"ASSESSMENT OF ORAL HEALTH STATUS AND TOBACCO-RELATED HABITS AMONG THE EMPLOYEES OF NORTH-WEST KARNATAKA ROAD TRANSPORT CORPORATION (NWKRTC), BELAGAVI CITY."

By

Dr. ABHRA ROY CHOUDHURY

REG. NO. IL0219001

Dissertation

Submitted to

KAHER, Belagavi, Karnataka

In partial fulfillment of the requirements for the degree of

MASTER OF DENTAL SURGERY

IN

PUBLIC HEALTH DENTISTRY

(BRANCH – VII)

Under the Guidance Of

Dr. MAHANTESH SIDDIBHAVI M.D.S

DEPARTMENT OF PUBLIC HEALTH DENTISTRY

KLE VISHWANATH KATTI INSTITUTE OF DENTAL SCIENCES, KAHER, BELAGAVI, KARNATAKA.

2019-2022

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH ,

BELAGAVI KARNATAKA

Declaration by the Candidate

I hereby declare that this dissertation/thesis entitled **"ASSESSMENT OF ORAL HEALTH STATUS AND TOBACCO-RELATED HABITS AMONG THE EMPLOYEES OF NORTH-WEST KARNATAKA ROAD TRANSPORT CORPORATION (NWKRTC), BELAGAVI CITY."** is a bonafide and genuine research work carried out by me under the guidance of **Dr. MAHANTESH SIDDIBHAVI** M.D.S, Reader, Department of Public Health Dentistry, KAHER's Vishwanath Katti Institute of Dental Sciences, Belagavi.

Date: 03/01/2022

Place: Belagavi

Dr. ABHRA ROY CHOUDHURY

REG. NO. IL0219001

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH ,

BELAGAVI KARNATAKA

Certificate by Guide

This is to certify that the dissertation entitled "**ASSESSMENT OF ORAL HEALTH STATUS AND TOBACCO-RELATED HABITS AMONG THE EMPLOYEES OF NORTH-WEST KARNATAKA ROAD TRANSPORT CORPORATION (NWKRTC), BELAGAVI CITY"** is a bonafide research work done by **Dr. ABHRA ROY CHOUDHURY**, postgraduate student in partial fulfillment of the requirement for the degree of **Master of Dental Surgery (MDS)** in Public Health Dentistry, (Branch VII).

Date: 03/01/2022

Place: Belagavi

Dr. MAHANTESH SIDDIBHAVIM.D.S.
Reader,
Department of Public Health Dentistry
KLE Vishwanath Katti
Institute of Dental Sciences,
KAHER,
Belagavi-590010.

Dr. Mahantesh B. Siddibhavi
Consultant : Regd. No. 6944 A
Public Health Dentistry
KLE VK IDS, Belgaum

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH ,

BELAGAVI KARNATAKA

Endorsement by the Head of the Department and Principal/Head of the Institution

This is to certify that the dissertation entitled "**ASSESSMENT OF ORAL HEALTH STATUS AND TOBACCO-RELATED HABITS AMONG THE EMPLOYEES OF NORTH-WEST KARNATAKA ROAD TRANSPORT CORPORATION (NWKRTC), BELAGAVI CITY"** is a bonafide research work done by **Dr. ABHRA ROY CHOUDHURY**, postgraduate student under the guidance of **Dr. MAHANTESH SIDDIBHAVI** M.D.S, Reader, Department of Public Health Dentistry, KAHER'S KLE Vishwanath Katti Institute of Dental Sciences, Belagavi-590010.

Head of Department

Dr. Anil V. Ankola M. D.S.
Professor & Head,
Department of Public Health Dentistry,
KLE Vishwanath Katti
Institute of Dental Sciences,
KAHER, Belagavi.

Date: 3/1/2022
Place: Belagavi

Professor and Head
Dept. of Public Health Dentistry
KLE VK Institute of Dental Sciences
Nehru Nagar, Belagavi

Principal

Dr. Alka Kale M. D.S.
Principal,
KLE Vishwanath Katti
Institute of Dental Sciences,
KAHER, Belagavi.

PRINCIPAL
KLE V. K. Institute of Dental Sciences,
Nehru Nagar, Belagavi

Date: 4/1/22
Place: Belagavi

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH ,

BELAGAVI KARNATAKA

Copyright

Declaration by the Candidate

I hereby declare that ***KLE Academy of Higher Education &Research, Belagavi, Karnataka*** shall have the rights to preserve, use & disseminate this Dissertation/Thesis entitled **"ASSESSMENT OF ORAL HEALTH STATUS AND TOBACCO-RELATED HABITS AMONG THE EMPLOYEES OF NORTH-WEST KARNATAKA ROAD TRANSPORT CORPORATION (NWKRTC), BELAGAVI CITY"** in print or electronic format for Academic/Research Purposes.

Date: 03/01/2022

Place: Belagavi

Dr. ABHRA ROY CHOUDHURY

REG. NO. IL0219001

[Established under section 3 of the UGC Act, 1956 vide GOI. Notification No. F.9-19/2000- U.3 (A)]

UNDERTAKING

I, Dr. ABHRA ROY CHOUDHURY, Post-Graduate student in the subject of PUBLIC HEALTH DENTISTRY have completed research work on the topic Assessment of oral health status and tobacco-related habits among the employees of North-West Karnataka Road Transport Corporation (NWKRTC), Belagavi City in the year 2021. I have been given to understand that any research work I undertake for the purpose of the dissertation, oral presentation, or publication during my study course shall be the property of the KLE V.K Institute of Dental Sciences, KAHER, Belagavi. Hence, I hereby declare that the name of the Department Institute and University shall be mentioned in my publications. The authorship shall be according to the guideline informed to me.

Signature of the Post-Graduate Student

UNDERTAKING

I, **Dr. ABHRA ROY CHOUDHURY** hereby declare that the information and data mentioned in my thesis entitled "**Assessment of oral health status and tobacco-related habits among the employees of North-West Karnataka Road Transport Corporation (NWKRTC), Belagavi City."** belongs to me and is original.

I am aware of the definition of plagiarism as detailed below:

- An act or instance of using or closely imitating the language and thoughts of another author without authorization and the representation of that author's work as one's own, as by not crediting the original author.
- A piece of writing or other work reflecting such unauthorized use or imitation.
- The deliberate or reckless representation of another's words, thoughts, or ideas as one's own without attribution in connection with the submission of academic work, whether graded or otherwise.

I hereby declare that the thesis prepared by me is the original one and does not involve plagiarism anywhere. In case at a later stage it is found that I have indulged in plagiarism, then I am solely responsible for the same and the Institution is at liberty to take any disciplinary action against me including cancellation of the dissertation or any other penalties imposed by the University.

Place: Signature of Student

Date:

PLAGIARISM CHECK REPORT

Scientific Correspondence and Review Committee

KLE VK Institute of Dental Sciences
A Constituent Unit of KLE Academy of Higher Education and Research
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Nehru Nagar, Belagavi - 590 010, Karnataka State
Accredited 'A' Grade by NAAC (2nd Cycle) Placed In Category 'A' by MHRD (GoI)
☎: 0831-2470362 Web: http://www.kledental-bgm.edu.in
FAX: 0831-2470640 E-mail:principal@kledental-bgm.edu.in

Date : 1-1-2022 Serial No. : 092

PLAGIARISM CHECK REPORT

Name of the Applicant : DR. ABHRA ROY CHOUDHURY
UG / PG / Ph.D / Staff : POSTGRADUATE
Batch & Year : 2019-22
Department : PUBLIC HEALTH DENTISTRY

The soft copy of Research Work / Manuscript by DR. ABHRA ROY CHOUDHURY entitled "ASSESMENT OF ORAL HEALTH STATUS AND TOBACCO-RELATED HABIT AMONG EMPLOYEES OF NORTH WEST KARNATAKA ROAD TRANSPORT CORPORATION (NWKRTC), BELAGAVI CITY"

under the guidance of DR. MAHANTESH BIDDIH has been submitted for Anti-Plagiarism check to the Scientific Correspondence & Review Committee of KLE VK Institute of Dental Sciences using "Turn-it-in" software.

The scan has been carried out and the scanned output reveals a Similarity Index of 9%, which is **within / not within** the acceptable limits of 10% as per the UGC guidelines.

Member Secretary
Scientific Correspondence and Review Committee
KLEVK Institute of Dental Sciences
KAHER-Belagavi

Chairman
Scientific Correspondence and Review Committee
KLEVK Institute of Dental Sciences
KAHER - Belagavi

BIOSTATISTICS CLEARANCE CERTIFICATE

KLE V.K. Institute of Dental Sciences
(A Constituent unit of KLE Academy of Higher Education & Research
Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Nehru Nagar, Belagavi-590 010 INDIA
Re-Accredited 'A' grade by NAAC (2nd Cycle) & Placed in Category 'A' by MHRD (GoI)
0831-2470362
FAX:0831-2470640
Web: http://www.kledental-bgm.edu.in
E-mail:principal@kledental-bgm.edu.in

Biostatistics Clearance Certificate

This is to certify that the Biostatistics aspect of the Dissertation / Research work of **Dr. ABHRA ROY CHOUDHURY , Post Graduate Student**, under the guidance of **Dr. MAHANTESH SIDDIBHAVI** $_{M.D.S}$, **Professor, Department of PUBLIC HEALTH DENTISTRY**, entitled **"ASSESSMENT OF ORAL HEALTH STATUS AND TOBACCO-RELATED HABITS AMONG THE EMPLOYEES OF NORTH-WEST KARNATAKA ROAD TRANSPORT CORPORATION (NWKRTC), BELAGAVI CITY"** has been done under my guidance and considered satisfactory.

Place: Belagavi
Date: 20/12/2021

Name & Signature of Biostatistician
(Dr. S. B. Javali)


Dedicated
To
My Family

Acknowledgement

I present this thesis as an ode to all the qualities and principles, which have been instilled in me by all those who have enriched my life through their knowledge and wisdom.

Mere words or long sentences lack the potential to fully express heartfelt gratitude and thanks, when it comes to acknowledging everyone, due to the immense contribution of all the people who influence you and your surroundings and yet an attempt must be made by one and all, although in a small way, to acknowledge the help and support given by everyone in this journey no matter how big or small.

It gives me great pleasure to express my gratitude to my teacher and guide, ***Dr. Mahantesh Siddibhavi*** ***MDS,*** *Professor, Department of Public Health Dentistry, KLE Vishwanath Katti Institute of Dental Sciences, KAHER, Belagavi for such an enthusiastic and involved guidance during this study. He has been a true pillar of strength and support and has always looked to help me push my boundaries further through her critical appraisal, keen sense of observation, and analytical approach.*

I am privileged to express my extreme gratefulness to my respected teacher ***Dr. Anil V. Ankola*** ***MDS,*** *Professor, and Head, Faculty of Dentistry, Department of Public Health Dentistry, KLE Vishwanath Katti Institute of Dental Sciences, KAHER, Belagavi for his willingness to always render help when needed and for her wise counsel.*

I am immensely indebted to ***Dr. Alka Kale*** ***MDS*** *Principal, KLE Vishwanath Katti Institute of Dental Sciences, KAHER, Belagavi, for providing the required facilities and infrastructure.*

I am greatly indebted to my respected teachers ***Dr. Roopali M*** ***MDS, PhD,*** *,* ***Dr. Sagar Jalihal*** ***MDS„*** ***Dr. Vinuta Hampiholi*** ***MDS*** *,* ***Dr. Pratibha Patil*** ***MDS*** *and* ***Dr. Laxmi Kabra*** ***MDS****, for their guidance and above all theirs inspirational support at all times.*

A special thanks to ***Dr.Atrey, Dr.Ram, Dr.Mehul, Dr.Varkey, Dr.Prajakta and Dr. Anu*** *for their valuable inputs and insight which helped me complete this study without any glitches.*

I would like to take this opportunity to also thank ***Dr. Susmita****,* ***Dr.Arun, Dr.Lokesh, Dr.Faheem, Dr. Rohit, Dr. Shreya*** *who has been like my family away from home, always standing by me through my highs and lows, been my pillar of strength, and has seen me grow as a person during the course of my post-graduation.*

*I sincerely thank my postgraduate colleagues****, Dr. Deepika V and Dr. Apurva Deshpande*** *for their co-operation and help during this study.*

I would like to thank my seniors ***Dr. Richa Singhal, Dr. Barkha Tiwari and Dr. Shefalika*** *for their constant support and motivation that helped me to do my work with maximum enthusiasm.*

I would like to extend my sincere thanks to ***Mr. Santosh and Mr. Chanappa*** *and all the non-teaching staff.*

I would like to acknowledge the tireless work of ***Mr. Anand*** *and* ***Mr. Arun*** *of Shri Vighneshwara Associates Computers of J.N.M.C for excellent data processing and completion of this dissertation.*

*I would like to acknowledge those who are the core of my life–****my beloved parents, Mr. Shashanka Roy Choudhury and Mrs. Nivedita Roy Choudhury*** and

my sister ***Ms. Tania Roy Choudhury*** *who have laid the foundation stone of fundamental principles and morals which have made me the person I am today****, and my friends*** *for their constant encouragement, support and guidance, and for being a firm backbone to my life through my many trials and tribulations.*

Dr. ABHRA ROY CHOUDHURY

ABBREVIATIONS

NWKRTC	-	North-West Karnataka Road Transport Corporation
DMFT	-	Decayed-Missing-Filled Teeth
DT	-	Decayed Teeth
MT	-	Missing Teeth
FT	-	Filled Teeth
BOP	-	Bleeding on Probing
PD	-	Periodontal Disease
DC	-	Dental Caries
WHO	-	World Health Organization
OML	-	Oral Mucosal Lesions

ABSTRACT

Background- Transport workers have a very haphazard and incongruent schedule which makes it difficult for them to follow proper oral hygiene practices. The prevalence of tobacco habits is also found to be high due to their longer periods of work and constant stress. **Aim and Objectives-** To assess the oral health status and tobacco-habits of the government bus drivers and conductors of NWKRTC, Belagavi City, Karnataka. **Methodology**- A descriptive cross-sectional study was conducted on 451 Government Bus drivers and other employees of NWKRTC who gave consent for the study. WHO Oral Health Assessment Form 2013 was used to record the oral health status and a self-designed, validated questionnaire was employed for recording the oral hygiene practices and tobacco-related habits. Descriptive statistics and Chi-Square was used for statistical analysis. **Result**- The mean age of the employees of NWKRTC is 43.55 years and there are 414 males as compared to only 37 females. The mean DMFT score was 5.55±3.08. 228 of them had some kind of tobacco habit with guthka (25.9 percent) being the most prevalent one. 57 employees had manifestations of leukoplakia and OSMF. There was an association between tobacco habits and oral mucosal lesions as well as the DMFT score. **Conclusion**- The Oral Health Status of the Government employees of NWKRTC is poor. It is further compounded by the high prevalence of tobacco habits and associated lesions and it is a problem that needs to be addressed immediately.

CONTENTS

LIST OF TABLES

LIST OF GRAPHS

LIST OF PHOTOGRAPHS

LIST OF ANNEXURES

INTRODUCTION

A comfortable livelihood has been one of the most basic desire of mankind and every individual looks at various ways of achieving it. The individuals following a similar occupation fall into the specific community which basically consists of people who have certain characteristics common among them. Every community component forms an important aspect of the conglomerate and contributes to its betterment. As members of the Public Health fraternity, it is our responsibility to address the needs of every section of the community. Health is an asset, not only for an individual but for the community as a whole, and it is an essential aspect by which a nation progresses rapidly.[1] Unfortunately, health is highly undervalued, and its importance is not appreciated unless it is lost[2]. Oral health is an important entity that contributes significantly to the well-being of a person. There can be many factors contributing towards oral disease, and it can affect humans of all ages, races, gender, ethnicity etc. In fact, everyone suffers from some oral health issue at least once in their lifetime, and no one is immune to it.[3]

Occupation has been one of the most relevant factors that causes a lot of social disparity related to oral health.[4] There is no denying the fact that people working in the transport sector do not pay much attention to their oral health. It can be attributed to their erratic lifestyle and odd timings at work, interspersed with delays and frequent breakdowns[5]. It becomes increasingly convenient to enter the abyss of adverse habits like tobacco consumption and alcohol intake. Bus drivers, in general, have a very haphazard and incongruent schedule of their own as they have to keep adapting to the different changes in the itinerary at work, based on their shifts and certain unforeseen situations, while being on the wheel for most of the time.[6] There have even been

specific surveys that suggest that bus drivers are one of the most neglected parts of the community, as far as oral health is concerned, and they cannot dedicate a specific amount of time for the maintenance of oral hygiene.

Moreover, due to the constant stress at work and to keep themselves functional, despite long working hours, they tend to resort to habits like tobacco consumption, either in a smoking or a smokeless form.[7] They also tend to come under several individual and social influences that further increase this habit.[8] Their working posture, heavy machinery, constant stress at work and minimal time off act as a predisposing factor even more radically. Nicotine, the principal constituent of tobacco, has been known to keep people awake for more extended periods due to the constant release of a chemical neurotransmitter. This is why most people engaging in odd jobs, including bus drivers, get addicted to it. They feel more alert and energetic, and if it is associated with certain flavours, it can also improve the taste of the mouth. They tend to ignore the fact that tobacco affects oral health tremendously and causes oral cancer, a deadly disease, that can ultimately prove to be fatal.[9] This lack of concern, coupled with the illiteracy and indifference, with a certain amount of informed naivety, can go a long way in crippling these people and induce specific disabilities which can affect not only themselves but their family as a whole.

More than 2000 bus drivers, conductors, and mechanics work in the Belgaum Bus depot, a small city located in the upper part of North Karnataka. It is a subsection of NWKRTC that boasts of 5000 vehicles carrying 2.2 million people per day. Bus Drivers and conductors travel for short and long distances within Belagavi City limits and the surrounding talukas and districts. They work tirelessly to cater to the needs of the general public, and their oral health must be given its due importance. The status

of oral health of the employees of NWKRTC needs to be assessed in detail as it has never been done before. Similar studies have been done on the bus drivers in Chandigarh and Chennai, and the findings were found to be significant. [4,5] The DMFT index, the need for prosthetics and malocclusions were all studied in detail. The studies also stated that most bus drivers drank tea and coffee multiple times a day, which resulted in an increased 'sweet score'. They belonged to the 'Watch Out Zone' and they were prone to dental caries and high DMFT scores as well.

Moreover, most of them had previously visited the dentist for extraction of teeth instead of any type of treatment. This was mainly due to the lack of oral health education, lack of time to visit the dentist, fear and apprehension and low socioeconomic status[6]. Similar studies have been done on sea-farers, coal mine workers and labourers, and the results have been similar[10,11,12].

Through this study, we will get a better perspective of the status related to oral health of the concerned community and extend a helping hand to them so that they embrace the right path before it becomes too late for them. Some of them are even motivated to quit the adverse habit and need help to succeed in this aspect.[13] They can be educated adequately about the different approaches for maintaining oral health so that they can embark on the path of reformation. Many need guidance in this matter, and identifying the people in despair is essential before any intervention can be administered. This study intends to do just that. The aim of the study is to assess the oral health status of the employees of NWKRTC, Belagavi City. The objective is to find its association with tobacco-related habits so that the risks can be identified prematurely and appropriate counselling and treatment is rendered at the earliest possible.

AIM AND OBJECTIVES

Aim

To assess oral health status and tobacco-habits of employees of NWKRTC, Belagavi City, Karnataka.

Objectives

1. To assess oral health status of employees of NWKRTC, Belagavi City, Karnataka.
2. To assess tobacco habits of employees of NWKRTC, Belagavi City, Karnataka.
3. To find the association between oral health status and tobacco habits of employees of NWKRTC, Belagavi City, Karnataka.

REVIEW OF LITERATURE

Studies done on transport workers in India

Aparna Sukumaran et al conducted a cross-sectional study to assess the oral health and the required treatment of the bus drivers working under Metropolitan Transport Corporation in Chennai. 860 subjects took part in the study. The WHO Oral Assessment Form of 1997 was used for recording details and the expressed mean DMFT score was 5.53. It had a close association with the sweet score as well as 85.9% were in the 'Watch Out Zone'. 12.4% of the subjects had periodontal issues. Precancerous lesions like Leukoplakia, OSMF, Candidiasis were also noted which has a close association with tobacco consumption[6]

A study of descriptive cross-sectional type was conducted to assess the oral health status and treatment needs among the transport workers of Chandigarh Transport Undertaking (C.T.U) by Ramandeep S. Gambhir et al. the study was done on 1008 participants with a mean age of 45.3+-7.8 years and 97% of them were males. The analysis of the data was done using the SPSS Package Version 13.0 and ANOVA and z-test. According to the data obtained, it was found that the dental caries prevalence was 63.4% with a mean DMFT score of 5.02. 47.6% of the total participants examined had maxillary prosthetic need and 53.3% had mandibular prosthetic need. With respect to the CPI score, it was concluded that only 8.13% of the subjects had periodontium that was healthy while 73.2% subjects had a calculus score of 2[14].

According to a study done by G Ayyappa et al, smokeless tobacco consumption is extremely common among the bus drivers of State Transport Corporation in Pune city. Therefore, a cross-sectional study of a descriptive type was implemented among 190 bus drivers and conductors working on this particular route. Almost 55.8% of the surveyed population had tobacco consumption habit with more than half of them being initiated before the age of 18 years due to "peer pressure", "feeling mature" and "out of curiosity". Close to 92% of the people knew about the ill effects of tobacco consumption and its potential to cause cancer while 76.4% of them tried to quit the habit at least once in their life. It was proven in the study that the long-distance transport workers had more prevalence of tobacco consumption habit when compared to the general population[4].

A cross-sectional study was done among the employees of KSRTC, Mysore Division by Chaitanya Reddy et al. A total of 1434 staffs, which included the bus drivers, mechanics, conductors and the staff involved for administrative duties were a part of the study. The study revealed that the prevalence of dental caries at 45.7% and the prevalence of periodontal diseases at 72.3% was higher among bus drivers when compared to other population. The poor oral hygiene and the more number of tobacco consumers among the bus drivers were found to be the reason behind this disparity[15].

Parashari A et al conducted a descriptive cross-sectional study among the employees of Uttar Pradesh State Road Transport Corporation (UPSRTC) on a sample size of 904, which included the bus drivers, conductors and other associated Government employees. The prevalence of tobacco as well as alcohol consumption was very high at 77.19%. Majority of the subjects had smokeless tobacco habit when

compared to the smoking form and even among the smokeless form, Gutkha was most prevalent, with some subjects confessing to consumption of 30-40 packets per day.

The major manifestations with respect to tobacco consumption were found to be acidity and burning sensation of the mouth and stomach on eating something spicy[8].

A descriptive cross-sectional study was conducted on the auto rickshaw drivers of Jaipur City to assess the prevalence of tobacco consumption habits among them. 94 participants were selected from the total population using random sampling to collect the required information using a pre-tested questionnaire. The results of the study revealed that almost 87% of the subject were addicted to tobacco consumption with peer pressure and the curiosity regarding tobacco being the most influential reasons behind it. Majority of them started early with 55% of them being initiated below 15 years of age. Thus, the auto rickshaw drivers were deemed to be a vulnerable group as far tobacco substance abuse was concerned[16].

Studies done on transport workers outside India

A study of cross-sectional descriptive type using a self-designed questionnaire was done by Saroj G et al among the bus drivers of Dharn Bus Depot in Nepal. A total of 300 staff which included the bus drivers and subjects from other occupations were administered the questionnaire to assess their knowledge about the various aspects of tobacco consumption. The prevalence of the adverse habits was as high as 96.3% although all of them reported that they were aware of the ill-effects of tobacco. The initiation of tobacco consumption took place at a young age of less than 18 years for 52% of the subjects. Almost 1/3rd of the tobacco users tried quitting the tobacco

consumption habit at some point but only 20% of them were successful in it. A large number of people said that they could not quit because they were addicted to tobacco and didn't want to go through the withdrawal symptoms related to it.[13]

The consumption of tobacco was found to be a major cause of mortality and morbidity among the people of the lower socioeconomic class in Pakistan. A descriptive cross-sectional study was done on 714 transport and heavy load workers in Pakistan. 93.7% of the study population consumed some form of tobacco with guthka being the most preferred type for it (60.2%). The most common reasons for this excessively high number were attributed to a masticatory habit, peer pressure from friends and increased alertness on the consumption of tobacco. These transport workers were identified as high-risk group from the study and there was an increased emphasis on planning tobacco-cessation programs to reduce the disease's burden on the involved community[17].

A cross-sectional study was conducted by Goon et al on 400 bus drivers working for the government transport sector of Dhaka City, Bangladesh to understand about the pattern, prevalence and the determinants of tobacco consumption habit. The prevalence was found to be as high as 93%. They also admitted to spending more than 20% of their total income on buying tobacco products which caused a financial burden to them. There were many factors that promoted the harmful habit with occupational stress and lower educational background being the two most important ones. Surprisingly, more than half of the total surveyed population showed some type of manifestation of heart complications. Therefore, it was imperative that the public health experts and the policy makers took this particular aspect into account to address the impending issue immediately.[18]

Studies done on subjects belonging to a low socioeconomic status

A descriptive cross-sectional study was conducted on the Coal Mine workers belonging to Ramakrishnapur in Telangana by Irram-Abbas et al. The study aimed to assess their oral health status. 356 workers were participants in the study and almost 90% of them had some tobacco or alcohol-related habits. For analysis, software SPSS package version 21.0 was used. The age group under consideration ranged from 21-60 years with the mean age as 49.89+-7.2 years. Maximum subjects belonged to 50-54 years of age. The mean score for DMFT was 2.32+-2.99. 48.3% of them had dental caries which were untreated while 20.3% of them had missing teeth. 45.5% had DMFT score less than equal to 6 while 10.1% had it as more than equal to 7. 94.4% of the total population had problems related to the periodontium with gingival bleeding, periodontal pockets and loss of attachment being the most common.[10]

The study conducted was of a descriptive cross-sectional type and was on the seafarers in Mundra Port, Kutch, Gujarat. Pankaj Aapaliya et al did the survey to assess the oral health of the above mentioned study population. 385 participants were included in the study and they were 21-70 years old. 365 of them were males and only 20 of them were females. Data analysis was done using SPSS software version 21.0 assessment of variable took place using Kolmogorov-Smirnov test. On analysing the collected data, it was found that the prevalence of the adverse habit was 72.3%. The same prevalence rate for dental caries stood at 88%, for periodontal disease at 75.1% and for prosthetic status at 6.5%. The mean DMFT score of the population being studied stood at 3.69+-1.57 which was indicative of the fact that the matter needed immediate intervention.[11]

1550 labourers of the Gunj Marketing Yard of Raichur in Karnataka was made to be the part of a descriptive cross-sectional study to assess their oral health status. The study was conducted by A.M Suresh Babu et al. For assessing the oral health status and variables in demography, a self-designed questionnaire was used along with the WHO Assessment Form (1997). The main index for oral hygiene status was the Oral Hygiene Index (1964). The average age of the population being studied was 35.1+-8.02 years. The collected data was analysed using SPSS V 16.0 IBM software. For reliability of the examiner, Cohen's Kappa statistics was used. Chi-Square Test was implemented for the evaluation of different associations. 64.1% of the participants were male and 35.9% of them were females. The result confirmed that the mean decayed teeth stood at 2.06+-1.49, the mean missing teeth was 0.76+-2.53 and the mean filled teeth was 0.13+-0.39. Dental caries prevalence stood at 85.7% and for the prevalence of periodontal disease it was 93.5%. It was also concluded that 45.9% of the labourers had poor oral hygiene status.[12]

A descriptive cross-sectional study was conducted to assess the oral health status and the practices of 1590 males belonging to the Bhil adult tribe of Southern Rajasthan, India by T. Santosh Kumar et al. Only dentate subjects were chosen and the sampling was through a multistage sampling procedure. They were aged between 15-54 years old and the SPSS Software version 11.0 was utilized for the data analysis. Multiple regression analysis along with the ANOVA and Chi-Square test were used for the multiple variables. The mean DMFT was 5.34+-6.48 and DMFS was 18.94+-35.87. Among the problems related to the periodontal health, shallow pockets were most commonly seen in 40% of the subjects with 11.6% of them having deep pockets.[19]

A study of cross-sectional type was executed among the Paniya tribal population belonging to Wayanad, Kerala by Iris Valsan et al. It was conducted on 420 samples and the stratified cluster sampling design was employed for the same. Statistical Analysis was done using SPSS version 17.0 and Bivariate Analysis and Chi-Square Test were used. The prevalence of caries was 39.7%. Bivariate analyses of DMFT scores with age groups was found to be highly significant (p=0.001). 89.3% of the sample reported to chewing tobacco and pan while 3.6% had oral lesions arising from the same.[20]

A cross-sectional survey was conducted by Diptajit Das et al. on 1412 members of the Juang tribe belonging to the Bansapal Taluk located in Northern Odisha. 16 villages were chosen by cluster random sampling method to meet the sample size. Majority of the participants had calculus with periodontal health problems being as high as 75.6%. Loss of attachment of 0-3 mm was noticed in 64.5% of the people. Even the caries score was found to be pretty high at 83.4%. Since the oral health status of the population was relatively poor, the data obtained from the study could be used to plan strategies for oral health promotion, prevention and treatment.[21]

A cross-sectional study using World Health Organization (WHO) 1997 'Oral Health Assessment Form' was conducted by S. Kadanakuppe et al on the Iriluga Tribal Community. 2605 people, with the age ranging from1-80 years, were included in the study. 57.9% of the checked population had calculus but 4.22% exhibited bleeding on probing. 3.67% of the people had pockets deeper than 6mm as well. The prevalence of dental caries was not found to be very high with 7.55% suffering from

it. The oral health status of the Iriluga tribe was found to be good and proper oral hygiene practices were attributed to it.[22]

Nisha Gopalankutty et al conducted a cross-sectional survey among the tribal population of the three panchayats of Attapatty district to mainly assess the periodontal status of them. 360 individuals were selected using multistage simple random sampling. Almost 87 percent of the total population manifested some form of periodontal diseases, with gingival bleeding and mild periodontitis being the most common ones. A significant statistical relationship was found between oral hygiene status, tobacco habits and the periodontal status of the population as well. A lot of misconceptions and myths about oral hygiene is prevalent among this particular population and it needs to be addressed as soon as possible.[23]

Studies done on general population

A hospital-based cross-sectional study was conducted in Khordha district headquarter hospital of Odisha by Shilpa Mahapatra et al to visualize the oral health effects caused by tobacco chewing among the adult patients attending the dental OPD and who were between 25-64 years. Among the tobacco chewers, 51.6% were betel quid chewers, 28.1% were gutkha chewers, and 20.3% were both betel quid and gutkha chewers. Loss of attachment was observed among all the tobacco users who chewed tobacco 10–20 times per day compared to those who didn't use tobacco.[24]

A cross-sectional study was conducted by Kishore Kumar Katuri et al among the patients attending the Outpatient Department of Periodontology and Implantology, Sibar Institute of Dental Sciences, Guntur, Andhra Pradesh, India. Patients with more than 10 healthy teeth and some form of tobacco habits were included for the study.

The patients belonged to the age range of 25-70 years. Descriptive statisitics, ANOVA and Post Hoc were conducted using SPSS version 22.0. A total of 120 people were subjected to the survey and they were divided into 3 groups of 40 each. Percentage of OHI-S scores under 3-4 in all the groups were 47.5 % in Group 1, 42.5% in Group 2, and 65% in Group 3. Total CPI Score of probing depth (CPI-PD) in three groups were under score 4.[25]

A cross-sectional study was conducted by Veera Reddy et al among the inmates facing life imprisonment in the central jails of Karnataka. The WHO Oral Assessment Form 1997 was used to collect the necessary data. The study revealed that the caries prevalence was close to 97% with a mean DMFT value of 5.26. almost 40% of the inmates had some form of loss of attachment. Oral mucosal lesions were also noted with 9.9% of them showing the pathognomic signs of Oral Submucous Fibrosis. A large number of them needed interventions in relation to their oral health which emphasized the need for attention for this specific population.[26]

A cross-sectional study that was community-based was conducted on 625 participants in Nimbut village, Pune, Maharashtra, India. 125 people were taken from the 5 WHO age groups, which were 5 years, 12 years, 15 years, 35-44 years and 65-74 years as specified by guidelines. Data collection was done using WHO Assessment Form, 1997 and Descriptive Analysis was done using Microsoft Excel 2007. Leukoplakia (14.88%) and oral sub-mucosal fibrosis (OSMF) (0.96%) were detected mostly in buccal mucosa. There were 336 (53.8%) participants with the presence of calculus, and this was found to be highest in the 12 and 15 years old. Mean number of bleeding sextants was 2.32, and this was highest in the 12 and 15 years old. The presence of pockets was highest in 35-44 years old. There were about 11.36%

participants with the presence of loss of attachment ranging from 4 to 5 mm and which was found to be most in 35-44 years old.[27]

A comprehensive examination was conducted at three large cantonments in India involving 1200 army personnel with age range of 16 to 56 years to know the pattern of oral diseases, prevalence of deleterious habits and treatment needs. Simplified WHO oral health assessment form 1997 was used for the study. The total number of decayed teeth were 453, missing teeth 183 and filled teeth 258 with a mean DMFT score of 0.74. The mean DMFT of cantonment A, B and C were 0.74, 0.89 and 0.61. 1188 subjects had normal TMJ, 1196 subjects had healthy oral mucosa. CPITN index was used to assess the periodontal health status. In Cantonment A, 203 (48.8%) had healthy periodontal status, 4 (0.96%) had bleeding on probing, 175 (42.07%) had shallow pockets and 12 (2.88%) had deep pockets. In Cantonment B, 296 (74%) had healthy periodontal status, 8 (2%) had bleeding on probing, 96 (24%) had shallow pockets and none had deep pockets. In Cantonment C, 226 (58.85%) had healthy periodontal status, 3 (0.78%) had bleeding on probing, 147 (38.28%) had shallow pockets and 8 (2.08%) had deep pockets. 10.4 % of the subjects required prosthodontic treatment. 99.25 % subjects in age group 16 to 18 years and 97.25% among age group 19 to 21 years had no deleterious oral habits. Among age group 22 to 56 years 66.83% had no habits, 158 (20%) smoked, 35(4.43%) used tobacco quid and 69(8.7%) used pan and betel nut. There was a statistically significant relation between age and oral habits.[28]

To determine the malocclusion severity in Asian men and the relation between malocclusion severity and orthodontic treatment need, 339 medically fit army recruits with age range 17 to 22 years and with no history of orthodontic treatment in any

form were studied. Peer assessment rating PAR index was used and the treatment need was categorized into two groups. No treatment required group had Dental Health Component 1 to 3 and Esthetic Component 1 to 7. Treatment group had Dental Health Component 4 to 5 and Esthetic Component 8 to 10. 48.1% subjects has Class I malocclusion with mean PAR score of 16.9, 26.3% had Class II Division 1 malocclusion with mean PAR score of 20, 3.2% had Class II Division 2 malocclusion with mean PAR score 28.4 and 22.4 % had Class III malocclusion with mean PAR score of 18.2. Subjects in treatment group had significantly higher PAR score. The area under ROC of PAR scores in relation to DHC and EC were 0.843 and 0.942 respectively. Thus PAR score was better predictor of esthetic than dental health impairment for assessing malocclusion.[29]

Sajith Vellapally et al. conducted a cross-sectional study among 805 patients in two private dental clinics in Kochi, India from the month of March to July 2007. A self-designed questionnaire was designed and implemented to collect the necessary data. Oral mucosal lesions were more commonly seen among tobacco-chewers (22.7%) while only 2.3% of the non-tobacco users exhibited any such manifestations. The mean of caries experience of teeth were significantly higher in tobacco chewers when compared to the non-tobacco users and this result was statistically significant as well. Thus, this study concludes that the use of tobacco can inadvertently affect the oral health and hygiene of a person.[30]

A study conducted by Saumyendra V. Singh et al in 10 villages in Lucknow, Uttar Pradesh on a sample size of 681 people above the age of 51 years revealed that 60 percent of them considered oral hygiene to be an important aspect of daily life and sound teeth in them was also significantly higher. Out of the total population included

in the survey, 76% of the total male and 48% of the total females used different forms of tobacco, either smoking or smokeless type. Sound teeth among the tobacco users was also found to be lower than the non-tobacco users.[31]

The aim of the study done by Avijit Awasthi et al was to evaluate the oral health status of 45-55 years old women residing in Ambala district, Haryana. Simple random sampling was employed to select 79 villages and 780 participants were recruited from it for the study using convenience sampling method. Women in the age group of 45-50 years had a lower DMFT index when compared to women of 51-55 years. The Loss of Attachment was also also found to be significantly higher in this particular age group. Almost 56% of them had a LOA of 4-6mm while it ranged from 8-10mm among 23.2% of them as well. Most of the findings of the study were found to be statistically significant. The study emphasized on the oral health care needs of the middle-aged women of this particular region.[32]

The purpose of a descriptive cross-sectional study conducted by Deepa Susan Daniel among 400 participants from Thiruvananthapuram district in Kerala was to find out about the oral health status of the population and to correlate it to the habit of tobacco consumption among them. The sample was selected using Multistage sampling technique and the result of the study revealed a mean DMFT of 6.23 ± 5.4 among them. Even the Oral Hygiene Index was poor among 41.8% of the subjects while 10.5% of them showed some form of premalignant lesion. There was a huge discrepancy in the consumption of tobacco among the males and females of the community. Only 16.5% of the females used some form of tobacco while that number went up to almost 72.3% among males. The study highlighted the importance of providing special attention to the oral health status of this particular population as

they were more vulnerable to tobacco use because of their erratic lifestyle and occupation. Therefore, proper interventions and policies are of utmost importance to reduce the load on the coastal community of Kerala.[33]

A comparative cross-sectional study was done by Avani Modi et al by taking 50 tobacco-chewers in one group and 50 non-tobacco chewers in the other and various standard index were used to compare the oral hygiene index among them. The study revealed that the mean DMFT index was lower among the people who used tobacco (8.48 ± 7.749) when compared to the ones who didn't use tobacco. However, the findings were opposite when considered for various oral hygiene index. The OHI-S and Plaque Index scores were significantly higher among tobacco users as compared to the non-tobacco users. The result of the study was significant enough to point towards the fact that dentists should encourage tobacco users to quit using it so that their oral health can improve significantly.[34]

METHODOLOGY

STUDY DESIGN AND DURATION- A descriptive cross-sectional study was conducted in the month of April 2021.

STUDY POPULATION- The study was conducted on the employees of NWKRTC in the age group of 24-60 years working in Central Bus Depot no.1 and City Bus Stand Depot no.2.

INCLUSION CRITERIA-

1. The subjects who were permanent employees of NWKRTC.
2. The subjects who reported for work on the days of the examination.
3. The subjects who gave informed consent to participate in the study.
4. The subjects who did not present with any signs and symptoms of COVID-19.

EXCLUSION CRITERIA-

1. The subjects who did not give consent to participate in the study.

STUDY SETTING- The examination site was fixed at a building within premises of the office of the Central Bus Stand and City Bus Stand. All necessary arrangements were done at the site of examination.

PERMISSIONS

ETHICAL CLEARANCE: The Ethical clearance was obtained from the Research and Ethics Committee of "KLE Vishwanath Katti Institute of Dental Sciences" and it has been included in Annexure I.

PERMISSION FROM THE AUTHORITIES Permission to examine the employees of NWKRTC, Belagavi City was obtained from the Labour Welfare Officer of NWKRTC.

INFORMED CONSENT Written informed consent was obtained prior to examination of each subject. The informed consent in Kannada and it has been included in Annexure II.

SAMPLE SIZE DETERMINATION Initially, a pilot study was done on 50 employees of NWKRTC to estimate the sample size and check for the feasibility of the study, using the self-designed questionnaire and WHO Oral Health Assessment Form 2013. The prevalence of Dental caries was nearly 73.33%. The formula used to calculate the sample size was:

$$n = \frac{Z^2_{1-\alpha/2} * p*q}{(5\% \text{ of } p)^2}$$

Where, $Z^2_{1-\alpha/2}$ = power of the test

p = prevalence of dental caries

q = 1-p

d = error

- According to pilot study,
    - Prevalence of dental caries is the highest and stands at 73.33%.
    - Using it in the aforementioned formula,
        - $Z^2_{1-\alpha/2}$ = 3.98
        - P = 73.33%
        - Q = 26.77
        - D = 3.67 as (5% of $p)^2$

The sample size was calculated to be 584

It was rounded off to 600

Unfortunately, due to the ongoing global pandemic of COVID-19, NWKRTC was not functioning at full strength and most of the employees were on leave or working on a rotation basis. Therefore, the employees who reported for work on the days of the study were included. Universal sampling technique was applied and 451 subjects were included in the study.

TRAINING AND CALIBRATION OF THE EXAMINER

The clinical examination of all the subjects was done by a single examiner, Dr. Abhra Roy Choudhury. The examiner was trained before conducting the study, in the "Department of Public Health Dentistry", "KLE VK Institute Of Dental Sciences, Belagavi", under the guidance of a Professor to limit the intra-examiner variability. The training continued till the examiner started producing consistent observations. The training was done on patients reporting as outpatient to the Department as the patients represented a wide range of oral findings. The intra examiner variability was checked by performing repeated examination on randomly selected subjects and the intra examiner Kappa co-efficient was calculated to be 0.82.

IMPLEMENTATION OF THE SURVEY

CONTACTING THE CONCERNED AUTHORITIES

Just before the study, the Labour Welfare Officer and his associates were contacted and they provided a list of the employees who were scheduled to report for

work on the allotted days for the study. An in-charge was contacted at the site of examination who made all the necessary arrangements to conduct the study.

SCHEDULING THE EXAMINATION

The schedule for examination of the employees of NWKRTC was prepared and submitted to the Labour Welfare Officer. Permission was taken for 15 days to conduct the study. The study was carried out from 2nd and 17th April, 2021. A total of 451 subjects who reported for work on the days of the study were allocated for the examination. A maximum of 40 subjects were examined on each day.

PERSONNEL AND ORGANIZATION

Recording clerk

One male intern from the college was trained to record the "WHO Oral Assessment Form 2013" as well as the self-designed questionnaire and assisted the examiner during the study as a recording clerk. The examiner and the recording clerk recorded few forms together before the study so that good co-ordination was achieved and codes were recorded correctly. He also assisted in the continuous supply of sterilized instruments to the principal examiner throughout the study.

Organizing clerk

A member of the office of the Central Bus Stand and City Bus Stand was allocated as organizing clerk to maintain the flow of subjects for the examination.

INSTRUMENTS AND SUPPLIES

Adequate supply of instruments was maintained at the site of examination site.

The following instruments and supplies were used:

1. Plane mouth mirrors
2. CPI probe
3. Chip blower
4. Tweezers
5. Kidney trays
6. Korsolex Solution for cold Sterilization – (Composition: Glutaraldehyde 7 g, 1.6 Dihydroxy, 2,5 Dioxahexane (chemically bound formaldehyde) 8.2 g Polymethylol urea derivatives 17.6 g, Rust inhibitors.)
7. Autoclave
8. Cloth hand towels
9. Gauze and cotton
10. Gloves and mouth masks
11. Torch
12. Survey Performa (WHO Oral Health Assessment Form 2013)
13. Self-designed questionnaire.

INFECTION CONTROL

The study was conducted during the dire times of the pandemic and it necessitated the strict following of infection protocol as laid down by the "Centre for Disease Control" (CDC) and "World Health Organization" (WHO). Personal Protective Equipment (PPE) kits were used by the investigator as well as the recording clerk. The kits were of the sterilizable and reusable type and were autoclaved thoroughly every day after conducting the examination. The kit consisted of a fully-covered surgical gown, head cap, eye protector, N95 mouth mask, respirator and disposable gloves. The gloves were changed before the examination of every subject and intermittent sterilization of the hand using sanitizer was also done. Proper sterilization of instruments was maintained throughout the survey. 50 instruments were made available for the examination and these instruments were sterilized at the end of the day. 25 CPI probes were made available and cold sterilization was done during the examination.

EXAMINER POSITION

The subjects were seated in a chair with back rest and the examiner performed the examination from a 10'oclock position to the chair.

SEATING OF THE RECORDING CLERK / INTERN

The recording clerk/ intern was seated such that he could hear the codes clearly and also see the area being examined. The examiner could see the codes being entered in the form. This was done so that any errors are avoided during recording the form.

Type III examination was performed in natural daylight so as to obtain maximum illumination. Torch was used when required.

DATA COLLECTION

ASSESSMENT FORMS

SELF-DESIGNED QUESTIONNAIRE

A self-designed questionnaire was used to collect data regarding the oral hygiene practices, adverse habits like tobacco and alcohol consumption and the tendency to quit the habit and it has been included in Annexure III. The questionnaire was divided into three components. The first part was used to record the basic sociodemographic details, which included the name, gender and age of the subjects. The second component of the questionnaire was related to the oral hygiene practices and included questions with respect to frequency of tooth brushing, agents used to clean the teeth, technique of tooth brushing, the type of toothbrush and toothpaste used and the average time period after which the toothbrush was changed. The third and last component recorded the various aspects of adverse habits related to tobacco and alcohol consumption. It was used to record the prevalence of tobacco and alcohol habits and the frequency and duration of it. Additionally, information was also collected about the type of tobacco consumed to get an idea about the use of different forms of tobacco by the employees. It also involved the collection of data regarding the tendency to quit the habits and the main reasons or motivation behind them.

WHO ORAL HEALTH ASSESSMENT FORM 2013

The "WHO Oral Health Assessment Form (2013)" was used for the study and it has been included in Annexure IV. The format was reproduced from the "Oral Health Survey – Basic Methods 5th Edition" and was printed. It provided the data with respect to the oral health status of the subjects and could be used for planning comprehensive oral health care programs. Details of the format has been included in the Annexure V.

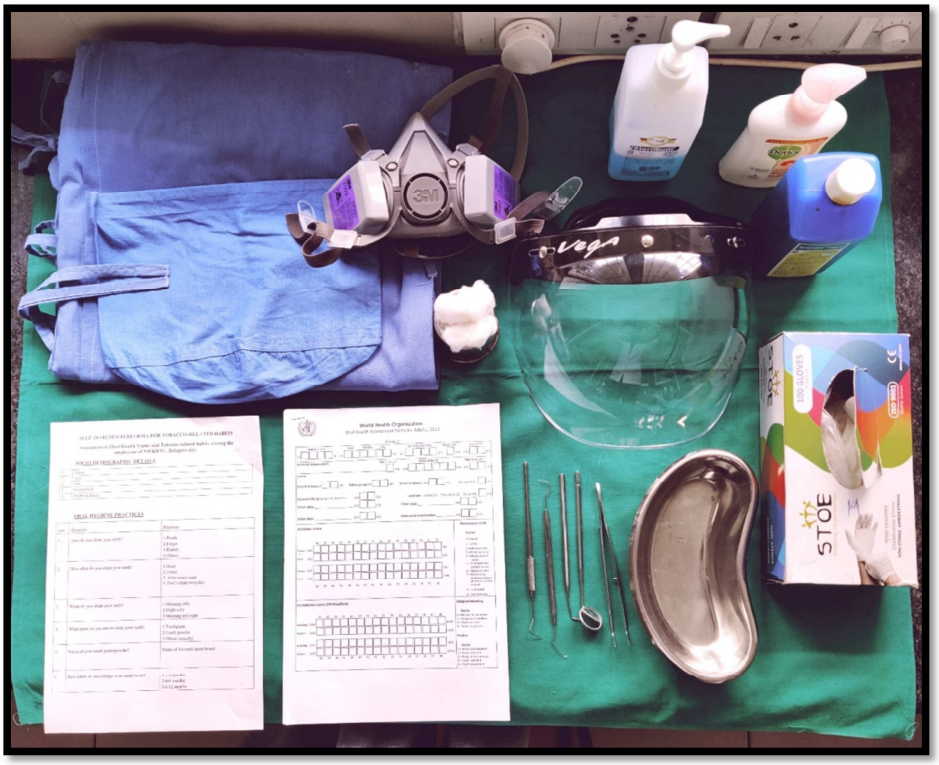
EMERGENCY CARE AND REFERRAL

Referrals were arranged to "KLE Vishwanath Katti Institute of Dental Sciences" and "KLE Cancer Hospital" for the subjects who needed emergency as well as elective treatment procedures.

DATA ANALYSIS

The data collected was entered in the spreadsheet using Microsoft Excel Software by the examiner. Mean and standard deviation and frequencies and percentages were initially calculated. The data was presented in tables and graphs. Chi-square test was used to compare frequencies and find the associations within different groups. Independent t-test was used to compare the means between two groups and ANOVA was used to compare mean between more than two groups wherever applicable. Regression analysis was also done to find the relationship between the various dependent and independent variable of the study. The level of significance was set as $p < 0.05$.

1. MATERIALS AND INSTRUMENTS USED IN THE STUDY



2. EXAMINATION PROCEDURE BY PRINCIPAL EXAMINER

RESULTS

The study was conducted to assess the Oral Health Status and Tobacco-related Habits among the employees of NWKRTC, Belagavi City, Karnataka. Data was collected by oral examination and interview using "WHO Oral Health Assessment Form (2013)" and a self-designed questionnaire. The data was entered in Microsoft Excel 2013 and data was analyzed using SPSS for Windows (Ver 21.0). The results were tabulated and presented as follows-

Table 1, Figure 1, 2 and 3 show the demographic profile of the entire population and how they are distributed. The age groups ranged from 21 to 60 years with the mean age being 43.55±8.46. Among the age distribution, 33 of them (7.32%) belonged to 21-30 years old and 119 (26.39%) of them were between 31-40 years age. Maximum number of participants were of the age group 41-50 years (41.46%) and 112 (24.83%) of them were between 51-60 years of age. In terms of gender distribution, 414 (91.80%) of them were males while only 37 (8.20%) of the employees of NWKRTC were females. The distribution of the occupation of the employees of NWKRTC showed that 328 (72.73%) of them were the bus drivers while 123 (27.27%) belonged to other occupations like Bus Conductors, Mechanics, Sweepers and Security Guards.

Table 2 shows the prevalence of dental caries among the various demographic profiles of the employees of NWKRTC. Among the total subjects, 445 (98.88%) of them had some form of caries experience reflected in terms of the DMFT score. 31 out of the 33 subjects (93.94%) belonging to the age group of 21-30 years and 118 (99.16%) subjects of the age group of 31-40 years showed some form of caries experience. 100% of the total subjects, that is, 187 of them had caries. 109 out of 112

participants belonging to 51-60 years old also showed an explicit caries experience. A statistically significant (p-value<0.05) association was found between age and dental caries. In terms of gender, 408 (98.55%) of the 414 males had some caries experience while 100% (37 out of 37) of the females also expressed the same. A comprehensive result was also obtained in terms of occupation with 324 among 328 (98.78%) bus drivers showing some form of manifestation of dental caries. Only 2 out of 123 (1.63%) participants belonging to other occupation like Bus conductor, Mechanic, Sweepers and Security Guards did not have any caries experience.

Table 3 and Figure 4 show the comparison of the Decayed-Missing-Filling Teeth (DMFT), Decayed Teeth (DT) component, Missing Teeth (MT) component and Filled Teeth (FT) component with age using ANOVA and a pair-wise post hoc comparative analysis using Scheffe's test. The results obtained with respect to Mean DMFT, DT and MT were found to be statistically significant (p-value<0.05), but it was not for the FT component. Pair-wise comparison revealed the pair of age-group values due to which the statistically significant results were obtained. For Mean DMFT, it was due to 21-30 years vs 31-40 years, 21-30 years vs 41-50 years and 21-30 years vs 51-60 years. For the DT component, statistical significance was found between 31-40 years vs 41-50 years only. For the MT component, statistical significance was obtained due to pair-wise comparison of three age groups, that is, 21-30 years vs 51-60 years, 31-40 years vs 41-50 years and 31-40 years vs 51-60 years.

Table 4 and Figure 5 show the comparison of the gender of the employees of NWKRTC with Mean DMFT score, DT, MT and FT using an Independent t-test. The mean DMFT score was more in males (5.57±3.03) when compared to females (5.35±3.70). However, the result was not found to be statistically significant. A

similar trend was noticed with respect to Decayed Teeth (DT) component as well. However, the results were different for the MT and FT components. In terms of MT, the mean value for males (1.53±2.05) was more than the value for females (0.68±1.87) and it was statistically significant. For the FT component, the trend reversed and the mean FT value was more in females (1.38) as compared to males (0.73) and the result was statistically significant as well.

Table 5 and Figure 6 show the comparison of the occupation of the employees of NWKRTC with Mean DMFT score, DT, MT and FT using an Independent t-test. The mean DMFT score for drivers was 5.44±3.01 and for others (Bus Conductors, Mechanics, Sweepers and Security Guards) it was 5.84±3.28. However, this value was not found to be statistically significant. The mean DT value was more for drivers was more than employees with other occupation. The mean MT score was more in employees of other occupation (1.67) when compared to bus drivers. The only statistically significant result was noticed in terms of the FT component and it was more among the employees of other occupation than the bus drivers of NWKRTC.

Table 6 shows the prevalence of Bleeding on Probing (BOP) with the various demographic profile of the employees of NWKRTC and the association between them. It was noticed to be highest among 51-60 years old where 25.89% of the participants exhibited bleeding on probing and it was found to be statistically significant. 24 out of 187 (12.83%) belonged to 41-50 years while only 26 out of 119 (21.85%) had the same manifestation among 31-40 years. It was relatively less among 21-30 years old, where only 4 out of 31 participants experienced the pathology. In terms of gender, none of the 37 females had Bleeding on Probing. It was moderately prevalent among males, with 83 out of 414 (20.05%) showing the symptoms for it.

These results were also found to be statistically significant. 19.82% of the total participants who were bus drivers had Bleeding of Probing while the number was a little less for participants of other occupation (14.63%).

Table 7 shows the prevalence of periodontal pocket disease (PPD) and it association with the demographic variables among the employees of NWKRTC. The prevalence was highest among those aged 51-60 years and it stood at 11.61% and it was found to be statistically significant. The mean number of teeth that was identified with the problem for this age group was 1.26. None of the participants of the age group 21-30 years had any periodontal pockets related disease. Males had more prevalence of PPD (24 out of 414) when compared to females. In terms of occupation, it was only bus drivers who had periodontal pockets and it was not seen in participants of other occupation. The result was found to be statistically significant as well.

Table 8 shows the prevalence of erosion and trauma among the various demographic profile of the employees of NWKRTC and the association between them using Chi-Square Test. Erosion was not noticed in the age groups 21-30 years and 31-40 years. 2 and 7 participants of the 41-50 years and 51-60 years age group had erosion respectively. The association between erosion and the different age groups was found to be statistically significant. Only males showed erosion among the observed participants and it was not statistically significant. The numbers were relatively low in terms of occupation as well as only 9 out of the total 451 participants exhibited it. A similar trend was noticed with respect to trauma as well. It was noticed more among the 51-60 years old, males and bus drivers. However, none of the associations with the demographic profiles were found to be statistically significant.

Table 9 and Figure 7, 8 and 9 show the frequency of tooth brushing among the employees of NWKRTC in percentages and its association with the various demographic profile. It revealed that 23 participants of 21-30 years, 94 of 31-40 years, 139 of 41-50 years and 92 of 51-60 years age brushed only once a day. The number was less for brushing twice daily with 10 participants doing it among 21-30 years, 25 among 31-40 years, 48 among 41-50 years and 20 participants among 51-60 years age. However, the association between age and brushing frequency was not found to be statistically significant. 78.99% of the males brushed once daily while 87 (21.01%) brushed two times. Among females, 21 out of 37 participants brushed once daily and the result was found to be statistically significant, establishing an association between genders and brushing frequency. 21.95% of the bus drivers brush twice daily while 256 of them do it only once.

Table 10 shows the association between the agents used commonly to clean the teeth with the demographic profiles of the employees of NWKRTC. A majority of the participants used toothpaste as the agent for cleaning with some participants opting for toothpowder as well. 98.32% of the participants of the age group 31-40 years used toothpaste while it was 100%, 91.98% and 94.64% for 21-30 years, 41-50 years and 51-60 years respectively. The association with age group was found to be statistically significant. A total of 391 males (94.44%) used toothpaste for cleaning. As far as its relation with occupation was concerned, 314 out of 328 bus drivers used toothpaste as a medium for cleaning their teeth. However, the association with gender and occupation was not found to be statistically significant.

Table 11 and Figure 10, 11 and 12 established an association between the frequencies of changing toothbrushes with the various demographic profiles of the

employees of NWKRTC. Maximum participants changed their toothbrush in 1-3 months and it was found to be maximum in the age group of 41-50 years (82.35%). A statistically significant association was found between the age groups and frequency of changing toothbrush. In terms of gender, majority of the males (77.54%) changed their toothbrush within 1-3 months while 36 out of 37 females did so. The association between gender and frequency of changing toothbrush was also found to be statistically significant. 257 out of 324 drivers (78.35%) changed their toothbrush in 1-3 months.

Table 12 and Figure 13 shows the prevalence of tobacco habits and its association with the various demographic profiles of the employees of NWKRTC. The maximum prevalence was found in the age group of 41-50 years with 55.61% of the participants having some form of tobacco-habits. The numbers were high for other age groups as well. The association between age group and tobacco-habits was found to be statistically significant. These tobacco-related habits were commonly seen among males and the prevalence stood at 52.9%. It was relatively less among females and a statistically significant association was found between gender and tobacco habits. Most importantly, the prevalence was found to be significantly higher among bus drivers with 54.27%. The association between occupation and tobacco habits was found to be statistically significant.

Table 13 and Figure 14, 15 and 16 show the prevalence of various type of tobacco consumption and its association with the demographic profiles of the employees of NWKRTC. Pan chewing with slaked lime was found to be the most prevalent type of tobacco habit in all age groups. It was found to be highest among 41-50 years age group, followed by 51-60 years, 31-40 years and 21-30 years in descending order.

There was a statistically significant association between age groups and the different tobacco types. Gutkha consumption was seen more commonly in males and bus drivers and a statistically significant association was seen with gender and occupation as well.

Table 14 and Figure 17 show the prevalence of alcohol habits and its association with the different demographic profiles of the employees of NWKRTC. 128 out of the 451 participants had alcohol habit with maximum prevalence being in the age group of 51-60 years and 31-40 years coming second in terms of prevalence (36 out of 119 participants). 127 out of 414 males had alcohol consumption habit while it was really low in females (1 out of 37) and an association was also found between gender and alcohol habit. In terms of occupation, 111 out of 328 bus drivers consumed alcohol and a statistically significant association was established.

Table 15 shows the number of people who tried to quit their tobacco habits and its association with the demographic profile of the employees of NWKRTC. Numerically speaking, the participants of the age group 31-40 years were most motivated to quit with 13 out of 119 (10.92%) answering in the affirmative. Only 1 out of 33 in the age group of 21-30 years was motivated to quit. The number was healthier among 41-50 years with 18 out of 187 (9.63%) opting for yes. Only 35 males wanted to quit their tobacco habit while the number was even lesser for bus drivers which stood at 26. However, none of the results were found to be statistically significant.

Table 16 shows the association between the different reasons to quit tobacco with the demographic profile of the employees of NWKRTC. Counselling from dentists/doctors was found to be the most common reason to quit with 19 out of 35 people opting for it. It was more commonly observed in the age group of 41-50 years,

in the male gender and among bus drivers. However, the results were not found to statistically significant.

Table 17, 18 and 19, and Figure 18, 19 and 20 show the prevalence of different oral mucosal lesions and the common sites of the lesions along with its association with different age group. The prevalence of oral mucosal lesions (OML) was found to be 15.29% (69 out of 451 participants). Among the OML, Leukoplakia and Oral Submucous Fibrosis (OSMF) were commonly found at 44.92% and 37.68% respectively. On performing an age-group wise comparison, it was found to be most prevalent in the 41-50 years age group. An association was found between the age groups and the prevalence of OML which was statistically significant. Buccal mucosa was inadvertently found to be the most common site of the OML at 72.46% when compared to all other sites.

Table 20 and 21 shows the association between the gender and Oral Mucosal Lesion and the site of lesion. Both Leukoplakia and Oral Submucous Fibrosis were found to be more commonly present among males when compared to females. However, there was no association between gender and the OML. In terms of site of lesion, Buccal mucosa was found to be the most common site with males having a higher prevalence in this area when compared to females.

Table 22, 23 and Figure 21 and 22 show the association of occupation with different oral mucosal lesions and the site of the lesions. Leukoplakia and Oral Submucous Fibrosis were more commonly seen in bus drivers when compared to other employees of different occupation in NWKRTC. The most common site of lesion was found to be buccal mucosa as well. However, none of the findings were statistically significant which does not show the presence of an association between them.

Table 24 shows the association between the prevalence of tobacco habits and oral mucosal lesions present among the employees of NWKRTC. All the subjects who had some manifestations of oral mucosal lesions had some kind of tobacco consumption habit as well and the association between them was found to be statistically significant.

Table 25 shows the association between different types of tobacco and oral mucosal lesion among NWKRTC employees. Leukoplakia was more commonly seen in subjects who consumed guthka (61.29%) while oral submucous fibrosis was found to be more common among subjects with the habit of eating paan with slaked lime, at 55.88%. A statistically significant association was found between the tobacco types and the presence of different manifestations of oral mucosal lesions as well.

Table 26 shows the association between the prevalence of tobacco habits with different disease indices like Dental caries (DC), Bleeding on Probing (BOP) and Periodontal Diseases (PD). It was found that among the 445 people with some kind of caries experience, 222 consumed some form of tobacco, keeping the prevalence at almost 50%. In terms of BOP, the participants who experienced Bleeding on Probing had an association with tobacco habits which was found to be statistically significant. For PD, the participants who had some form of periodontal disease had tobacco-related habits as well and an association was found in between these two variables

Table 27 shows the association between the different types of tobacco with the prevalence of Dental Caries, Bleeding on Probing and Periodontal Disease of the employees of NWKRTC. It was seen that the maximum number of people with dental caries, Bleeding On Probing and Periodontal Diseases had the habit of Gutkha

chewing. An association was seen between Dental Caries and Periodontal Disease with the type of tobacco and it was statistically significant as well.

Table 28 shows the multiple linear regression analysis between DMFT and all the other independent variables. Only age and duration of tobacco consumption in years were found to be positive predictors of DMFT and the association was found to be statistically significant.

Table 29 shows the multiple logistic regression analysis between BOP and the various independent variables in the study. With respect to age, multiple regression analysis showed that keeping the age 21-30 years as reference, the ones lying in the age group of 41-50 years had 0.32 times chances of experiencing Bleeding on Probing and the result was statistically significant. Another statistically significant association was found between BOP and alcohol habit as well and people who had alcohol habit had 2.54 times more chances of having BOP than people without alcohol habit.

Table 30 shows the multiple logistic regression analysis between periodontal diseases and the different independent variables of the study. It was found that people who had alcohol habit had 5.05 times higher chances of having Periodontal pocket when compared to the participants without alcohol habit and it was found to be statistically significant.

Table 1: Distribution of the demographic profile of employees of NWKRTC

Demographic Profile	No. of employees n (%)
Age groups	
21-30yrs	33 (7.32%)
31-40yrs	119 (26.39%)
41-50yrs	187 (41.46%)
51-60yrs	112 (24.83%)
Total	**451 (100.00%)**
Mean ± SD of age = 43.55±8.46 years.	
Gender	
Male	414 (91.80%)
Female	37 (8.20%)
Total	**451 (100.00%)**
Occupation	
Driver	328 (72.73%)
Others (Mechanics, Conductors, Sweepers, Security Guards)	123 (27.27%)
Total	**451 (100.00%)**

Table 2: Association between prevalence of dental caries and demographic profile of employees of NWKRTC

Demographic Profile	Without caries n (%)	With caries n (%)	Total n (%)	Chi-square	p-value
Age groups					
21-30yrs	2 (6.06%)	31 (93.94%)	33 (7.32%)	9.9150	0.0190*
31-40yrs	1 (0.84%)	118 (99.16%)	119 (26.39%)		
41-50yrs	0 (0.00%)	187 (100.00%)	187 (41.46%)		
51-60yrs	3 (2.68%)	109 (97.32%)	112 (24.83%)		
Total	**6 (1.33%)**	**445 (98.67%)**	**451 (100.00%)**		
Gender					
Male	6 (1.47%)	408 (98.53%)	414 (91.80%)	0.5430	0.4610
Female	0 (00.00%)	37 (100.00%)	37 (8.20%)		
Total	**6 (1.33%)**	**445 (98.67%)**	**451 (100.00%)**		
Occupation					
Driver	4 (1.21%)	324 (98.78%)	328 (72.73%)	0.1130	0.7370
Others	2 (1.62%)	121 (98.37%)	123 (27.27%)		
Total	**6 (1.33%)**	**445 (98.67%)**	**451 (100.00%)**		

*$p<0.05$

Table 3: Comparison of age groups with mean DMFT and its components (DT, MT, FT) by one way ANOVA

Age groups	DMFT		DT		MT		FT	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
21-30yrs	3.79	2.34	2.73	1.75	0.64	1.32	0.42	0.97
31-40yrs	5.55	3.26	3.83	2.48	0.82	1.48	0.91	1.97
41-50yrs	5.44	2.69	3.11	2.08	1.66	1.93	0.68	1.62
51-60yrs	6.24	3.48	3.27	2.17	2.04	2.63	0.93	2.43
Total	**5.55**	**3.08**	**3.31**	**2.21**	**1.46**	**2.05**	**0.78**	**1.91**
F-value	5.7195		3.5630		9.7708		0.9409	
P-value	0.0008*		0.0143*		0.0001*		0.4207	
Pair wise comparisons by Scheffe's posthoc								
21-30yrs vs 31-40yrs	p=0.0341*		p=0.0897		p=0.9729		p=0.6468	
21-30yrs vs 41-50yrs	p=0.0417*		p=0.8401		p=0.0621		p=0.9140	
21-30yrs vs 51-60yrs	p=0.0010*		p=0.6721		p=0.0056*		p=0.6196	
31-40yrs vs 41-50yrs	p=0.9911		p=0.0488*		p=0.0056*		p=0.8028	
31-40yrs vs 51-60yrs	p=0.4008		p=0.2844		p=0.0001*		p=0.9998	
41-50yrs vs 51-60yrs	p=0.1816		p=0.9451		p=0.4505		p=0.7661	

*$p<0.05$

Table 4: Comparison of gender with mean DMFT and its components (DT, MT, FT) by Independent t-test

Gender	DMFT		DT		MT		FT	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Male	5.57	3.03	3.31	2.24	1.53	2.05	0.73	1.73
Female	5.35	3.70	3.30	1.98	0.68	1.87	1.38	3.28
Total	**5.55**	**3.08**	**3.31**	**2.21**	**1.46**	**2.05**	**0.78**	**1.91**
t-value	0.4037		0.0376		2.4412		-1.9811	
P-value	0.6866		0.9700		0.0150*		0.0482*	

*p<0.05

Table 5: Comparison of occupation with mean DMFT and its components (DT, MT, FT) by Independent t-test

Occupation	DMFT		DT		MT		FT	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Bus Drivers	5.44	3.01	3.42	2.21	1.38	1.97	0.64	1.56
Others	5.84	3.28	3.01	2.20	1.67	2.25	1.16	2.58
Total	**5.55**	**3.08**	**3.31**	**2.21**	**1.46**	**2.05**	**0.78**	**1.91**
t-value	-1.2222		1.7796		-1.3716		-2.5906	
P-value	0.2223		0.0758		0.1709		0.0099*	

*p<0.05

Table 6: Association between prevalence of bleeding on probing (BOP) and demographic profile of employees of NWKRTC

Demographic Profile	Without BOP n (%)	With BOP n (%)	Total n (%)	Chi-square	p-value
Age groups					
21-30yrs	29 (87.88%)	4 (12.12%)	33 (7.32%)	9.8540	0.0200*
31-40yrs	93 (78.15%)	26 (21.85%)	119 (26.39%)		
41-50yrs	163 (87.17%)	24 (12.83%)	187 (41.46%)		
51-60yrs	83 (74.11%)	29 (25.89%)	112 (24.83%)		
Total	**368 (81.60%)**	**83 (18.40%)**	**451 (100.00%)**		
Gender					
Male	331 (79.95%)	83 (20.05%)	414 (91.80%)	9.0910	0.0030*
Female	37 (100.00%)	0 (00.00%)	37 (8.20%)		
Total	**368 (81.60%)**	**83 (18.40%)**	**451 (100.00%)**		
Occupation					
Driver	263 (80.18%)	65 (19.82%)	328 (72.73%)	1.6000	0.2060
Others	105 (85.37%)	18 (14.63%)	123 (27.27%)		
Total	**368 (81.60%)**	**83 (18.40%)**	**451 (100.00%)**		

*$p<0.05$

Table 7: Association between prevalence of periodontal diseases (PD) and demographic profile of employees of NWKRTC

Demographic Profile	Without PD n (%)	With PD n (%)	Chi-square	p-value	Mean number of teeth	SD teeth	p-value
Age groups							
21-30yrs	33 (110.00%)	0 (0.00%)	12.8940	0.005*	0.33	0.92	0.1647
31-40yrs	116 (97.48%)	3 (2.52%)			1.12	2.60	
41-50yrs	179 (95.72%)	8 (4.28%)			0.86	2.31	
51-60yrs	99 (88.39%)	13 (11.61%)			1.26	2.28	
Total	**427 (94.68%)**	**24 (5.32%)**			**0.99**	**2.32**	
Gender							
Male	390 (94.20%)	24 (5.80%)	2.2650	0.1320	1.08	2.40	0.0066*
Female	37 (100.00%)	0 (0.00%)			0.00	0.00	
Total	**427 (94.68%)**	**24 (5.32%)**			**0.99**	**2.32**	
Occupation							
Driver	304 (92.68%)	24 (7.32%)	9.5060	0.002*	1.07	2.42	0.2247
Others	123 (100.00%)	0 (0.00%)			0.77	2.03	
Total	**427 (94.68%)**	**24 (5.32%)**			**0.99**	**2.32**	

*$p<0.05$

Table 8: Association between presence of erosion and trauma and demographic profile of employees of NWKRTC

Demographic Profile	With erosion n (%)	p-value	With trauma n (%)	p-value
Age groups				
21-30yrs	0 (0.00%)	0.0030*	1 (14.28%)	0.1320
31-40yrs	0 (0.00%)		0 (0.00%)	
41-50yrs	2 (22.22%)		2 (28.57%)	
51-60yrs	7 (77.78%)		4 (57.14%)	
Total	**9 (2.00%)**		**7 (1.55%)**	
Gender				
Male	9 (100.00%)	0.3650	7 (100.00%)	0.4250
Female	0 (0.00%)		0 (0.00%)	
Total	**9 (2.00%)**		**7 (1.55%)**	
Occupation				
Driver	7 (77.77%)	0.7310	6 (85.71%)	0.4370
Others	2 (22.23%)		1 (14.29%)	
Total	**9 (2.00%)**		**7 (1.55%)**	

*$p<0.05$

Table 9: Association between frequencies of brushing with demographic profile of employees of NWKRTC

Demographic Profile	Once a day n (%)	Twice a day n (%)	Total n (%)	Chi-square	p-value
Age groups					
21-30yrs	23 (69.70%)	10 (30.30%)	33 (7.32%)	3.6960	0.2960
31-40yrs	94 (78.99%)	25 (21.01%)	119 (26.39%)		
41-50yrs	139 (74.33%)	48 (25.67%)	187 (41.46%)		
51-60yrs	92 (82.14%)	20 (17.86%)	112 (24.83%)		
Total	**348 (77.16%)**	**103 (22.84%)**	**451 (100.00%)**		
Gender					
Male	327 (78.99%)	87 (21.01%)	414 (91.80%)	9.5230	0.0020*
Female	21 (56.76%)	16 (43.24%)	37 (8.20%)		
Total	**348 (77.16%)**	**103 (22.84%)**	**451 (100.00%)**		
Occupation					
Driver	256 (78.05%)	72 (21.95%)	328 (72.73%)	0.5370	0.4640
Others	92 (74.80%)	31 (25.20%)	123 (27.27%)		
Total	**348 (77.16%)**	**103 (22.84%)**	**451 (100.00%)**		

*$p<0.05$

Table 10: Association between agents to clean teeth with demographic profile of employees of NWKRTC

Demographic Profile	Toothpaste n (%)	Tooth Powder n (%)	Total n (%)	Chi-square	p-value
Age groups					
21-30yrs	33 (100.00%)	0 (0.00%)	33 (7.32%)	7.9610	0.0470*
31-40yrs	117 (98.32%)	2 (1.68%)	119 (26.39%)		
41-50yrs	172 (91.98%)	15 (8.02%)	187 (41.46%)		
51-60yrs	106 (94.64%)	6 (5.36%)	112 (24.83%)		
Total	**428 (94.90%)**	**23 (5.10%)**	**451 (100.00%)**		
Gender					
Male	391 (94.44%)	23 (5.56%)	414 (91.80%)	2.1660	0.1410
Female	37 (100.00%)	0 (0.00%)	37 (8.20%)		
Total	**428 (94.90%)**	**23 (5.10%)**	**451 (100.00%)**		
Occupation					
Driver	314 (95.73%)	14 (4.27%)	328 (72.73%)	1.7180	0.1900
Others	114 (92.68%)	9 (7.32%)	123 (27.27%)		
Total	**428 (94.90%)**	**23 (5.10%)**	**451 (100.00%)**		

*$p<0.05$

Table 11: Association between frequency of changing toothbrush and demographic profile of employees of NWKRTC

Demographic Profile	1-3months n (%)	4-6 months n (%)	More than 6 months n (%)	Chi-square	p-value
Age groups					
21-30yrs	28 (84.85%)	5 (15.15%)	0 (0.00%)	14.4240	0.0250*
31-40yrs	94 (78.99%)	20 (16.81%)	5 (4.20%)		
41-50yrs	154 (82.35%)	31 (16.58%)	2 (1.07%)		
51-60yrs	81 (72.32%)	31 (27.68%)	0 (0.00%)		
Total	**357 (79.16%)**	**87 (19.29%)**	**7 (1.55%)**		
Gender					
Male	321 (77.54%)	86 (20.77%)	7 (1.69%)	8.0500	0.0180*
Female	36 (97.30%)	1 (2.70%)	0 (0.00%)		
Total	**357 (79.16%)**	**87 (19.29%)**	**7 (1.55%)**		
Occupation					
Driver	257 (78.35%)	67 (20.43%)	4 (1.22%)	1.7600	0.4150
Others	100 (81.30%)	20 (16.26%)	3 (2.44%)		
Total	**357 (79.16%)**	**87 (19.29%)**	**7 (1.55%)**		

*$p<0.05$

Table 12: Association between presence of tobacco habits and demographic profile of employees of NWKRTC

Demographic profile	Tobacco habit present	Tobacco habit absent	Total	Chi-square	p-value
Age groups					
21-30yrs	17 (51.52%)	16 (48.48%)	33 (7.32%)	13.7070	0.0030*
31-40yrs	54 (45.38%)	65 (54.62%)	119 (26.39%)		
41-50yrs	83 (44.39%)	104 (55.61%)	187 (41.46%)		
51-60yrs	73 (65.18%)	39 (34.82%)	112 (24.83%)		
Total	**227 (50.33%)**	**224 (49.67%)**	**451 (100.00%)**		
Gender					
Male	195 (47.10%)	219 (52.90%)	414 (91.80%)	21.0750	0.0001*
Female	32 (86.49%)	5 (13.51%)	37 (8.20%)		
Total	**227 (50.33%)**	**224 (49.67%)**	**451 (100.00%)**		
Occupation					
Driver	150 (45.73%)	178 (54.27%)	328 (72.73%)	10.1840	0.0010*
Others	77 (62.60%)	46 (37.40%)	123 (27.27%)		
Total	**227 (50.33%)**	**224 (49.67%)**	**451 (100.00%)**		

*$p<0.05$

Table 13: Association between different types of tobacco intake with demographic profile of employees of NWKRTC

Profile	Cigarette	Beedi	Pan with slaked lime	Gutkha	Total	Chi-square	p-value
Age groups							
21-30yrs	0 (0.00%)	3 (18.75%)	4 (25.00%)	9 (56.25%)	16 (7.04%)	33.96	0.0010*
31-40yrs	3 (4.54%)	3 (4.54%)	24 (36.66%)	36 (54.54%)	66 (29.07%)		
41-50yrs	2 (1.88%)	3 (2.83%)	38 (35.84%)	63 (59.43%)	106 (46.69%)		
51-60yrs	1 (2.56%)	4 (10.25%)	24 (61.53%)	10 (25.64%)	39 (17.18%)		
Total	**6 (2.64%)**	**13 (5.72%)**	**90 (39.64%)**	**118 (51.98%)**	**227 (100.00%)**		
Gender							
Male	6 (2.71%)	13 (5.88%)	85 (38.46%)	117 (52.94%)	221 (97.35%)	20.46	0.0001*
Female	0 (0.00%)	0 (0.00%)	5 (83.33%)	1 (16.67%)	6 (2.64%)		
Total	**6 (2.64%)**	**13 (5.72%)**	**90 (39.64%)**	**118 (51.98%)**	**227 (100.00%)**		
Occupation							
Driver	4 (2.23%)	8 (4.46%)	74 (41.34%)	93 (51.95%)	179 (78.85%)	11.58	0.0210*
Others	2 (4.16%)	5 (10.41%)	16 (33.33%)	25 (52.08%)	48 (21.15%)		
Total	**6 (2.64%)**	**13 (5.72%)**	**90 (39.64%)**	**118 (51.98%)**	**227 (100.00%)**		

*$p<0.05$

Table 14: Association between alcohol habits and demographic profile of employees of NWKRTC

Profile	Alcohol habit absent n (%)	Alcohol habit present n (%)	Total n (%)	Chi-square	p-value
Age groups					
21-30yrs	25 (75.76%)	8 (24.24%)	33 (7.32%)	1.3380	0.7200
31-40yrs	83 (69.75%)	36 (30.25%)	119 (26.39%)		
41-50yrs	131 (70.05%)	56 (29.95%)	187 (41.46%)		
51-60yrs	84 (75.00%)	28 (25.00%)	112 (24.83%)		
Total	**323 (71.62%)**	**128 (28.38%)**	**451 (100.00%)**		
Gender					
Male	287 (69.32%)	127 (30.68%)	414 (91.80%)	13.0760	0.0001*
Female	36 (30.68%)	1 (2.70%)	37 (8.20%)		
Total	**323 (71.62%)**	**128 (28.38%)**	**451 (100.00%)**		
Occupation					
Driver	217 (66.16%)	111 (33.84%)	328 (72.73%)	17.6390	0.0001*
Others	106 (86.18%)	17 (13.82%)	123 (27.27%)		
Total	**323 (71.62%)**	**128 (28.38%)**	**451 (100.00%)**		

*$p<0.05$

Table 15: Association between trying to quit the habits and demographic profile of employees of NWKRTC

Profile	No	Yes	Total	Chi-square	p-value
Age groups					
21-30yrs	32 (96.97%)	1 (3.03%)	33 (7.32%)	7.6450	0.0540
31-40yrs	106 (89.08%)	13 (10.92%)	119 (26.39%)		
41-50yrs	169 (90.37%)	18 (9.63%)	187 (41.46%)		
51-60yrs	109 (97.32%)	3 (2.68%)	112 (24.83%)		
Total	**416 (92.23%)**	**35 (7.76%)**	**451 (100.00%)**		
Gender					
Male	379 (91.55%)	35 (8.45%)	414 (91.80%)	3.3910	0.0660
Female	37 (100.00%)	0 (0.00%)	37 (8.20%)		
Total	**416 (92.23%)**	**35 (7.76%)**	**451 (100.00%)**		
Occupation					
Driver	302 (92.07%)	26 (7.93%)	328 (72.73%)	0.0460	0.8290
Others	114 (92.68%)	9 (7.32%)	123 (27.27%)		
Total	**416 (92.23%)**	**35 (7.76%)**	**451 (100.00%)**		

Table 16: Association between REASONS to quit tobacco habits and demographic profile of employees of NWKRTC

Demographic Profile	Counselling from Dentists/ Doctors n (%)	Anti-tobacco campaigns on mass media n (%)	Warnings on packets n (%)	TOTAL n (%)	Chi-square	p-value
Age groups						
21-30yrs	0 (0.00%)	1 (100.0%)	0 (0.00%)	1 (2.85%)	10.774	0.2910
31-40yrs	6 (46.15%)	4 (30.76%)	3 (23.07%)	13 (37.14%)		
41-50yrs	10(55.55%)	6 (33.33%)	2 (11.11%)	18 (51.42%)		
51-60yrs	3 (100.0%)	0 (0.00%)	0 (0.00%)	3 (8.57%)		
Total	**19 (54.28%)**	**11 (31.42%)**	**5 (14.28%)**	**35 (7.76%)**		
Gender						
Male	19 (54.28%)	11 (31.42%)	5 (14.28%)	35 (100.0%)	3.3910	0.3350
Female	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		
Total	**19 (54.28%)**	**11 (31.42%)**	**5 (14.28%)**	**35 (7.76%)**		
Occupation						
Driver	17 (65.38%)	7 (26.92%)	2 (7.69%)	26 (74.28%)	5.8480	0.1190
Others	2 (22.22%)	4 (44.44%)	3 (33.34%)	9 (25.71%)		
Total	**19 (54.28%)**	**11 (31.42%)**	**5 (14.28%)**	**35 (7.76%)**		

*$p<0.05$

Table 17: Prevalence of different oral mucosal lesions

SL NO	ORAL MUCOSAL LESIONS	NO. OF EMPLOYEES n (%)
1.	Oral Cancer	2 (2.89%)
2	Leukoplakia	31 (44.92%)
3	Oral Submucous Fibrosis (OSMF)	26 (37.68%)
4	Ulcerations	10 (14.49%)
	Total	**69 (15.29%)**

Table 18: Association between age groups and different oral mucosal lesions

AGE GROUPS	21-30yrs n (%)	31-40yrs n (%)	41-50yrs n (%)	51-60yrs n (%)	Total n (%)	Chi-square	p-value
ORAL MUCOSAL LESIONS							
Oral cancer	0 (0.00%)	0 (0.00%)	0 (0.00%)	2 (100.00%)	2 (2.89%)	21.981	0.038*
Leukoplakia	1 (3.22%)	6 (19.35%)	18 (58.06%)	6 (19.35%)	31 (44.92%)		
Ulcerations	0 (0.00%)	4 (40.00%)	2 (20.00%)	4 (40.00%)	10 (14.49%)		
OSMF	0 (0.00%)	8 (30.76%)	16 (61.53%)	2 (7.69%)	26 (37.68%)		
Total	**1 (1.44%)**	**18 (26.08%)**	**36 (52.17%)**	**14 (20.28%)**	**69 (15.29%)**		

*$p<0.05$

Table 19: Association between age groups and sites of lesions

AGE GROUPS	21-30yrs n (%)	31-40yrs n (%)	41-50yrs n (%)	51-60yrs n (%)	Total n (%)	Chi-square	p-value
Sites of lesion							
Lips	0 (0.00%)	4 (50.00%)	2 (25.00%)	2 (25.00%)	8 (11.59%)	18.94	0.216
Buccal mucosa	1 (2.00%)	12 (24.00%)	29 (58.00%)	8 (16.00%)	50 (72.46%)		
Floor of the mouth	0 (0.00%)	0 (0.00%)	1 (100.00%)	0 (0.00%)	1 (1.44%)		
Tongue	0 (0.00%)	2 (25.00%)	4 (50.00%)	2 (25.00%)	8 (11.59%)		
Gingiva/alveolar ridge	0 (0.00%)	0 (0.00%)	0 (0.00%)	2 (100.00%)	2 (2.88%)		
Total	**1 (1.44%)**	**18 (26.08%)**	**36 (52.17%**	**14 (20.28%)**	**69 (15.29%)**		

Table 20: Association between gender and oral mucosal lesions

GENDER	Male n(%)	Female n(%)	Total n(%)	Chi-square	p-value
ORAL MUCOSAL LESIONS					
Oral cancer	2 (100.00%)	0 (0.00%)	2 (2.89%)	3.9880	0.4080
Leukoplakia	29 (93.54%)	2 (6.46%)	31 (44.92%)		
Ulcerations	10 (100.00%)	0 (0.00%)	10 (14.49%)		
OSMF	26 (100.00%)	0 (0.00%)	26 (37.68%)		
Total	**67 (97.10%)**	**2 (2.90%)**	**69 (15.29%)**		

Table 21: Association between gender and sites of lesions

GENDER	Male n(%)	Female n(%)	Total n(%)	Chi-square	p-value
Sites of lesion					
Lips	8 (100.0%)	0 (0.00%)	8 (11.59%)	4.2000	0.5210
Buccal mucosa	49 (98.00%)	1 (2.00%)	50 (72.46%)		
Floor of the mouth	1 (100.0%)	0 (0.00%)	1 (1.44%)		
Tongue	7 (87.50%)	1 (12.50%)	8 (11.59%)		
Gingiva/alveolar ridge	2 (100.0%)	0 (100.0%)	2 (2.88%)		
Total	**67 (97.10%)**	**2 (2.90%)**	**69 (15.29%)**		

Table 22: Association between occupation and oral mucosal lesions

OCCUPATION	Drivers n(%)	Others n(%)	Total n(%)	Chi-square	p-value
ORAL MUCOSAL LESION					
Oral cancer	2 (100.0%)	0 (0.00%)	2 (2.89%)	5.3310	0.2550
Leukoplakia	27 (87.09%)	4 (12.90%)	31 (44.92%)		
Ulcerations	6 (60.00%)	4 (40.00%)	10 (14.49%)		
OSMF	20 (76.92%)	6 23.08%)	26 (37.68%)		
Total	**55 (79.71%)**	**14 (20.29%)**	**69 (15.29%)**		

*$p<0.05$

Table 23: Association between occupations and sites of lesions

OCCUPATION	Drivers n(%)	Others n(%)	Total n(%)	Chi-square	p-value
Sites of lesion					
Lips	4 (50.00%)	4 (50.00%)	8 (11.59%)	6.5620	0.2550
Buccal mucosa	41 (82.00%)	9 (18.00%)	50 (72.46%)		
Floor of the mouth	1 (100.00%)	0 (0.00%)	1 (1.44%)		
Tongue	7 (87.50%)	1 (12.50%)	8 (11.59%)		
Gingiva/alveolar ridge	2 (100.00%)	0 (0.00%)	2 (2.88%)		
Total	**55 (79.71%)**	**14 (20.29%)**	**69 (15.29%)**		

Table 24: Association between presence of tobacco habits and oral mucosal lesions of employees of NWKRTC

	Tobacco habit present	**Tobacco habit absent**	**Total**	**Chi-square**	**p-value**
Oral mucosal lesions					
Oral Cancer	2 (0.89%)	0 (0.00%)	2 (0.89%)	82.554	0.0000*
Leukoplakia	31 (13.65%)	0 (0.00%)	31 (13.65%)		
Oral Submucous Fibrosis	26 (11.45%)	0 (0.00%)	26 (11.45%)		
Ulcerations	10 (4.40%)	0 (0.00%)	10 (4.40%)		
No manifestation of OML	158 (69.60%)	224 (100.00%)	382 (69.60%)		
Total	**227 (100.00%)**	**0 (0.00%)**	**227 (15.29%)**		

*$p<0.05$

Table 25: Association between different types of tobacco intake and oral mucosal lesions of employees of NWKRTC

Profile	Cigarette	Beedi	Pan with slaked lime	Gutkha	Total	Chi-square	p-value
Age groups							
Oral Cancer	0 (0.00%)	0 (0.00%)	2 (5.88%)	0 (0.00%)	2 (2.89%)	33.96	0.001*
Leukoplakia	0 (0.00%)	0 (0.00%)	12 (35.29%)	19 (61.29%)	31 (44.92%)		
Oral Submucous Fibrosis	0 (0.00%)	2 (50.00%)	19 (55.88%)	5 (16.12%)	26 (37.68%)		
Ulcerations	0 (0.00%)	2 (50.00%)	1 (2.94%)	7 (22.58%)	10 (14.49%)		
Total	**0 (0.00%)**	**4 (100.00%)**	**34 (100.00%)**	**31 (100.00%)**	**69 (15.29%)**		

*p<0.05

Table 26: Association between tobacco habits with prevalence of DC, BOP, PD of employees of NWKRTC

Prevalence of DC, BOP and PD	With tobacco habits n (%)	Without tobacco habits n (%)	Total n (%)	Chi-square	p-value
DC					
Without dental caries	4 (1.76%)	2 (0.89%)	6 (1.33%)	0.6490	0.4200
With dental caries	223 (98.24%)	222 (99.11%)	445 (98.67%)		
Total	**227 (50.33%)**	**224 ((49.67%)**	**451 (100.00%)**		
BOP					
Without BOP	194 (85.46%)	174 (77.68%)	368 (81.60%)	4.5490	0.0330*
With BP	33 (14.54%)	50 (22.32%)	83 (18.40%)		
Total	**227 (50.33%)**	**224 ((49.67%)**	**451 (100.00%)**		
PD					
Without PD	220 (96.92%)	207 (92.41%)	427 (94.67%)	4.5430	0.0330*
With PD	7 (3.08%)	17 (7.59%)	24 (5.33%)		
Total	**227 (50.33%)**	**224 ((49.67%)**	**451 (100.00%)**		

*$p<0.05$

Table 27: Association between types of tobacco with prevalence of DC, BOP, PD of employees of NWKRTC

Prevalence of DC, BOP and PD	Cigarette	Bidi	Pan with slaked lime	Gutkha	Total	Chi-square	p-value
Dental Caries							
Without dental caries	1	0	1	0	2	12.9040	0.0120*
With	5	13	89	118	225		
Total	**6**	**13**	**90**	**118**	**227**		
Bleeding On Probing							
Without BOP	6	10	63	98	177	11.7790	0.0190*
With BOP	0	3	27	20	50		
Total	**6**	**13**	**90**	**118**	**227**		
Periodontal Disease							
Without PD	6	13	82	109	210	6.7310	0.1510
With PD	0	0	8	9	17		
Total	**6**	**13**	**90**	**118**	**227**		

*$p<0.05$

Table 28: Multiple linear regression analysis of DMFT by other variables

Independent variables	Estimates	Std. error	t-value	p-level
Age	0.0706	0.0173	4.0804	0.0001*
Sex	-0.3315	0.5891	-0.5628	0.5738
Occupation	0.5083	0.3524	1.4423	0.1499
Frequency of brushing	-0.0468	0.3461	-0.1352	0.8925
Agents to clean teeth	0.0063	0.6551	0.0097	0.9923
Change toothbrush	0.1005	0.3195	0.3147	0.7532
Tobacco frequency/ day	-0.0178	0.0429	-0.4146	0.6786
Duration in years	-0.0587	0.0298	-1.9711	0.0493*
Frequency alcohol	0.0375	0.1381	0.2715	0.7861
$R=0.2480$, $R^2=0.0615$, $F(9,441)=3.2116$ $p<0.05$, S, Std.Error of estimate: 3.0186				

*$p<0.05$

Table 29: Multiple logistic regression analysis of BOP

Independent variables	Adjusted OR	95% CI for OR		P-value
		Lower	Upper	
Age groups				
21-30yrs	Ref.			
31-40yrs	0.88	0.39	1.95	0.7450
41-50yrs	0.32	0.16	0.65	0.0020*
51-60yrs	0.96	0.45	2.03	0.9070
Gender				
Male	Ref.			
Female	-	-	-	0.9970
Occupations				
Driver	0.52	0.29	0.92	0.0240*
Others	Ref.			
Frequency of brushing				
Once	0.56	0.33	0.96	0.0360*
Twice	Ref.			
Agents use				
Paste	Ref.			
Powder	0.32	0.07	1.52	0.1520

Change toothbrush				
1-3months	Ref.			
4-6month	0.55	0.29	1.06	0.0720
More than 6 months	-	-	-	0.9990
Tobacco habit				
No	Ref.			
Yes	0.97	0.58	1.63	0.9010
Alcohol habit				
No	Ref.			
Yes	2.54	1.48	4.38	0.0010*

*p<0.05

Table 30: Multiple logistic regression analysis of PD

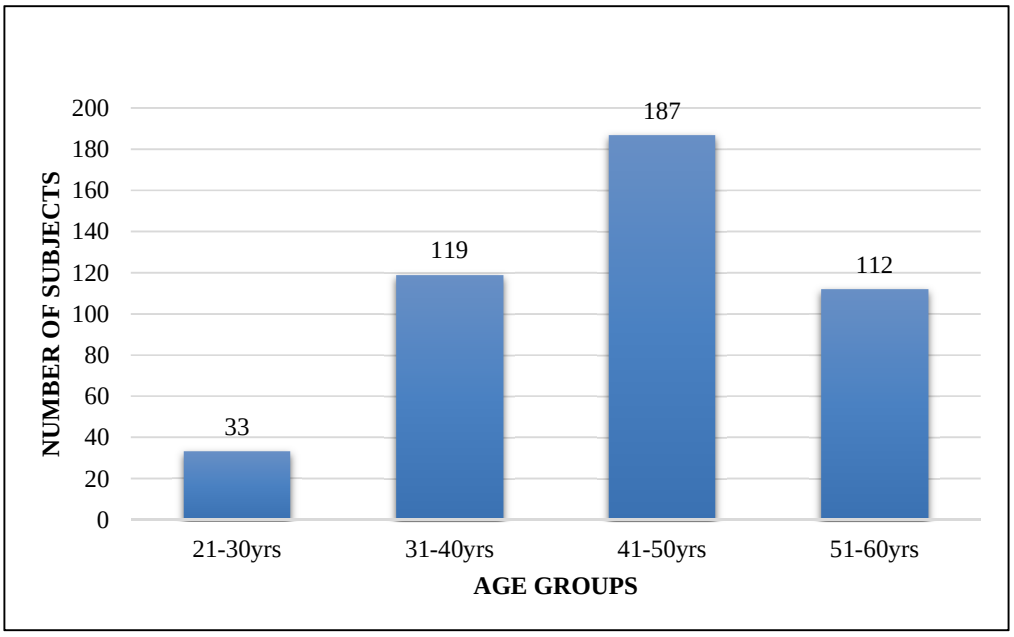
Independent variables	Adjusted OR	95% CI for OR		P-value
		Lower	Upper	
Age groups				
21-30yrs	Ref.			
31-40yrs	0.06	0.01	0.26	0.0001*
41-50yrs	0.09	0.03	0.24	0.0001*
51-60yrs	0.28	0.10	0.78	0.0140*
Gender				
Male	Ref.			
Female	-	-	-	0.9980
Occupations				
Driver	0.57	0.23	1.44	0.2360
Others	Ref.			
Frequency of brushing				
Once	0.36	0.18	0.74	0.0050*
Twice	Ref.			
Agents use				
Paste	Ref.			
Powder	0.00	0.00	.	0.9980

Change toothbrush				
1-3months	Ref.			
4-6month	1.74	0.73	4.15	0.2130
7-10month	-	-	-	0.9990
Tobacco habit				
No	Ref.			
Yes	0.64	0.28	1.45	0.2860
Alcohol habit				
No	Ref.			
Yes	5.05	2.11	12.07	0.0001*

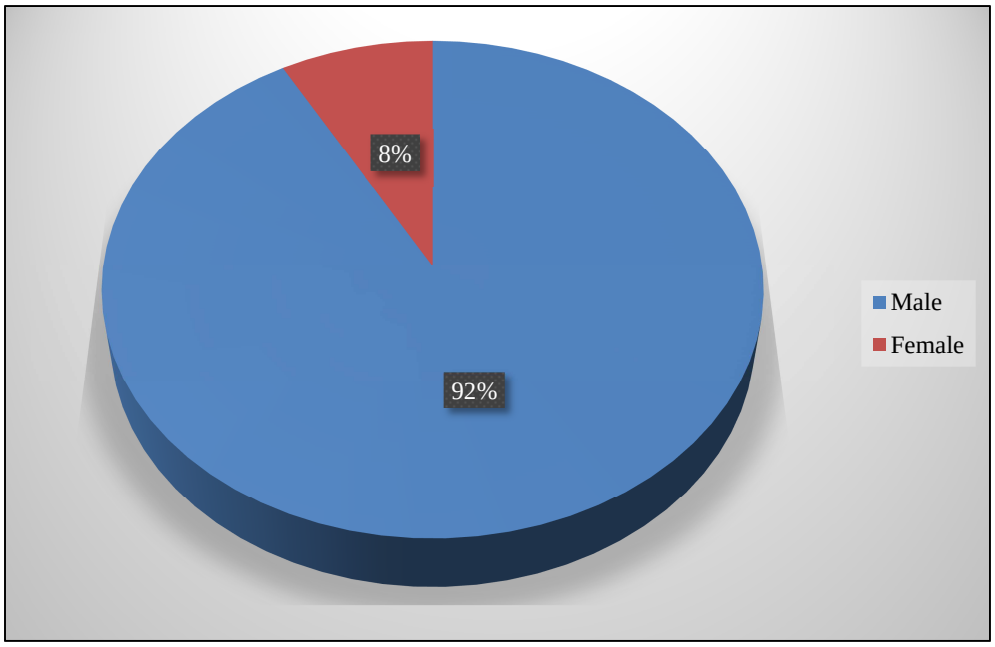
*$p<0.05$

GRAPHS

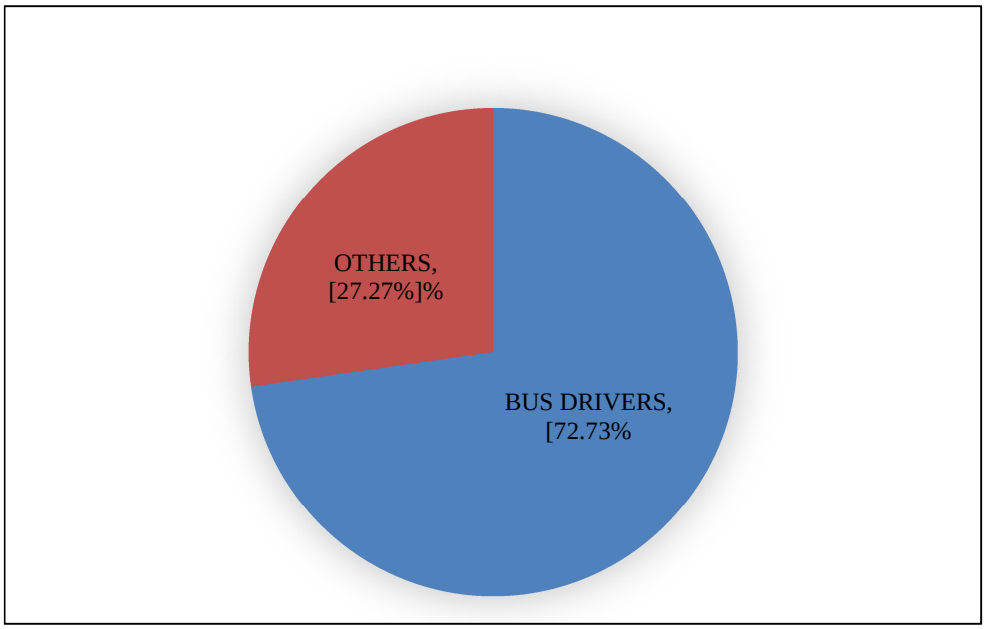
Graph 1: Distribution of subjects by age group



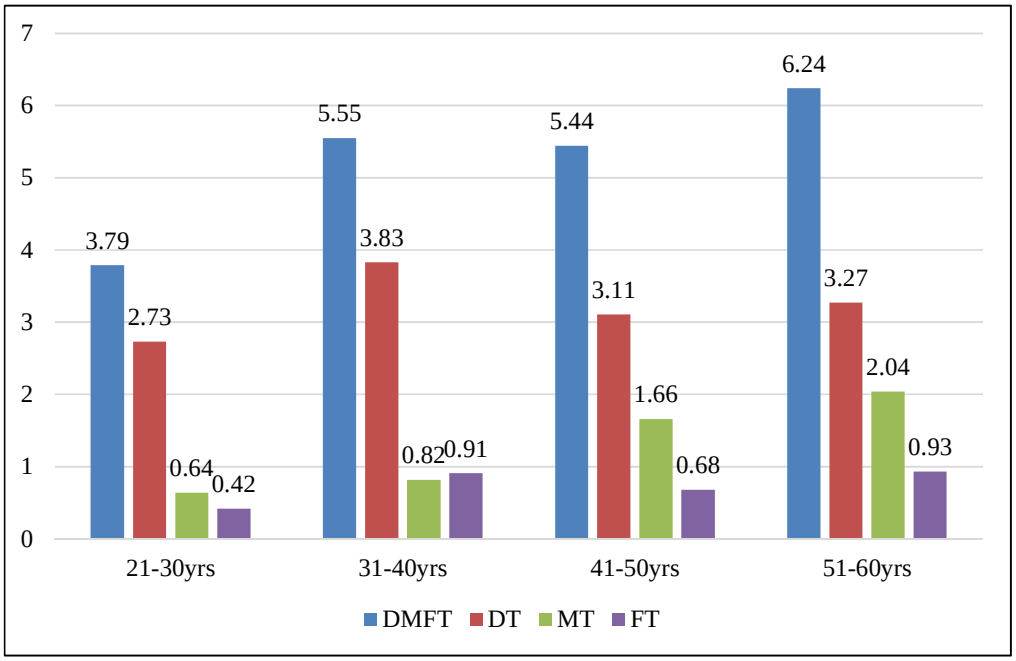
Graph 2: Distribution of subjects by gender



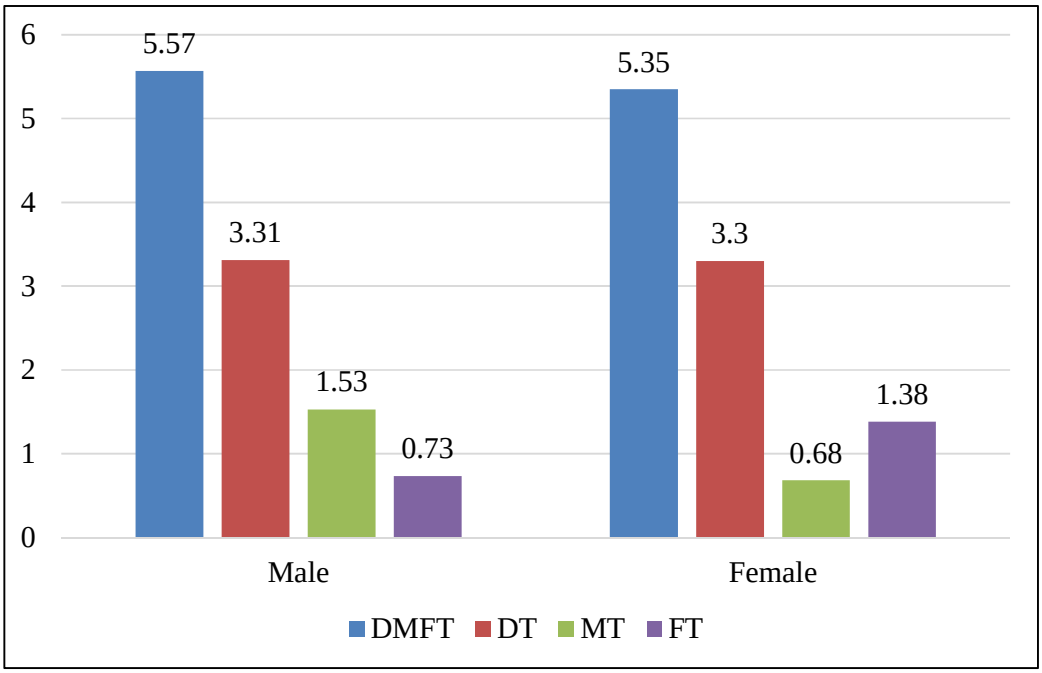
Graph 3: Distribution of subjects by occupation



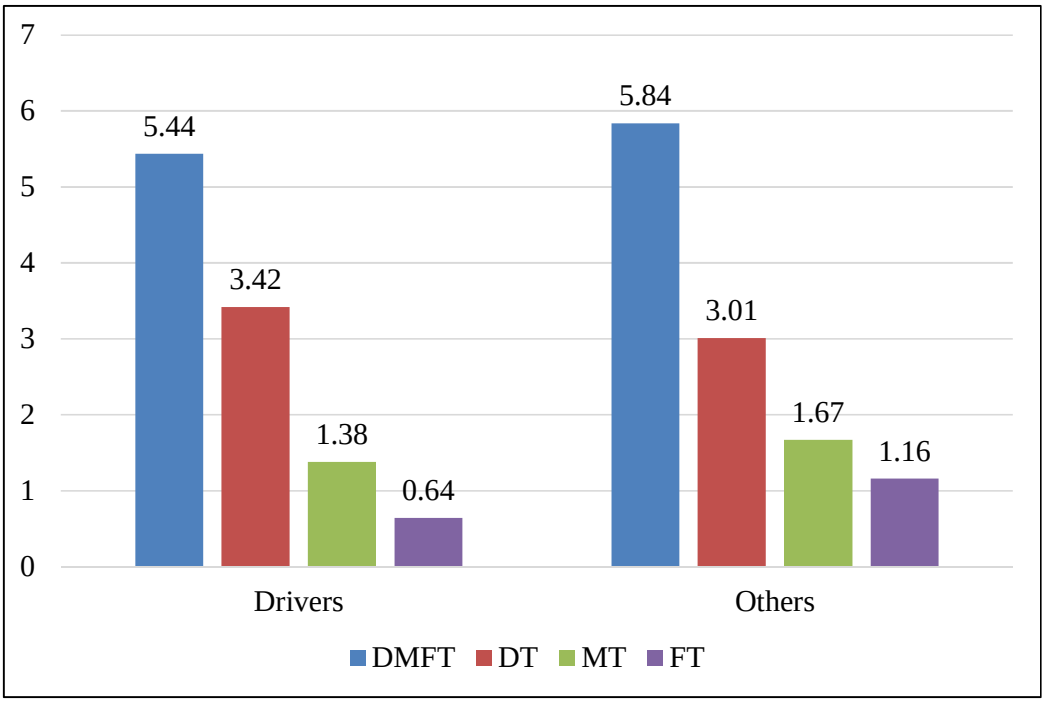
Graph 4: Mean DMFT, DT, MT and FT of the subjects according to age groups



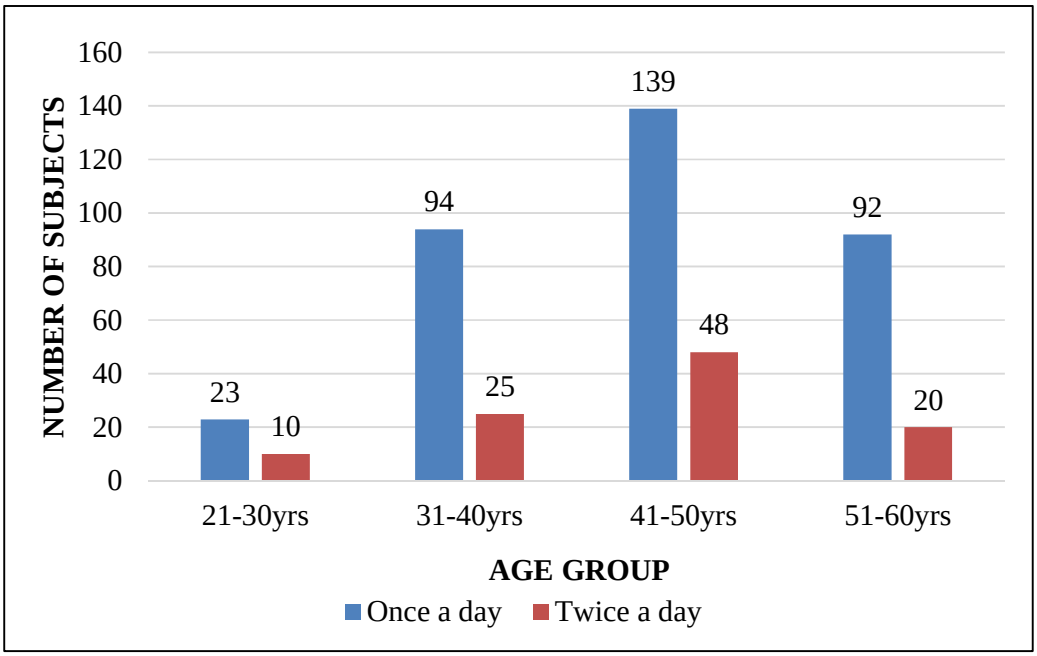
Graph 5: Mean DMFT. DT, MT and FT of the subjects according to gender



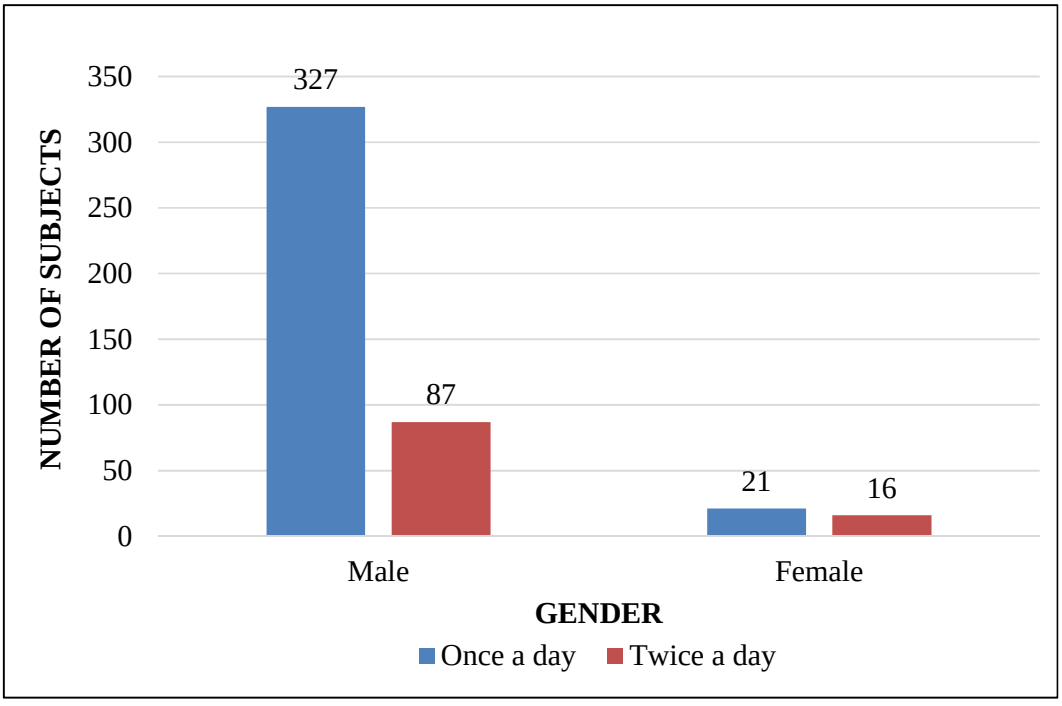
Graph 6: Mean DMFT, DT, MT, FT of the subjects according to occupation



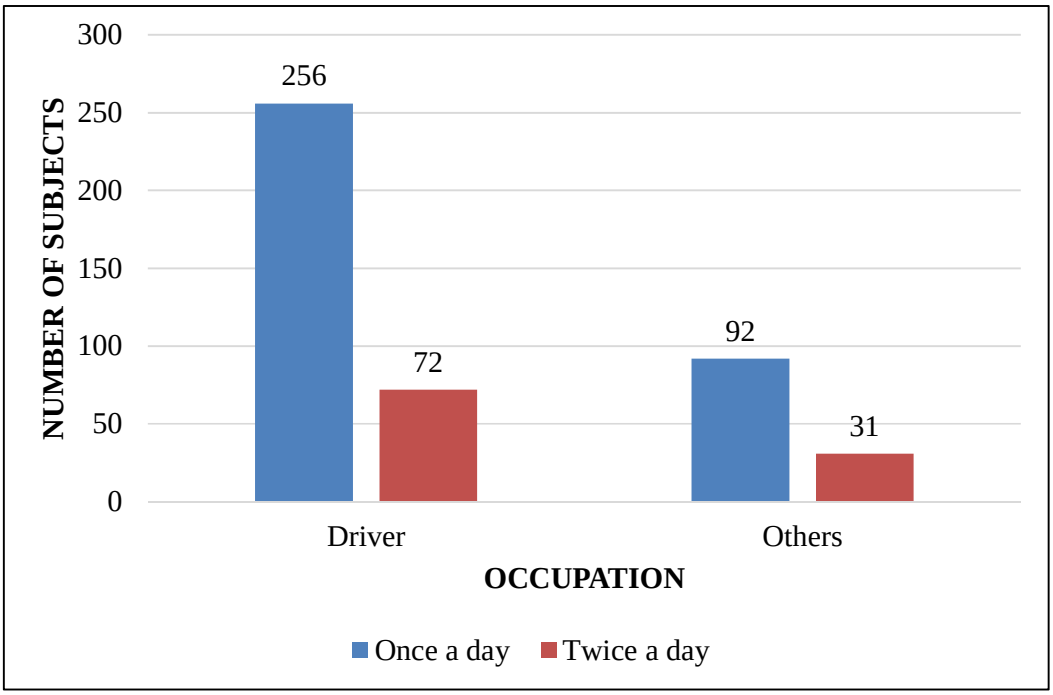
Graph 7: Distribution of frequency of tooth brushing with age groups



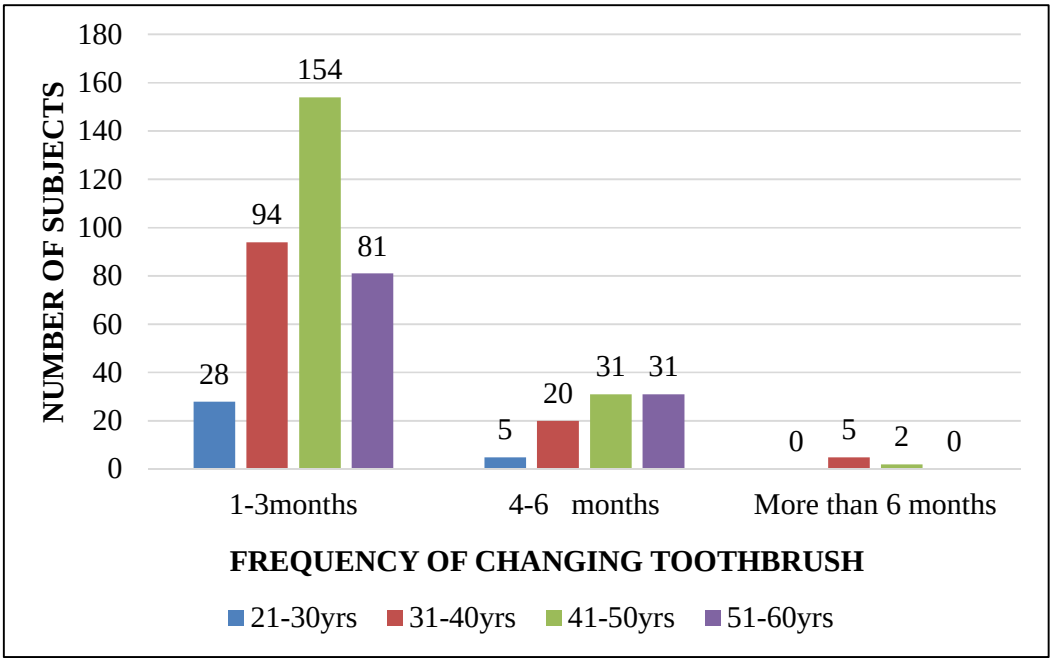
Graph 8: Distribution of frequency of tooth brushing with gender



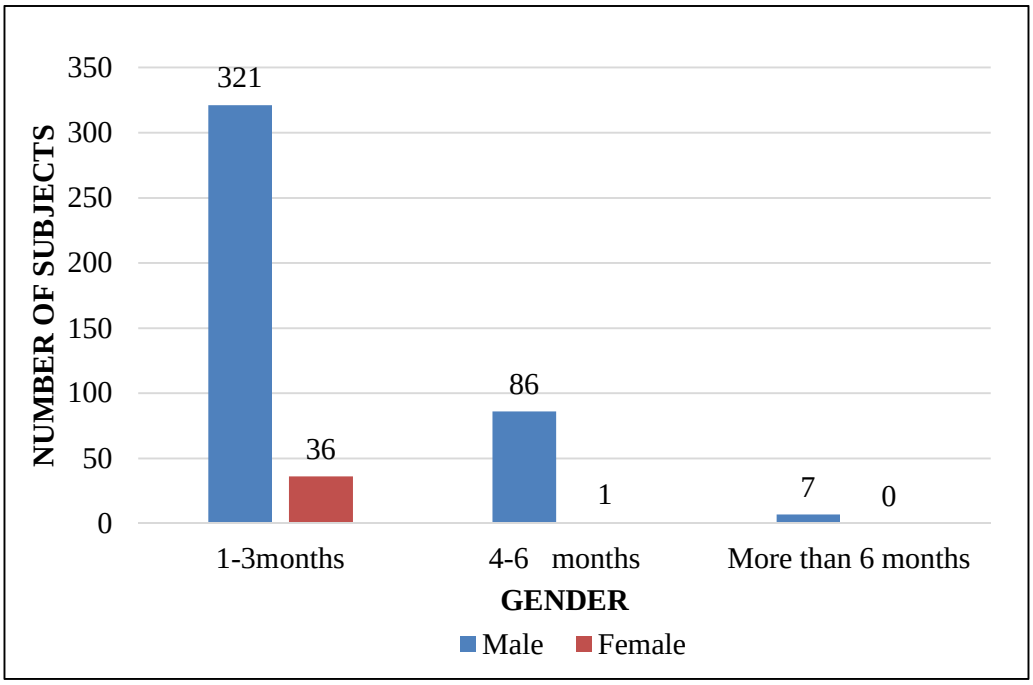
Graph 9: Distribution of frequency of tooth brushing with occupation



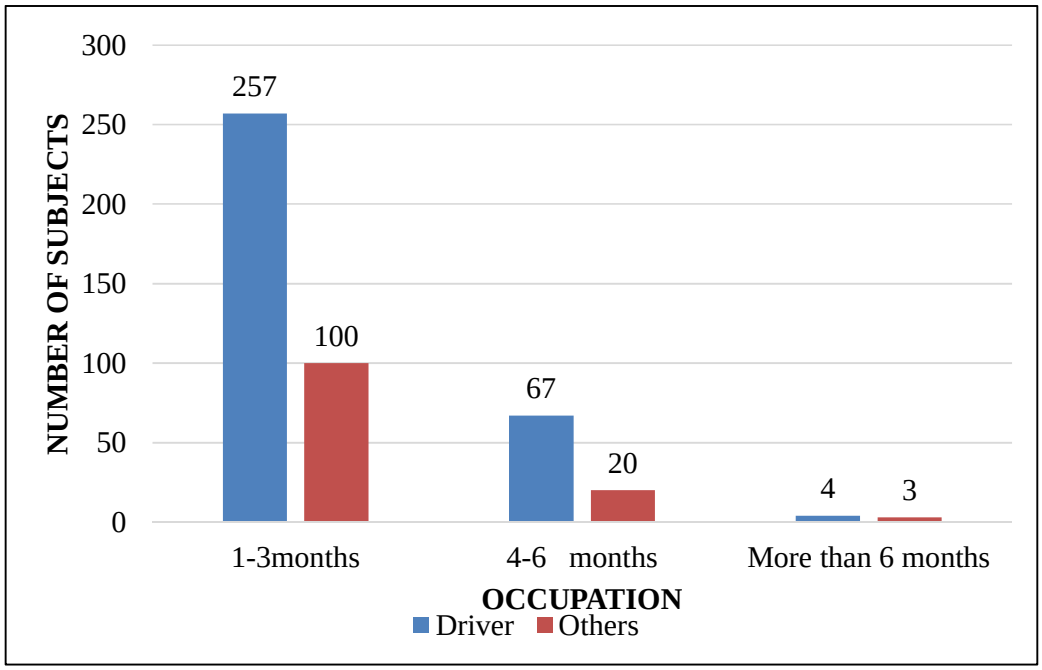
Graph 10: Distribution of frequency of changing toothbrush with age groups



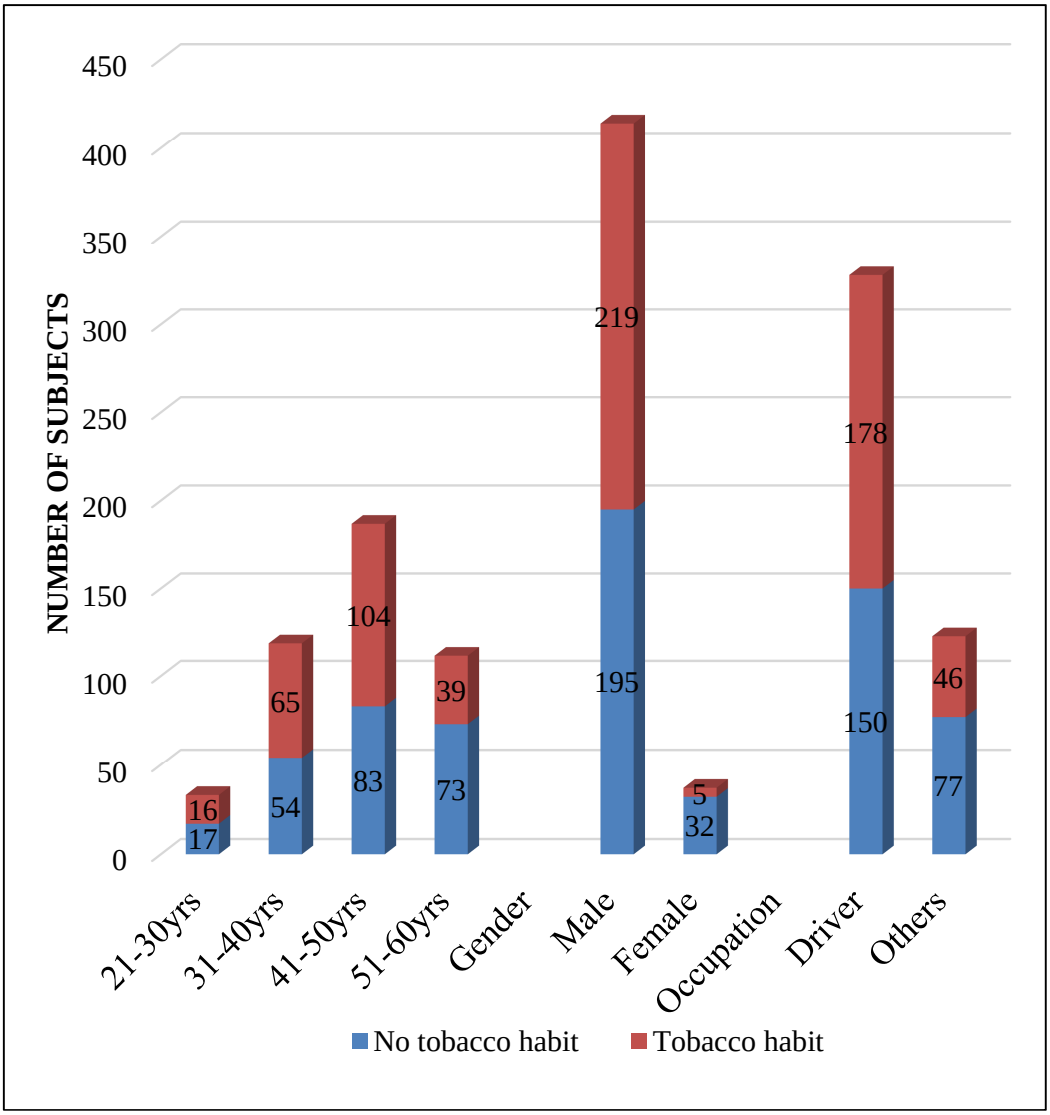
Graph 11: Distribution of frequency of changing toothbrush with gender



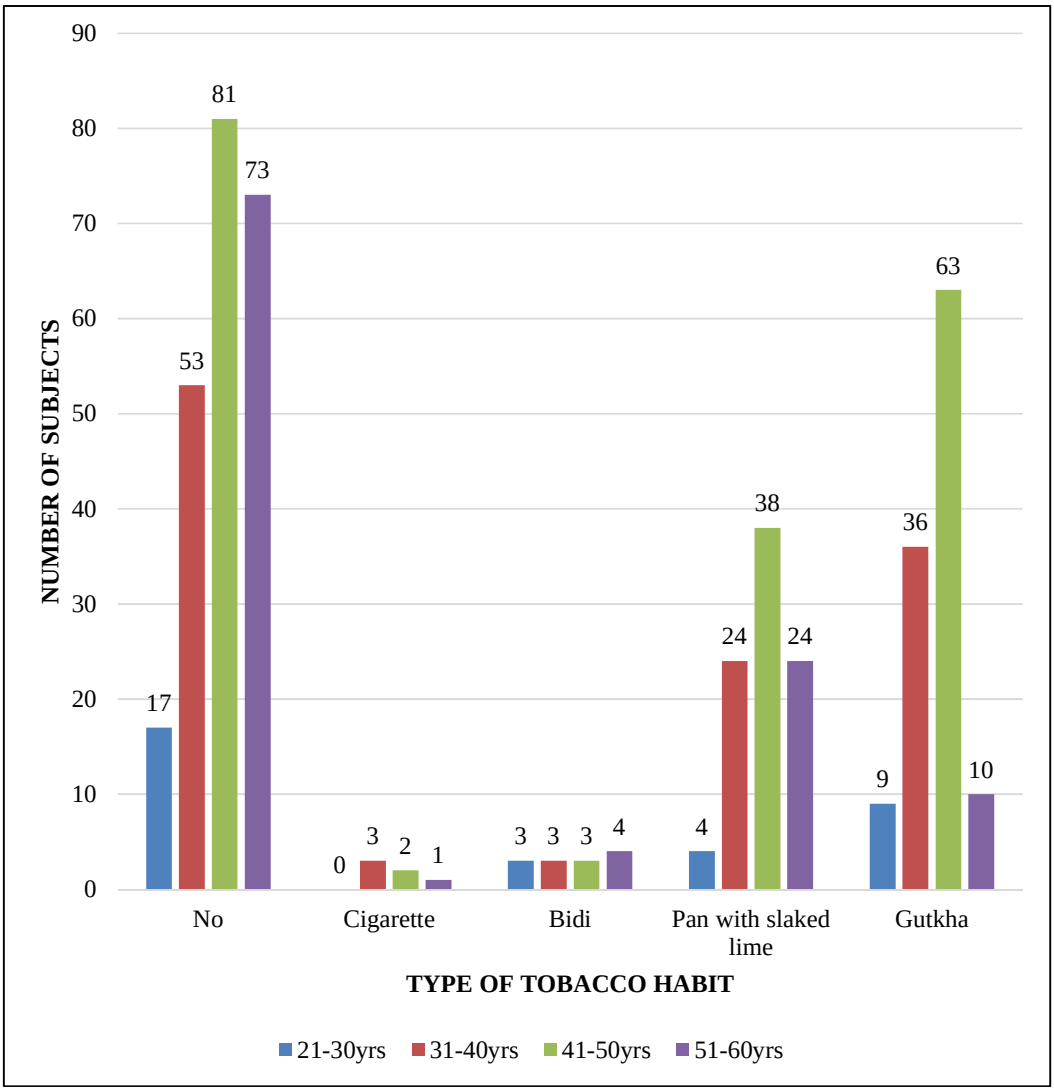
Graph 12: Distribution of frequency of changing toothbrush with occupation



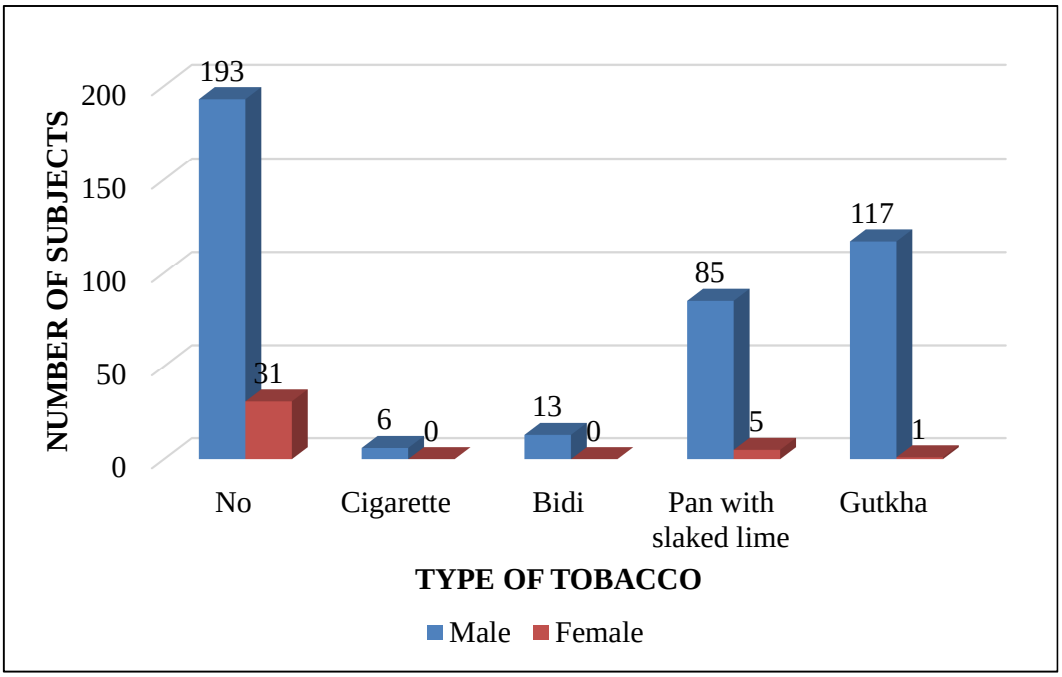
Graph 13: Distribution of presence of tobacco habits with age, gender and occupation



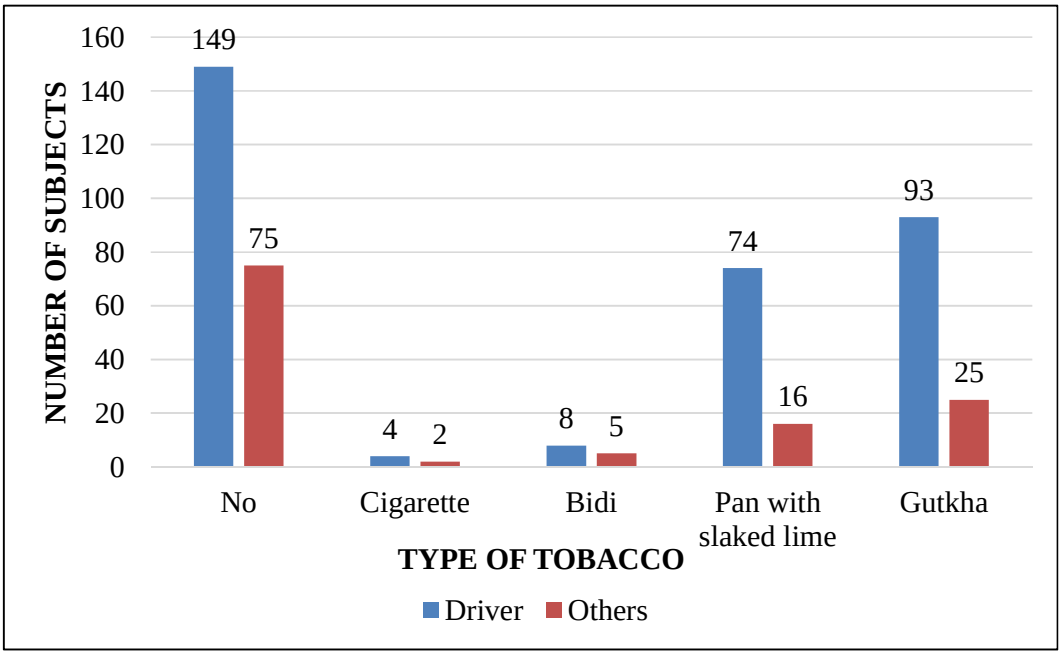
Graph 14: Distribution of different types of tobacco habits with age groups



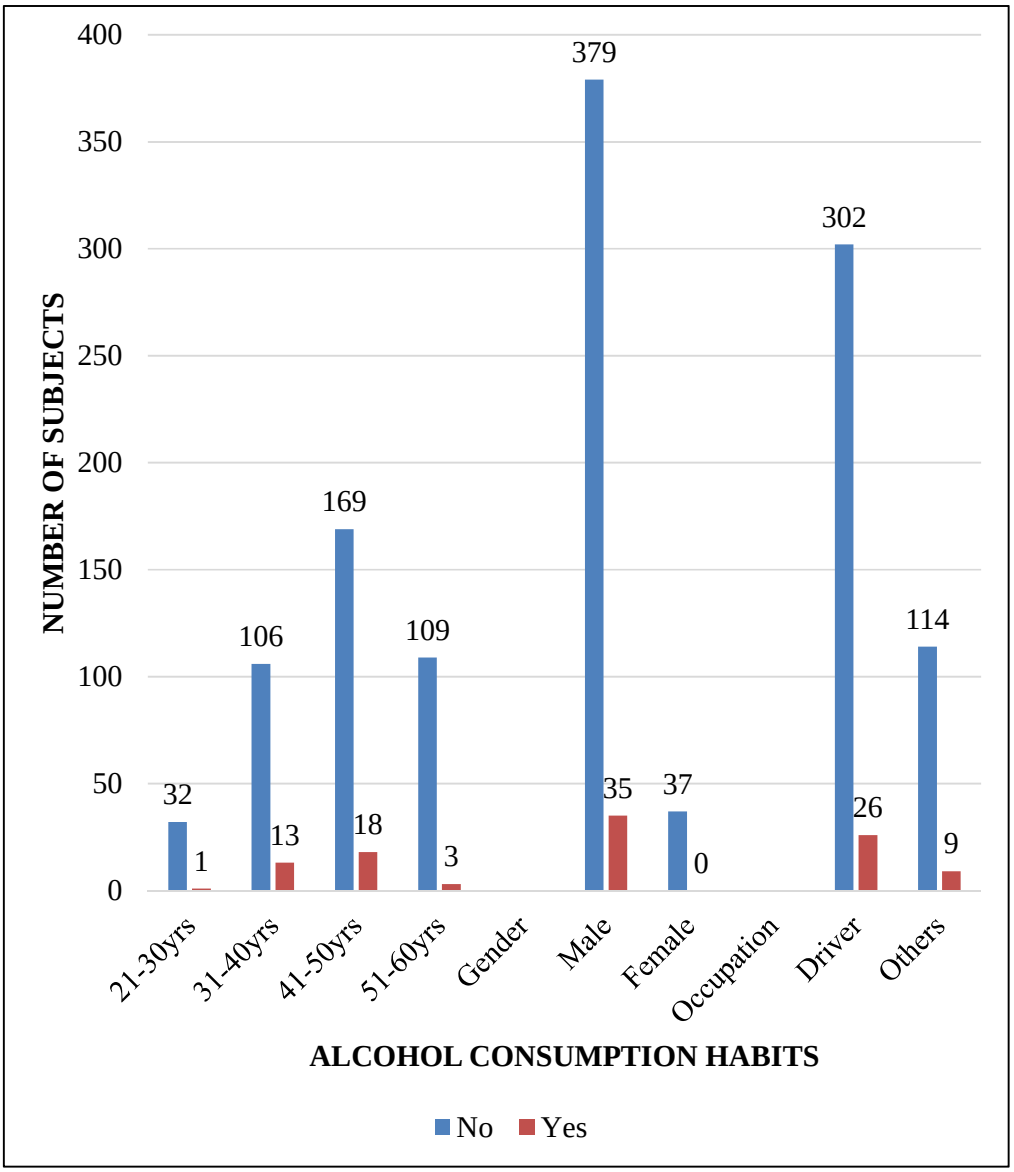
Graph 15: Distribution of different types of tobacco habits with gender



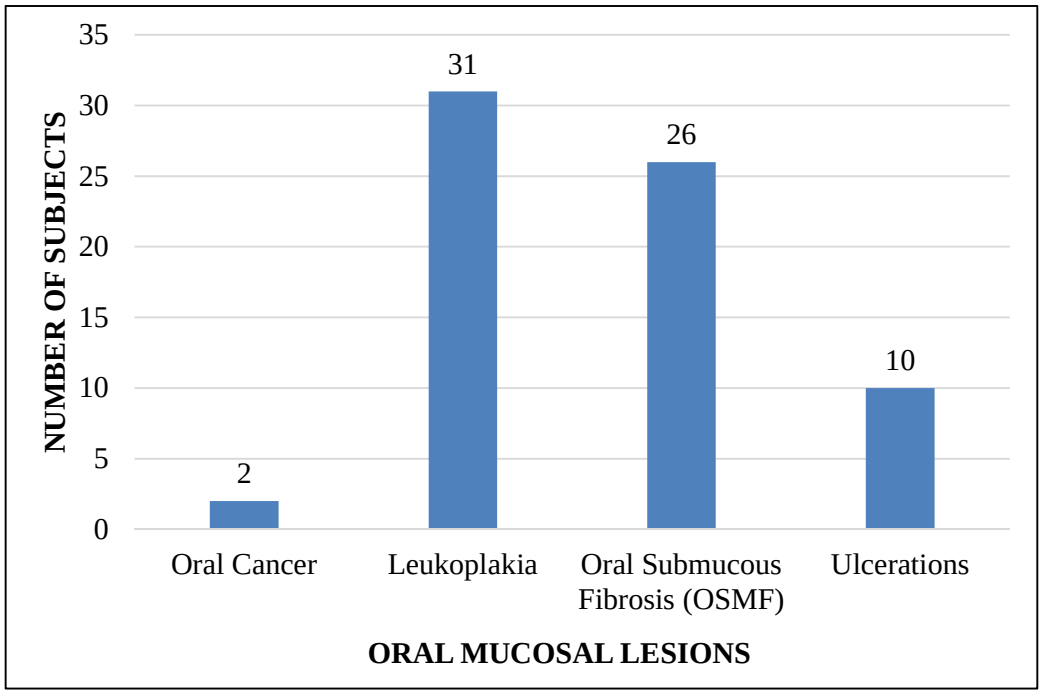
Graph 16: Distribution of different types of tobacco habits with occupation



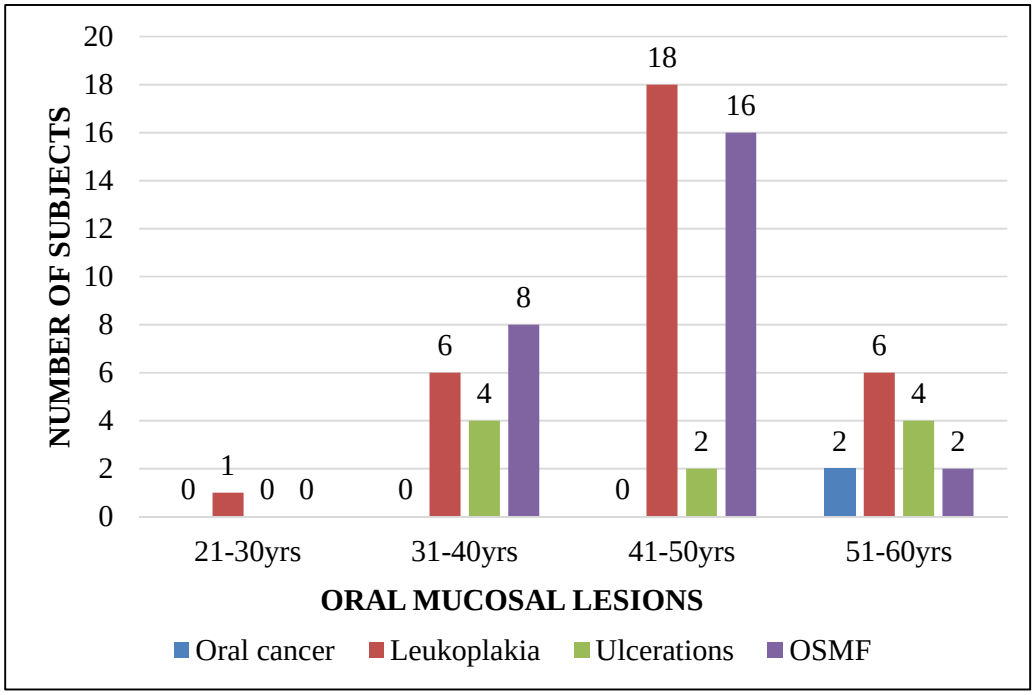
Graph 17: Distribution of alcohol habits with age, gender and occupation



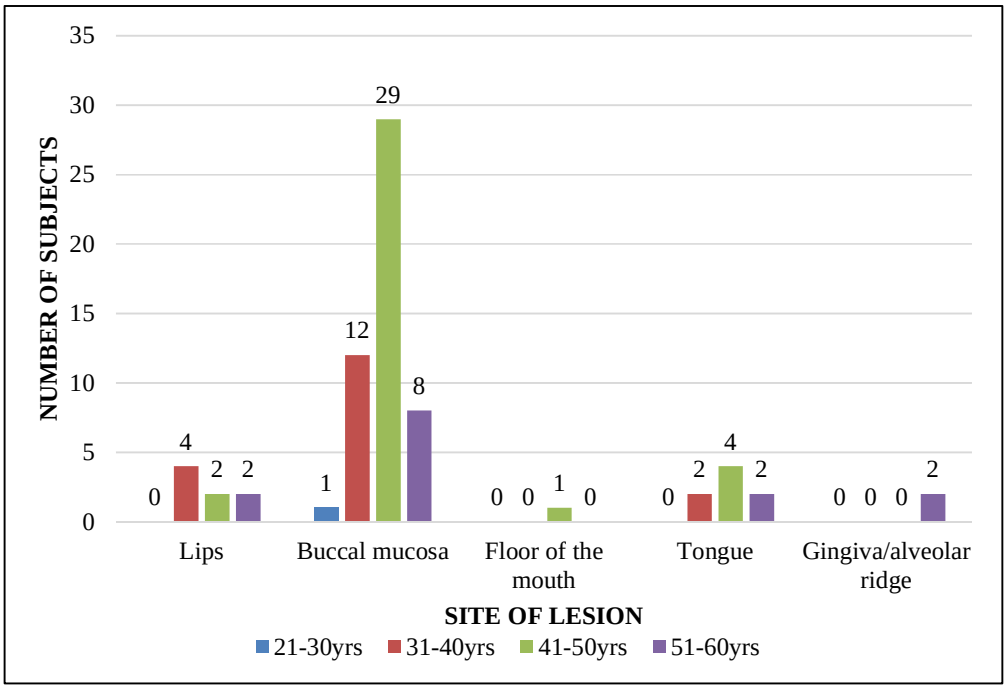
Graph 18: Prevalence of different oral mucosal lesions



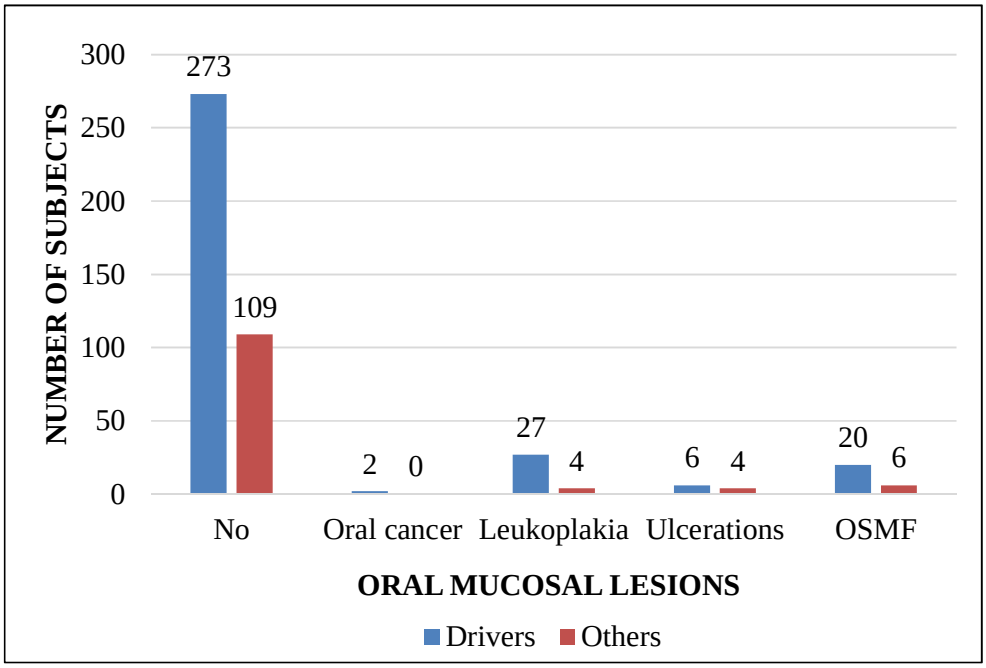
Graph 19: Distribution of oral mucosal lesions with age groups



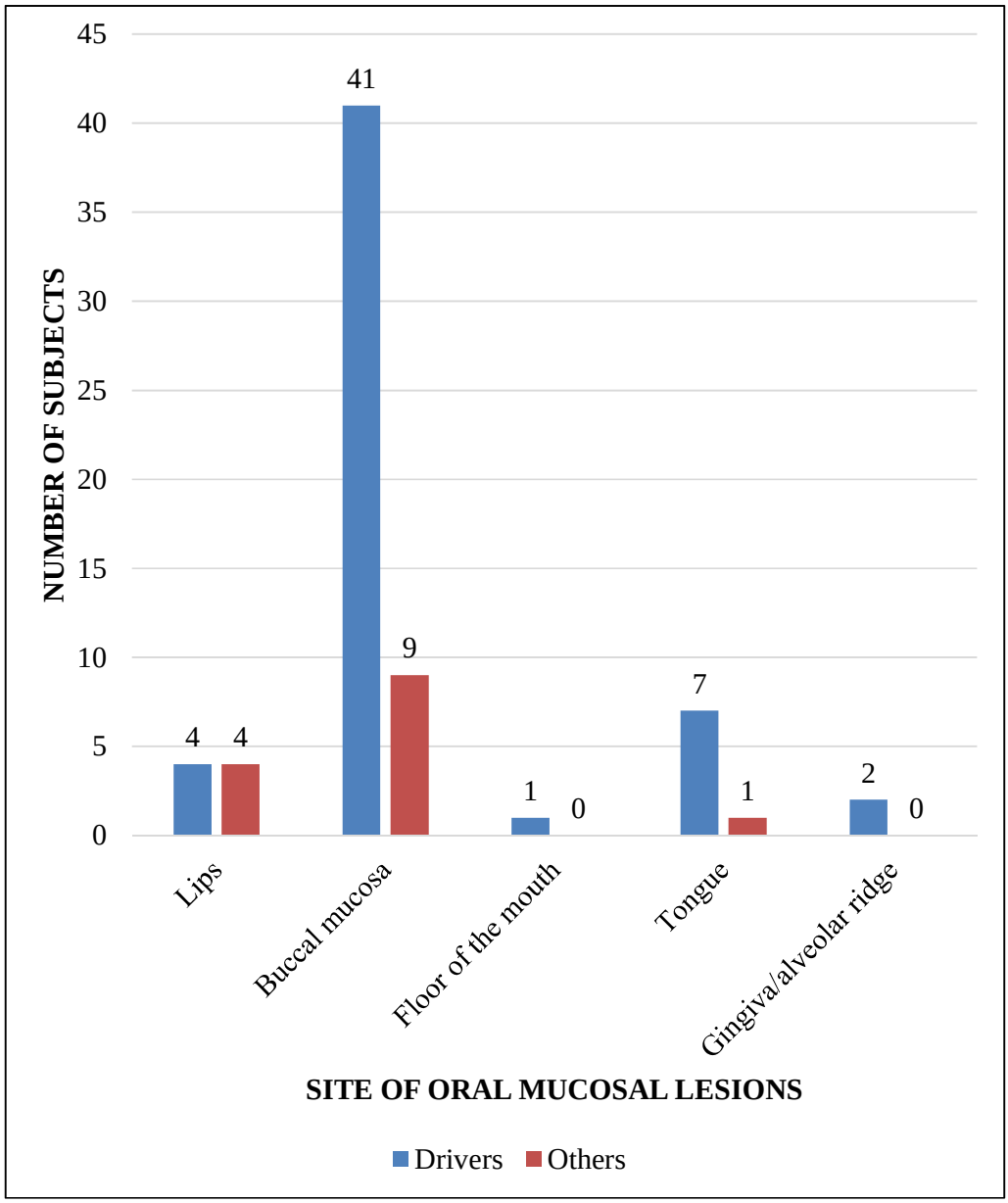
Graph 20: Distribution of sites of oral mucosal lesions with age groups



Graph 21: Distribution of oral mucosal lesions with occupation



Graph 22: Distribution of site of oral mucosal lesions with occupation



DISCUSSION

The present study was conducted to find out about the oral health status of North-West Karnataka Road Transport Corporation (NWKRTC) employees in Belagavi City in a systematic manner. This information can help to identify the significant problems encountered by this community so that proper planning and implementation and the subsequent evaluation of health programs can be done. It also describes the prevalence and the patterns related to tobacco-related habits among them so that this pressing issue can be addressed at the earliest, using appropriate measures.

Study Population

The study population consisted of the employees of North-West Karnataka Road Transport Corporation in Belagavi City. Most of them were employed as bus drivers. There were subjects from other occupations, which included like bus conductors, mechanics, sweepers and the security guards at NWKRTC as well. They were all permanent employees with the required educational qualification. A job under the State Government was considered satisfactory by many as it guaranteed a fixed salary and other perks associated with it. More than 3000 people were employed by NWKRTC for different purposes related to transport.

Age

The age group of the employees of NWKRTC in Belagavi ranged from 25-60 years, and most of them fell in the bracket of 41-50 years. The minimum requirement for recruitment under NWKRTC is to clear Higher Secondary Examination and be of

at least 24 years of age. The State Government has recently increased the retirement age to 60 years from 56 years, which justifies the age range. The maximum age of the subject who was employed as a driver was 60 years. In the study by G Ayappa et al[4] on the transport workers of Pune City, the age range was found to be 19-60 years which was similar to the present study. Driving a bus needs good motor skills and hand-eye coordination, and it is something that wanes off as a person ages. Therefore, the employees take retirement when they reach the fixed age. A large number of subjects who were in the middle-aged group were employed for decades which indicated that they did not want to leave their job due to the conveniences attached to them.

Gender

The majority of the employees working in NWKRTC were males. Only 8.20% of them were females, and all of them worked as bus conductors. This clearly states that there is a huge gender disparity in the employment ratio, which can be because females do not prefer to work for long and odd hours due to safety matters. The concept that transport workers are generally males and the associated stigma that it is not a job for females could have contributed to this significant gender imbalance.

Occupation

The occupation of the employees of NWKRTC was broadly classified into two sections: bus drivers and others. Other employees included the bus conductors, mechanics, sweepers and the security guards who worked in the different Bus Depot. The conductors were responsible for ticketing the passengers and keeping a record of the earnings from the buses, which they had to present in front of a higher authority

every month. Buses broke down quite often or had some fault at the machinery that needed the mechanics' expertise posted in the Bus Depots itself. The sweepers and janitors were responsible for keeping the premises of the Bus Depot clean at all times. The security guards were stationed in rotation throughout the day to ensure the safety of the people in the Bus Depot and to prevent any nuisance caused by the miscreants. Thus, all the employees of NWKRTC knew about what they had to do and executed their duties professionally.

Oral Hygiene Practices

More than 1/3rd of the employees in the present study brushed their teeth once a day. The recommended frequency of brushing is twice a day, and it should be promoted to the subjects so that they change their habit. The fact that the employees come back home after a long day at work and get tired at night could be one of the main reasons why they did not brush at night. This was in accordance with what is generally noted, that is, the people who brush their teeth once daily, did so in the morning, before consuming any meal[6]. Almost 95% of the total participants used a toothbrush and fluoridated toothpaste to brush their teeth. This can be attributed to the fact that the employees used the standard toothpastes for brushing which contained fluorides. However, no inferences can be made about their knowledge with respect to the importance of fluoride in toothpaste using this data. When asked about the frequency of changing toothbrushes, most of them responded with the option of 1-3 months. The most common reason behind it was the fraying of bristles within this period, with very few of them saying that they did so due to hygienic concerns.

Dental Caries

Dental caries experience denotes some form of manifestation of caries, including tooth decay, filling as well as missing tooth due to caries. The dental caries experience of the employees of NWKRTC was evaluated using the caries index included in WHO Oral Assessment Form 2013. It provided enough data to compute and analyse the overall caries experience as well as the Decayed-Missing-Filled Teeth (DMFT) along with individual components like Decayed Teeth (DT), Missing Teeth (MT) and Filled Teeth (FT) individually.

The caries experience was very high at 98.88%, with the mean DMFT score for the total population being 5.55±3.08. This result was similar to the study done by Ramandeep S. Gambhir et al. on the transport workers of Chandigarh Transport Undertaking (CTU), where the DMFT was 5.02[11]. These results could be related to the fact that the transport workers consumed tea and coffee more often when compared to normal individuals, which resulted in an increase in the 'sweet score'. According to the studies done by Akrad et al. [35] and Masalin et al. [36], a positive correlation was present between the 'sweet score' and the DMFT score. The employees were under constant stress at work, mainly due to long working hours, and the frequent consumption could be a form of relaxation and de-stressing. Peer pressure and influence from colleagues can also be significant contributing factors for the same[6].

When looking at the individual components, it was found that the mean score of DT was highest at 3.31, followed by MT at 1.46 and FT at 0.78. This implies that the transport workers did not visit the dentists at the initial stage of the problem related to tooth decay, which destroyed the tooth structure and sometimes went to the

stage of irreplaceable damage and extraction. Several factors can be attributed to it. First and foremost is the low socioeconomic status of the employees and the misconception that dental treatments are generally expensive. They do not have good awareness regarding oral health due to the same reason. Other factors include rigid schedules at work, making it impossible to visit a dentist, fear of pain and discomfort during dental treatment and the continuous stress at work, making them ignore the oral health problems. These results were in accordance with the studies done by Clarke et al. [37], Hamesha et al. [38] and Kawamura et al. [39], who pointed to a similar pattern in their findings.

An association was also found between dental caries and the various independent variables. It revealed that maximum dental caries experience was noticed in middle-aged employees, that is, among 41-50 years old. This can be related to the fact that young people tend to be more aware of the importance of oral health and maintenance of oral hygiene. The employees in middle age become more accustomed to the stress and working hours and gradually lose interest in it. In terms of gender, males were more prone to dental caries than females due to the apparent reason of males being engaged in the stressful work of bus driving. This was further reiterated by the fact that the bus drivers had maximum caries experience compared to other employees of NWKRTC.

A comparison can also be made with other populations belonging to a similar socioeconomic status so that the relation of caries experience with occupation, lifestyle, and healthcare utilisation can be assessed. The average DMFT was less than a study on mill workers by Bachanek T et al. [40] and construction workers as seen by

Tomita et al. [41]. However, a similar result was obtained from a study on industrial workers by Masalin et al. [42].

Periodontal Status

Different types of periodontal diseases are caused due to the interplay of several entities, including the etiological factors causing plaque accumulation as well as the genetic and environmental aspects. The periodontal status of the employees of NWKRTC was found to be moderate. The inability to maintain proper oral hygiene techniques and the excessive consumption of tobacco could be the two main reasons behind it. Both the reasons mentioned above are related to their long working hours and stress at work, which is again a matter of concern. Almost 1/5th of the population had bleeding on probing, which was indicative of reversible gingivitis, and a few of them had manifestations of periodontal pockets as well. The study findings were found to be similar to the ones by Dilip et al. [43].

Oral Mucosal Findings

The findings related to the oral mucosa were one of the most significant ones in the present study and set it apart from the other studies done in this population. The prevalence of oral mucosal findings was 15.29% which was in contrast to the study by Gambhir et al. [11] where it was found to be 1.9%, and Reddy et al. [44], where the manifestation was seen to be 3.1%. Although the etiology of oral mucosal conditions are multifaceted, that is, it can be due to some microbial infection, local trauma or some manifestation of a systemic disease, the most common reasons that could be attributed to this particular scenario was the tobacco and alcohol consumption habits, coupled with stress. Among the oral mucosal lesions, leukoplakia, in the form of

whitish patches or plaque, was most commonly found, and it was associated with long-term exposure to different types of tobacco. Another important finding was the presence of Oral Submucous Fibrosis associated with areca nut and betel nut chewing seen more commonly in the subjects who had the habit of consuming Pan with slaked lime.

Two of the subjects presented with clinical findings resembling oral cancer as well. A brief history was taken, and they were immediately referred to KLE Cancer Hospital for further diagnosis and treatment. Photographs of the patients with manifestations of oral cancer could not be taken as they did not give consent for it. The most common site of oral mucosal lesions was buccal mucosa, followed by the buccal vestibule and lips. The fact that the subjects had the habit of placing the tobacco quid in these areas increased the chances of lesions here.

Tobacco habits

An important finding of this particular study was the prevalence of tobacco habits and various aspects associated with it, which included the type of tobacco consumed, the frequency and the duration of tobacco consumption. Almost half the examined population reported some tobacco habit with the prevalence being at 50.13%, which can be considered to be pretty high. It is also higher than the prevalence of tobacco habits in India, at 42%[45]. This result was similar to the study done by Parashari et al.[8] where the prevalence of tobacco consumption among the long-distance bus drivers in Ghaziabad, Uttar Pradesh, was 50.1% and a study by G Ayappa et al. [4] where the prevalence among the bus drivers in Pune was 55.8%. Tobacco is one of the leading causes of oral cancer in India and globally.

More than 5 million people succumb to cancer caused by tobacco every year, and the number is expected to rise over the years. Many deaths are mainly reported in the countries belonging to low or medium-income strata[46]. A higher prevalence is typically noted in people belonging to the lower socioeconomic strata[47]. The primary reasons for the frequent tobacco consumption among transport workers were the stress at work due to long working hours and the fact that they stay away from home most of the time and are surrounded by their peers, which makes the environment conducive for tobacco consumption. Another essential factor of consideration is that the nicotine present in tobacco makes a person feel alert and awake for more extended periods. Since the bus drivers are on the wheel for long hours, they 'need' the tobacco to sustain themselves[48]. Some people even cited the reason that tobacco consumption made them feel 'mature' and respected in front of their friends and colleagues, which is consistent with other studies in this regard[49]. There is also enough evidence in the literature that points to the fact that the people with blue-collar jobs and a low level of education tend to consume tobacco in more amounts[50-52]. They have presented with multiple reasons for tobacco consumption, with some of them being an attempt to relieve stress, to come out of boredom, increase alertness, and improve the friendship and camaraderie with their friends and colleagues.

Among the different types of tobacco mainly consumed by the employees of NWKRTC, Pan with slaked lime and chewing gutkha were the most popular. It can be due to the acceptability of a chewing form of tobacco in society for males. The result was consistent with other results in this spectrum, that is, smokeless form of tobacco was seen more commonly among 41-50 years old subjects who were males and bus drivers.

Alcohol habits

Alcohol habits were also prevalent among the employees of NWKRTC, and it was more often than not seen as an accompaniment to tobacco habit. The reasons behind the prevalence of alcohol habits were similar to the ones seen concerning tobacco habits. Some of them thought that both have a synergistic effect and induced the pleasure and satisfaction derived from it. It helped deal with the stress at work as some believed it to be a quick fix. Moreover, they stayed out of home due to long working hours, leading to more freedom to drink. Some even engaged in alcohol consumption under the influence of their peers and to maintain their friendship and camaraderie with others. Consumption of alcohol can lead to erosion and other types of wasting diseases[54]. However, no such significant result was noted in this study.

Tendency to quit the habits

A meagre percentage (7.76%) of the study participants tended to quit their tobacco and alcohol consumption habits. The psychological dependence on these substances and their addiction could be the main reasons behind it. Some of them might even be afraid of the withdrawal symptoms, which hindered their quitting mentality. Among the few subjects who were motivated enough to quit, most cited health concerns and counselling from doctors and dentists as the main reasons behind it. This was similar to the result obtained from the study by Echer et al. [55]. A few subjects also selected factors like influence from mass media and the warnings on tobacco packets.

Referrals

All the subjects who were examined on the days of data collection were given a referral card which had the provision of a 20% discount on selective treatment costs if they reported to the KLE VK Institute of Dental Sciences or any of the eight satellite centres under the jurisdiction of Department Of Public Health Dentistry within three months of their oral health check-up. All the subjects with positive findings related to the oral mucosal lesions were immediately referred to KLE hospital, and prompt diagnosis and treatment were planned for them.

LIMITATION OF THE STUDY

One limitation that the study might have is the limited sample size. However, the study was conducted in the middle of a global pandemic of COVID-19 which was the main reason behind this limitation. The sample size was set at 600 after appropriate calculations. However, only 451 employees of NWKRTC could be included in the study. Even though lockdown was lifted in April, many people were still apprehensive of contracting the disease, primarily because of its high infectivity and moderate mortality rate. Therefore, only a few employees worked in the Bus Depots on a rotation basis which led to a further compromise in the sample size. More studies can be done in the future, taking a larger sample size from all the districts of Belagavi city and allocating more time for data collection, so that a complete result can be obtained from them.

CONCLUSION

A survey was done to record the oral health status and the tobacco habits of 450 employees of North-West Karnataka Road Transport Corporation (NWKRTC), Belagavi City. The following conclusions were drawn from it-

- Most of the employees of NWKRTC were of the middle age group.
- There was a huge dominance of male employees when compared to females in NWKRTC.
- The dental caries experience of the employees of NWKRTC was very high.
- A lot of participants had plaque and calculus in their mouth. However, the number of people manifesting bleeding on probing, periodontal pockets and loss of attachment were relatively low.
- There was a high prevalence of tobacco consumption, especially among the bus drivers, who used it to deal with the stress at work, stay alert and awake for long hours and under peer pressure. Quite a few of them also consumed alcohol with it.
- The prevalence of oral mucosal lesions was very high when compared to other studies done on the same population groups in other parts of India. It could be related to the high tobacco consumption habit. Among the oral mucosal lesions, leukoplakia, a whitish plaque or patch on the buccal mucosa, was most commonly seen, followed closely by Oral Submucous Fibrosis.
- Two subjects presented with the manifestations of oral cancer and were referred to KLE Cancer Hospital for treatment.

- All of the participants were provided with a referral slips using which they could avail simple dental treatments at KLE Vishwanath Katti Institute of Dental Sciences, Belagavi at a discounted rate.
- Recommendations were given on the basis of the findings of the study. Motivation and education of the subjects along with preventive treatment and research should be given its due importance.
- More indigenous research should be encouraged, especially among this population group so that there is an overall improvement in their oral health.

BIBLIOGRAPHY

1. Sharda AJ, Shetty S. Relationship of periodontal status and dental caries status with oral health knowledge, attitude and behavior among professional students in India. Int J Oral Sci 2009;1:196-206
2. Park. Park's textbook of Preventive and Social medicine. 25th ed. New Delhi: Banarsidas Bhanot Publishers; 2019
3. Naveen N, Reddy CV. Oral health status and treatment needs of police personnel in Mysore city, Karnataka. Streamdent 2010;1:156-60.
4. Ayyappa G, Kunte R, Yadav AK, Basannar DR. Is occupation the "driving force" for tobacco consumption? A cross-sectional study to assess prevalence, patterns, and attitude towards tobacco use among long-distance bus drivers and conductors in Western Maharashtra. *Ind Psychiatry J*. 2019;28(2):237-241. doi:10.4103/ipj.ipj_72_20
5. Chandigarh Transport Undertaking [monograph on the internet]. Chandigarh: 2009. Department of Information Technology and NationalInformatics Centre, Chandigarh.Available from: http://www. chandigarh.gov.in
6. Aparna, S & Kumar, Pd. (2019). . Assessment of oral health status and treatment needs of professional bus drivers in Chennai. 10.4103/EJSS.EJSS_4_18.
7. Bhatt B, Seema MS. Occupational health hazards: A study of bus drivers. J Health Manage. 2012;14:201–6.
8. Parashari A, Ahmad S, Asthana S, Saxena S. Tobacco use among drivers and conductors in Western Uttar Pradesh, India. Indian J Community Health. 2017;29:301–7.

9. Jiang X, Wu J, Wang J, Huang R. Tobacco and oral squamous cell carcinoma: A review of carcinogenic pathways. *Tob Induc Dis*. 2019;17:29. Published 2019 Apr 12. doi:10.18332/tid/105844

10. Abbas I, Mohammad SA, Peddireddy PR, Mocherla M, Koppula YR, Avidapu R. Oral Health Status of Underground Coal Mine Workers of Ramakrishnapur, Adilabad District, Telangana, India - A Cross-Sectional Study. *J Clin Diagn Res*. 2016;10(1):ZC28-ZC31. doi:10.7860/JCDR/2016/15777.7059

11. Aapaliya P, Shinde K, Deswal AK, Mohapatra S, Saleem S, Mangal R, Bithu A, Bithu AS, Maurya SP, Sanadhya S, Jain S, Pujara P. Assessment of oral health among seafarers in Mundra Port, Kutch, Gujarat: a cross-sectional study. Int Marit Health. 2015;66(1):11-7. doi: 10.5603/IMH.2015.0004. PMID: 25792160.

12. Rao BV, Suresh Babu AM, Kamalsha SK, Rao MS, Karthik K. Oral Health Status and Treatment Needs of Gunj Marketing Yard Laborers of Raichur City, Karnataka. J Pharm Bioallied Sci. 2017 Jul-Sep;9(3):195-200. doi: 10.4103/jpbs.JPBS_32_17. PMID: 28979074; PMCID: PMC5621182.

13. Saroj, G. et al. "Tobacco Use Among Long Route Bus Drivers and Staffs of Dharan Eastern Nepal a KAP Study." Science Journal of Public Health 5 (2017): 301.

14. Gambhir RS, Sogi GM, Veeresha KL, Sohi RK, Randhawa A, Kakar H. Dental health status and treatment needs of transport workers of a northern Indian city: A cross-sectional study. *J Nat Sci Biol Med*. 2013;4(2):451-456. doi:10.4103/0976-9668.117010

15. Reddy S, Reddy C. Oral Health Status and Treatment Needs of Karnataka State Road Transport Corporation Drivers and Employees in Mysore Division .J Indian Assoc Public Health Dent 2010;8:221-227

16. *Rewar, Sudhir et al. "A Cross-Sectional Study on Tobacco Consumption Pattern among Auto Rickshaw Drivers in Jaipur City, Rajasthan." IOSR Journal of Humanities and Social Science 14 (2013): 88-91.*

17. Warsi, Ibrahim & Younus, Anjum & Rasheed, Abdur & Ahmed, Javeria & Syed Muhammad, Hamza & Farooqui, Rabeea & Qureshi, Ambrina. (2017). Smokeless tobacco consumption among public and heavy load drivers in Karachi, Pakistan: A crosssectional study. Journal of Public Health and Epidemiology. 9. 292-299.

18. Goon S, Bipasha MS. Prevalence and Pattern of Smoking among Bus Drivers of Dhaka, Bangladesh. *Tob Use Insights*. 2014;7:21-25. Published 2014 Mar 9. doi:10.4137/TUI.S13966

19. Kumar TS, Dagli RJ, Mathur A, Jain M, Balasubramanyam G, Prabu D, Kulkarni S. Oral health status and practices of dentate Bhil adult tribes of southern Rajasthan, India. Int Dent J. 2009 Jun;59(3):133-40. PMID: 19637521.

20. Valsan I, Joseph J, Janakiram C, Mohamed S. Oral Health Status and Treatment Needs of Paniya Tribes in Kerala. *J Clin Diagn Res*. 2016;10(10):ZC12-ZC15. doi:10.7860/JCDR/2016/21535.8631

21. Das D, Suresan V, Jnaneswar A, Khurana C, Bhadauria US, Saha D. Oral health status and treatment needs among the Juang tribe-a particularly vulnerable tribal group residing in Northern Odisha, India: A cross-sectional

study. Health Soc Care Community. 2019 Sep;27(5):e752-e759. doi: 10.1111/hsc.12788. Epub 2019 Jun 24. PMID: 31231942.

22. Bhat Padma K., Kadanakuppe Sushi. Periodontal health status and oral hygiene practices of Iruliga tribal community residing at Ramanagar district, Karnataka, India. June 2010 , vol 2 (Issue 1)
23. Gopalankutty N, Vadakkekuttical RJ, Remadevi S, Pillai AS. Prevalence of periodontitis and its correlates among tribal population of Attapady block, Palakkad District, Kerala. J Indian Soc Periodontol 2020;24:264-70
24. Mahapatra S, Chaly PE, Mohapatra SC, Madhumitha M. Influence of tobacco chewing on oral health: A hospital-based cross-sectional study in Odisha. Indian J Public Health. 2018 Oct-Dec;62(4):282-286. doi: 10.4103/ijph.IJPH_327_17. PMID: 30539890.
25. Katuri KK, Alluri JK, Chintagunta C, Tadiboina N, Borugadda R, Loya M, Marella Y, Bollepalli AC. Assessment of periodontal health status in smokers and smokeless tobacco users: a cross-sectional study. Journal of clinical and diagnostic research: JCDR. 2016 Oct;10(10):ZC143.
26. Reddy V, Kondareddy CV, Siddanna S, Manjunath M. A survey on oral health status and treatment needs of life-imprisoned inmates in central jails of Karnataka, India. Int Dent J. 2012 Feb;62(1):27-32. doi: 10.1111/j.1875-595X.2011.00082.x. PMID: 22251034
27. Kakade SP, Hegde-Shetiya S, Mahuli AV, Mahuli SA, Agrawal D. Assessment of oral health status and normative treatment needs of residents of Nimbut Village, Pune, Maharashtra, India. Int J Dent Health Concern 2016;1(2):1-5

28. Nuuja T, Meurman JH, Murtomaa H, Kortelainen S, Metteri J. The effect of a combination of chlorhexidine diacetate, sodium fluoride and xylitol on plaque wet weight and periodontal index scores in military academy cadets refraining from mechanical tooth cleaning for 7-day experimental periods. J Clin Periodontol. 1992 Feb;19(2):73-6.

29. Banerjee A. Tobacco use patterns among military recruits. Medical Journal Armed Forces Of India 2000 ; 56(3): 192-4.

30. Vellappally S, Jacob V, Smejkalová J, Shriharsha P, Kumar V, Fiala Z. Tobacco habits and oral health status in selected Indian population. Cent Eur J Public Health. 2008 Jun;16(2):77-84. doi: 10.21101/cejph.a3448. PMID: 18661810.

31. Bhansali S, Tripathi A, Tiwari SC, Singh SV. A study of the prosthodontic and oral health needs of an ageing psychiatric population. Gerodontology. 2008 Jun;25(2):113-7. doi: 10.1111/j.1741-2358.2007.00209.x. Epub 2008 Feb 18. PMID: 18282147.

32. Avasthi A, Veeresha KL, Bilal D. Oral Health Status of Middle-Aged (45-55 Years) Rural Women: A Cross-Sectional Study from North India. Contemp Clin Dent. 2019 Oct-Dec;10(4):595-599. doi: 10.4103/ccd.ccd_625_18. PMID: 32792816; PMCID: PMC7390430.

33. Deepa Susan, Daniel. Oral Health Status and its Correlates in a Coastal Community in Thiruvananthapuram district, Kerala

34. Avani Modi[1] , Dheeraj Kalra[2] , Purvi Bhate[3] , Rashmi Sakharkar[4]. Assessment of Oral Health Status & Association of Caries Experience, Oral Hygiene and Dental Plaque with Tobacco Habits: A Cross Sectional Analytical Study. Indian Journal of Contemporary Dentistry, January-June 2020, Vol.8, No.1

35. Akrad ZT, Beitollahi JM, Khajetorab AA. DMFT (Decayed, Missing, Filled, Teeth) Oral health index in sweets and cable industry workers. Iran J Public Health 2006;35:64-8.

36. Masalin K, Murtomaa H. Work-related behavioral and dental risk factors among confectionery workers. Scand J Work Environ Health 1992;18:388-92

37. Srikandi TW, Clarke NG. Periodontal status in a South Australian industrial population. Community Dent Oral Epidemiol 1982;10:272-5.

38. Hamasha AA, Sasa I, Al-Qudah M. Risk indicators associated with tooth loss in Jordanian adults. Community Dent Oral Epidemiol 2000;28:67-72

39. Kawamura M, Iwamoto Y. Present state of dental health knowledge, attitudes/behaviour and perceived oral health of Japanese employees. Int Dent J 1999;49:173-81.

40. Bachanek T, Pawlowicz A, Tarczydlo B, Chalas R. Evaluation of dental health in mill workers. Part I. The state of dentition. Ann Agric Environ Med 2001;8:103-5

41. Tomita NE, Chinellato LE, Lauris JR, Kussano CM, Mendes HJ, Cardoso MT. Oral health of building construction workers. J Appl Oral Sci 2005;13:252-61.

42. Masalin KE, Murtomaa HT, Sipila KP. Dental caries risk in relation to dietary habits and dental services in two industrial populations. J Public Health Dent 1994;54:160-6.

43. Dilip CL. Health status, treatment requirements, knowledge and attitude towards oral health of police recruits in Karnataka. J Indian Assoc Public Health Dent 2005;5:20-34.

44. Reddy S, Reddy C. Oral Health Status and Treatment Needs of Karnataka State Road Transport Corporation Drivers and Employees in Mysore Division .J Indian Assoc Public Health Dent 2010;8:221-227

45. Global Adult Tobacco Survey. Global Adult Tobacco Survey: Fact Sheet, Maharashtra 2016-17 Global Adult Tobacco Survey. 2017. Available from: http://wwwwhoint/tobacco/surveillance/survey /gats/GATS_Mahrashtra_2016-17_FactSheetpdf

46. World Health Organization. MPOWER: A policy package to reverse the tobacco epidemic. Geneva: World Health Organization; 2008.

47. WHO report on the Global Tobacco Epidemic, 2009: Implementing Smoke-Free Environments. Geneva, World Health Organization, 2009.http://www.who.int/tobacco/publications/gender/en.tfi.g ender.women.prevalence.tobacco.use.pdf

48. Singh A, Ladusingh L. Prevalence and determinants of tobacco use in India: Evidence from recent global adult tobacco survey data. PLoS One. 2014;9:e114073.

49. Bhatt B, Seema MS. Occupational health hazards: A study of bus drivers. J Health Manage. 2012;14:201–6.

50. Subba SH, Binu VS, Menezes RG, Ninan J, Rana MS. Tobacco chewing and associated factors among youth of Western Nepal: A cross-sectional study. Indian J Community Med. 2011;36:128–32.

51. Lalithambigai G, Rao A, Rajesh G, Ramya S, Pai BM. Predictors of cigarette smoking among young adults in Mangalore, India. Asian Pac J Cancer Prev. 2016;17:45–50.

52. Gupta B, Kumar N. A cross-country comparison of knowledge, attitudes and practices about tobacco use: Findings from the global adult tobacco survey. Asian Pac J Cancer Prev. 2014;15:5035–42.

53. Prabhakar B, Narake SS, Pednekar MS. Social disparities in tobacco use in India: The roles of occupation, education and gender. Indian J Cancer. 2012;49:401–9

54. Jesus MC, Silva MH, Cordeiro SM, Kortchmar E, Zampier VS, Merighi MA. Understanding unsuccessful attempts to quit smoking: A social phenomenology approach. Rev Esc Enferm USP

55. Echer IC, Corrêa AP, Lucena AF, Ferreira SA, Knorst MM. Prevalence of smoking among employees of a university hospital. Rev Lat Am Enfermagem. 2011;19:179–86

56. Knapp MJ. Advancement of dentistry through Army research. J Am Dent Assoc. 1969 Dec;79(6):1388-94.

ANNEXURES

ANNEXURE 1- ETHICAL CLEARANCE

Research and Ethics Committee
KLE V K INSTITUTE OF DENTAL SCIENCES
KLE University

Accredited 'A' Grade by NAAC Placed in Category 'A' by MHRD (GoI)

Nehru Nagar, Belagavi - 590 010, Karnataka State

☎: 0831-2470362
FAX: 0831-2470640

Web: http://www.kledental-bgm.edu.in
E-mail:principal@kledental-bgm.edu.in

Sl. No. : 1305

CERTIFICATE

This is to Certify that the synopsis titled

ASSESSMENT OF ORAL HEALTH STATUS & TOBACCO - RELATED HABITS AMONG THE EMPLOYEES OF NWKRTC, BELGAVI CITY - A CROSS SECTIONAL STUDY *Submitted by*

Dr. ABHRA ROY CHOUDHURY *P. G. Student / Staff, Guided by* DR. MAHANTESH SIDDIBHAVI *from Department of* PUBLIC HEALTH DENTISTRY *has been critically evaluated by committee members and granted ethical clearance to conduct the above mentioned study*

Date :

Member Secretary
Research and Ethical Committee
KLEVK Institute of Dental Sciences
Belagavi

Research & Ethical Committee
KLEVK Institute of Dental Sciences
BELAGAVI.

Chairman
Research and Ethical Committee
KLEVK Institute of Dental Sciences
Belagavi

Chairman
Research and Ethical Committee
KLE VK Institute of Dental Sciences
Belgaum

ANNEXURE 2- INFORMED CONSENT IN KANNADA

ಒಪ್ಪಿಗೆ ಪತ್ರ

ಸಾರ್ವಜನಿಕ ಆರೋಗ್ಯ ದಂತ ಇಲಾಖೆ

ಕೆಎಲ್ ವಿಕೆ ಇನ್ಸ್ಟಿಟ್ಯೂಟ್ ಆಫ್ ಡೆಂಟಲ್ ಸೈನ್ಸಸ್, ನೆಹರೂ ನಗರ, ಬೆಳಗಾವಿ

ಬೆಳಗಾವಿ ನಗರದ ಎನ್ ಡಬ್ಲ್ಯೂಕೆಆರ್ ಟಿಸಿ ನೌಕರರಲ್ಲಿ ಬಾಯಿಯ ಆರೋಗ್ಯ ಸ್ಥಿತಿ ಮತ್ತು ತಂಬಾಕು ಸಂಬಂಧಿತ ಅಭ್ಯಾಸದ ಮೌಲ್ಯಮಾಪನ.

ನನಗೆ ಅರ್ಥವಾಗುವ ಭಾಷೆಯಲ್ಲಿ ಅಧ್ಯಯನದಲ್ಲಿ ನನ್ನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ನನಗೆ ಮಾಹಿತಿ ನೀಡಲಾಗಿದೆ.

1. ನನ್ನ ವೈಯಕ್ತಿಕ ವಿವರಗಳಾದ ಹೆಸರು, ವಯಸ್ಸು, ಲಿಂಗ, ವಿಳಾಸ, ಹಿಂದಿನ ಹಲ್ಲಿನ ಇತಿಹಾಸ ಮತ್ತು ಅಧ್ಯಯನಕ್ಕೆ ಬೇಕಾದ ವಿವರಗಳನ್ನು ನನ್ನ ಜ್ಞಾನದ ಅತ್ಯುತ್ತಮವಾಗಿ ನೀಡಲು ನಾನು ಒಪ್ಪುತ್ತೇನೆ.

2. ನನ್ನ ಇಂಟ್ರಾ ಮೌಖಿಕ ಮತ್ತು ಹೆಚ್ಚುವರಿ ಮೌಖಿಕ ಪರೀಕ್ಷೆಗೆ ನಾನು ದಂತವೈದ್ಯರೊಂದಿಗೆ ಸಹಕರಿಸುತ್ತೇನೆ.

3. ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ದಂತವೈದ್ಯರು ನೀಡಿದ ಸೂಚನೆಗಳನ್ನು ನಾನು ಅನುಸರಿಸುತ್ತೇನೆ.

4. ದಂತವೈದ್ಯರಿಗೆ ನನ್ನ ಛಾಯಾಚಿತ್ರಗಳನ್ನು ಅಥವಾ ಯಾವುದೇ ಅಸಹಜತೆ / ಲೆಸಿಯಾನ್ ಅನ್ನು ಅಧ್ಯಯನ ಮತ್ತು ಸಂಶೋಧನಾ ಉದ್ದೇಶಕ್ಕಾಗಿ ಬಳಸಲು ನಾನು ಅನುಮತಿ ನೀಡುತ್ತೇನೆ

5. ನಾನು ನೀಡಿದ ಮಾಹಿತಿಯನ್ನು ಮತ್ತು ಈ ಅಧ್ಯಯನದಿಂದ ಪಡೆದ ಫಲಿತಾಂಶಗಳನ್ನು ಪ್ರಸ್ತುತಿ ಮತ್ತು ಪ್ರಕಟಣೆಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಲು ಆಪರೇಟರ್‌ಗೆ ನಾನು ಅನುಮತಿ ನೀಡುತ್ತೇನೆ.

6. ಅಧ್ಯಯನದಲ್ಲಿ ನನ್ನ ಸಹಕಾರಕ್ಕಾಗಿ ಯಾವುದೇ ಆದಾಯವನ್ನು ನಾನು ಪಡೆಯುವುದಿಲ್ಲ, ಅದನ್ನು ಯಾವುದೇ ಸಂಸ್ಥೆ ಪ್ರಾಯೋಜಿಸುತ್ತಿದ್ದರೂ ಸಹ. ನಾನು ನನ್ನ ಸ್ವಂತ ಇಚ್ಛೆ ಶಕ್ತಿ ಮತ್ತು ಆಶಯದೊಂದಿಗೆ ಭಾಗವಹಿಸುತ್ತಿದ್ದೇನೆ.

7. ಯಾವುದೇ ಕಾರಣಕ್ಕಾಗಿ ನಾನು ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಸಾಧ್ಯವಾಗದಿದ್ದರೆ, ಅಪರಿಚಿತ ಕಾರಣಗಳಿಗಾಗಿ, ನಾನು ಅಧ್ಯಯನದಿಂದ ಹಿಂದೆ ಸರಿಯಬಹುದು.

ಅಧ್ಯಯನದ ಬಗ್ಗೆ ವೈದ್ಯರು ನೀಡಿದ ಮೇಲಿನ ಮಾಹಿತಿಯನ್ನು ನಾನು ಓದಿದ್ದೇನೆ ಮತ್ತು ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ.

ನಾನು ಈ ಅರ್ಜಿಯನ್ನು ನಮೂದಿಸಿ ಸಹಿ ಮಾಡಿದ್ದೇನೆ

ದಂತವೈದ್ಯರ ಹೆಸರು:

ದೂರವಾಣಿ ಸಂಖ್ಯೆ **ಭಾಗವಹಿಸುವವರ ಸಹಿ**

ದಂತವೈದ್ಯರ ಸಹಿ:

ಮಾರ್ಗದರ್ಶಿ ಹೆಸರು

ಫೋನ್ ಸಂಖ್ಯೆಯನ್ನು ಮಾರ್ಗದರ್ಶನ ಮಾಡಿ

ANNEXURE 3- SELF-DESIGNED QUESTIONNAIRE

Assessment of Oral health status with treatment needs and tobacco-related habits among the employees of NWKRTC, Belagavi city.

DETAILS

s.no	Question	Response
1.	Name	
2.	Working hours	
3.	Income	

ORAL HYGIENE PRACTICES

s.no	Question	Practices
1.	How do you clean your teeth?	1.Brush 2.Finger 3.Datum 4.Others
2.	How often do you clean your teeth?	1.Once 2.Twice 3. After every meal 4.Don't clean everyday
3.	When do you clean your teeth?	1.Morning only 2.Night only 3.Morning and night
4.	What agent do you use to clean your teeth?	1.Toothpaste 2.Tooth powder 3.Others (specify)
5.	Name of your tooth paste/powder?	Name of the tooth paste brand-
6.	How often do you change your tooth brush?	1.1-3 months 2.4-6 months 3.6-12 months

ADVERSE HABITS

1. Do you consume tobacco – yes / No

2. If yes – In which form they use tobacco and frequency per day

	Frequency (per day)	Duration
Cigarettes		
Bidi		
Pan (Quid)		
Chewing tobacco(Guthka)		
Khaini		
Combination of different tobacco products.		

3.Do you consume alcohol?- Yes / No.

If yes –How frequently do you consume alcohol?

- Daily
- Twice a week
- More than twice a week

4. What is the quantityand durationof consuming alcohol?

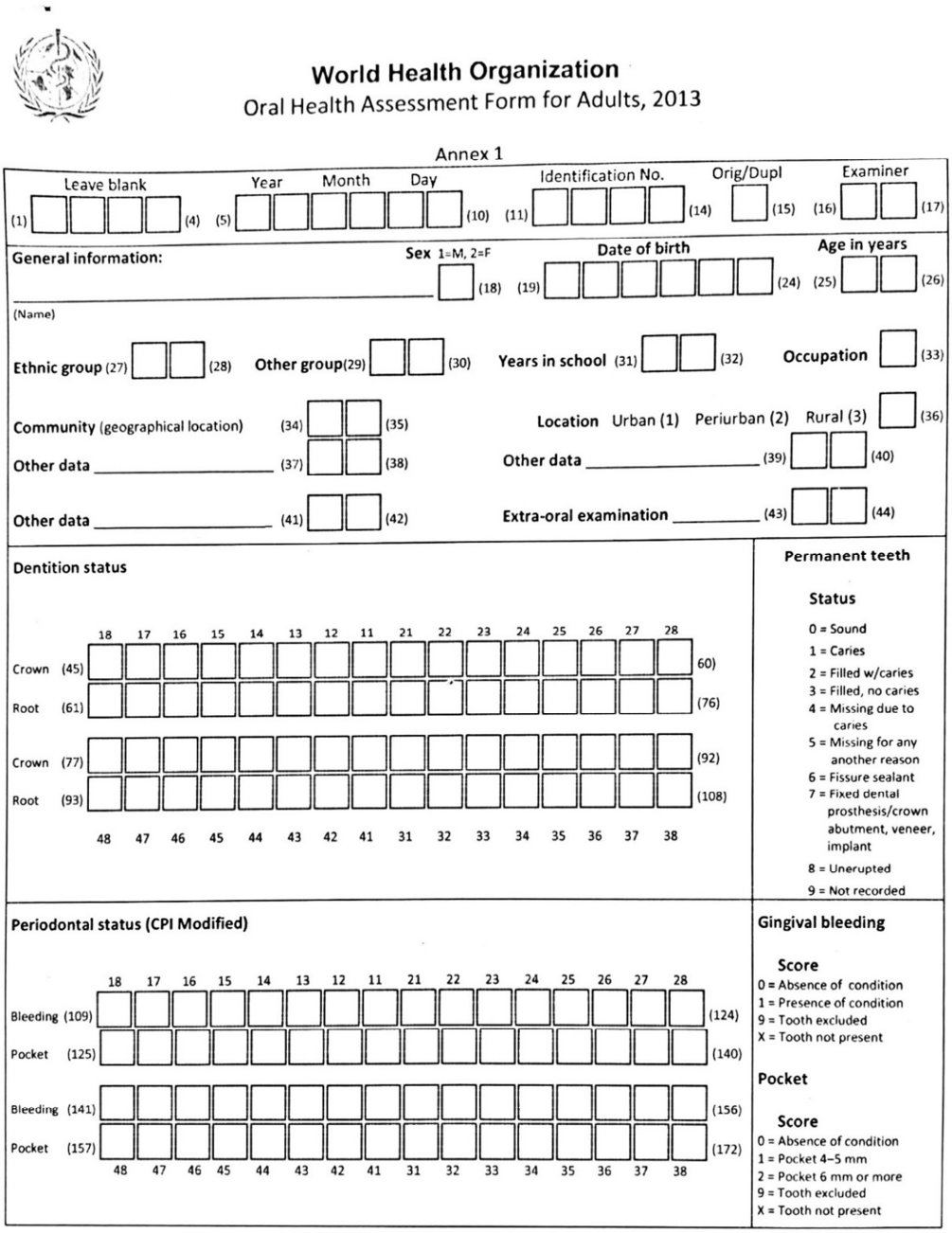
	Quantity	Duration
Alcohol		

5. Have you tried quitting in the past? Yes / No.

If yes – why

- Receiving advice to quit tobacco from dentist/ doctor
- Noticing anti-tobacco ill-effects information from newspapers/ magazines/ television.
- Noticing health warnings on tobacco packets/sachets.
- Noticing anti-tobacco information on stores.

ANNEXURE IV- WHO ORAL HEALTH ASSESSMENT FORM 2013



World Health Organization

Oral Health Assessment Form for Adults, 2013

Annex 1

Leave blank (1) (4) (5) Year Month Day (10) (11) Identification No. (14) Orig/Dupl (15) (16) Examiner (17)

General information: Sex 1=M, 2=F (18) (19) Date of birth (24) Age in years (25) (26)

(Name)

Ethnic group (27) (28) Other group(29) (30) Years in school (31) (32) Occupation (33)

Community (geographical location) (34) (35) Location Urban (1) Periurban (2) Rural (3) (36)

Other data (37) (38) Other data (39) (40)

Other data (41) (42) Extra-oral examination (43) (44)

Dentition status

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Crown (45)																	(60)
Root (61)																	(76)
Crown (77)																	(92)
Root (93)																	(108)
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Permanent teeth

Status

0 = Sound
1 = Caries
2 = Filled w/caries
3 = Filled, no caries
4 = Missing due to caries
5 = Missing for any another reason
6 = Fissure sealant
7 = Fixed dental prosthesis/crown abutment, veneer, implant
8 = Unerupted
9 = Not recorded

Periodontal status (CPI Modified)

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Bleeding (109)																	(124)
Pocket (125)																	(140)
Bleeding (141)																	(156)
Pocket (157)																	(172)
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Gingival bleeding

Score

0 = Absence of condition
1 = Presence of condition
9 = Tooth excluded
X = Tooth not present

Pocket

Score

0 = Absence of condition
1 = Pocket 4–5 mm
2 = Pocket 6 mm or more
9 = Tooth excluded
X = Tooth not present

Loss of attachment

Severity
0 = 0–3 mm
1 = 4–5 mm Cemento-enamel junction (CEJ) within black band
2 = 6–8 mm CEJ between upper limit of black band and 8.5 mm ring
3 = 9–11 mm CEJ between 8.5 mm and 11.5 mm ring
4 = 12 mm or more CEJ beyond 11.5 mm ring
X = Excluded sextant
9 = Not recorded

* Not recorded under 15 years of age

Index teeth

17/16 11 26/27
(173) (175)
(176) (178)
47/46 31 36/37

Enamel fluorosis (179)

Severity
0 = Normal
1 = Questionable
2 = Very mild
3 = Mild
4 = Moderate
5 = Severe
8 = Excluded (crown, restoration, "bracket")
9 = Not recorded (unerupted tooth)

Dental erosion

Severity (180)

0 = No sign of erosion
1 = Enamel lesion
2 = Dentinal lesion
3 = Pulp involvement

Number of teeth affected

(181) (182)

Dental trauma

Status (183)

0 = No sign of injury
1 = Treated injury
2 = Enamel fracture only
3 = Enamel and dentine fracture
4 = Pulp involvement
5 = Missing tooth due to trauma
6 = Other damage
9 = Excluded tooth

Number of teeth affected

(184) (185)

Oral mucosal lesions

(186)
(187)
(188)
(189)
(190)
(191)

Condition

0 = No abnormal condition
1 = Malignant tumour (oral cancer)
2 = Leukoplakia
3 = Lichen planus
4 = Ulceration (aphthous, herpetic, traumatic)
5 = Acute necrotizing ulcerative gingivitis (ANUG)
6 = Candidiasis
7 = Abscess
8 = Other condition (specify if possible)
9 = Not recorded

Location

0 = Vermillion border
1 = Commissures
2 = Lips
3 = Sulci
4 = Buccal mucosa
5 = Floor of the mouth
6 = Tongue
7 = Hard and/or soft palate
8 = Alveolar ridges/gingiva
9 = Not recorded

Denture(s)

Upper (192) **Lower** (193)

Status

0 = No denture
1 = Partial denture
2 = Complete denture
9 = Not recorded

Intervention urgency (194)

0 = No treatment needed
1 = Preventive or routine treatment needed
2 = Prompt treatment (including scaling) needed
3 = Immediate (urgent) treatment needed due to pain or infection of dental and/or oral origin
4 = Referred for comprehensive evaluation or medical/dental treatment (systemic condition)

ANNEXURE V- DETAILS OF WHO ORAL HEALTH ASSESSMENT FORM 2013

Identification and general information sections of the form

Boxes 1-4 : were not filled as they are reserved for the WHO's country code.

Boxes 5-10: were used for recording the year, month and day of the examination.

Boxes 11-14: were used for the identification numbers of the subjects in a serial order.

Box 15: Was used to record original and duplicate examination. Code 0 was used for original and 1 for duplicate examination which was performed for 10% of the subjects selected randomly to assess the intra examiner reliability.

Box 16-17: were used to record the examiner code. Since only one examiner did the entire survey the code was recorded as 1.

Name: The name of the subject was written in the space provided.

Boxes 18- was used to record the sex of the participant.

Boxes 19-24: were used to record the date of the birth of the subject.

Boxes 25-26: were used to record the age of the subject.

Box 27-28: was used to record the ethnic group of the subject. A coding criteria was developed as follows

0 – Hindu

1 – Muslim

2- Sikh

3- Christian

4- Others

9- Not recorded

Box 29-30: was used to identify and record other subpopulation group.

Box 31-32: Was used for assessment of the level of education, which is important factor in the analysis of oral health.

Box 33- was used to record the occupation based on their work.

0 –Bus Driver

1 -Conductor

9- Not recorded.

Boxes 34-35: were not used as the survey was done at a single site.

Box 36: was not used as the all subjects were from the same area (Urban).

Box 37-42: These boxes were used for recording other information about the subjects examined

It was used for recording the Oral Hygiene Practices of the subjects. The coding system was developed as follows

0- Use of Brush and Fluoridated Tooth Paste Once a Day

1- Use of Brush and Fluoridated Tooth Paste Twice a Day

2- Use of Brush and Non - Fluoridated Tooth Paste Once a Day

3- Use of Brush and Non - Fluoridated Tooth Paste Twice a Day

4- Use of Other Oral Hygiene Practices

9- Not Recorded

The participants were enquired into the type of oral hygiene practices they used. Though most of them were not aware of the type of paste they were using i.e. Fluoridated or Non Fluoridated, they told the brand name of the tooth paste being used. The examiner had a list of commonly available tooth pastes and gave appropriate codes to the paste being used.

It was used for recording various habits like Smoking, Tobacco Chewing and Alcohol Consumption. The coding system was developed as follows

0- No habit

1- Alcohol consumption

2- Smoking

3- Use of smokeless tobacco

4- Smoking and smokeless tobacco consumption

5- Smoking and alcohol consumption

6- Smokeless tobacco and alcohol consumption

7- All three habits

9- Not recorded

The subjects were interviewed about their habits and proper codes recorded. Additionally, two boxes were reserved for recording any abnormality identified by the examiner during extra-oral exam

Box 43-44: Clinical examination was done to record any evident abnormality of the tissues of the face, nose, cheek or chin.

Condition (Box 43)

0 = Normal

1 = Ulceration, sores

2 = Erosions

3 = Fissures

4 = Cancrum oris

5 = Enlarged lymph nodes

6 = Any other abnormalities

9 = Not recorded

Location **(Box 44)**

1 = Face

2 = Neck

3 = Nose

4 = Cheeks

5 = Chin

6 = Commissures

7 = Vermillion border

8 = Jaws

Box 45-108: Dentition status in the Oral Health Assessment form for Adults, 2013.

45-76: for upper teeth

77-108: for lower teeth

The codes and criteria used were

0- Sound crown: A crown was recorded as sound if it showed no evidence of treated or untreated clinical caries. The stages of caries that precede cavitation, as well as other conditions similar to the early stages of caries were excluded because they cannot be reliably diagnosed. A crown with the following criteria in absence of other positive criteria was recorded as sound.

a) White chalky spots
b) Discolored or rough spots that are not soft to touch with metal CPI probe
c) Stained pits and fissures in the enamel, or softening of the floor or walls detectable with CPI probe
d) Dark shiny hard pitted areas of enamel in a tooth showing signs of moderate to severe fluorosis
e) Lesions that on the basis of their distribution or history or visual tactile examination appear to be due to abrasion

Sound root : A root was recorded as sound when it was exposed and showed no evidence of treated or untreated clinical caries

1- Decayed crown: Caries was recorded as present when a lesion in a pit or fissure or on a smooth tooth surface had an unmistakable cavity, undermined enamel or a detectably softened floor or wall. A tooth with a temporary filling or one which was sealed but also decayed was also included in this category.

Decayed root: Caries was recorded as present when a lesion felt soft or leathery to probing with the CPI probe.

2 - Filled crown with decay: A crown was considered filled, with decay, when it had one or more permanent restorations and one or more areas that were decayed.

Filled root with decay: A root was considered filled with decay when it had one or more permanent restorations and one or more areas that are decayed.

3- Filled crown with no decay: A crown was considered filled, without decay, when one or more permanent restorations were present and there was no caries anywhere on the crown. A tooth that had been crowned because of previous decay was recorded in this category.

Filled root with no decay: A root was considered filled without decay when one or more permanent restorations were present and there was no caries anywhere on the root.

4- Missing tooth, as a result of caries: This code was used for permanent teeth that had been extracted because of caries.

5 - Permanent tooth missing due to any other reason: This code was used for permanent teeth judged to be absent congenitally or extracted for orthodontic reasons or because of periodontal disease, trauma etc.

6- Fissure sealant: This code was used for teeth in which a fissure sealant had been placed on the occlusal surface or for teeth in which the occlusal fissure had been enlarged with a rounded or "flame-shaped" bur and a composite material placed.

7- Bridge abutment special crown or veneer: This code was used to indicate that a tooth forms part of a fixed bridge i.e. is a bridge abutment. This code was also used for crowns placed for reasons other than caries and for veneers or laminates covering the labial surface of a tooth on which there was no evidence of caries or a restoration.

Implant: This was used under root status to indicate that an implant had been placed as an abutment

8- Unerupted crown: This classification was restricted to permanent teeth and was used only for a tooth space with an unerupted permanent tooth but without a primary tooth.

Unexposed root: This code indicated that the root surface was not exposed i.e. there was no gingival recession

T - Trauma (fracture): A crown was scored as fractured when some of its surface was missing as a result of trauma and there was no evidence of caries

9- Not recorded: This code was used for any erupted permanent tooth that could not be examined for any reason (e.g. because of orthodontic bands, severe hypoplasias etc).

Box 109-124 and 141-156: Scoring for gingival bleeding in the Oral Health Assessment Form for Adults, 2013

0 = Absence of condition

1 = Presence of condition

9 = Tooth excluded

X = Tooth not present

Box 125-140 and 157-172: Scoring for Pocket scores in the Oral Health Assessment Form for Adults, 2013.

0 = Absence of condition

1 = Pocket 4–5 mm

2 = Pocket 6 mm or more

9 = Tooth excluded

X = Tooth not present

Box 173-178: Scoring for Loss of Attachment in the Oral Health Assessment Forms for Adults, 2013

These boxes were used to record the Loss of Attachment of the six sextants. Information on loss of attachment was collected from index teeth in order to obtain an estimate of the life time accumulated destruction of the periodontal attachment. The following codes and criteria were used.

0- Loss of attachment 0-3 mm (CEJ not visible and CPI score 0-3)

1- Loss of attachment 4-5 mm (CEJ within the black band)

2- Loss of attachment 6-8 mm (CEJ between the upper limit of the black band and the 8.5 mm ring)

3- Loss of attachment 9-11 mm (CEJ between the 8.5 mm and 11.5 mm ring)

4- Loss of attachment 12 mm or more (CEJ beyond the 11.5 mm ring)

X- Excluded sextant

9- Not recorded CEJ neither visible nor detectable

Box 179: used to detect dental fluorosis using Dean's Fluorosis Index.

The recording was made on the basis of the two teeth that were most affected. If the two teeth were not equally affected, the score for the lesser affected of the two was recorded. The examination started at the higher end of the index i.e. – "Severe" and eliminated each score until arrived at the condition present. In case of doubt the lower score was given. The codes and criteria used were

0- Normal: The enamel surface was smooth, glossy and usually a pale creamy white color.

1- Questionable: The enamel showed slight aberrations from the translucency of normal enamel, which ranged from few white specks to occasional spots.

2- Very mild: Small, opaque, paper white areas scattered irregularly over the tooth but involving less than 25% of the labial tooth surface.

3- Mild: The white opacity of the enamel of the tooth was more extensive than for code 2 but covered less than 50% of the tooth surface.

4- Moderate: The enamel surface of the teeth showed marked wear and brown stain was frequently a disfiguring feature.

5- Severe: The enamel surfaces were badly affected and hypoplasia was so marked that the general form of the tooth was affected. There were pitted or worn areas and brown stains were wide spread; the teeth often had a corroded experience.

6- Excluded (e.g. crowned tooth)

9- Not Recorded

Box 180-182: Used to record dental erosion

Enamel tissue which might be lost by exposure to acids which may come from dietary sources or may be intrinsic, i.e. in individuals suffering from bulimia, gastro-

esophageal reflux or heavy alcohol consumption and chronic vomit. The following codes

0 = No sign of erosion

1–3 are used where the crown of a tooth shows an erosion lesion at different levels:

1 = Enamel lesion

2 = Dentinal lesion

3 = Pulp involvement

Box 183-185: Used to record traumatic Dental injuries

Teeth affected by dental trauma are coded as follows:

0 = No sign of injury

1 = Treated injury

2 = Enamel fracture only (Plate 47)

3 = Enamel and dentine fracture (Plate 48)

4 = Pulp involvement (Plate 49)

5 = Missing tooth due to trauma (Plate 50)

6 = Other damage

9 = Excluded tooth

Box 186-191: Used to record Oral mucosal lesion

An examination of the oral mucosa and soft tissues in and around the mouth was made on every subject. The examination was thorough and systemic and was performed in the following sequence:

(a) Labial mucosa and labial sulci (upper and lower)

(b) Labial part of the commissures and buccal mucosa (right and left)

(c) Tongue (dorsal and ventral surfaces, margins)

(d) Floor of the mouth

(e) Hard and soft palate

(f) Alveolar ridges/gingiva (upper and lower)

Boxes 186–188 should be used to record the absence, presence, or suspected presence of the conditions coded 1–7. Examiners should be alert to, and can make a tentative diagnosis for, these conditions during clinical examination. Code 8 should be used to record a condition not mentioned in the list; for example, hairy leukoplakia or Kaposi sarcoma. Whenever possible, the tentative diagnosis should be specified in the space provided, for up to three conditions

The codes and criteria used to record the nature of the lesion in boxes 186-188 were

0- No abnormal condition

1- Malignant tumour (oral cancer)

2- Leukoplakia

3- Lichen planus

4- Ulceration (apthous, herpetic, traumatic)

5- Acute necrotizing gingivitis

6- Candidiasis

7- Abscess

8- Other condition

9- Not recorded

The main location of the oral mucosal lesion(s) were recorded in boxes 189-191 as follows:

0- Vermillion border

1- Commissures

2- Lips

3- Sulci

4- Buccal mucosa

5- Floor of mouth

6- Tongue

7- Hard and/or soft palate

8- Alveolar ridges/gingiva

9- Not recorded

Box 192-193: Used to record Denture Status

The presence of removable dentures should be recorded for each jaw (Box 192, upper jaw; Box 193, lower jaw). The codes are as follows:

0 = No denture

1 = Partial denture

2 = Complete denture

9 = Not recorded

The following intervention urgency codes are recommended:

0 = No treatment needed

1 = Preventive or routine treatment needed

2 = Prompt treatment including scaling needed

3 = Immediate (urgent) treatment needed due to pain or infection of dental and/or oral origin

4 = Referred for comprehensive evaluation or medical/dental treatment