondents (63.3%) knew about the presence of fluoride in their toothpaste of choice. Respondents with a lower level of formal education were less likely to know that toothpaste contains fluoride ($p=0.029$). Fluoride in water or in dentrifices has a caries-reducing effect.

Asked whether they used interdental cleaning instruments 98% said they used tooth picks while 1% used floss. Interdental cleaning instruments are beneficial because they remove food particles between teeth. According to one key informant (a dentist), only people with a higher level (beyond primary level) of formal education know about floss as an interdental cleaning tool, and even then only a few utilize it.

5.3 Factors influencing seeking of dental conservation methods

The results indicated that only a minority of the respondents (7.9%) had a filled tooth as compared to 73.9% who had a tooth extracted. Respondents with a filled tooth thought that dental fillings are useful ($p=0.001$). Those who had the experience of a dental filling were at an advantage of knowing its usefulness. They were also likely to seek dental conservation methods in future in case of a dental problem. Majority of the respondents (70.5%) thought dental fillings were not useful because the fillings come out and that the teeth will end up being extracted. This finding shows the negative attitude the population has towards fillings and this definitely affects the utilization of this type of conservation method. The duration the filling takes in the mouth depends on factors like the size of the

cavity compared to the tooth substance. A small occlusal filling can take years in the mouth whereas a big proximal filling may take a shorter duration. Big forces applied on a big proximal filling can chip it off but will not affect a small occlusal filling. Most of the respondents (56.5%) thought that a dental filling procedure is painful. This finding corresponds to a study done among Nairobi University students in Kenya where 60% of the respondents who had sought dental treatment described the dental visit as uncomfortable and painful. About 48% of the respondents considered the cost of treatment as being unreasonably high (Wakiaga *et al.*, 1996). The mouth is a very sensitive part of the body and most people fear the local anaesthetic injection in the oral cavity. This is a normal reaction and assurance from the dental professional with explanation of the procedure to be done usually reduces the fear considerably. Cost may also be a hindrance to the uptake of dental conservation methods. The cost in government hospitals is five hundred shillings per filling which is expensive in a rural setting.

Several studies that have been done elsewhere indicate that very few fillings have been done compared to extractions. In a study done in Tanzania none of the decayed permanent teeth were restored and only one deciduous tooth had a filling (Simon *et al.*, 2008). In another study also in Tanzania, 96.7% of the treatment composed of extractions and only one patient had a filling done in the entire study period (Matee *et al.*, 2006). In a study in South Africa, 99% of the decayed teeth were untreated and restorative care was nil (Bajomo *et al.*, 2004).

Most of the respondents (73.3%) who had a filling had it done in a private clinic. Respondents with a filled tooth were likely to have sought help from a private clinic facility ($p=0.006$). A key informant, (a dentist), in Thika District Hospital when asked about the challenges the professionals face when providing dental conservation methods had this to say; *“The biggest challenge we face is when the dental machines break down and then they take very long to be repaired. It affects patients because they get frustrated when they are given appointments for fillings only to find the machines not in order. Prompt restoration of decayed teeth is necessary to avoid further damage and loss of teeth but sometimes this is not possible when the machines break down.”*

This finding corresponds to a study done in Kenya where it was found out that one of the main reasons for high tooth mortality was lack of facilities for restorative procedures in most public hospitals (Maina and Ng’ang’a, 1991). This can be supported by the fact that in spite of its importance in general health, oral health has not been given its appropriate place in the general health planning in Kenya. This is evidenced by the meager annual budgetary allocation to this sub-sector (0.0016% of the total health budget) (NOHP, 2002). This explains why most of the fillings were done in the private clinics because those who afford go to private clinics to avoid the delays in the government hospitals.

5.4 Socio-cultural factors and dental conservation methods

Some beliefs and perceptions may also affect the uptake of dental conservation methods. Some respondents (22.4%) said they would not mind losing all their teeth at old age.

Most of them said this is because they would get a denture ($p=0.047$). Older respondents (above 60 years) were less likely to mind losing all their teeth compared to the young respondents ($p=0.013$). A big percentage of the respondents (47.9%) thought dentures are beautiful and 32% thought they could be used to eat all types of food. At the back of peoples' minds they know they can get another chance in life with their teeth by getting another artificial set of teeth. Therefore they may not take conservation of their teeth with the weight it deserves. Even in people who have some knowledge on dental problems, dental care is not taken with the seriousness it deserves. In a study done on university students in Kenya, most of the students did not appreciate the need to see a dentist for check up unless they had a dental problem and even so a significant proportion (35%) of those with a problem gave one reason or another for not seeing a dentist (Wakiaga *et al.*, 1996). In another study done in Ibadan, Nigeria none of the children examined had gone for routine dental check up before except for 12.6% who had previous dental consultation due to toothache (Onyeaso, 2004). Routine dental check ups twice an year are necessary so that problems like dental caries can be noticed early enough and necessary measures taken to treat them.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

- Knowledge of dental conservation methods was low. Most teeth ended up being extracted instead of being conserved.
- Many claimed to brush their teeth but this was not reflected in the tooth mortality as it was very high. It can be concluded that tooth-brushing was not done effectively.
- There was a negative attitude on professional dental conservation methods and their usefulness in preserving teeth.
- Cost was a hindrance to the uptake of dental conservation methods like fillings.

- There was a significant relationship between fillings and seeking of dental conservation methods. Respondents who had fillings were more likely to utilize dental conservation methods again as compared to those who did not have fillings.
- Lack or break down of facilities for restorative procedures in most public hospitals contribute to poor uptake of dental conservation methods.
- Beliefs and perceptions affect uptake of dental conservation methods. Dentures were seen as beautiful and a second chance to a new set of teeth and conservation of teeth not taken with the seriousness it deserves.

6.2 Recommendations

- The Ministry of Public Health should encourage and provide training in oral health education to the community health workers. This can be done at the district level by the dental professionals. In this way they will be equipped with dental knowledge and will pass the information to the community.
- The Ministry of Public Health should encourage dissemination of oral health education to the community through seminars and barazas. This can be done at the district level by the dental professionals and would be best if integrated with other on going seminars like those for HIV/AIDS Programmes.
- The Ministry of Public Health should implement a surveillance system to monitor patterns of oral disease at local or district level so that proper planning is done.
- The Ministry of Public Health and the Ministry of Education should develop a curriculum on oral health that includes effective tooth-brushing methods and use of interdental cleaning instruments.

6.3 Areas of further research

- There is need for more research regarding the factors that may improve dental service delivery in the government facilities especially on the dental conservation methods.
- There is need to analyze mechanisms that can be used to promote research in oral health care.
- The research on the impact of poor oral health on national development is also an area for further research.

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APPENDIX II

Structured Interview Schedule

Date:

1. Date of Birth

2. Sex Male _____

 Female _____

3. Marital Status

 Married _____

 Single _____

 Divorced/Separate _____

 Widow _____

4. Level of formal education

 None

 Primary level

 Secondary

 Diploma

 University

5. Occupation

.....

6. Religion

7. Have you ever had a dental Problem? yes No

8. If yes, what was it?

 Tooth ache

 Bleeding gums

 Any other

yes

No

9. If toothache did you seek help?

10. I no, why?

Self Medication

Health centre too far

Subsided on its own

Other, (specify)

11. If yes, where?

Government hospital

Traditional Medicine

Private Clinic

Other, (specify)

12. What was done?

Extraction

Medication

Referred

Other, (specify)

13. If referred why?

Services not available

Personnel not available

14. Do you know any other form of treating teeth apart from extractions?

yes

No

15. If yes which one?

Filling

Cleaning

Both

16. If extraction would you have preferred any other form of treatment?

Yes

No

17. If yes, which one?

Filling

Cleaning

18. If you get a dental problem now, what would you prefer to be done to your tooth?

Extracted

Conserved

19. Do you know anybody who has ever had a dental problem?

Yes

No

Other, (specify)

20. If yes, what did they do?

Sought help in government hospital

Applied herbal medicine.

21. If went to hospital, what was done?

Extracted

Filling

Referred

22. Do you have children?

Yes No

23. If yes, have they ever had any dental problem?

 Yes No

24. If yes what was it?

Tooth ache

Bleeding gums

Swollen cheek

Other, (specify)

25. If toothache, did you seek help?

 Yes No

26. What was done for them?

Extraction

Medication

Referred

Other, (specify)

27. What would be your first choice of treatment to relief pain on a tooth?

Extraction

Medication

Conservation

28. Do you brush your teeth?

 Yes

No

29. If No, why?

Not Important

No tooth brush

Other, (specify)

30. If yes, why?

To avoid decay

To remain clean

Other, (specify)

31. When do you brush?

Morning

Night

Other, (specify)

32. Do you brush before or after eating?

Before

After

33. If before why?

So food does not stick to teeth

To remove bad breath

Other, (specify)

34. If after why?

To remove food particles

To have fresh breath

Other, (specify)

35. What do you use to clean your teeth?

Tooth brush from shop

Chew stick

36. If chew stick why?

Can't afford tooth brush from shop

Chew stick cleans better

Toothbrush from shop injures gums

Other, (specify)

37. If tooth brush from shop why?

Cleans better

Does not injure gums

Other, (specify)

38. Do you think it's important to brush teeth?

Yes

No

39. If yes why?

To avoid Decay

Because others do

Other, (specify)

40. If no, why?

Bad teeth are inherited

Brushing will cause bleeding gums

Other, (specify)

41. Do you use toothpaste when brushing?

Yes

No

42. If yes why?

For fresh breath

Teeth get cleaner

Other, (specify)

43. If no, why?

Can't afford

Not important

Other, (specify)

44. Does the toothpaste contain fluoride?

Yes

No

Don't know

45. Do you use any interdental cleaning instruments?

Yes

No

If yes which one?

Toothpick

Floss

Any other Specify

46 Do you have any filled tooth?

Yes

No

47. If yes where was it done?

Government hospitals

Private clinic

48. If no, do you know anybody who has been done a filling?

Yes

No

49. If yes where was it done?

Government hospital

Private clinic

50. Do you think dental fillings are useful?

Yes

No

51. If yes why?

Tooth continues being useful

The pain stops

Other, (specify)

52. If no, why?

The filling falls off

Tooth continues to pain

Tooth will finally be extracted

Other, (specify)

53. Do you think a dental filling procedure is painful?

Yes

No

54. Do you think dental fillings are expensive?

Yes

No

55. How much do you think it should cost in Kenya shilling

Less than 100

200

300

Above 400

56. What is the general view of people towards dental fillings?

People don't know about fillings

They are useful

They are useless

Other, (specify)

57. What are your feelings about losing a tooth due to extraction?

Don't mind

Wish it can be avoided

Feel bad about it

Other, (specify)

58. Would you mind losing all your teeth at old age?

Yes

No

59. If yes why?

Will look bad

Will not be able to eat

Other, (specify)

60 If no, why

I will get a denture

No more teeth problems

Other, (specify)

61. What is the general view of people about dentures?

They are beautiful

Can eat all types of food with them

Other, (specify)

APPENDIX III

KEY INFORMANT INTERVIEW GUIDE

Age (years).....

Sex

1. What challenges are experienced by patients on the uptake of dental conservation methods that would lead to low utilization of these methods?
2. What challenges do you face as professionals in providing dental conservation methods?
3. Do you think cost is a hindrance to the uptake of dental conservation methods?

4. What do you advise patients when you are unable to provide conservation methods due to some unavoidable circumstances like machine breakdown?
5. Do you think the community takes dental conservation methods with the weight it deserves and if not what should be done?

