



Oral hygiene status in South West coastal district of India

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Abstract

Background: To study and compare the oral hygiene status in rural and peri-urban locations of South-west coastal district in India and to study the effect of age, gender, location, occupation, brushing habits, and diet on the oral hygiene status.

Materials and Methods: A total of 2000 patients visiting the Department of Conservative Dentistry and Endodontics of the Institute and the rural satellite centers of the same institute were randomly selected and included in the study. The oral hygiene status of each patient was recorded using the oral hygiene index-simplified; under proper illumination with a mouth mirror and explorer. The data were then coded and the oral hygiene status was evaluated and analyzed according to age, gender, diet, location, and occupation using Chi-square analysis test.

Results: It was seen that younger age group, urban, literate and people who brushed twice daily had better oral hygiene.

Conclusion: It could be concluded that higher levels of oral hygiene among the young, urban, and literate population was seen because of oral health maintenance by regular oral cleansing at personal level as well as by trained personnel. Hence, health education and health promotion are indispensable in achieving this target.

Introduction

Over the last few years, there has been a tremendous improvement in oral health status and the associated care in India. However, inequalities in oral health status still exist throughout the regions. Dakshina Kannada is a coastal region in southwestern part of India with a different climate, culture, and diet compared to the other areas.

The oral cavity is the mirror of an individual's overall health status. Teeth and the periodontium are of main importance to oral health.^[1] Dental plaque, a diverse microbial community found on the tooth surface, is embedded in a matrix of polymers of bacterial and salivary origin.^[2] Negligence in plaque disruption and removal leads to its mineralization into calculus which, in turn, starts up the inflammatory process in the supporting periodontium. If not disrupted regularly, it might lead to several oral diseases such as dental caries, gingivitis; periodontitis which, in turn, would further lead to loss of teeth.^[3] Oral hygiene is an important determinant in the incidence of dental caries, as well as for treatment planning and for the subsequent treatment outcomes to be successful.

The objectives of the study were to compare the oral hygiene status in rural and peri-urban locations of Dakshina Kannada and

to study the effect of age, gender, location, occupation, brushing habits, and diet on the oral hygiene status.

Materials and Methods

A cross-sectional survey was conducted in the Southwest coastal district of Karnataka State, India, which has an area of 4866 km², population density around 390/km² with a total population of 1,656,165. The rural and urban population is 1,122,723 and 533,442, respectively, with a male: female ratio around 1000:1020. The survey was conducted to collect information on the oral hygiene status in the patients visiting the outpatient department of Department of Conservative Dentistry and Endodontics of the Dental Institute in the district and the associated satellite centers of the same during April 2014 to March 2015. The patients were grouped as urban or rural depending on the place of treatment provided. The sample size was 2000. A pretested questionnaire adapted from the Oral Health Survey WHO format 2013 was used in the survey. The questionnaire was followed by basic oral examination under good illumination using mouth mirror and explorer with proper infection control measures. The Oral Hygiene Index-Simplified (OHI-S) by Greene and Vermillion,

1964, has been useful for evaluation of dental health education in public institutional systems^[4] and is widely used in epidemiological surveys for the screening and examining oral hygiene status because of its simple methods, less time requirement, fair reproducibility, and minimal training requirement.^[5,6]

The oral hygiene status of each patient was recorded using the OHI-S which requires examination of six surfaces selected from four posteriors and two anterior teeth.

The clinical levels of oral hygiene that are associated with group OHI-S scores are:

- Good: 0.0-1.2
- Fair: 1.3-3
- Poor: 3.1-6.

All the data were then coded and the oral hygiene status was evaluated according to age, gender, diet, location, occupation, and brushing habits using statistical analysis.

All the patients were informed about the nature of the survey and its objectives and were ensured about the confidentiality of their information. A written consent regarding the same was obtained from the patients. After the examination, the patients were provided with the required treatment.

Data entry and analysis

The data obtained were entered and analyzed using SPSS 16 software, and Chi-square test was used for correlation between oral hygiene status and the other parameters.

Results

Age group 26-35 years - Out of 630 examined, 51 (8.10%) individuals had poor oral hygiene, whereas 481 (76.34%) individuals had fair oral hygiene and 98 (15.56%) individuals had good oral hygiene.

Age group above 65 years - Out of 37 examined, 27 (72.97%) individuals had poor oral hygiene, whereas 9 (24.33%) individuals had fair oral hygiene and only 1 (2.70%) individual had good oral hygiene.

The result was statistically significant [Table 1].

Out of 1029 male individuals, 169 (16.42%) had poor oral hygiene, whereas 699 (67.93%) had fair oral hygiene and 161 (15.65%) had good oral hygiene. Out of 971 females individuals, 147 (15.14%) had poor oral hygiene, whereas 665 (68.48%) had fair oral hygiene and 159 (16.37%) had good oral hygiene. The result was statistically not significant [Graph 1].

In urban population - Out of 1500, 215 (14.3%) individuals had poor oral hygiene, whereas 1044 (69.6%) had fair oral hygiene and 241 (16.1%) had good oral hygiene. In rural population - Out of 500, 101 (20.2%) individuals had poor oral hygiene, whereas 320 (64.0%) had fair oral hygiene and 79 (15.8%) had good oral hygiene. The result was statistically significant when the association between OHI-S and location was considered [Graph 1].

OHI-S in those with vegetarian diet 509 examined - 64 individuals (12.57%) had poor oral hygiene, whereas 363 individuals (71.31%)

had fair oral hygiene and 82 (16.12%) had good oral hygiene. OHI-S with a mixed diet 1491 examined - 252 individuals (16.9%) had poor oral hygiene, whereas 1001 (67.13%) had fair oral hygiene and 238 (15.97%) had good oral hygiene. The result was statistically not significant [Graph 1].

OHI-S in those with lower primary education out of 900 individuals examined - 354 individuals (39.33%) had poor oral hygiene, whereas 680 (75.5%) had fair oral hygiene and 103 (11.44%) had good oral hygiene. OHI-S with higher primary education (HE) 1100 individuals examined - 79 individuals (7.18%) had poor oral hygiene, whereas 750 (68.18%) had fair oral hygiene and 271 (24.64%) had good oral hygiene. The result was statistically significant [Table 2].

OHI-S when compared in those using brush and paste 1899 examined - 293 individuals (15.43%) had poor oral hygiene,

Table 1: OHI-S with respect to age

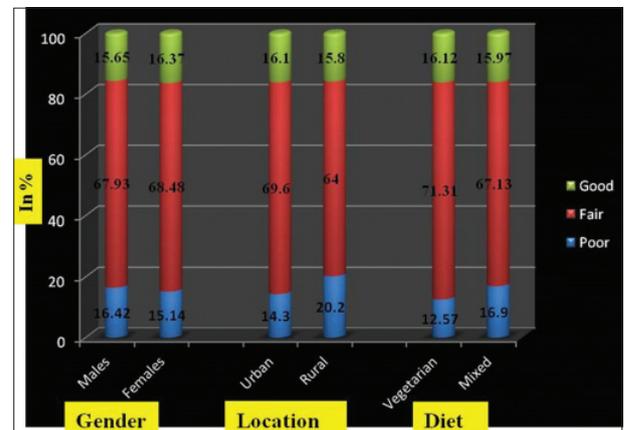
Age (in years)	OHI-S, N (%)			Total
	Poor	Fair	Good	
15-25	42 (7.82)	323 (60.15)	172 (32.03)	537
26-35	51 (8.10)	481 (76.34)	98 (15.56)	630
36-45	65 (15.48)	320 (76.19)	35 (8.33)	420
46-55	70 (25.83)	187 (69.00)	14 (5.17)	271
≥56	88 (61.70)	49	05 (3.81)	142

Chi-square value=428.802, P<0.05 (significant). OHI-S: Oral hygiene index-simplified

Table 2: OHI-S with respect to educational background

Occupation	OHI-S, N (%)			Total
	Poor	Fair	Good	
LE	354 (39.33)	680 (75.50)	103 (11.44)	900
HE	79 (7.18)	750 (68.18)	271 (24.64)	1100

Chi-square=175.813, P<0.05 (significant). HE: Higher primary and greater education, LE: Lower primary education



Graph 1: Oral hygiene index-simplified with respect to gender, location, and diet. Gender: Chi-square = 0.710, P = 0.701 (not significant), Location: Chi-square = 9.910, P < 0.05 (significant), Diet: Chi-square = 5.475, P = 0.065 (not significant)

whereas 1298 (68.35%) had fair oral hygiene and 308 (16.22%) had good oral hygiene. OHI-S with other aids/methods 101 individuals examined - 23 (22.8%) had poor oral hygiene, whereas 66 (65.3%) had fair oral hygiene and 12 (11.9%) had good oral hygiene. The result was statistically not significant [Graph 2].

OHI-S when compared with respect to brushing frequency; in individuals brushing once, of total 1129 examined - 188 (16.65%) had poor oral hygiene, whereas 795 (70.41%) had fair oral hygiene and 146 (12.9%) had good oral hygiene. OHI-S in individuals who brushed twice; total 862 individuals examined - 128 (14.85%) had poor oral hygiene, whereas 560 (64.96%) had fair oral hygiene and 174 (20.19%) had good oral hygiene. Among individuals who brushed more than twice; of total 9 individuals, all 9 (100%) had fair oral hygiene. The result was statistically significant [Graph 2].

OHI-S when compared with respect to brushing method/technique the total number of individuals adopting horizontal method were 1565, of which, 252 (16.1%) had poor oral hygiene, whereas 1069 (68.3%) had fair oral hygiene and 244 (15.59%) had good oral hygiene. OHI-S with individuals brushing in a vertical manner of total 421 individuals examined - 59 (14.0%) had poor oral hygiene, whereas 288 (68.4%) had fair oral hygiene and 74 cases (17.6%) had good oral hygiene. The individuals who did not use either horizontal or vertical method were totally 14, of which, 5 (35.7%) had poor oral hygiene, 7 (50%) had fair oral hygiene, and 2 (14.29%) had good oral hygiene. The result was statistically not significant [Graph 2].

Discussion

The oral cavity being an important part of the body plays a major role in mastication, swallowing, speech, forming facial expressions along with the maintenance of nutritional status,

health, and self-esteem. Oral hygiene is directly linked to systemic infections, autoimmune disorders, chronic cardiovascular diseases, blood glucose control in diabetes, nutritional intake, and other diseases.^[7-9]

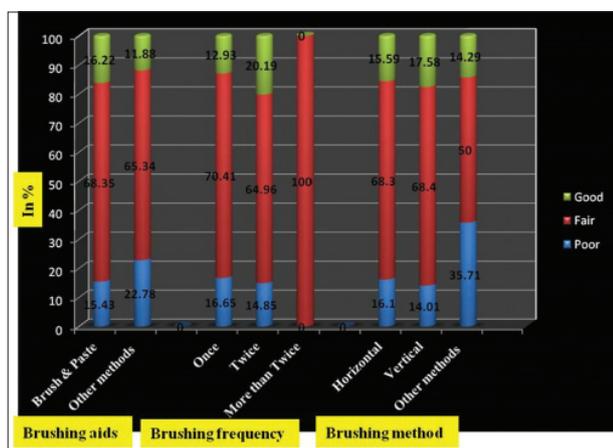
The present study reveals that the younger generation has a higher percentage of good and fair oral hygiene (15-25 years) as compared to the other elder age groups. This can be true considering the levels of awareness and knowledge about oral hygiene maintenance among the younger population. It was observed in a study by Abdellatif and Burt^[10] that the rate of increase in the incidence of periodontitis with age, throughout all age groups, is much higher among subjects with poor oral hygiene than among those with good oral hygiene and concluded that the effect of age on the progression of periodontitis could, therefore, be considered negligible when good oral hygiene is maintained.

When gender was compared among the study population, it was found that females had slightly better oral hygiene than males though the results were not statistically significant. It has been observed that younger age, male gender, and lower tooth brushing frequency were associated with poor oral hygiene.^[11]

The percentage of people having poor oral hygiene was greater in the rural population than the urban, when location was compared. This could be attributed to the fact that urban population have better access to basic as well as specialty dental care with greater awareness and knowledge as compared to the rural population. In another study conducted in Delhi, India and surrounding areas, the urban-rural difference in caries experience was significant statistically, which was related to the fact that rural people received lesser access to dental care.^[12] Subrata and Subrata^[13] showed that the prevalence and severity of dental caries were higher among children in urban areas, whereas the oral hygiene levels were poorer among children in rural areas.

The oral hygiene in the vegetarians was found to be better than the people consuming mixed diet. Similar results associated with dental caries prevalence were found to be higher in non-vegetarians in comparison with vegetarian elderly population.^[12] Same results were supported in a study done by Sherfudhin *et al.*,^[14] who stated the reason to be lesser tendency for sweets between meals with higher tooth wear in vegetarians compared to non-vegetarians.

Oral hygiene was significantly better among participants who brushed twice a day compared to those who did once or more than twice. Mahesh Kumar *et al.*^[15] conducted a study where the frequency of brushing habits in private school boys and girls was assessed, it was seen that those children who brush once daily had more calculus as compared to those children brushing twice a day. It was also noticed in the present study that the participants who incorporated the horizontal and vertical methods of toothbrushing fared better than the ones following other methods. This explains the phenomenon of plaque and biofilm disruption which depends not only on the frequency of tooth brushing but also on the method or technique used. Furthermore, the participants using tooth brush and paste showed better oral hygiene than the ones who used other



Graph 2: Oral hygiene index-simplified; with respect to brushing aids, brushing frequency, and brushing method. Brushing aids: Chi-square value - 4.528, P = 0.104 (not significant), Brushing frequency: Chi-square value = 23.425, P < 0.05 (significant), Brushing method: Chi-square value = 5.983, P = 0.20 (not significant)

aids which are similarly stated in the results of another study conducted by Raju *et al.*^[16] in the Eastern Ghats of India.

Influence of the level of education was certainly seen in the study results, which revealed that the participants with HE fared better in the oral hygiene maintenance. Therefore, it is necessary to consider the education status in assessing risk and planning for appropriate preventive measures.^[17]

Conclusion

The present study concluded that urban population had better oral hygiene than the rural population probably due to accessible dental facilities, educational factor, and motivation to maintain oral health. Female gender showed slightly better oral hygiene than males, though this result was not very significant. Older age groups above 45 years showed poor oral hygiene status than the younger population due to lack of motivation. Educational status was found to be an important factor in the maintenance of oral hygiene. Literacy and educational background proved to be a positive factor for good oral hygiene. Brushing frequency was an important factor. It was found that people who brushed twice a day definitely had better oral hygiene than people who did it once or not at all. Prevention can thus be achieved by effective and regular oral cleansing at personal level as well as by regular professional dental check-up. It is of utmost importance that oral health services in the rural area and also the general population be imparted uniformly and strengthened. Health education and health promotion are, therefore, indispensable in achieving the target.

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