



RESEARCH ARTICLE

SUBJECTIVE AND OBJECTIVE ORAL HEALTH INDICATORS AMONG INDIAN ADULT POPULATION

^{*}1Dr. Ritu Gupta, ²Dr. Arun Kumar, A., ³Dr. Neha Gupta, ⁴Dr. Venkatesh Goud,
²Dr. Somanath Reddy, ¹Dr. Basavaraj Patthi and ¹Dr. Ashish Singla

¹Department of Public Health Dentistry, D.J. College of Dental Sciences and Research, Modinagar

²Department of Public Health Dentistry, Navodaya Dental College and Hospital, Raichur

³Department of Oral Medicine and Radiology, People's College of Dental Sciences and Research centre, Bhopal

⁴Department of Public Health Dentistry, Malla Reddy Institute of Dental Sciences, Hyderabad

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ABSTRACT

Background: Occupational stress is becoming increasingly globalised. Research scientists, technicians and labourers are under stress due to irregular work pattern and prolonged working hours, making this group vulnerable to change their regular dietary habits and lifestyle. Thus, the present study was conducted to assess the impact of oral conditions on quality of life among employees of Central Sericulture, Research and Training Institute (CSR&TI), Mysore and to assess the relationship between clinical measure of oral health status; dental caries and oral health related quality of life.

Methods: Cross-sectional data from all the scientists, technicians and labourers of CSR&TI, Mysore, was collected. A 14-item Oral Health Impact Profile to assess oral health related quality of life was used and clinical examination was done to record DMFT according to WHO criteria 1997.

Results: The prevalence of caries was 76.2%. The mean DT, MT, FT and DMFT were 1.98±2.49, 1.10±1.71, 0.49±1.06 and 3.57±3.19 respectively. The most prevalently affected OHIP-14 domain was physical pain (64.76%). Caries status was found to be significantly correlated with most of the domains of OHIP-14.

Conclusion: Clinical indicator of oral health status; dental caries was found to be associated with OHIP-14 scores and has an impact on oral health related quality of life.

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INTRODUCTION

Health and disease have been a major pre-occupation of humans since antiquity although the use of the word 'health' to describe human 'well being' is relatively recent (Üstün and Jakob, 2005). The World health Organization (WHO) defines health as a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity (Constitution of the World Health Organization, 1948). The concept of quality of life (QoL) is used to evaluate general well-being and includes all emotional, social and physical aspects of an individual's life (Antonarakis et al., 2013). When oral health conditions impact on an individual's well-being, the evaluation of the particular oral health condition in question as it interacts with the individual's well-being is referred to as oral health-related quality of life (OHRQoL) (Antonarakis et al., 2013). OHRQoL is a multidimensional construct that includes a

subjective evaluation of the individual's oral health, functional well-being, expectations and satisfaction with care, and sense of self. OHRQoL is an integral part of general health and well-being (Sischo and Broder, 2011). It is recognised by the WHO as an important segment of Global Oral Health Program (The World Oral health report 2003). Oral diseases such as dental caries or periodontal disease are highly prevalent and their consequences are not only physical; they are also economic, social and psychological (Naito et al., 2006). Oral diseases are not usually fatal, but can affect the ability to eat, speak and socialize without active disease or embarrassment and contribute to ones' general well-being. In essence, oral disorders can affect various aspects of life, including oral function, appearance interpersonal relationships and daily activities and therefore the 'goodness' or 'quality of life' (Acharya, 2008). Although occupational stress is by no means a new phenomenon, it is becoming increasingly globalised and affects all countries, professions and categories of workers (Arandelovic and Ilic, 2006). Work-related stress is a pattern of physiological, emotional, cognitive and behavioural reactions to some extremely taxing aspects of work content, work

*Corresponding author: Dr. Ritu Gupta,

Department of Public Health Dentistry, D.J. College of Dental Sciences and Research, Modinagar

organization and work environment (Houtman and Cedilo, 2007). Research scientists are under stress due to irregular work pattern, prolonged working hours and high concentration required at work place, making this group vulnerable to change their regular dietary habits and lifestyle. India is the second largest producer of silk, and also the largest consumer of silk. Central Sericulture Research & Training Institute (CSRTI), Mysore, is the pioneer research institution in the field of tropical sericulture (Central Sericulture Research and Training Institute, 2013). The central sericulture, research and training institute, Mysore, comprises of employees of different socioeconomic status from scientists belonging to higher socioeconomic status to labourers/ field workers belonging to low socioeconomic strata under one organization thus facilitating to assess the influence of socioeconomic factors on their oral health. Also the labourers in the institute work on field where mulberry plantation is done and have the habit of eating mulberry fruits which are juicy. No study has been reported on the oral health indicators of CSRTI employees. Thus, the present study was undertaken to assess the effect of variable of oral health status; dental caries and oral health related quality of life and to investigate the correlation between variables of oral health status and oral health related quality of life in employees of Central Sericulture, Research and training Institute, Mysore.

Aim and Objectives

To assess the prevalence of dental caries, its impact on quality of life and the relationship between clinical measures of dental caries and oral health related quality of life among the employees of Central Sericulture Research and Training Institute, Mysore.

MATERIALS AND METHODS

Study design and study settings: A descriptive cross-sectional study was conducted to assess subjective and objective oral health indicators among employees of Central Sericulture Research and Training Institute, Mysore

Central Sericulture Research & Training Institute (CSRTI), Mysore, the pioneer research institution in the field of tropical sericulture, was established at Chennapattna in 1961 under the administrative control of Central Silk Board, Ministry of Textiles, and Government of India for the overall development of silk industry in the country. During the course of development the Institute was shifted to Mysore the princely city in the year 1963 (Central Sericulture Research and Training Institute, 2013).

Inclusion criteria

All the employees of Central Sericulture research and Training Institute, Mysore who gave a written consent were included.

Ethical Committee Clearance

The study protocol was approved by the Institutional Ethical Committee, Navodaya Dental College and Hospital, Raichur.

Director, CSRTI, Mysore permission

The permission and consent was obtained from the Director, Central Sericulture Research and Training Institute, Mysore to conduct the study in the institute.

Study Group Consent

Voluntary informed written consent was obtained from the study participants, after explanation of the nature of the study.

Questionnaire

A specially prepared questionnaire was administered to the employees to know the demographic variables. 14-item Oral Health Impact Profile (Slade, 1997) was interviewer administered to assess Oral health related quality of life. For each of the 14 OHIP questions, study subjects were asked how frequently they had experienced the impact in the preceding 12 months. All the questions were explained in their local language verbally and the answers were recorded by the examiner itself. Responses were made on a Likert-type scale and coded; 4 = "very often", 3 = "fairly often", 2 = "occasionally", 1 = "hardly ever", 0 = "never". Socioeconomic status was calculated using Kuppuswamy scale (Kumar *et al.*, 2012).

Questionnaire Validation

The questionnaire was pretested on 42 patients who comprised 20% of the study sample. Reliability of the questionnaire was assessed using Test-Retest and the values of measured kappa (k) were 0.86 and weighted kappa (k) was 0.9. Internal consistency of the questionnaire was assessed by applying cronbach's-alpha (α) and the value of $\alpha = 0.84$ was obtained. Criterion and construct validity of the questionnaire was assured by using Spearman's correlation coefficient ($p < 0.001$).

Clinical Examination

Clinical examination was done to record the DMFT of all the employees of Central Sericulture Research and Training Institute, Mysore according to the WHO Oral Health Assessment Form (1997).

Training and Calibration

Two-day training sessions for standardization and calibration of the data collection methods was organized in the Department of Public Health Dentistry. The training session consisted of a reevaluation of the criteria outlined, followed by an examination of adult patients based on simulation of field technique for reliability. DMFT was assessed using WHO Oral Health Assessment Form (1997). Intra-examiner reliability was assessed through Cohen's Kappa which was 0.85.

Statistical Analysis

Descriptive statistics such as mean, standard deviation and percentage was used. Association was evaluated using chi-square. Pearson's correlation coefficient was used to assess the association between components of DMFT and OHIP-14. Any p-value less than 0.05 were considered as significant.

RESULTS

The present study was conducted on 210 employees of Central Sericulture Research and Training Institute Mysore, comprising of scientists, technical assistants and skilled farm workers aged 35-60 years with a mean age of 49.95 ± 5.25

years. Among the 50 scientists working at CSR&TI; 37 (74%) were PhD (Doctor of Philosophy) and 13 (26%) MSc (Master of Science) in sericulture, zoology, botany, biochemistry, agriculture, life sciences or biotechnology. Of the 55 technical assistants 32 (58.18%) were graduates with BSc (Bachelor of Science) and 23 (41.82%) had done post high school diploma in agriculture and among 105 skilled farm workers majority of 64 (60.95%) were illiterate, 15 (14.29%) had high school certificate and 26 (24.76%) possessed primary school certificate Table 01 shows socio-demographic characteristics of the study population.

The overall prevalence of dental caries was 76.2%, with a mean number of decayed teeth (DT), missing teeth (MT), filled teeth (FT) and DMFT per person being 1.98 ± 2.49 , 1.10 ± 1.71 , 0.49 ± 1.06 and 3.57 ± 3.19 respectively. Table 02 shows association of decayed, missing and filled teeth with occupation and socio-economic status, it was found that prevalence of decayed teeth was higher among the skilled farm workers whereas the filled teeth component was higher among the scientists. Similarly, prevalence of caries was higher among the lower/upper lower class when compared to upper, upper middle and middle/lower middle class and the difference was found to be statistically significant.

Table 1. Socio-demographic characteristics of the study population

Variables	Number	Percentage
Age-Group (years)		
35-47	62	29.5
48-60	148	70.5
Gender		
Males	164	78.1
Females	46	21.9
Occupation		
Scientists	50	23.8
Technical Assistants	55	26.2
Skilled Farm Workers	105	50.0
Socioeconomic status		
Upper	59	28.1
Upper Middle	46	21.9
Middle/Lower Middle	09	4.3
Lower/Upper Lower	96	45.7

Table 2. Association between occupation and socioeconomic status with decayed, missing and filled teeth component of DMFT

Variables	without decayed teeth n(%)	with decayed teeth n(%)	p value
Occupation			
Scientists	30(60.0)	20(40.0)	*p<0.0001
Technical Assistants	39(70.9)	16(29.1)	
Skilled Farm Workers	24(22.9)	81(77.1)	
Socioeconomic status			
Upper	34(57.6)	25(42.4)	*p<0.0001
Upper Middle	35(76.1)	11(23.9)	
Middle/Lower Middle	05(55.6)	04(44.4)	
Lower/Upper Lower	19(19.8)	77(80.2)	
without missing teeth n(%)			
with missing teeth n(%)			
Occupation			
Scientists	30(60.0)	20(40.0)	p=0.79
Technical Assistants	31(56.4)	24(43.6)	
Skilled Farm Workers	57(54.3)	48(45.7)	
Socioeconomic status			
Upper	37(62.7)	22(37.3)	p=0.35
Upper Middle	24(52.2)	22(47.8)	
Middle/Lower Middle	03(33.3)	06(66.7)	
Lower/Upper Lower	54(56.2)	42(43.7)	
Occupation			
Scientists	30(60.0)	20(40.0)	p=0.79
Technical Assistants	31(56.4)	24(43.6)	
Skilled Farm Workers	57(54.3)	48(45.7)	
Socioeconomic status			
Upper	37(62.7)	22(37.3)	p=0.35
Upper Middle	24(52.2)	22(47.8)	
Middle/Lower Middle	03(33.3)	06(66.7)	
Lower/Upper Lower	54(56.2)	42(43.7)	
without filled teeth n(%)			
with filled teeth n(%)			
Occupation			
Scientists	36(72.0)	14(28.0)	*p=0.003
Technical Assistants	37(67.3)	18(32.7)	
Skilled Farm Workers	93(88.6)	12(11.4)	
Socioeconomic status			
Upper	42(71.2)	17(28.8)	*p=0.006
Upper Middle	31(67.4)	15(32.6)	
Middle/Lower Middle	09(100.0)	00(0.0)	
Lower/Upper Lower	84(87.5)	12(12.5)	

*- Statistically significant (p<0.05)

Table 3. Distribution of Responses for OHIP-14

OHIP-14 ITEMS	Responses	
	Never (%)	Other (%)
1. Have you had trouble pronouncing any word because of problems with your teeth or mouth or dentures	86.2	13.8
2. Have you felt that your sense of taste has worsened because of problems with your teeth or dentures	83.3	16.7
3. Have you had painful aching in your mouth	38.6	62.4
4. Have you found it uncomfortable to eat any food because of problems with your teeth or mouth	55.2	44.8
5. Have been self-conscious because of your teeth or mouth	87.6	12.4
6. Have you felt tense because of problems with your teeth or mouth	78.1	21.9
7. Has your diet been unsatisfactory because of problems with your teeth or mouth	62.9	37.1
8. Have you had to interrupt meals because of problems with your teeth or mouth	68.6	31.4
9. Have you found it difficult to relax because of problems with your teeth or mouth	79.0	21.0
10. Have you been embarrassed because of problems with your teeth or mouth	96.7	3.3
11. Have you been a bit irritable with other people because of problems with your teeth or mouth	81.9	8.1
12. Have you had difficulty doing your usual job because of problems with your teeth or mouth	82.9	17.1
13. Have you felt that life in general was less satisfying because of problems with your teeth or mouth	80.0	20.0
14. Have you been totally unable to function because of problems with your teeth or mouth	89.0	11.0

Table 4. Distribution of responses and mean scores for the OHIP-14

Items	Responses					Mean (SD)
	Never (0) n (%)	Hardly ever (1) n (%)	Occasionally (2) n (%)	Fairly often (3) n (%)	Very often (4) n (%)	
1	181 (86.2)	11 (5.2)	16 (7.6)	1 (0.5)	1 (0.5)	0.38 (0.97)
2	175 (83.3)	2 (1)	28 (13.3)	3 (1.4)	2 (1)	0.36 (0.84)
3	81 (38.6)	8 (3.8)	65 (31)	35 (16.7)	21 (10)	1.56 (1.4)
4	116 (55.2)	11 (5.2)	47 (22.4)	19 (9)	17 (8.1)	1.10 (1.36)
5	184 (87.6)	11 (5.2)	8 (3.8)	5 (2.4)	2 (1)	0.24 (0.72)
6	164 (78.1)	8 (3.8)	29 (13.8)	9 (4.3)	0	0.44 (0.88)
7	132 (62.9)	10 (4.8)	50 (23.8)	7 (3.3)	11 (5.2)	0.83 (1.2)
8	144 (68.6)	11 (5.2)	30 (14.3)	24 (11.4)	1(0.5)	0.70 (1.12)
9	166 (79)	4 (1.9)	21 (10)	17 (8.1)	2 (1)	0.50 (1.03)
10	203 (96.7)	2 (1)	4 (1.9)	1 (0.5)	0	0.06 (0.35)
11	172 (81.9)	7 (3.3)	20 (9.5)	9 (4.3)	2 (1)	0.39 (0.89)
12	174 (82.9)	6 (2.9)	16 (7.6)	12 (5.7)	2 (1)	0.39 (0.92)
13	168 (80)	7 (3.3)	19 (9)	12 (5.7)	4 (1.9)	0.46 (1)
14	187 (89)	0	15 (7.1)	7 (3.3)	1 (0.5)	0.26 (0.77)

Table 5. Correlation between the variables of oral health status and OHIP-14

	Mean Score (SD)	DT	MT	FT	DMFT
Functional Limitation	0.37 (0.76)	0.27***	0.27***	-0.017	0.42***
Physical Pain	1.33 (1.27)	0.42***	0.41***	0.07	0.63***
Psychological discomfort	0.34 (0.6)	0.27***	0.28***	0.1	0.49***
Physical disability	0.77 (1.11)	0.33***	0.43***	0.022	0.56***
Psychological disability	0.28 (0.57)	0.27***	0.34***	-0.017	0.43***
Social handicap	0.39 (0.84)	0.22***	0.37***	0.022	0.42***
Handicap	0.36 (0.8)	0.21***	0.45***	-0.14	0.42***
Overall OHIP-14	7.67 (10)	0.42***	0.46***	0.05	0.65***

*** - very highly significant ($p < 0.001$)

Oral Health Related Quality of Life

Table 03 and 04 shows the assessment of oral health related quality of life using OHIP-14 questionnaire which has 7 subscales. Majority of the employees reported no problem in the previous year on most items. This was evident from the high percentage of respondents scoring never (0) for most of the OHIP-14 questions. Majority of the employees had physical pain, as 62.4% had painful aching in their mouth in the previous year with a mean score of 1.56 ± 1.4 , followed by 44.8% reporting being uncomfortable to eat any food because of problems of teeth or mouth with a mean score of 1.1 ± 1.36 . For the subscale functional limitation, 13.8% had trouble pronouncing any word because of problems with teeth, mouth or dentures with a mean score of 0.38 ± 0.97 and 16.7% had felt their sense of taste had worsened in the previous year because of problems with their teeth or dentures with a mean score of 0.36 ± 0.84 . For the dimension of psychological discomfort, 12.4% reported being self-conscious because of their teeth or mouth with a mean score of 0.24 ± 0.72 and 21.9% felt tensed

because of problems with their teeth or mouth, with a mean score of 0.44 ± 0.88 . For the subscale physical disability, 37.1% had reported their diet being unsatisfactory because of problems in their teeth or mouth with a mean score of 0.83 ± 1.2 and 31.4% reported they had to interrupt their meals because of problems in their teeth or mouth, with a mean score of 0.70 ± 1.12 . For the psychological disability dimension, 21.0% had found it difficult to relax because of problems in their teeth or mouth, with a mean score of 0.5 ± 1.03 , and 3.3% reported being embarrassed because of problems in their teeth or mouth with a mean score of 0.06 ± 0.35 . For the subscale social disability, 8.1% reported being irritable with other people because of problems in their teeth or mouth, with a mean score of 0.39 ± 0.89 and 17.1% had reported of difficulty in doing their usual job because of problem in their teeth or mouth with a mean score of 0.39 ± 0.92 . For the dimension of handicap, 20.0% had felt life in general was less satisfying because of problems in their teeth or mouth, with a mean score of 0.46 ± 1 and 11.0% had reported of being totally unable to function because of problems in their teeth or mouth.

Correlation between variables of oral health status (DT, MT, FT and DMFT) and OHIP-14

All the 7 subscales of OHIP-14; functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social handicap and handicap were very highly ($p < 0.001$) positively associated with DT, MT and DMFT score. (Table 05)

DISCUSSION

The present study was carried out among the employees of Central Sericulture, Research and Training Institute, Mysore, to mainly co-relate oral health indicator; dental caries with the oral health related quality of life. In the present study, the presence of decayed teeth was higher in the skilled farm workers (77.1%), compared to the scientists (40.0%) and technical assistants (29.1%) and there was significant association between occupation and dental caries. The percentage of subjects with filled teeth was higher among scientists (28.0%) and technical assistants (32.7%) when compared to the skilled farm workers (11.4%). This could be due to positive attitude towards oral health with better knowledge, awareness and affordability to access the dental care among the scientists and technical assistants when compared to the skilled farm workers due to their education and better socioeconomic status. They tend not to ignore the problem at the initial stages itself and hence resort to preventive treatment like filling. On the contrary, among people belonging to the low socioeconomic status, there is a general lack of attitude towards oral health maintenance. Hence they tend to report only at later stages when the problem has exceeded with overt symptoms of pain. This leads to more extractions than preventive therapies being adopted. This lack of attitude and negligence towards one's oral health has a negative impact on the quality of life, leading to more functional disability and physical disability. It is equally essential to lay stress upon improving their attitude towards preventive mechanisms that could reduce the negative impact on their quality of life. The participants belonging to the lower/upper lower class had statistically higher prevalence of caries; 86.5% compared to those belonging to the higher socioeconomic status (69.5%). The study among State government employees in Shimla by Bhardwaj *et al.* (2014), also showed that there was more caries among subjects belonging to the lower socioeconomic status, compared to those in the highest socioeconomic status. The difference in socioeconomic status is one of the most powerful risk factor for poor health and oral health outcomes. Persons of lower socioeconomic status suffer disproportionately from nearly all diseases than people of higher socioeconomic status. Also people of low socioeconomic status generally lack awareness regarding importance of good oral health and have large unmet dental needs with lesser utilization of dental care services.

There was a high correlation between functional disability and DMFT components in the present study. Painful aching was reported among 62.4%, and it was significantly associated with the DT component, in contrast to the study conducted by Ingle *et al.* (2010) in Chennai (Ingle *et al.*, 2010), where the physical pain was highly significant with the missing component, but similar to the study conducted by Acharya (2008) in Manipal (Acharya, 2008), where physical pain was co-related to the decayed teeth and also the study carried out by Montero-Martin *et al.* (2009) in Spain (Montero-Martin *et al.*, 2009),

where psychological discomfort was the most common impact cited on the quality of life. DT was significantly correlated to the impact on the life of these people, since it leads to pain, food lodgement, interference with mastication and the daily routine activity, which is perceived by the patient as physical and psychological discomfort. Functional limitation in the present study was found to be significantly associated with the decayed and missing components of DMFT, in similar lines to the study conducted by Ingle *et al.* (2010) in Chennai (Ingle *et al.*, 2010), where functional limitation was associated with the missing teeth. Psychological disability in the present study was significant to DT and MT, whereas in the study conducted by Ingle *et al.* (2010) in Chennai (Ingle *et al.*, 2010), it was positively correlated with MT. The OHIP-14 scores was significantly co-related with DT, MT and DMFT in our study. FT was not found to be correlated to the quality of life in the present study; this could be due to restoration of normal functioning of teeth and causing no interference with the daily activities and any kind of psychological discomfort. The study shows that there is a need to improve the knowledge and oral hygiene practices to prevent the occurrence of oral diseases that will prove to be yet another financial burden especially on those belonging to the low income group. Also accessibility to an affordable dental care is equally essential for those people. Since oral health is significantly having an impact on the life of the CSRTI employees, an optimum oral health care is indeed required to help reduce the pre-existing burden, given their work environment and demands. A reinforcement of oral health education and stress on preventive measures is essential, focusing upon the individuals belonging to the low socioeconomic status. Since the quality of life is a multifactorial aspect and oral health being one of the essential component, considering it is needed. Also, high prevalence of dental caries and unmet dental needs among the employees indicates neglect towards their oral health. This lack of attitude and negligence towards one's oral health has a negative impact on the quality of life, tending to more functional and physical disability. It is equally essential to lay stress upon improving their attitude towards preventive mechanisms that could reduce the negative impact on their quality of life.

Conclusion

The study demonstrated a high prevalence of dental caries in the study population, which in turn had an impact on their quality of life. Decayed teeth, missing teeth and DMFT scores were positively and significantly correlated with all the 7 subscales of OHIP-14 mean scores. Filled teeth component was negatively correlated with functional limitation, psychological disability and handicap. The Oral Health Impact Profile (OHIP) has a multitude of substantive applications for the field of dentistry, healthcare, and dental research providing a comprehensive measure of self-reported dysfunction, discomfort and disability attributed to oral conditions. Patient-oriented outcomes like OHIP-14 will enhance our understanding of the relationship between oral health and general health and demonstrate to clinical researchers and practitioners that improving the quality of a patient's well-being go beyond simply treating oral conditions. These impacts are intended to complement traditional oral epidemiological indicators of clinical disease, thereby providing information about the "burden of illness" within populations and the effectiveness of health services in reducing that burden of illness.

Conflict of Interest: None

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