A CROSS-SECTIONAL STUDY ON THE PREVALENCE AND
PERCEPTION OF TOOTH DISCOLOURATION AMONG 16-50
YEARS OLD PATIENTS VISITING THE UNIVERSITY OF
NAIROBI DENTAL HOSPITAL.

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DURATION OF THE STUDY: JULY TO OCTOBER 2005
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A community dentistry research project submitted in partial fulfilment of the Bachelor of Dental surgery at the University of Nairobi.

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DURATION OF STUDY: 4 MONTHS

COST OF STUDY: 6500KSHS

SOURCE OF FUNDS: 1) SELF
2) FDS
DECLARATION

I, KARIUKI MUMBI HELLEN (BDSIII), declare that this is my original work and that it has not been submitted by any other person for research purposes, degree or otherwise.

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Sign ___________________________ Date 7th November 2005
DEDICATION

To my mother, family and friends for their encouragement, support and counsel whenever I needed them. May God bless you all.
ACKNOWLEDGEMENTS:
I wish to acknowledge the following with great gratitude for the help offered throughout my research work.

Dr R. Mutave for her dedication in supervising my work and showing me the way to go.

Dr. T. Dienya for his never failing commitment, encouragement and support with his precious time, and required academic material.

Patients who visited the University of Nairobi Dental Hospital during the research period for their cooperation in filling the questionnaires.

Fellow Dental students for their assistance in data collection.

To the University Dental community for creating conducive environment for the research project.
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LIST OF ABBREVIATIONS USED

BDS-Bachelor of Dental Surgery

MRes – Master of Research in Health Geography.

SA- South Africa

UON-University of Nairobi

CIABRD-Certificate in atraumatic Basic restorative Dentistry

Kshs-Kenya shillings.

FDS- Faculty of Dental Sciences.
SUMMARY

Tooth discolouration is often associated with poor aesthetics and possible physiological disturbances of affected patients. Normal tooth colour is composed of many colours and a gradation occurs from the gingival to the incisal edge. This study was designed to investigate the perception and prevalence of tooth discolouration in patients attending the University of Nairobi Dental Hospital during the month of September and October. All patients attending the University Dental Hospital Outpatient Clinic aged between 16-50 years were interviewed.

A questionnaire with both structured and open ended questions was used for the data collection and later oral examination carried out under natural and artificial lights to detect any discolouration.

From the study, the prevalence of discolouration was observed to be 64.8%. The results also show that tooth discolouration was more in the older than in the young; however, the young had a more negative perception to tooth discolouration compared to the old. The results of the study can form a basis for further research to determine the reasons for the trends observed. The study also indicates an extremely high level of tooth discolouration hence the need for intervention at an early stage as well as the enactment of appropriate preventive measures.
1.1: INTRODUCTION

Tooth discoloration is normally diagnosed when the colour of the teeth deviates from the normal white to yellowish white of normal teeth. It is synonymous with staining. A. Watts and M. Addy in “Tooth discoloration and staining” carried out an extensive review of the literature on tooth staining with particular regard to some of the more recent literature on the mechanism of tooth staining involving mouthrinses.

It is of paramount importance to note that teeth are composed of a number of colours and a gradation of colour occurs in an individual tooth from the gingival margin to the incisal edge of the tooth.

The science of colour is important in dentistry in regard to diagnosis of tooth colour and discolouration. Perception and description, and can be improved with training. The viewing conditions are extremely important in colour perception and variables such as light source, time of the day, surroundings conditions and the angle the tooth is viewed all affect the apparent tooth colour. The aesthetic aspects of tooth colour are difficult to quantify and colour perception is highly subjective and prone to individual variation. Discrepancies between dentists in shade matching the same tooth have been documented by Culpepper not only between dentists but also the same dentist on different occasions.

There are two distinct kinds of tooth discoloration as described by A. Watts and M. Addy: Intrinsic and Extrinsic discolouration. Intrinsic discoloration is incorporated into the structure of either dentine or enamel and cannot be removed by prophylaxis with toothpaste or pumice. Intrinsic discoloration can be a significant cosmetic and in some instances functional disturbance. Examples include conditions like:- Enamel hypoplasia, Fluorosis, Tetracycline staining, Dentinogenesis imperfecta, Amelogenesis imperfecta, Congenital hyperbilirubinemia, Congenital erythropoietic porphyria, Alkaptonuria, Enamel hypoplasia, Pulpal haemorrhagic products, Root resorption and aging.

Management includes microabrasion with hydrochloric acid/pumice or phosphoric acid/pumice, non-vital bleaching, vital bleaching which includes home and office bleaching, composite resin restorations and in severe cases porcelain veneers/crowns.
Extrinsic discoloration on the other hand are confined to outer tooth surface or utmost penetrating microcracks and fissures, and can thus be removed by dental polishing. They are mainly pigments embedded in the calculus or plaque which has been stained from interaction with food debris, tobacco smoke, wine or other external sources; colour itself being from chemical reactions and not necessarily from colour of the food itself. Enamel defects, salivary gland dysfunction and poor oral hygiene all predispose to the development of extrinsic stains.

On the other hand there is the age related discoloration seen in older patients where there is attrition and enamel wear exposing the less radiolucent dentine. Secondary dentine formed over time generally gives the teeth a darker shade. There is also internalization of stains through developmental defects such as fluorosis and enamel hypoplasia. Internalisation also occur through acquired defects such as tooth wear and gingival recession, dental caries, and restorative materials including amalgams.

The aim of the study is to determine the prevalence and perception of tooth discoloration among 16-50 years old patients visiting the University dental hospital. The study will provide useful information for planning and organizing clinical and community oral health education programs as well as formulation of oral health policies in Kenya. It will also provide basic data useful for intervention measures as well as form a basis for future research in the area of tooth discolouration.
2.1: STATEMENT OF THE RESEARCH PROBLEM

Tooth discoloration occurs in many forms. The discoloration can cause severe aesthetic problems, loss of function and in severe cases tooth mortality. In this light therefore the socio-economic impact of tooth discoloration is worth mentioning since some of the causes can be prevented. This can save the patient from expensive treatment needed in such situations.

People's habits also contribute to discoloration; for example, cigarette smoking produces yellowish brown to black discoloration usually on cervical portion of the teeth primarily on lingual surfaces.

Coffee and tea cause tenacious severe discoloration usually black to brown.

Among intrinsic discoloration fluorosis and other congenital defects are also of importance in tooth discoloration. There is great need to incorporate management of both intrinsic and extrinsic discolouration in the dental treatment to satisfy and meet the patients demand and this will only be possible if prevalence and perception of patients on tooth discoloration is established. The outcome of this research will be able to answer the following research questions. What is the prevalence of tooth discoloration among a selected group of patients? How do they perceive tooth discoloration?

2.2: JUSTIFICATION OF THE STUDY

The population is increasingly becoming aware of tooth discoloration.

On the other hand there has been lots of advertisement on tooth whitening agents and the awakening of the home bleaching kit to brighten smiles.

With financial constraints affecting oral health, programmes globally and especially in our country, this study will go a long way to help put in place preventive measures in the management of tooth discoloration.

This study will therefore provide baseline data for planning of oral health education programs, management and prevention of discoloration and for further research.
3.1: LITERATURE REVIEW

Many studies concur that tooth discoloration has a global distribution. In Nigeria, a study carried out by Koleoso D.C\(^3\) et al to determine prevalence of intrinsic tooth discolouration among 11-16 years old Nigerians found the causes to be enamel opacities (23.0%) Tetracycline (9.2%) Enamel hypoplasia (4.3%) and Dental caries (4.3%).

T. Nakawira\(^4\) et al studied the effects of polishing and bleaching on colour of discoloured teeth. They found that polishing was not detrimental to tooth structure and that abrasion with pumice caused loss of about 10 microns after 10 prophylaxis sessions. In the United Kingdom, a study carried out by Akhatib MN\(^5\) et al titled, “Prevalence of self assessed tooth discolouration in the United Kingdom” and published in the journal of dentistry 2004, a national cross sectional study done on 3215 subjects on self assessment of tooth discoloration showed that 50% of population perceived themselves to have normal tooth colour, 6% severe discoloration and 44% in between these two extremes Sex, age income and smoking had statistically significant effects on prevalence of perceived discoloration.

A study carried out in the U.S.A in 2004 at Baylor college of dentistry, Texas A&M University health science centre by Shulman JD\(^6\) et al, and published by the Journal of the American Dental Association in May 2004 on perception of desirable tooth colour among parents, dentists and children as part of a large scale fluoridation cessation programme among 8281 school-aged children using the Thylstrup Fejerskov Index(TFI) showed that younger patients were more critical about their tooth appearance than were their older counterparts.

In an endeavour to evaluate the typical appearance of natural anterior teeth in young and elderly people and to develop guidelines for the natural appearance of dentures, a study carried out by Hartnam R\(^7\) et al entitled, ‘Clinical studies on the appearance of natural anterior teeth in 128 young and old adults”, and published in Gerontology in March 2004, showed that subjects in the study group had a higher incidence of stains, cracks and defects. An interdental black triangle seemed to be typical feature of an aged dental appearance and majority of patients over 60 years of age would not wish to change their appearance in case of prosthodontic rehabilitation.
A lot of research has been carried out on fluoride discolouration and the public is generally more aware of this problem especially in areas of high fluoride content in drinking water. In Ethiopia, a comparison study conducted in the three Ethiopian Rift Valleys known for endemic fluorosis by Wondwossen et al, entitled, “Perception of dental fluorosis amongst Ethiopian children and their mothers”, and published in Acta Odontol Scand in April 2003, found that the TFI was significantly higher in girls and boys of unemployed fathers compared to children of employed one.

Likelihood of reporting dental problems with dental appearance increased with increasing individual TFI scores. It was found that mother/child pairs found teeth with TF scores 2 and 3 aesthetically acceptable while teeth with TF 5 and 7 were considered unacceptable. Mothers were also found to be more critical of severe fluorosis than their children.

From the above studies both done inside and outside Africa, it can be deduced that tooth discolouration has a global distribution. However, none of these studies has been done in Kenya.

Findings from this study will help create a clear picture of the real situation so that a plan can be drawn to combat the problem of tooth discolouration and encourage patients to seek treatment.
4.1 OBJECTIVES
Main objectives
To determine the prevalence and perception of tooth discoloration among patients visiting the University dental hospital.
Specific objectives:
1) To determine the prevalence of tooth discoloration among patients visiting the University dental hospital.
2). To determine the perception of tooth discoloration by patients.
3). To establish the patterns and causes of tooth discoloration among patients visiting the University Dental Hospital.
4). To determine the relationship between tooth discoloration and it's perception by the patients.
5) To determine if sex and age have influence on tooth discoloration and its perception.

4.2: HYPOTHESIS
1) Prevalence of tooth discoloration is more than 50% among members of the public.
2) Majority of the patients have a negative perception to tooth discoloration.
3) Discoloration is more frequent in the old than young and the young have a more negative perception to tooth discoloration.

4.3: VARIABLES
(i)Socio-demographic variables
1) Age
2) Sex
3) Occupation.
(ii)Dependent variables
Experience of tooth discoloration
- Causes of discoloration
- Perception of tooth discoloration
(iii)Independent variables
1). Prevalence of tooth discoloration
2) Perception of tooth discoloration.
5.1: STUDY DESIGN
This was a descriptive cross-sectional study.

STUDY CENTRE
The study was conducted at the University dental Hospital situated opposite The Nairobi Hospital at the junction of Argwings Kodhek Road and Valley Road on Ralph Bunche Road. It is a dental institute training members of the dental profession at an undergraduate and postgraduate level.

5.2 STUDY POPULATION.
Adult patients visiting the University dental hospital in the age category of 16-50 years. This was principally because this is the age bracket frequently affected by discolouration and conscious about it and in most cases having most of their teeth in the mouth. This was done in the month of September and October 2005.

5.3: SAMPLING METHOD
Random sampling method was used.
A convenient sample size was calculated using Fisher et al formula

SAMPLE SIZE
\[ N = \frac{Z^2P(1-P)}{C^2} \]
\[ = \frac{1.96^2 \times 0.5 (1-0.5)}{(1-0.95)^2} \]
\[ = 384 \]

Where, N= sample size
P= prevalence
Z= corresponding value to the confidence leveling the z table
C=1-confidence level
Prevalence level of 50% by Akhatib MN, Holt R, Bedi R and confidence level of 95%.
5.5 INCLUSION AND EXCLUSION CRITERIA

INCLUSION
1) Patients who consented to the study.
2) Patients who visited University dental hospital in the age bracket 16-50 years.

EXCLUSION
1) Patients not willing to participate
2) Patients below 16 and above 50 years of age.

5.6: INSTRUMENTS
Intraoral mirrors, explores, periodontal probes, and wooden spatulas, were used for examination of the selected patients.

DATA COLLECTION
Data was collected using self administered structured questionnaires.

5.7: PROCEDURES
Willing patients were made to fill the self administered questionnaires after which clinical examination on discoloration was done by dental students in clinical years and recorded on the questionnaires. The subjects were examined under the lights in the units in the dental chairs. Discoloration was diagnosed only when there was obvious extrinsic and intrinsic staining as indicated on the clinical examination form. Consideration of age of patient was put into account. Both inter and intra-examiner calibration was done to ensure reliability.

5.8: DATA ANALYSIS AND PRESENTATION
Data was cleaned and analyzed manually as well as, and by the use of computer statistical program-SPSS V10. The measures computed include percentage, means, standard deviations, ranges and proportions. The information was then presented in form of graphs, tables and pie-charts.
6.1: SCOPE AND LIMITATION OF THE STUDY

1) Financial and time constraints during the study period.
2) Logistic problems like colour perception
3) Data may be subjected to both sampling and non-sampling errors such as misunderstanding of the questions by respondent or interviewer.
4) Errors in identifying actual discolouration by the examining clinician.
5) Conditions under which the tooth is viewed may not be uniform throughout the study.