

Background characteristics, Pattern and Reasons for Tooth Extraction among patients seeking Dental treatment at a Tertiary Dental Center in Kottayam,India

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Abstract

Objectives: Tooth loss can be used as a measure of the oral health of a population. The aim of this study was to evaluate the background characteristics, pattern and reasons for tooth extraction in the population that reported to the tertiary dental care center.

Materials and Methods: A cross sectional analytical study was conducted among patients reporting to the Dept. of Oral and Maxillofacial Surgery at a Dental College in Kottayam. Subjects were selected by convenience random sampling and data was collected by the use of interviewer-administered questionnaire. The number of Participants interviewed were 400 and consisted of 139(34.75%) males and 261 (65.25%) females.

Results: Collected data was analysed using SPSS version 16. The present study showed that caries(53.3%) and periodontal disease(37.5%) were the major cause of tooth

loss among the participants. Teeth extracted due to other reasons included 9.2% of the total teeth extracted.

Conclusion: It should be noted that modification of risk factors found in the present study by enhancement of dental health care can lead to reduction of preventable oral diseases in the population, notably dental caries and periodontal disease. Therefore, there is need to provide dental health education to promote oral health among the population by improvement in maintenance of oral hygiene, thereby reducing incidence of tooth extraction.

Keywords: Periodontal disease, Dental Caries, Tooth Loss, oral health

Introduction

Tooth loss can be used to measure of the oral health of a population as this is usually the last resort in a dental treatment protocol. Estimation of dental health of a population can be done to an extent by studying total tooth

loss^[1,2]. Tooth loss can lead to restriction of dietary choices, impaired speech, poor facial appearance, chewing difficulties and malnutrition. The impact on speech and mastication is particularly pronounced among the elderly^[3]. Therefore, tooth loss can diminish the quality of life and also impacts the psychological status and self-esteem of an individual^[4,5,6].

According to geographic, cultural and economic differences the reasons of tooth loss can be varied. Several studies have been undertaken in different countries to find the reasons for loss of teeth and to get an idea of preventive methods to be taken by the dental profession and government. Majority of the studies have found dental caries to be the major cause across all age groups.^[7] Many studies have found periodontal disease as a major cause of tooth loss after the age of 40.^[8] Other studies have found almost equal distribution of periodontal disease and dental caries as reasons for extraction of teeth especially after middle age.^[9] There are very few studies which shows periodontal disease to be a major cause of tooth loss.^[10] Other reasons of tooth loss may include extractions for orthodontic purpose, failed or improper RCT or due to trauma. There are some instances where removal of teeth becomes necessary before initiation of medical treatment like irradiation for malignancy.

Oral hygiene measures being used by the population and regular dental care have shown to reduce the amount of tooth loss across all age groups. Deleterious habits like smoking and chewing of tobacco have shown to increase the tooth loss.

There are a lot of medical conditions which can cause complications during and after removal of teeth. The precautions to be taken can be ascertained only if the usual medical conditions found in the population that needs removal of teeth is found out. The replacement of a tooth lost is imperative for well-being and to enhance the

quality of life. So, an idea of the common replacements known to the population also is of importance.

There is a need to evaluate the Dental health of a population of a local area to decide on the variabilities that needs to be addressed to increase the level of wellbeing for that particular population. The usual option is to evaluate the tooth loss of the particular population and its reasons. Since there have been very few studies in our population, it is imperative that such a study is undertaken.

The aim of this study was evaluation of the background characteristics, pattern and reasons for tooth extractions in the population that reported to a tertiary dental care center for their dental treatment. Also included in the study were any special medical conditions in this population that warranted special precautions. Since comprehensive treatment is given to the population in a tertiary dental care center, an analysis of the type of replacement of teeth after extraction was also included.

Materials and Methods

An analytical cross sectional study was conducted in the Dept. of Oral and Maxillofacial Surgery at a Dental College in Kottayam, from among patients reporting there. Data collection was undertaken in an anonymous and confidential manner after taking clearance from the institutional ethical board and informed consent was obtained from each participant. The participants included in the study had only permanent teeth and those reporting with deciduous teeth were excluded. Data collection was done using an interviewer-administered questionnaire. The data was collected after explaining the study methods. The questionnaire was pretested in a similar community and exhibited adequate reliability and validity. The tooth loss survey form contained tables to indicate the sex and age of the patient, any medical condition that warrants consideration, the tooth to be extracted, and the dental

condition that necessitated extraction and the planned replacement after extraction.

Sample size calculation

Sample size calculation was done using the formula $n = 4pq/d^2$. Since there was a probability of 54% for loss of tooth due to caries according to available literature,^[3] the estimation of attribute was taken as 0.54. The confidence interval was taken as 95%. 398 was the sample size calculated by this formula and the final sample size was rounded off as data of 400 patients.

All necessary permissions were taken from the relevant authorities before starting the study. A convenience sampling technique was followed by including all the patients reporting to the Oral and Maxillofacial Surgery Department.

Study design

The data collection (400 tooth loss study forms) was done by interns in the Department. The data collection ended when the 400th form was filled. Tooth extraction up to 2nd molar was taken, 3rd molar extractions were not included in the study. The data obtained were entered into Microsoft Excel® (Microsoft Corp., Redmond, Washington, USA) and summarized as frequencies and percentages, and the statistical tests were done using SPSS software(version 16; SPSS Inc., Chicago, IL, USA).

Results

400 participants were interviewed and their data was recorded. The age range of the participants were from 13years to 85 years with a mean age of 45.48 ± 16.425 (Table1). The participants were grouped into eight groups depending on the distribution of age. The distribution of subjects who had their teeth extracted according to gender and age range are seen in Table 1. This consisted of 139(34.75%) males and 261(65.25%) females as seen in Table 1 and Graph 1.

648 teeth were extracted in 400 participants. Maxillary anterior segments(51.8%) had marginally higher tooth loss when compared to the mandibular anterior segments(48.2%). Similar results were obtained in the maxillary(50.6%) and mandibular posterior(49.4%) segments.

Factors which influenced extraction, are depicted in Graph 2. Caries accounted for 53.3% of the tooth loss whereas periodontal disease accounted for 37.5%(Graph 2). Teeth extracted due to other reasons included 9.2% of the total teeth extracted.

Graph 3 describes the comparison between age and reasons for tooth extraction. Graphs 4,5 and 6 shows age of patients compared to the Oral health determinants - Brushing, scaling and smoking respectively.

Graph 7 reveals the choice of planned replacement of the extracted teeth and Graph 8 reveals the distribution of patients who reported for tooth extraction and who had underlying systemic conditions. Linear Regression analysis revealed associations with frequency of brushing and history of prophylaxis in cases with caries and periodontal disease (Table 2).

Discussion

The results from this study indicates caries and periodontal disease to be the main reasons for extraction of tooth in the participants, which was similar to a previous study^[8] that concluded caries to be the main etiologic factor for extraction in patients with 20–40 years of age, and in patients older than 60 years periodontal disease; contrary to another study in Scotland that reported the most important of tooth loss was due to caries.^[11] In this study, participants were taken from the same region without much cultural differences.

The results of this study found agreement with previous studies that maximum loss of tooth were in the age group of 40-60 years and that tooth loss increased as the age of

the participants increased.^[12-15] In patients upto 60 years of age, caries was observed to be the predominant reason for tooth extraction whereas periodontal disease was found to be the major cause after 40 years of age (Graph 3). More teeth were lost from the maxilla than the mandible. When considering the segments of maxilla and mandible, tooth loss was more in the posterior segments of the maxilla and the mandible than the anterior segment. Other studies have reported similar findings.^[15,16] The tooth that was most frequently extracted in this study was the second molar in maxillary left and the central incisor in the mandibular left least frequently extracted tooth.

The study also found that males had fewer teeth extracted than females, which tended to agree with the study conducted by Barbato *et al.*,^[17] and Kalyanpur and Prasad.^[18] Cahen *et al.*,^[7] obtained contrary results and stated that male participants were observed to have more extractions are than female participants.

Globally, dental caries and periodontal disease are the two major causes of tooth loss. Earlier research from Nigeria^[19, 20] reported periodontal disease to be the main reason for tooth loss. Years later Taiwo *et al.*^[21] in 2006 reported that 98.7% loss of tooth seen in Ibadan, Nigeria among elderly population was due to periodontal disease. Recently, Saheeb *et al.*^[22] and Oginni *et al.*^[14] reported a change in trend for the reasons for loss of teeth as caries was the reason for more teeth being lost now. The findings of the present study are in agreement with this reported change in trend of the causes of tooth loss. It was observed in the present study that that 53.3% of total extractions were due to caries and 37.5% of total extractions were due to periodontal diseases. This however does not conform to the findings of two previous studies that puts periodontal disease to be the major cause for the loss of more teeth.^[8,23] Other causes of tooth extraction (9.2%) mainly included teeth extracted prior to radiation treatment in

participants afflicted with malignancy and extractions as part of orthodontic therapy.

In the present study, while evaluating the linear regression analysis between brushing twice a day with loss of tooth due to caries and periodontal disease (Table 2), it was found that the results were statistically significant and thereby patients who brushed twice daily were observed to have lesser loss of tooth because of caries and periodontal disease(Graph 4). Similarly, patients who underwent prophylaxis in less than six months were observed to have a statistically significant lesser incidence of loss of tooth as a result of caries and periodontal disease (Graph 4). Since the majority of the patients in this study were females, Graph 6 revealed the patients to be predominantly non-smokers.

The planned replacement after tooth loss revealed that majority (38.75%) of the participants had not decided on the modality of replacement, whereas 31.5% had planned for removable partial dentures and 26.5% for complete dentures respectively (Graph 7).

Among health conditions investigated in the present study, hypertension was reported in 16% of the participants in the study (Graph 8). The next common medical illness was diabetes mellitus followed by asthma. All these medical conditions need specific precautions before tooth extractions and this points to a need for proper and detailed history taking before extraction procedures.

Many elderly participants had general health problems and the medical care that is needed for it maybe took higher priority and regular dental care maybe took lesser priority. Also the adult population may have thought that it would be better if they invested their money for better future of their children rather than on dental treatments which were supported by Jaleel *et al.*^[6] This may give an explanation for more tooth loss in the middle aged and elderly.

Therefore, the conclusion arrived at was that the main reason for extraction in patients with 20–30 years of age was caries and in patients older than 40 years periodontal disease was the main reason. Thus, any strategy that aims to reduce tooth loss needs to reduce oral diseases and their sequelae from expressing itself - important of all, dental caries and periodontal disease. Public health policies should employ different mechanisms to address the inequalities in oral health care given to different age groups. An example of this is may be creating policies for older age groups so as to encourage them to seek the regular use of oral health services.

The design of the present study which is cross-sectional is applicable to analysing the database, but it does limit the generalizability of results by not identifying the socio-economic status effects. In this study socio-economic conditions as risk factors were not addressed for tooth loss. Future research with a larger population is needed to further examine risk factors leading to “tooth loss” to generalize the result and to prevent these risk factors.

While the present study shows that more teeth are lost due to caries, periodontal disease also still remains the major reason for tooth loss among elderly population as documented by other studies. [21, 26-27] However, an increase in tooth loss as a result of dental caries may be due to urbanization and an ever-increasing Western dietary and lifestyle influences which may be leading to an increased incidence of dental caries.

Conclusion

This study suggests that tooth loss is not only a disease-related extension but also rather a different phenomenon with several risk factors playing a prominent part. It should be noted that modification of risk factors found in the present study by enhancement of dental health care can lead to reduction of preventable oral diseases in the population, notably dental caries and periodontal disease.

Oral selfcare and routine dental check up with oral health education to the general public with an emphasis on the available treatment procedures are also a must.

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Legend Tables and Graphs

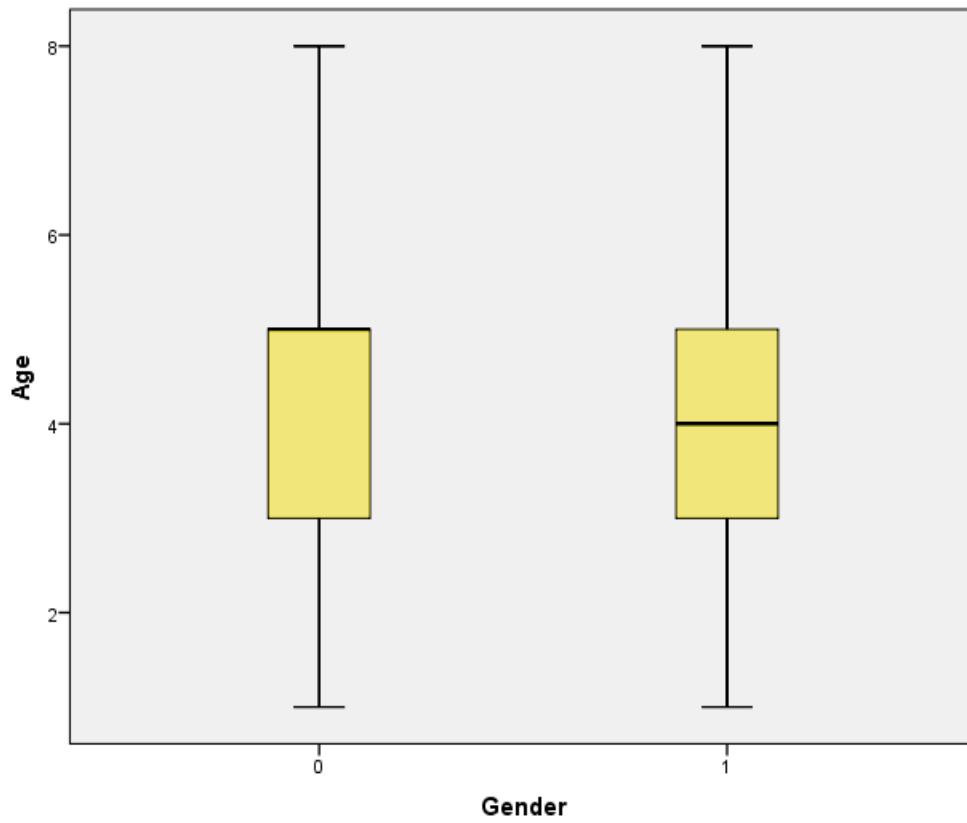
Age group	Age Distribution	Males	Females
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1	13-19	15	12
2	20-29	20	38
3	30-39	11	48
4	40-49	15	62
5	50-59	45	48
6	60-69	22	46
7	70-79	10	6
8	80-89	1	1
Total	13-89	139	261

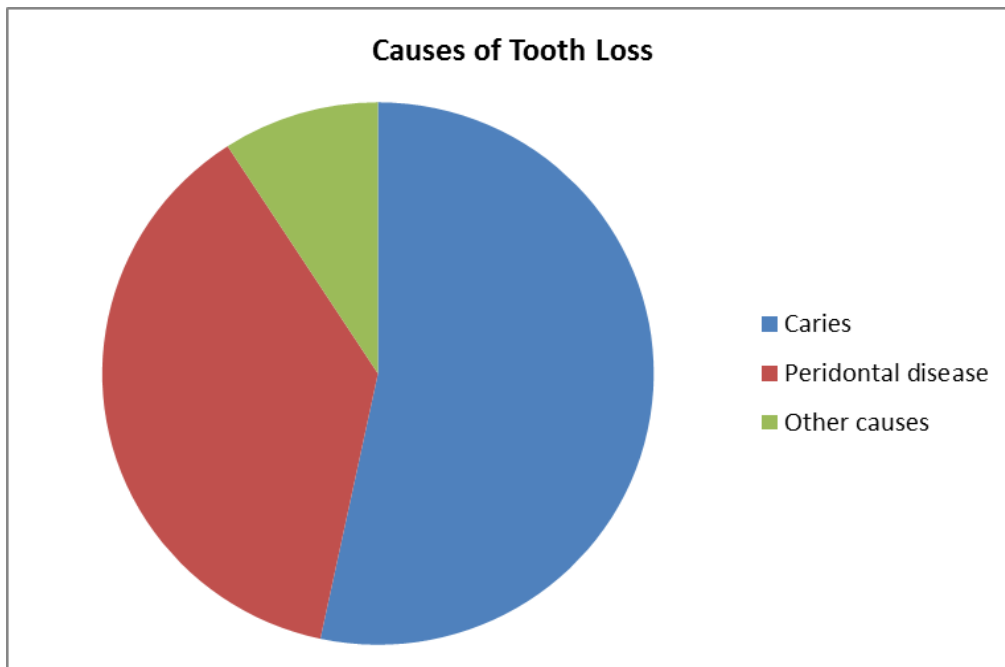
Table1: Age and Gender Distribution of Patients

No	Oral Health Determinants		95% CI		P
			Lower Bound	Upper Bound	
1	Brushing & Caries	2or more/day	.391	2.459	.019
		once	-.221	.644	.246
		occasionally	-6.149	7.739	.767
2	Brushing & Periodontal disease	2or more/day	-2.265	.338	.022
		once	.165	1.255	.109
		occasionally	-7.539	9.950	.721
3	Prophylaxis & Caries	<6months	.888	2.153	.005
		6mths-1year	-3.182	2.644	.788
		>1year	-2.290	3.135	.654
		never	-1.704	-.015	.048
4	Prophylaxis & Periodontal disease	<6months	-1.611	-.539	.008
		6mths-1year	-1.252	3.680	.215
		>1year	-.460	4.133	.084
		never	1.280	2.709	.003
5	Smoking & Caries	No	.038	1.054	.041
		Yes	-.306	2.445	.480
		Past	-28.008	1.450	.067
6	Smoking & Periodontal disease	No	-.158	.617	.175
		Yes	-1.344	.755	.097
		Past	9.305	31.775	.007

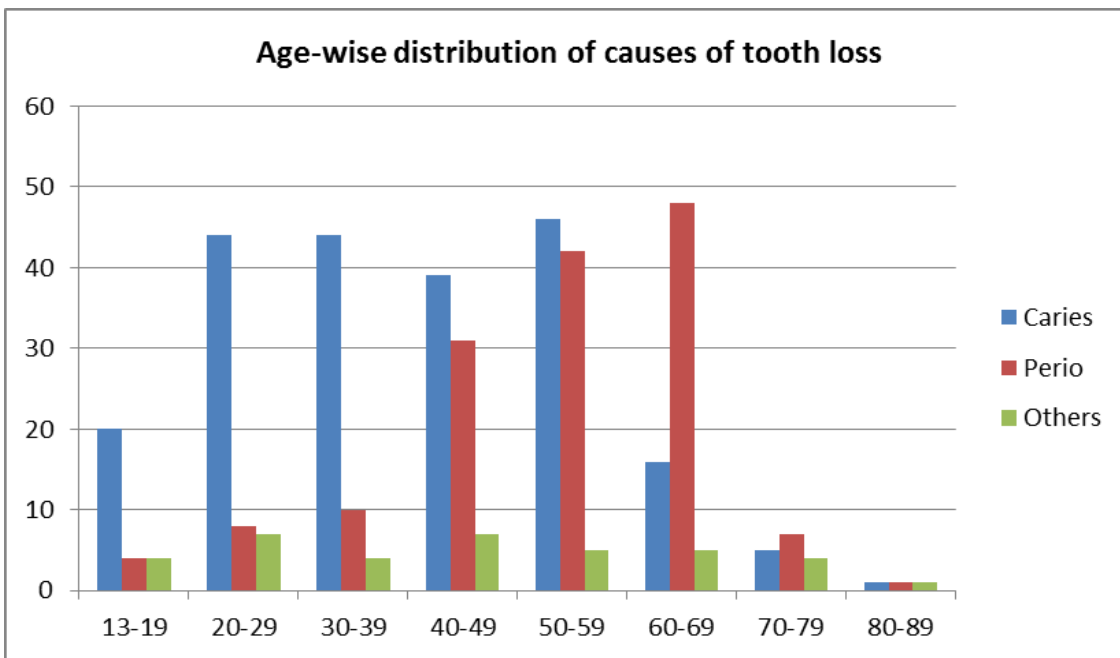
Table 2:Linear Regression Analysis of Tooth Loss and Oral health determinants



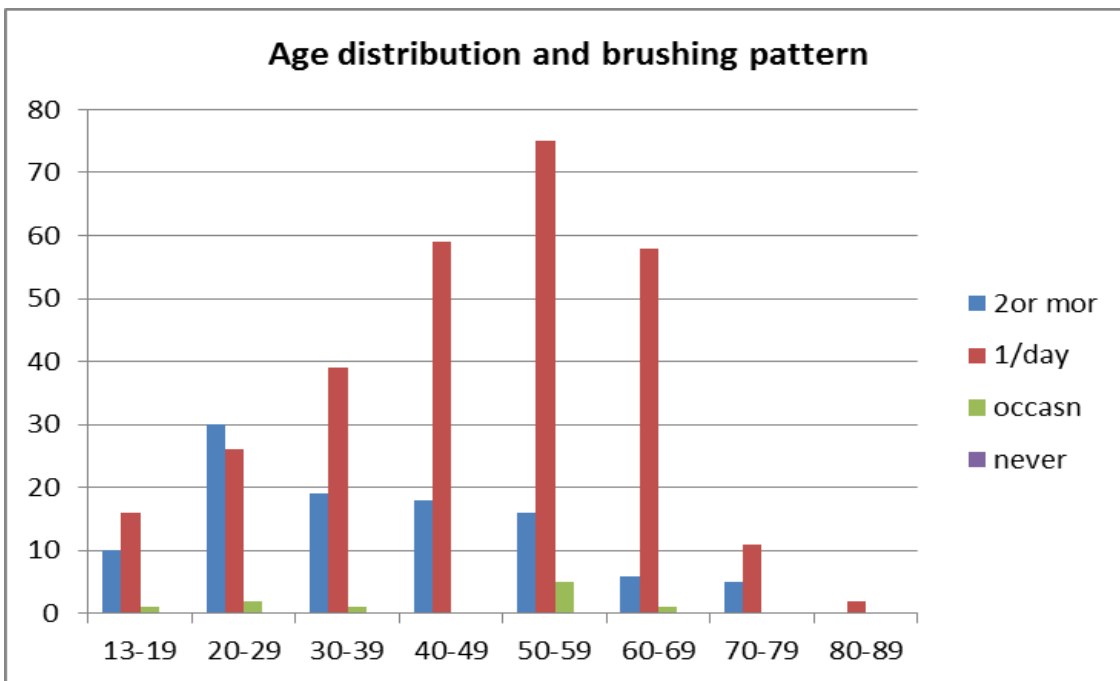
Graph 1: Box Plot showing Gender and Age distribution of participants



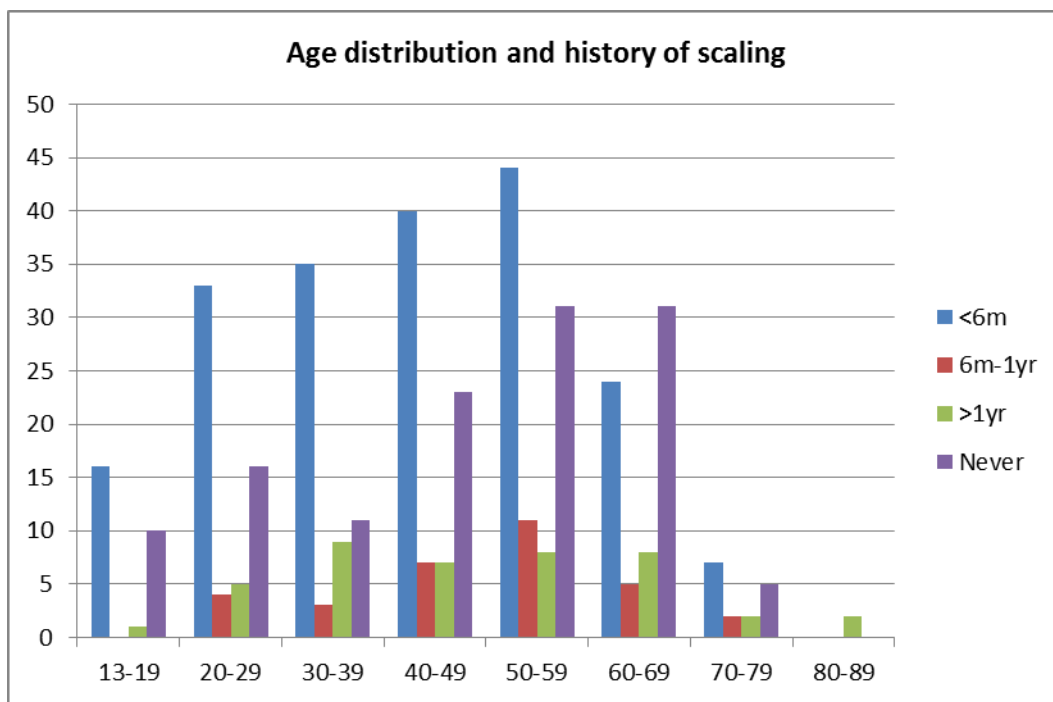
Graph 2: Causes of tooth loss



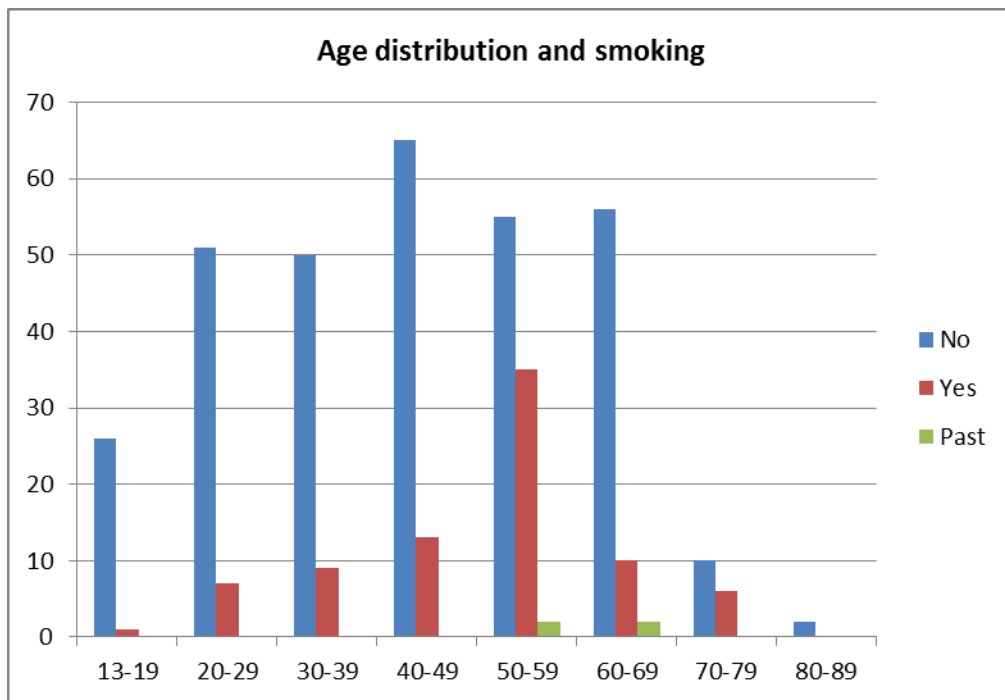
Graph 3:Age-wise distribution of causes of tooth loss



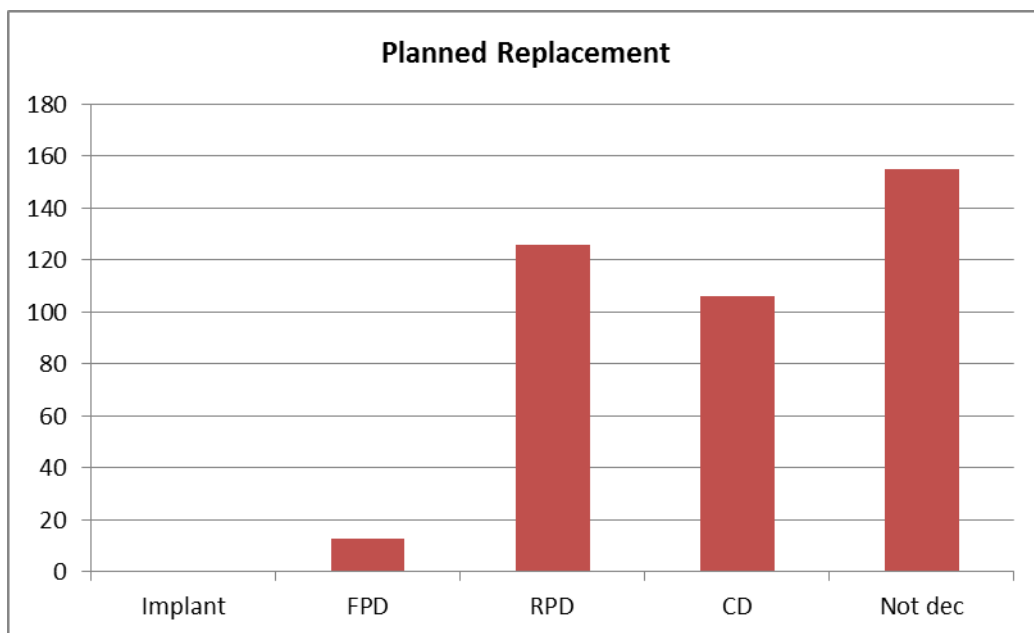
Graph 4:Age distribution and brushing pattern



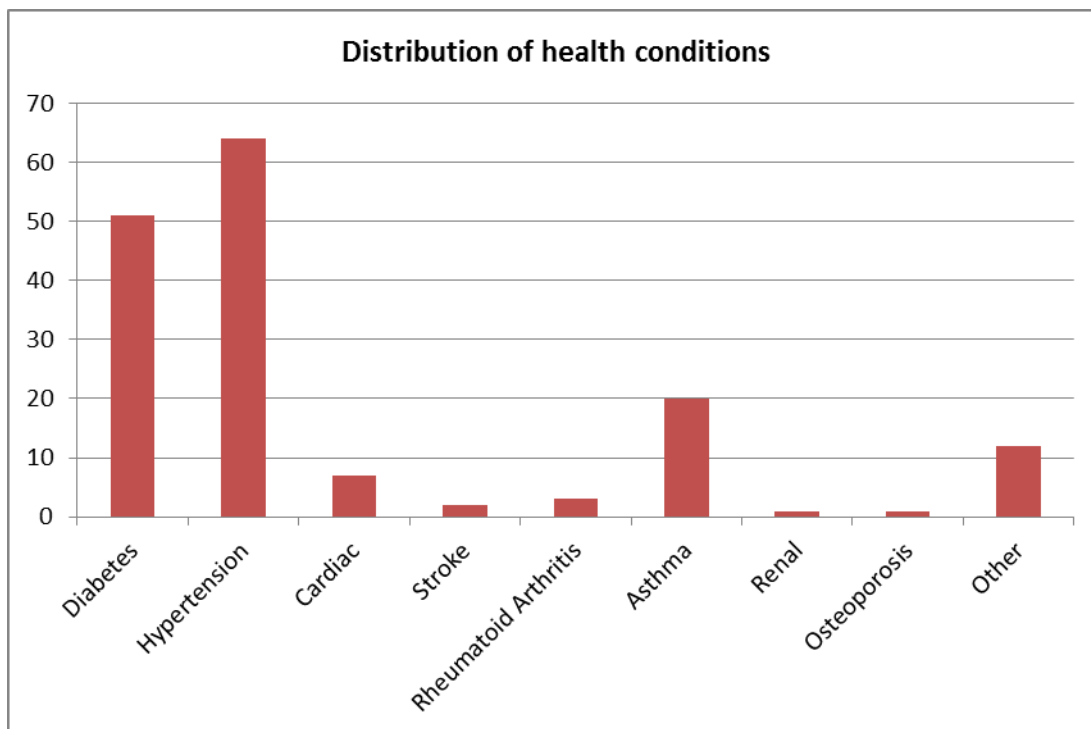
Graph 5: Age distribution and history of scaling



Graph 6: Age distribution and smoking



Graph 7:Planned Replacement



Graph 8:Distribution of health conditions