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A study on assessment of oral hygiene status and practices among community dwellers of Peenya 2nd stage, Bangalore

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Abstract

Background and Objective: Oral diseases are topping the list of some common diseases in the world. Poor oral hygiene is a known important predisposing factor of some oral diseases. Thus, the present study was conducted to assess the oral hygiene status and practices, to create oral health awareness and to suggest measures for improving oral health status among the community dwellers of Peenya 2nd stage, Bangalore.

Methods: The present study was descriptive cross sectional community based study conducted in Peenya 2nd stage locality of Bangalore. A total of 400 subjects were included. A predesigned, pretested, structured schedule consisting of questions on various aspects regarding socio-demographic profile, oral hygiene, oral health problems and practices were administered to the participants fulfilling inclusion criteria. Data regarding oral hygiene status were obtained by using Oral Hygiene Index (simplified). SPSS 16.0 software was used for data analysis.

Results: Findings of the study revealed that, Oral hygiene status was good in 23.5% subjects where as 59.7% and 16.8% subjects had fair and poor status respectively. A strong relation was found between oral hygiene status and socioeconomic status. Present study confirmed significant association between oral hygiene status and oral hygiene practices. Prevalence of dental caries, Stains, Calculus and Plaque were found 65.5%, 89.5%, 46.5% and 39.3% respectively. Halitosis/ bad breath was found to be 40.8%. Relationship between sweet consumption and Oral hygiene status was quite significant.

Interpretation and Conclusion: Present study reveals that increasing prevalence of oral diseases and poor oral hygiene and practices among the community dwellers of Peenya 2nd stage highlights that there is an urgent need to enhance oral health and hygiene practices, and along with that the need for dental health programme to target the population at community level is emphasized.

Keywords: oral hygiene; oral health status; practices; Bangalore

Introduction

Oral health is an essential and integral component of overall health throughout life and is much more than just healthy teeth. The mouth is our primary connection to the world. It is how we take in water and nutrients to sustain life, our primary means of communication, the most visible sign of our mood, and a major part of how we appear to others. It is an integral part of human anatomy and plays a major role in our overall physiology. Oral health is a state of being free from chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal disease, tooth decay and tooth loss, and other diseases and disorders that affect the oral cavity^[1, 2]. Oral health is intimately related to the health of the rest of the body. World health organisation (WHO) claimed that poor oral health may have a profound effect on general health as well as quality of life, and several oral diseases are related to chronic diseases. The experience of pain, problems with eating, chewing, smiling and communication due to missing, discoloured or damaged teeth have a major impact on people's daily lives and well-being^[2].

Oro-dental diseases are among the most widespread diseases around the globe with almost every individual experiencing poor oral health at least once in their lifetime^[3, 4]. The most common oral diseases are dental cavities, periodontal (gum) disease, oral cancer, oral infectious diseases, trauma, and hereditary lesions. Oral conditions affect 3.9 billion people globally; the global burden of which increased 20.8% from 1990-2010^[5]. Untreated caries in permanent teeth the most prevalent condition was followed by severe periodontitis and untreated caries in deciduous teeth. Dental caries affects 60-90% of school-age children and most of the adults. Periodontal disease is prevalent in 50-90% of adults, becoming severe in 10-15% of them, while gingival diseases occur in majority of children and adolescents.

Globally, poor oral hygiene occurring due to increasing plaque and calculus deposits with increasing age have been reported among children and adolescents. In India, dental caries affects more than four fifths of children (6-19 years). Prevalence of periodontal diseases ranges from 55% in adolescents to 80% in adults. The incidence of dental plaque in different states varies between 31 and 89%. Severe periodontal (gum) disease, which may result in tooth loss, is found in 15–20% of middle aged (35-44 years) adults. It has been considered an important global oral health burden and in many developing countries its prevalence is increasing, thereby constituting a growing public health problem. Dental plaque is an associated factor for caries and it has been demonstrated that poor oral hygiene contributes to an increased risk of caries. There is a high correlation between poor oral hygiene and the development of periodontal disease [6].

The prevalence of oral disease varies by geographical region, and availability and accessibility of oral health services. Social determinants in oral health are also very strong. Further, the prevalence of oral diseases is increasing in low and middle income countries, and in all countries, the oral disease burden is significantly higher among poor and disadvantaged population groups. In India the prevalence of caries alone is 80% at the age of 12-16 years. Many oral health surveys in various districts of Karnataka revealed that the prevalence of dental caries and other oral diseases was 80-86% in children [7]. Irregular arrangement of teeth, hereditary, brushing habits, unhealthy diet, chocolate consumption, smoking, tobacco use, harmful alcohol use, poor oral hygiene and social determinants are the risk factors for various oro-dental conditions.

There is increasing evidence linking impaired oral hygiene to various health conditions such as pancreatic cancer in men, role of periodontal disease as a risk factor for stroke/TIA, greater prevalence of severe periodontal disease among individuals with type I and II diabetes in the age group 15-24 years of age. There is also increasing evidence that periodontal disease has been associated with low birth weight and pre-term deliveries [8].

Oral diseases in their various forms have afflicted humans since the dawn of the history. A discussion about oral diseases is mentioned in ancient Chinese, Greek, Roman, Egyptian, Arabic and ancient Indian medical and surgical treatises.

Present study was a community based cross sectional survey conducted at Peenya 2nd stage, a place at a distance of about 5 kms from National Institute of Unani Medicine, Bengaluru, to assess the Oral Hygiene Status and Practices among community dwellers. This area comes under urban locality of the city and mainly this is an industrial area of the city. The data was collected from selected households using simple random sampling method. A predesigned, pretested, structured schedule consisting of questions on various aspects of oral hygiene, oral health problems and practices were administered to the participants fulfilling inclusion criteria. Data regarding oral hygiene status were obtained by using Oral Hygiene Index (simplified). Data thus collected were put for statistical analysis.

Materials and Methods

The present study was conducted by the Department of Preventive and Social Medicine, National Institute of Unani

Medicine, Bangalore. Before starting of study, a protocol was put for the ethical clearance, which was approved by the Institutional ethics committee of NIUM. 400 eligible subjects fulfilling the inclusion criteria were selected in this study. Written informed consent was sought from every subject before inclusion in the study. Present study was completed within a period of one year. Before starting the survey, the author/investigator was posted in Dental OPD of NIUM Hospital for one week to learn necessary techniques. Sample size was Calculated as 400 using formula $N = Z_{\alpha/2}^2 \times P \times (1-p) \div D^2 \div E^2$, Where P is the prevalence or proportion of event of interest for study (P=50%), E is the precision or margin of error (E= 10% of P), $Z_{\alpha/2}$ is normal deviation at 5% level of confidence (=1.96) and D is the design effect (which is 1 for simple random sampling).

Method of data collection

The data was collected from selected households using simple random sampling method. Participants from selected households of either gender of all age groups were included while as those who were not willing to be interviewed/examined were excluded. A predesigned, pretested, structured schedule consisting of questions on various aspects of oral hygiene, oral health problems and practices were administered to the participants fulfilling inclusion criteria. Also data were collected from oral health assessment using Oral Hygiene Index- simplified. Clinical examination of all 400 participants was done by investigator himself. General information and information regarding oral hygiene practices and habits were collected by interviews. Clinical examination was done to assess oral mucosal conditions, dental conditions, temporomandibular joints disorder, developmental enamel defects, fluorosis, dental caries status, dental deposits, and oral hygiene.

Instruments used for data collection

Instruments used in present study were; a) Physical Instruments (The instruments used were plane mouth mirror, probes, tweezers, tongue depressors, chemical sterilising solution, surgical gloves, gauze, cotton, torch, and survey proforma), b) Questionnaire (A detailed Questionnaire was used; keeping in view the objectives of the study). Questionnaire was divided into 3 sections. Section A contains information regarding socio-demographic profile, dietary habits addiction, clinical examinations, extra oral examination, temporomandibular Joints assessment, dental fluorosis, dentition status and dental Deposits. Section B contains questions regarding habit of oral hygiene practice like how they clean the teeth, type of tooth brush used, material used to clean the teeth, method of cleaning the teeth whether vertical, circular or horizontal, frequency of cleaning, timing of cleaning, frequency of oral rinsing, use of any other oral hygiene aids, presence or absence of bad breath, dental problems and their relation with general health, frequency of visiting a dentist, knowledge about the condition of teeth and gums, number of visit to a dentist in one year, and reason for visiting to the dentist. Section C of the questionnaire contains criteria for calculating Oral hygiene status. The oral hygiene index has two component, Debris index and Calculus index, each of these indices intern is based on numerical determination representing the amount of debris or calculus found on the preselected tooth surface.

Analysis of Data

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5% level of significance. Chi-square/Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups, Non-parametric setting for Qualitative data analysis. Significant figures in present study include as + (Suggestive significance P value: 0.05<P<0.10), * (Moderately significant P value: 0.01<P ≤ 0.05) and ** (strongly significant P value: P≤0.01). The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

Results

In present study maximum number of subjects, 36.0% (144) were in the age group of 31-40 years followed by 30.3% (121), 19.8% (79), 6.0% (24), 5.0% (20) and 3.0% (12) in the age groups of 21-30 years, 41-50 years, 11-20 years, 51-60 years and above 60 years respectively. Our study subjects comprised predominantly of males 75.7% (303) while remaining 24.3% (97) were females. When the relation was analysed among two genders regarding oral hygiene practices in present study it was shown that males gave good attention to their oral health (P<0.05). In present study maximum number of subjects 55.3% (221) were Hindus, 43.0% (172) were Muslims and 1.7% (7) were Christians. Regarding distribution of subjects studied 83.5% (334) were married and 16.5% (66) were unmarried. Maximum number of subjects 79.8% (319) belonged to Lower Socioeconomic status (upper lower & Lower middle), 18.4% (74) belonged to Upper middle where as only 1.8% (7) belonged to Upper socioeconomic status.

Table 1: Sociodemographic profile of the participants

Demographic Data		No. of Participants (N=400)	%age
Age group	11-20	24	6.0
	21-30	121	30.3
	31-40	144	36.0
	41-50	79	19.7
	51-60	20	5.0
	>60	12	3.0
Gender	Males	303	75.7
	Females	97	24.3
Religion	Hindus	221	55.3
	Muslims	172	43.0
	Christians	7	1.7
Marital Status	Married	334	83.5
	Unmarried	66	16.5
Socio economic status	Upper	7	1.8
	Upper Middle	74	18.4
	Upper Lower	156	39.6
	Lower Middle	163	40.8
Diet	Vegetarians	72	18
	Non- vegetarians	328	82

Present study revealed that 94% (376) had rice as their main food. 4.7% (19) consume wheat as their main food where as only 1.3% (5) had ragi as their main diet. Majority of study subjects were non- vegetarians 82% (328) with only 18% (72) as vegetarians. 9.2% (37) took solid sweet, 0.5% (2) took liquid sweet while as 90% (361) took both types of sweet. 23.8% (95) subjects took sweets during meals and 76.2% (305) subjects took sweet at other time. 90.55% (362) exhibited normal extra oral appearance, 0.7% (3) presented with ulceration, sores erosions and fissures (head & neck), 1.3% (5) showed enlarged lymph nodes and 1.0% (4) subjects presented ulceration, sores erosion, fissures commissures on nose cheeks and chin. Majority of studied subjects 92.0% (368) had normal temporomandibular joint, only 8.0% (32) presented with symptoms while as temporomandibular signs were present in only 1.2% (5) subjects and 98.8% (395) had no signs. Out of the total 100% (400) subjects, the prevalence of dental caries was found to be 65.5% (262). When the relation of dental caries was correlated with sweet consumption the results were found to be significant (p<0.05). Present study revealed that 23.5% (94) subjects were having good Oral Hygiene status 59.7% (239), 16.8% (67) as fair and poor status. Out of 100% (400) subjects

studied, 5.3% (21) used fingers for cleaning their teeth, 94.0% (376) used brush and 0.8% (3) used need stick as aids of cleaning teeth. Majority of subjects 97.3% (389) used tooth paste where as 1.8% (7), 1.0% (4) used tooth power and other materials respectively. 60.8% (243) subjects used fluoridated tooth paste/powder while as remaining 38.5% (154) had no knowledge about it and only 0.8% (3) subjects were using non fluoridated tooth paste. 75.3% (301) subjects clean their teeth only once (morning) where as 24.8% (99) subjects clean their teeth twice in a day (morning & evening). In present study the prevalence of halitosis/bad breath was found to be 40.8%. Among the studied subjects 62.3% (249) thought that their dental problems could affect their general health. Majority of the subjects 92.8% (371) visited dentist only when there was a problem and only 0.8% (3) subjects visited dentist regularly. When asked about the description of teeth and gums 34% (136) subjects said it as average, 11% (44), 20% (80) described the condition as poor and good respectively. 35% (140) subjects had no knowledge about their teeth and gums. When enquired about the reason of their last visit to the dentist, majority 68.3% (273) did not remember the reason, 31.8% (127) subjects visited due to problem in their teeth and gums. Participants were asked

about their routine dental check up during last one year, 31% (124) subjects answered that they went once, 0.5% (2)

subjects said twice and majority of the subjects 68.5% (127) had no routine dental check up for the past one year.

Table 2: Distribution of Subjects according to Teeth and oral hygiene practices.

Teeth and oral hygiene practices	No. of patients (n=400)	%
How do you generally clean your teeth?		
Finger	21	5.3
Brush	376	94.0
Neem Stick	3	0.8
What type of tooth brush do you use?		
Soft	122	30.5
Medium	253	63.2
Hard	25	6.3
What material do you use to clean the teeth?		
Tooth Paste	389	97.3
Tooth powder	7	1.8
Other	4	1.0
Is your tooth paste/ powder		
Fluoridated	243	60.8
Non Fluoridated	3	0.8
Don't Know	154	38.5
Method of tooth cleaning		
Vertical	5	1.3
Horizontal	142	35.5
Circular	252	63.0
How often do you clean your teeth in a day?		
Once	301	75.3
Twice	99	24.8
After every meal	0	0.0
What is your timing of cleaning teeth?		
Morning	297	74.3
Morning and Night	103	25.8
After meal	0	0.0
Frequency of oral rinsing		
After every meal	8	2.0
After major meal	294	73.5
Occasionally	98	24.5
No Response	0	0.0
Do you have any other oral hygiene aids?		
Yes	0	0.0
No	357	89.3
If Yes Specify	43	10.8
Do you have bad breath?		
Yes	163	40.8
No	237	59.3
Do you think dental problems can affect general health?		
Yes	249	62.3
No	1	0.3
Don't know	148	37.0
How often should one visit a dentist?		
Regularly	3	0.8
Whenever there is a problems	371	92.8
Don't know	26	6.5
How would you describe the health of your teeth and gums?		
Poor	44	11
Average	136	34
Good	80	20
Don't know	140	35
How often did you go to the dentist during the last 12 months?		
Once	124	31.0
Twice	2	0.5
Three & more than three times a year	0	0.0
No visit during the last 12 months	274	68.5
What was the reason of your last visit to the dentist?		
Pain/troubles with teeth or gums	127	31.8
It was part of the follow up treatment	0	0.0
Don't remember	273	68.3

When the oral hygiene practices were correlated with oral hygiene status the result were found to be highly significant ($p < 0.001$) in present study. Out of 100 % (21) subjects who used finger for cleaning teeth, among them 66.7% (14) subjects had a poor oral hygiene status, 33.3% (7) subjects showed fair oral hygiene status where as none of the subjects showed good oral hygiene status. Comparatively, out of 100% (376) subjects, who used tooth brush to clean teeth, 60.9% (229) subjects had fair oral hygiene status, 25% (94) subjects had a good oral hygiene status and only

14.1% (53) subjects had poor oral hygiene status. Similarly out of 100 % (389) subjects who use tooth paste as cleaning material for the teeth, 60.2% (234), 24.1% (94) and 15.7% (61) subjects had fair, good and poor oral hygiene status respectively while as those using tooth powder, out of 100% (7) subjects, 85.7% (6) had poor and only 14.3% (1) subjects had good oral hygiene status. Among those subjects who brush twice, 51.5% and 42.4% had good and fair oral hygiene status respectively, where as only 6.1% showed poor oral hygiene status.

Table 3: Association between oral hygiene practices and oral hygiene status

Teeth and oral hygiene practices	Oral Hygiene Status			Total (n=400)	P value
	GOOD 1 (n=94)	FAIR 2 (n=239)	POOR 3 (n=67)		
How do you generally clean your teeth?					
Finger	0(0%)	7(2.9%)	14(20.9%)	21(5.3%)	<0.001**
Brush	94(100%)	229(95.8%)	53(79.1%)	376(94%)	
Neem Stick	0(0%)	3(1.3%)	0(0%)	3(0.8%)	
What material do you use to clean the teeth?					
Tooth Paste	94(100%)	234(97.9%)	61(91%)	389(97.3%)	<0.001**
Tooth powder	0(0%)	1(0.4%)	6(9%)	7(1.8%)	
Other	0(0%)	4(1.7%)	0(0%)	4(1%)	
How often do you clean your teeth in a day?					
Once	43(45.7%)	197(82.4%)	61(91%)	301(75.3%)	<0.001**
Twice	51(54.3%)	42(17.6%)	6(9%)	99(24.8%)	
After every meal	0(0%)	0(0%)	0(0%)	0(0%)	
What is your timing of cleaning teeth?					
Morning	43(45.7%)	193(80.8%)	61(91%)	297(74.3%)	<0.001**
Morning and Night	51(54.3%)	46(19.2%)	6(9%)	103(25.8%)	
After meal	0(0%)	0(0%)	0(0%)	0(0%)	
Frequency of oral rinsing					
After every meal	1(1.1%)	7(2.9%)	0(0%)	8(2%)	<0.001**
After major meal	86(92.5%)	166(69.5%)	41(61.2%)	294(73.5%)	
Occasionally	7(7.4%)	66(27.6%)	26(38.8%)	98(24.5%)	
How often should one visit a dentist?					
Regularly	3(3.1%)	0(0%)	0(0%)	3(0.8%)	0.034*
Whenever there is a problems	89(94.7%)	220(92.1%)	62(92.5%)	371(92.8%)	
Don't know	2(2.2%)	19(7.9%)	5(7.5%)	26(6.5%)	

Association between dietary habits (type of main food) and oral hygiene status in present study showed that the results were insignificant ($p > 0.05$). Relationship between sweet consumption and Oral hygiene status was quite significant ($p < 0.05$). In present study dental deposits distribution of the subject studied showed that, 89.5% (358) presented with stains, 46.5% (186) had calculus and 39.3% (157) had dental plaque.

In our study it was found that dental deposits (stains, calculus & plaque) were present in 100 % of subjects (21) who used finger for cleaning their teeth. Comparatively less number of subjects had dental deposits that used brush or neem stick as an aid for cleaning their teeth. Regarding the type of tooth paste used, whether fluoridated or non fluoridated a significant association was found. 59.3% (229), 48.4% (134) and 56.1% (192) subjects had dental stains, calculus and plaque respectively. Those subjects who clean their teeth only once had 77.2% (298), 86.3% (239) and 80.7% (276) stains, calculus and plaque respectively as compared to those who clean their teeth twice, stains, calculus and plaque was found only in 22.8% (88), 13.7% (38) and 19.3% (66) subjects respectively. These results were found statistically significant ($p < 0.05$). Significant association ($p < 0.05$) was found between the timing of teeth cleaning and occurrence of dental deposits. Those subjects who clean their teeth only in the morning were found to

have 76.2%, 84.8% and 79.5% stains, calculus and plaque respectively compared to those who clean their teeth in the morning as well as evening, the stains, calculus and plaque prevalence was only 23.8%, 15.2% and 20.5% respectively. The higher prevalence of dental stains, calculus and plaque was exhibited among rice consuming subjects. It was 93.8%, 92.8% and 93.3% respectively. These result was statistically not significant ($p > 0.05$). When the habit of eating sweets were correlated with the occurrence of dental stain, calculus and plaque, results were found significant ($p < 0.05$).

Discussion

Oral health touches every aspect of our lives but is often taken for granted. Our mouth is a window into the health of one's body. It can show signs of nutritional deficiencies or general infection. Systemic diseases, those that affect the entire body, may first become apparent because of mouth lesions or other oral problems. World health organisation (WHO) claimed that poor oral health may have a profound effect on general health as well as quality of life, and several oral diseases are related to chronic diseases. Present study was a community based cross sectional survey conducted at Peenya 2nd stage, a place at a distance of about 5 kms from National Institute of Unani Medicine, Bangalore. The study aimed to assess the oral hygiene status and practices, to

create oral health awareness and to suggest measures for improving oral health status in the selected community.

Our study subjects comprised predominantly of males as compared to females. When the relation was analysed among two genders regarding oral hygiene practices in present study it was shown that males gave good attention to their oral health ($P < 0.05$). Study done by Clement C *et al*, showed that females in comparison to males significantly gave good attention to their oral hygiene practices^[108]. In another study done by Berteau P C *et al*, it too showed that female gender is associated with dental care and dental hygiene^[9]. Our study results are contrary to these findings and the reason for this being that in present study the number of male participants was large as compared to females, whereas in the above mentioned studies the male female ratio was almost equal. However the results of the study done by K Fukai *et al*, support the thesis that gender specificities in oral health depend on individual attitudes to oral health and dental utilization^[10]. Maximum number of subjects belonged to lower socioeconomic status (upper lower & lower middle as compared to upper socioeconomic status). The link between socioeconomic status and health, including oral health is well established. Inequalities in socioeconomic status underlie many health disparities in the world, including oral health. Occupational status, income and education are intrinsically related and often serve as measure for each-other. In general, the population groups that suffer the worst oral health status are also those that have the highest poverty rates and the lowest education. Higher income enable people to afford better housing and permit increased access to medical care. In the same time, a high level of education increases the opportunity to engage in oral health-promoting behaviours^[11]. Numerous studies have demonstrated that the health of individuals from the lower end of the socioeconomic scale is markedly worse than that of individuals from the upper end^[12]. This relationship exists across a broad range of health indicators, including dental health^[13]. Study done by Hobdell MH *et al*, also concluded in their study that there is strong relationship between oral diseases (dental caries & periodontal diseases) and socio-economic status^[14]. Further, study done by Taani D *et al*, also found that the oral hygiene, gingival status and dental caries were worse among lower socioeconomic children. Thus, these studies validate our results regarding socioeconomic status of the studied subjects^[15].

Out of the total 100% (400) subjects, the prevalence of dental caries was found to be 65.5% (262). Dental caries remains the most important dental health problem in developing countries. In India the prevalence of dental caries is reported to be about 50-60%. Most of the Indian studies have been carried out in school children and very few in adults. Since present study was carried out at community level which includes children, adults as well as elderly. According to Patro B K *et al*, who conducted the study on the prevalence of dental caries among adults and elderly in an urban resettlement colony of New Delhi, prevalence was found to be above 60%^[16]. Prevalence of dental caries in the age-group of 36-45 years in a study conducted by E. Shubha Poorani *et al*, was found to be 63.4%. In our study also maximum number of subjects 55% (223) belonged to 30-50 years of age group. Thus, our study results are almost similar to these study findings^[17]. When the relation of dental caries was correlated with sweet

consumption the results were found to be significant ($p < 0.05$). In present study 90% (361) subjects consumed sweet in both liquid as well as in solid form. The dietary sugar as well as sweet and confectionary causes caries is rarely disputed although some academic dentists emphasise the importance of the frequency of sugar consumption and the adverse effects of sugary drinks and confectionery rather than sugary foods. Each of these factors enhances the short-term induction of caries. Nevertheless, studies which simply deal with sugar intakes predominantly in food reveal that added sugar, even within food, induces dental caries (Sheiham *et al*, 2014)^[18]. Nidhi and Gupta *et al*, concluded that there is undoubtedly a strong correlation between the two variables (sweet intake & dental caries), with an increase in one factor often leading to an increase in the other. Hence our results are in conformity with their findings^[19].

Present study revealed that 23.5% (94) subjects were having good Oral Hygiene status 59.7% (239), 16.8% (67) as fair and poor status. Our study results are very much in proximity with the findings of Nur-E-Saud *et al*. According to their study results majority of the participants 45.18% had fair oral hygiene status, about 16.66% respondents had good oral hygiene and 38.14% had poor oral hygiene^[20].

Out of the total subjects studied, 5.3% (21) used fingers for cleaning their teeth, 94.0% (376) used brush and 0.8% (3) used need stick as aids of cleaning teeth. Study conducted by Ahad M *et al*, also brought out with the results that 94.4% use tooth brush for cleaning their teeth, though, a small percentage of subjects indicated the use of neem stick and finger. These findings are exactly same with our results^[21].

Majority of subjects 97.3% (389) used tooth paste where as 1.8% (7), 1.0% (4) used tooth power and other materials respectively. 60.8% (243) subjects used fluoridated tooth paste/powder while as remaining 38.5% (154) had no knowledge about it and only 0.8% (3) subjects were using non fluoridated tooth paste. 75.3% (301) subjects clean their teeth only once (morning) where as 24.8% (99) subjects clean their teeth twice in a day (morning & evening). In a cross sectional study conducted by Tomar SP *et al*, frequency of brushing practice showed that 76.6% of subjects perform morning brushing while as morning and evening brushing is done by only 22.7% subjects, tooth paste plus brush was used by 86.7% of subjects and tooth power plus finger by 1%. These findings are almost same to our study findings^[22].

In present study the prevalence of halitosis/bad breath was found to be 40.8%. The prevalence of halitosis, according to the studies published, is between 2% and 44%. According to the American Dental Association, about 50% of the adult population had at least an occasional complaint of oral halitosis. It is estimated that 30% of the world population suffers with this problem regularly. A study evaluated a sample of 2000 Chinese subjects (1000 men and 1000 women), aged between 15 and 64 years, to try to establish the relationship between halitosis and oral health, and social and behavioural factors. The authors found prevalence of halitosis to be 27% in the sample, and the tongue coating and periodontal condition were the main related factors^[23].

According to study done by Nachani S *et al*, nearly more than 50% of the general population has halitosis^[24]. Among the studied subjects 62.3% (249) thought that their dental problems could affect their general health. According to Bulletin of WHO, 74% of 35-44 year olds in Thailand responded that they had daily performances affected by their

oral state: 46% reported their emotional stability was affected [25]. In one more study 61.6% of subjects said that improper oral health will affect their general health (Ahad M *et al*, 2015) [21]. Thus, our data is in similarity with them. Study conducted by Azado CC *et al*, on 154 subjects regarding the oral hygiene practices also showed that majority of the participants 133 (86.4%) cleaned their teeth with toothbrush and toothpaste, 115 (74.7%) indulged in once daily tooth cleaning and 145 (94.2%) have never visited the dentist. These results are closely similar to our study findings [26].

When the oral hygiene practices were correlated with oral hygiene status the result were found to be highly significant ($p<0.001$) in present study. Among those subjects who brush twice, 51.5% and 42.4% had good and fair oral hygiene status respectively, where as only 6.1% showed poor oral hygiene status. Similarly subjects who use tooth paste as cleaning material for the teeth as compared to those who use tooth powder had good oral hygiene status. Our study results are similar with the findings of Aparecida de Menezes *et al*, who concluded in their study that those following good oral hygiene practices claimed good oral hygiene status [27]. A study carried by Praveena S *et al*, in Sullia Taluk of Karnataka also concluded low prevalence of dental carries and good oral hygiene status among children brushing teeth twice and using tooth paste and brush, hence their findings further validate our results [28].

Association between dietary habits (type of main food) and oral hygiene status in present study showed that the results were insignificant ($p>0.05$).

The relationship among eating habits, lifestyle and oral health status of students' conducted by Ariake M *et al*, showed that who ate rice (traditional Japanese-style food, according to their study) for breakfast had less DMFT compared with those who ate other foods, such as bread or noodles. They also analysed in this study that oral health behaviour and nutrition balance of the subjects who ate rice for breakfast was better than that of others. Thus, the relationship of their study confirmed our study results [29].

Relationship between sweet consumption and Oral hygiene status was quite significant ($p<0.05$). It showed that sweet consumption had a significant effect on ones oral health. There is clear and extensive evidence established to prove correlation between frequency and amount of sweets/sugars containing products and prevalence and severity of dental caries, erosion and hence oral hygiene status. In present study dental deposits distribution of the subject studied showed that, out of 100% (400) subjects, 89.5% (358) presented with stains, 46.5% (186) had calculus and 39.3% (157) had dental plaque. Gaikward R S *et al*, and Suneeta Rao *et al*, in two separate studies reported 47.8% of stains and 38.39% calculus respectively which are similar to our findings [30, 31]. Study findings of Ndanu TA *et al*, showed that about 60.0% of their participants had plaque and 64.4% had supra gingival calculus [32]. Our results showed significant association between the frequencies of teeth cleaning and occurrence of dental deposits. Similarly, significant association ($p<0.05$) was found between the timing of teeth cleaning and occurrence of dental deposits. Study done by George J and John J also concluded in their study that Oral health care professionals should motivate patients to brush for longer periods of time. A minimum duration of 2 minutes or more should be advised to the patients instead of 45 seconds. Special emphasis should be

given in motivating all patients to brush of 2 minutes or more for plaque removal [33]. In the present study the direct effects of dietary habits were witnessed among study subjects. The higher prevalence of dental stains, calculus and plaque was exhibited among rice consuming subjects. These result was statistically not significant ($p>0.05$). However, high prevalence of dental deposits among rice consumers could be due the high content of carbohydrates in the rice, which is prone to accept demineralization of the teeth, resulting in dental deposits in beginning and dental caries later.

When the habit of eating sweets were correlated with the occurrence of dental stain, calculus and plaque, results were found significant ($p<0.05$). Significant association between sweet consumption and dental stains, calculus and plaque was found irrespective of frequency and sweet consumption. Saliva plays a major role in protecting the teeth, owing to its cleaning actions as well as its acid neutralizing, antisolubility, and antimicrobial properties. A high secretion rate, together with mastication, helps to eliminate sugars and food particles from the oral cavity. A short clearance time reduces the length of time that sugar is available for acid production by the bacteria in the dental plaque. Lanke LS *et al*, performed studies on the clearance of sugar from saliva to relate the intake of sugar to its availability for bacterial degradation. It was demonstrated that food factors such as sugar concentration, rate of solubilisation, rate of enzymatic degradation, ability to adhere to the teeth, and ability to stimulate salivary flow all affected the rate at which sugar is cleared from saliva [34]. More recent studies have supported this view, revealing slower clearance rates resulting in increased risk for caries in the elderly, during an artificially induced low secretion rate and for individuals with normally low secretion rates [35]. Hence consumption of sweets which contains hefty amount of sugars; this above mentioned mechanism is disturbed. This could be the possible reason that sweet consuming participants presented with higher prevalence of dental deposits and thereby dental caries as suggested by our study findings. Further, it is a well established concept that Sugars present in sweets, readily metabolized by many bacteria involved in dental biofilm formation, generates acid byproducts that can lead to demineralization of the tooth structure.

Conclusion

Oral health means more than just healthy teeth. Oral health affects people physically and psychologically and influences how they grow, look, speak, chew, taste food and socialize, as well as their feelings of social wellbeing. It is fundamental to overall health and quality of life. From the present study it was found that oral hygiene status was good in only small percentage of subjects. A strong relation was found between oral hygiene status and socioeconomic status. Strong relationship between oral hygiene status and oral hygiene practices was also found which predicts that adequate knowledge on the importance of brushing, timing and frequency of brushing, and material to be used for proper cleaning of teeth had a great impact on oral hygiene status. Further it is clear and extensive evidence established to prove correlation between frequency and amount of sweets/sugars containing products and prevalence and severity of dental caries, erosion and hence oral hygiene status. Thus the increasing prevalence of oral diseases and poor oral hygiene and practices among the community

dweller of Peenya 2nd stage highlighted that there is an urgent need to enhance oral health and hygiene practices, and along with that the need for dental health programme to target the population at community level is emphasized. This could be achieved by educating public and school children through health education as well as multipronged, multilevel public health intervention integrating oral health should be instituted.

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