

Oral Health Status and Treatment Needs of Primary and Middle School Teachers of Davangere City, Karnataka State, India

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ABSTRACT

Background and objective: School teachers are among best available health personnel who help in improving the health of the community. Few studies conducted regarding knowledge, attitude and practices of the teachers. There is no available data regarding their oral health status which may cast an indirect impact on the children. Thus, the objective of this study is to assess the Oral Health Status and Treatment Needs of primary and middle school teachers of Davangere city, Karnataka.

Methods: Using stratified random sampling technique, 300 school teachers were selected. Personal data was collected by questionnaire and oral health examination was conducted as per WHO Criteria of 1997. The simplified oral hygiene index (OHI-S), periodontal status (CPI), dental caries status (DMFT) and prosthetic status and treatment needs were recorded and statistically analysed.

Results: Of total 300 teachers examined, 84.3% (n=253) were females and 15.7% (n=47) were males. The results were analysed based on age groups, area of location, education, gender and type of schools. The mean OHI-S score was 2.3 ± 1.2 . OHI-S ($P < 0.001$, HS), DMFT ($P < 0.01$, S), CPI ($P < 0.001$, HS), Prosthetic status and treatment needs ($P < 0.01$, S) scores increased with age. Mean dental caries experience DMFT was 2.3 ± 2.4 and DMFS 4.9 ± 6.7 ($P < 0.001$, HS), 95% needed health education and 38.6% needed complex periodontal therapy. No one was in need of a complete denture and only 19.6% needed partial dentures.

Conclusion: The teachers demonstrates, poor oral hygiene due to lack adequate of knowledge regarding oral hygiene. This study brings out the oral health status and treatment needs related to teachers. There is an imperative need for oral health education to the school teachers to make them help themselves, their students and the community.

INTRODUCTION

In every community and country, children are the most important natural resources. They must be at the very heart of 'development'. To achieve this potential, school children must participate fully in educational activities. To do this they must be healthy, attentive and emotionally secure. School is a location, which helps to promote the health of staff, families and community members along with that of the students^[1]. A school teacher hold influential, community gatekeeper, decision making roles that may affect not only student/family knowledge, but also their opinion and decision about the health are worth, and thus lead implementation of dental public health programs^[2]. It is through them that, children can be reached at the time the health habits are forming^[3].

Teacher's preparedness to teach about the link between personal habits and health outcomes reflect their beliefs about the oral health benefits accruing from carrying out those activities. Strengthening health beliefs in the presence of correct knowledge might successfully promote adoption and maintenance of oral health enhancing behaviours among teachers training, thereby improving their status as role models for the school children^[3]. The advantages of using school personnel are the potentials for reaching all the children for continuity in the instructions, and for integration of health and oral health with other activities and the

low cost of the activity. Thus the teachers undoubtedly become key persons in this activity. However they need proper training and practical support from dentists experienced in public health.

Although many studies are conducted in the field of knowledge, attitude and practices of the school teachers, no study so far is reported regarding their oral health status or their treatment needs. Thus this study is a sincere attempt in that direction to obtain a baseline data regarding “oral health status and treatment needs of primary and middle school teachers of Davangere city, Karnataka”.

Objectives

To assess the oral health status of primary and middle school teachers of Davangere city, Karnataka and to determine the treatment needs of primary and middle school teachers of Davangere city, Karnataka.

METHODOLOGY

The present study is a descriptive cross sectional epidemiological survey. The final sample based on this information, which necessitated 10% of the total schools for the study, 16 schools were picked up using simple random sampling (through random number table) to make 300 teachers. These 16 schools were proportionately allocated to urban, semi urban areas.

From each of the selected schools all the teachers were selected with the following inclusion and exclusion criteria's. Prior to the commencement of the study, permission was obtained from the Deputy Director of Public Instructions (DDPI), Davangere district. The verbal and the written consent were obtained from the concerned school authorities that were chosen for the study. Ethical clearance was obtained from the Ethical Committee of College of Dental Sciences, Davangere, Karnataka.

A pilot study was conducted in two schools. One urban school and one semi urban school with 15 teachers each, to check the feasibility of the survey and to note any difficulties encountered during the examination. All examinations were conducted by single examiner. For the collection of data, a specially designed pre tested proforma was used. The proforma consisted of two sections, the first section was pertaining the questions that included demographic information.

The second section of the proforma consisted of the indices used to assess the oral health by examination of the subject according to Modified assessment of WHO-Basic Oral Health Surveys methodology 1997 Criteria ^[4]. It consisted of Simplified Oral Hygiene Index (OHI-S) 44, Community Periodontal Index (CPI)5, Decayed, Missing and Filled Teeth and Surfaces indices (DMFT and DMFS) 6 and Prosthetic status/treatment needs ^[5].

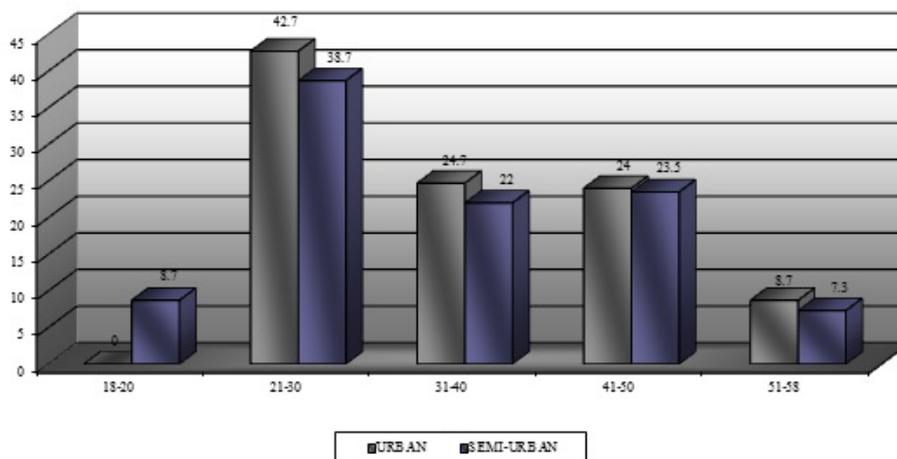
The data collected was arranged systemically, and the information from the collected proforma's were transferred to the computerized excel sheet format which was later analyzed using Statistical Package for Social Sciences (SPSS) and MINITAB (Version IV, USA) software's and the data was subjected to statistical analysis.

Continuous data is presented as mean and standard deviation, and categorical data as numbers and percentages. One-way ANOVA (Analysis of variance), Chi-square test was used for quantitative analysis. $p < 0.05$ was set to be statistically significant (S) and $p < 0.01$ was set to be highly significant (HS).

RESULTS

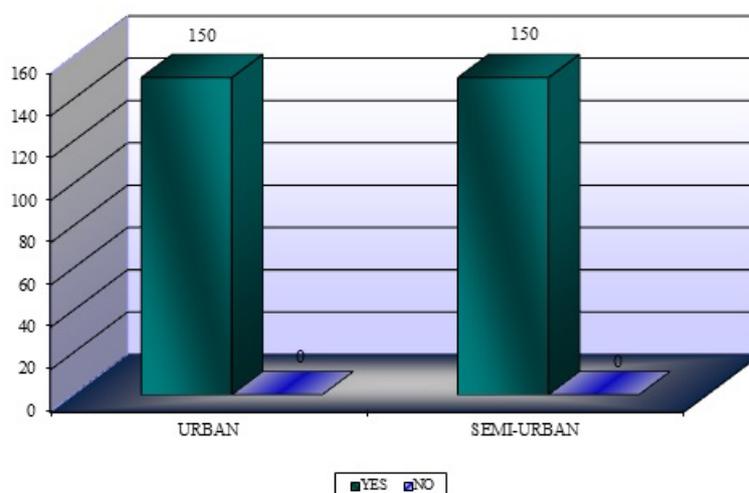
A Total of 300 Teachers who included 150 teachers considered from the urban and 150 from semi-urban area were examined. On completion, the teachers were in between the age group of 18-58 years with mean age being 34.5 years. 47 (15.7%) teachers were males and 253 (84.3%) were females. The study population was categorized into five age groups i.e., the teachers between, 18-20 years, 21-30years, 31-40years, 41-50 years and 51-58 years.

Graph 1 shows the distribution of sample population based on age groups and the locations of the schools. The maximum number of teachers belonged to age group of 21-30 years (40.7%), followed by 41-50 years (23.7%), 31-40 years (23.3%), 51-58 years (8.0%) and 18-21years (4.3%) respectively.



Graph 1. Distribution of study population based on age groups and location.

Graph 2 shows distribution of study population based on their daily oral hygiene maintenance. All the teachers cleaned their teeth every day. Regarding the aids used to clean teeth, 92% (n=138) of the teachers in the urban areas, and 90% (n=135) in the semi-urban area used tooth brush and dentifrice.



Graph 2. Distribution of study population based on their daily oral hygiene maintenance.

The mean OHI-S scores of the study population based on the age groups are displayed in **Table 1**. The mean OHI-S score of the total sample population was found to be 2.3 ± 1.2 . The DI-S, CI-S and the OHI-S scores increased progressively with age and found to be highly significant (ANOVA, $F=11.7$, $P=0.001$). The poor OHI-S score was recorded in the teachers belonging to 51-58 years age group.

Table 1. OHI-S scores according to age groups.

Age Group (in Years)	N	DI-S	CI-S	OHI-S
18-20	13	0.7 ± 0.5	0.5 ± 0.7	1.3 ± 1.2
21-30	122	1.1 ± 0.6	0.8 ± 0.6	1.9 ± 1.1
31-40	70	1.3 ± 0.8	1.1 ± 0.6	2.4 ± 1.1
41-50	71	1.4 ± 0.6	1.3 ± 0.7	2.7 ± 1.2
51-58	21	1.6 ± 0.6	1.5 ± 0.8	3.1 ± 1.4
Total	300	1.2 ± 0.7	1.1 ± 0.7	2.3 ± 1.2

ANOVA, $F = 11.7$, $p = 0.001$ (HS)

The results of CPI were found to be as tabulated in **Tables 2A and 2B**. Where it is presented as percentage of persons coded with CPI and the mean number of sextants affected. Very few teachers 15 (5%) recorded healthy gingiva whereas majority 122 (40.6%) showed the presence of calculus, bleeding on probing was observed in 47 teachers (15.7%), shallow pockets were observed in 88 teachers (29.3%) and 28 (9.3%) teachers showed deep pockets.

Table 2A. Number, percentage of persons coded with CPI.

Age Groups in Years	N	Percentage of Persons Coded					
		Healthy Gingival 0 n (%)	Bleeding 1 n (%)	Calculus 2 n (%)	Shallow Pockets 3 n (%)	Deep Pocket 4 n (%)	Excluded X n (%)
18-20	13	4 (30.8)	4 (30.8)	5 (38.5)	-	-	-
31-30	122	7 (5.7)	35 (28.7)	69 (56.6)	10 (8.2)	1 (0.8)	-
31-40	70	1 (1.4)	8 (11.4)	33 (47.1)	25 (35.7)	3 (4.3)	-
41-50	71	2 (2.8)	-	13 (18.3)	43 (60.6)	13 (18.3)	-
51-58	24	1 (4.2)	-	2 (8.3)	10 (41.7)	11 (45.8)	-
Total	300 (100)	15 (5.0)	47 (15.7)	122 (40.7)	88 (29.3)	28 (9.3)	-

X² = 175.1, p<0.001, HS

Table 2B. Mean number of sextants affected by periodontal conditions.

Age Groups in Years	Mean Number of Sextant Coded With					
	0	1+2+3+4	2+3+4	3+4	4	X
18-20	3.53	2.15	0.61	-	-	-
31-30	2.14	3.42	1.66	0.09	-	-
31-40	0.78	4.94	2.81	0.65	0.57	-
41-50	0.29	5.32	2.04	1.74	0.25	-
51-58	0.52	6.71	5.6	2.85	0.95	-
Total	1.46	4.5	2.54	1.06	0.35	-

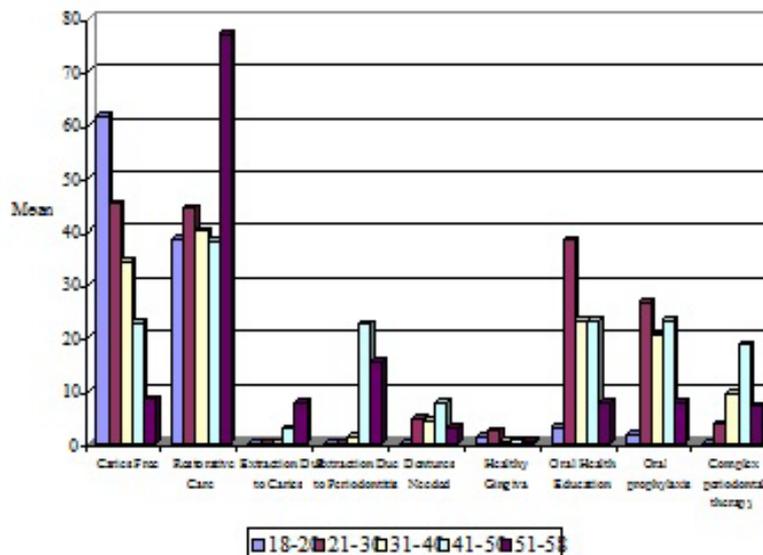
Table 3 present the caries experience in the study population in the form of mean and standard deviation. The overall mean and standard deviation of DMFT was 2.3 ± 2.4. DMFT and DMFS scores show to increase with increasing age i.e., at 20 years DMFT 1.2 ± 2.0, to DMFT 3.0 ± 2.0 for the age group 50-58 years. The tests were found to be significant (p<0.01).

Table 3. Caries prevalence by DMFT.

Age Group in Years	N	DT	MT	FT	DMFT
18 - 20	13	1.1 ± 2.1	0	0.1 ± 0.3	1.2 ± 2.0
21 - 30	122	1.0 ± 1.4	0.2 ± 0.5	0.6 ± 1.4	1.8 ± 2.2
31 - 40	70	1.2 ± 1.9	0.4 ± 1.3	0.8 ± 1.7	2.5 ± 2.7
41 - 50	71	1.1 ± 1.7	0.6 ± 1.0	1.1 ± 1.9	2.8 ± 2.5
51 - 58	21	1.3 ± 2.1	0.9 ± 1.4	1.0 ± 1.3	3.0 ± 2.0
Total	300	1.1 ± 1.7	0.4 ± 1.0	0.8 ± 1.6	2.3 ± 2.4

ANOVA F=3.75, p<0.01 (S)

Graph 3 lays out the prosthetic status and prosthetic treatment needs of the teachers which shows that none of them had a complete denture, and no one in the study population were in need of complete denture. 24 teachers had either removable or fixed partial denture, among whom 17 (5.7%) had FPD (Fixed Partial Denture) and 7 (2.3%) had RPD (Removable Partial Denture). It was observed that 59 teachers needed a removable or fixed partial denture. 42 (14%) of them needed FPD and 17 (5.6%) required RPD. The prosthetic status (p<0.05) was found to be significantly rising with age (**Tables 4A and 4B**).



Graph 3. Treatment needs of teachers according to age group.

Table 4A. Prosthetic status of teachers by age.

Age Group in Years	n	Prosthetic Status			
		No Prosthesis	RPD	FPD	CD
18 - 20	13	13 (100)	-	-	-
21 - 30	122	117 (95.9)	2 (1.6)	3 (2.5)	-
31 - 40	70	66 (94.3)	1 (1.4)	3 (2.5)	-
41 - 50	71	62 (87.3)	1 (1.3)	8 (11.4)	-
51 - 58	21	18 (75)	3 (12.5)	3 (12.5)	-
Total	300	276 (92)	7 (2.3)	17 (5.7)	-

X² = 22.0, p<0.01 (S)

Table 4B. Prosthetic need of teachers by age.

Age Group in Years	n	Prosthetic Need				Overall Need
		No Prosthesis	RPD	FPD	CD	
18- 20	13	13 (100)	-	-	-	-
21 - 30	122	108 (88.52)	2 (0.16)	12 (9.83)	-	14 (4.66)
31 - 40	70	57 (81.42)	3 (4.28)	10 (14.28)	-	13 (4.33)
41 - 50	71	48 (67.6)	6 (8.45)	17 (23.94)	-	23 (7.66)
51 - 58	21	15 (71.42)	6 (28.57)	3 (14.28)	-	9 (3)
Total	300	241 (80.3)	17 (5.6)	42 (14)	-	59 (19.66)

X² = 33.7, p<0.01 (HS)

Table 5 shows that oral health status of the teachers belonging to schools located in urban or semi-urban areas did not influence on the dental caries status (p=0.22) but the oral hygiene status was found to be better in case of teachers belonging to the semi urban schools when compared with the urban schools (P<0.001, HS).

Table 5. OHI-S, DMFT, percentage of persons coded with CPI, prosthetic status and needs in regards to teachers employed in schools located in urban and semi-urban locations.

Location	n	OHI-S*	DMFT**	Percentage of Persons Coded with CPI***					Prosthetic Status****				Prosthetic Need*****			
				Healthy Gingiva	Bleeding	Calculus	Shallow Pocket	Deep Pocket	No Prosthesis	RPD	FPD	CD	No Need	RPD	FPD	CD
Urban	150	2.56 ± 1.12	2.44 ± 2.4	8	12	44	28	8	132 (88)	6 (4)	12 (8)	-	114 (76)	11 (2.3)	25 (16.7)	-
Semi-Urban	150	1.97 ± 1.28	2.10 ± 2.5	2	19.3	37.3	30.7	10.7	144 (96)	1 (0.7)	5 (3.3)	-	127 (84.7)	6 (4)	17 (11.3)	-

*Z = 4.28, P<0.001, HS, **Z = 1.22, P=0.22, NS, ***X² = 9.55, P=0.05, S, ****X² = 6.98, p<0.05, S, *****X² = 3.70, p=0.16, NS

Table 6 portrays the DMFT and CPI in relation to OHI-S status in the overall study population. The caries experience was found to increase with the worsening of oral hygiene status (ANOVA, $F=6.92$ $P<0.001$, HS). CPI scores proportionally demonstrated a rise with rise in OHI-S scores ($\chi^2=38.4$ $p<0.001$ HS).

Table 6. Analysis of DMFT and CPI in relation to OHI-S.

Oral Hygiene Status Simplified		No. of Teachers	DMFT	Persons coded with CPI				
Score	Status			Mean ± SD	0	1	2	3
0.0 – 1.2	Good	64	1.33 ± 2.02	10	16	22	13	3
1.3 – 3	Fair	165	2.42 ± 2.40	4	26	76	44	15
3.1 – 6	Poor	71	2.76 ± 2.58	1	5	24	31	10
Significance			ANOVA $F=8.92$ $P<0.01$ (S)	$\chi^2 = 38.4$, $p<0.001$ (HS)				

Treatment Needs

Graph 3 exhibits the treatment needs of study population. The overall caries free population was 35%. 41.3% required restorative care with the highest need seen in the age group of 51-58 years (76.9%) followed by 44.2% in 21-30 year old age group. Only 1% of teeth needed extraction of untreatable carious lesions. 9.3% required extraction due to grade III mobility as a consequence of periodontitis.

None of the study population needed complete dentures. The need for RPD or FPD was observed in 59 (19.66%) of the teachers. The highest need of prosthesis was in the age group 41-50 years (7.6%). Among various forms of periodontal treatments necessary, 95% needed oral health education 79.3% needed oral prophylaxis and 38.66% needed complex periodontal therapy. The complex periodontal therapy was in higher need for teachers between 41-50 year age group. Only 5% of the study population displayed healthy gingiva.

DISCUSSION

Oral diseases are one of the most commonly and extensively effecting disease of mankind, regardless of age, sex, location or employment of an individual.

An attempt is being made since years in regards to reduce the dental problems affecting the human kind. In that row, to get the data regarding health status many surveys have been made.

School teachers are being used as one of the best health personnel available worldwide to instruct their students about health and be familiar with the current oral health concept [3,6-8].

This present descriptive cross sectional study was conducted in order to obtain data regarding the oral health status and treatment needs of primary and middle school teachers of Davangere city, Karnataka, as there was no available data so far. This can help us reach to the prime personnel of school who would in turn reach out to the students and the parents/ guardians who constitute the community.

Demographic Distribution of Population

By the end of study, 84.3% (n=253) of the study population were females and 15.7% (n=47) were men.

When tabulated regarding the frequency of cleaning their teeth, 100% of the teachers cleaned their tooth once a day in the morning and among them, 138 teachers in the urban area and 135 teachers in the semi-urban area used tooth brush and dentifrice. 12 teachers of urban and 15 of semi urban teachers used finger with dentifrice. The teachers who used finger and dentifrice complained of bleeding gums if in case they used tooth brush.

Dental Caries Status

It was observed from the data collected that, the prevalence of dental caries increased with an increase in age. This observation is similar with many other surveys [9-17].

The overall dental caries prevalence was 41.3% similar to study conducted by Doifode VV, et al. [18] at Bapunagar, Nagpur, India. The mean and SD of DMFT at 18-20 years age group was 1.2 ± 2.4 which increased with age and mean the mean DMFT at 50-58 years it was 3.30 ± 2.0 .

It was seen that mean DT was not greatly different from younger to older age group i.e., (1.1 ± 2.1 at 18-20 years to 1.3 ± 2.1

at 50-58 years), but MT was greater in older age group, it was zero at 18-20 years to 0.9 ± 1.4 at 50-58 years which was similar as compared with Varenne B, et al. [19].

In the present study there was no much difference between the DT (mean=1.3) or FT (mean=0.9) component of the older age group. This was in contrast with the results found in the study conducted at Syria by Beiruti N, et al. [20], where in they found the DT component to be major contributor to the DMFT scores in the younger than the older and MT to be major contributor in the DMFT of the older age group. This difference could be because of, the upper age limit of the study population being 58 years.

The highest mean of dental caries was in the age group of 50-58 years (DMFT 3.0 ± 2.0) wherein the major contributor was the DT (1.3 ± 2.1) followed by MT (0.9 ± 1.4). The result was similar when compared with Oral health survey and fluoride mapping Karnataka, India [10]. The high prevalence of dental caries and high DMFT/DMFS scores observed in this age group may be attributed to a long time presence and exposure of permanent teeth to oral environment almost extending 5-6 decades. It may also be due to the fact that the dental caries is a cumulative disease and DMF value shows the cumulative experience of caries and its consequences.

When the dental caries status was compared with regards to urban and the semi urban areas, there was no significance observed ($p > 0.05$). The mean DMFT in urban areas was 2.44 as compare with 2.10 in semi urban areas. Hardwick KS, et al. [21] conducted a study in Madagan Oblast which showed that there were lesser incidences of caries in the other areas as compared with that of towns. This might be given a reason as also found by the study conducted at Madagascar by Petersen PE, et al. [22] wherein they found that DMFT increases with urbanization.

The gender showed no significant findings in relation to dental caries occurrence as found by Thessaly et al. [23], Slade GD, et al. [24] whereas it was dissimilar to Alvarez-Arenal A, et al. [25], Kerosuo E, et al. [11], Jones CM, et al. [26], wherein they found higher caries experience among women.

When DMFT was tabulated in relation to the oral hygiene status of the total sample of teachers, it was observed to be significant i.e., as the oral hygiene status was poor the severity of occurrence of dental caries also was greater. Mean DMFT was 1.33 at good oral hygiene status to 2.76 at poor oral hygiene status. This finding was similar to Frentzen M, et al. [27]. The reason for this finding may be the microbial plaque, one common factor that increases the poor oral hygiene and dental caries.

Treatment Needs

It was observed that 8 (61.5%) of teachers who belonging to age groups 18-20 years. 55 (45.1%) of age group 21-30 years, 24 (34.3%) of age group 31-40 years, 16 (22.5%) of teachers belonging to 41-50 years and 2 (8.3%) of 51-58 years age group had no dental caries i.e., making up to 35% of overall population as caries free. An overall requirement of 41.3% of restoration need was observed as similar to the study held by Hescot P, et al. [27] with 48.8% requiring restoration for one or the other teeth. This requirement could be because of the negligence of oral health treatment needs by the elderly which is very commonly observed in the developing country. Thus the highest treatment need when compared to extraction was that of restoration which was similar to survey conducted in the eastern states of India by Mandal KP, et al. [28].

Oral Hygiene Status and Treatment Needs

The overall mean oral hygiene status was 2.3 ± 1.2 , which was near to findings by De la Maza FJ, et al. [13], Sendilkumar S, et al. [29].

The gender differences showed no significance with regards to oral hygiene status, which was not similar to findings by Alvarez-Arenal A, et al. [24] Ettinger RL, et al. [9] where they found that oral hygiene status was better in women [30].

As mentioned earlier with the raise in OHI-S scores, the scores of DMFT also increased as found by Frentzen M, et al. [26], Athanassouli T, et al. [22].

As mentioned earlier, there was significant raise in DMFT and CPI with poorer the OHI-S scores as the oral health is found to be inter related to each of them similar to the study conducted by Athanassouli T, et al. at Greece [22].

Periodontal Status

The periodontal condition of different age groups was measured by the CPI index with four different indicators bleeding, calculus, shallow pockets and deep pockets.

There was gradual increase in the CPI scores with age and almost doubled when it came to older age group as recorded by Gaengler P, et al. [12], Songpaisan Y, et al. [17], Frentzen M, et al. [27], Slade GD, et al. [24]. The occurrence of pockets also increased with increase in age. Similar to Songpaisan Y, et al. [17], Slade GD, et al. [31], Mosha HJ, et al. [14] Adegbembo AO, et al. [32], Gamonal JA, et al. [33], Brindle R, et al. [34], El-Qaderi SS, et al. [35], Hugoson A, et al. [36], Burt BA [37], Papapanou PN [38] this relationship is explained due to the prolonged exposure to risk factors over a person's life, creating a cumulative effect with time span.

Overall bleeding on probing was recorded in 157% (n=47) of total sample. It was higher in younger age groups when compared

with the older age group. Calculus was recorded in 40.7% (n=122) of total sample. Which was highest in the age group of 21-30 years with 56.6% (n=69).

Shallow pocket was recorded in 29.3% of overall population and deep pocket in 9.3% with greater percentage contributed by the older age group [39,40].

The overall shallow or deep pockets were 29.3% and 9.3% respectively, which was 41.7% and 45.8% in 50-58 years age group and 60.6% and 18.3% in 45-50 years age group which was similar to that of the findings Hardwick KS, et al. [22].

There was a high level of treatment necessary for periodontal health was 95% required oral health education, 79% required oral prophylaxis as similar to Bergman JD, et al. [23], Loh T, et al. [41], Brindle R, et al. [35]. 38.66% required complex periodontal therapy which was in similarity with the findings of Helderman W, et al. [40].

Prosthetic Status and Prosthetic Needs

All the teachers were dentate and none were in need of complete dentures. The missing number of teeth were found to be increasing with the older age than when compared with those teachers of younger age group which was also found by Salive ME, et al. [17] Athanassouli T, et al. [24].

92% of the study population did not have any sort of prosthesis and 80.3% did not need any prosthesis as the majority of the sample teachers were dentate this finding is similar to a study conducted at Singapore by Loh T, et al. [42].

17 (5.7%) had FPD and 7 (2.3%) had RPD. The overall prosthetic need was 19.66% with greatest requirement in the age group of 51-58 years (42.95%). None of the study population required any complete dentures in contrast to Vigild M, et al. [42] wherein he conducted a study for elderly. This finding could be because of the upper age limit of the study population was only 58 years [43].

CONCLUSION

The prosthetic need was found to be higher in males (21.3%) when compared with females (19.3%) in contrast to Alvarez-Arenal A, et al. [26], Ettinger RL, et al. [11] this could be because female teachers constituted greater proportion (84.7%) than male teachers (15.3%).

The need for prosthesis increased with increased age group. This was found to be highly significant ($P < 0.01$), which was similar to Ettinger RL, et al. [11] which could be because of reason as quoted by, Athanassouli T, et al. [23], Hardwick KS, et al. [21], the reason could be the negligence of the oral health similar to that of the general health which has led to increased number of missing teeth with a greater need of one or other form of prosthetic treatment among the elderly as compared with those belonging to the younger age group.

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