

# Oral Health Related Quality of Life among Tamil Speaking Adults Attending a Dental Institution in Chennai, Southern India

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## ABSTRACT

**Introduction:** Oral Health-Related Quality of Life (OHRQoL) indicates an individual's perception of how their well-being and quality of life is influenced by oral health. It facilitates treatment planning, assessing patient centred treatment outcomes and satisfaction.

**Aim:** The study aimed to identify the factors influencing OHRQoL among Tamil speaking South Indian adult population.

**Materials and Methods:** Non-probability sampling was done and 199 subjects aged 20-70 years were recruited for this observational study. The subjects were requested to fill a survey form along with the validated Tamil General Oral Health Assessment Index (GOHAI-Tml) questionnaire in the waiting area following which clinical examination was done by a single experienced Periodontist.

**Results:** The mean score with standard deviation for physical dimension was  $4.34 \pm 0.96$ , psychological dimension was  $4.03 \pm 1.13$  and pain was  $4.05 \pm 1.09$  on GOHAI. Greater impacts were seen for psychosocial dimensions like pleased with the appearance of teeth/denture Q7 ( $3.7 \pm 1.2$ ), worried about the problems with teeth/denture Q9 ( $3.7 \pm 1$ ) and pain or

discomfort in teeth Q12 ( $3.8 \pm 1$ ). Functions like swallowing Q3 ( $4.5 \pm 0.8$ ) and speaking Q4 ( $4.6 \pm 0.7$ ) were minimally affected. As age increased subjects perceived more negative impacts as indicated by lower ADD-GOHAI and higher SC-GOHAI scores ( $p < 0.01$ ). Subjects complaining of bad breath, bleeding gums and Temporomandibular Joint (TMJ) problems, reported poor OHRQoL ( $p < 0.05$ ). It was observed that as self-perceived oral and general health status deteriorated, OHRQoL also worsened ( $p < 0.01$ ). Subjects with missing teeth, cervical abrasion, restorations, gingival recession and mobility had more impacts on OHRQoL ( $p < 0.05$ ). Subjects diagnosed with periodontitis had lower OHRQoL as reported on the scale than gingivitis subjects ( $p < 0.01$ ).

**Conclusion:** In this study minimal impact was seen in all the three dimensions assessed with GOHAI. Factors like age, education, employment status, income, self-reported oral health, self-perceived general health, satisfaction with oral health, perceived need for treatment and denture wearing status influenced perceived OHRQoL. Bad breath, bleeding gums, TMJ problems, more number of missing teeth, decayed teeth, cervical abrasion, gingival recession and mobility were associated with poor OHRQoL.

**Keywords:** General oral health assessment index, Physical impact, Psychological impact, Social impact

## INTRODUCTION

Canadian Dental Association defines oral health as a state wherein the oral tissues contribute positively to an individual's well-being in all dimensions of health by allowing them to eat, speak, and socialise without any discomfort [1]. Thus, oral health plays a major role in the general well-being of a person.

Oral health problems can have wider social, economic and psychological concerns thereby affecting the quality of life. Quality of Life (QoL) is concerned with "the degree to which a person enjoys the important possibilities of life" [2,3]. It is currently a very effective subjective parameter to assess patient centred impacts of general and oral health. Problems like teeth decay, pulpitis and periodontitis cause considerable pain. Teeth loss can interfere with proper chewing, speaking and aesthetic appearance. Craniofacial disorders, malocclusion, appearance of the teeth or dentures significantly affect self-esteem, social relationships and communication capability. Other oral diseases such as head and neck cancer, dental fluorosis, craniofacial anomalies cause considerable distress to individuals thereby affecting QoL [4-10].

Oral Health Related Quality of Life (OHRQoL) denotes a person's perception of how oral health influences life quality and overall wellbeing. It encompasses an individual's satisfaction with oral health, self-esteem and the ease with which they are able to eat,

speak, and engage in social interactions [11]. Various socio-dental indicators are available to measure OHRQoL, such as social impacts of dental disease [12], geriatric oral health assessment index [13], oral health impact profile [14], dental impact on daily living [15], oral health related quality of life UK [16], oral impacts on daily performances [17], dental impact profile [18].

Clinical parameters measure the presence or absence and severity of disease. However, they do not measure the impact on the individual's quality of life; hence, complementing with OHRQoL indicators can enable the clinicians not only in planning the treatment but also to assess patient centred treatment outcomes and satisfaction.

In the present study we primarily intended to determine the extent of impact on physical, psychological, social and functional aspects due to oral health or disease among patients attending the outpatient department of a teaching dental institution in Southern India. Additionally, we also aimed to evaluate whether socio-demographic factors, subject's self-perceived health status and treatment needs, subjective clinical symptoms experienced, clinical parameters assessed objectively influenced OHRQoL.

## MATERIALS AND METHODS

**Study Participants:** Non-probability method of sampling was

used. A sample of 199 subjects was recruited for the observational study from the outpatient department of SRM Dental College and Hospital, Chennai, Tamil Nadu, India, from June 2015 to October 2015. Respondent's age ranging from 20-70 years, who were able to speak and read Tamil fluently and willing to participate were selected. Both verbal and written informed consents were obtained. Ethical clearance was obtained from institutional review board.

Completely edentulous subjects and those giving a history of acute dental problems or severe infections were excluded. Individuals psychologically affected and under treatment were not included.

**Data Collection for the Study:** The subjects were requested to fill the survey form along with the validated Tamil GOHAI questionnaire in the waiting area following which clinical examination was done. Trained residents were available at all times to clarify queries during completion of the survey form [19]. The OHRQoL is assessed in three dimensions – physical dimension which includes mastication, speech and swallowing, psychosocial dimension which includes worrying and self-consciousness about oral health, dissatisfaction with appearance and avoiding social contacts due to oral problems and the pain or discomfort dimension which includes use of medicines [Table/Fig-1]. In the present study 5 point Likert's response was used with scores from 1 to 5 namely never-5, seldom-4, sometimes-3, often-2 and always-1. The total score was calculated by summing up the response of all 12 items and it ranges from 12 to 60, this is referred to as ADD-GOHAI score. A higher score indicates good OHRQoL whereas, lower indicates poorer OHRQoL. A Simple Count score (SC-GOHAI) is also calculated by counting the number of items with response "sometimes", "often" or "always" and ranges from 0-12. GOHAI questionnaire forms with missing data i.e.,  $\geq 3$  items were not used for statistical data analysis. If scoring was not done for one or two items, the corresponding item mean was substituted for the missing value.

Information was collected on demographic data and personal habits like tooth brushing frequency and smoking, history of medical and oral problems like presence or absence of bad breath, bleeding from gums, burning mouth problem, Temporomandibular

Joint (TMJ) problems. Respondents were questioned on whether they had previously visited a dentist, whether satisfied with their oral health, whether replaced their missing teeth with dentures, whether they perceived any need for dental treatment and whether they are concerned about aesthetic appearance of their teeth. Data on perception of their general health and oral health status was also recorded.

A specialist Periodontist did the clinical examination using mouth mirror, explorer no. 23/17 and periodontal probe. The following clinical parameters were recorded: number of missing teeth, decayed teeth, restored teeth, cervical abrasion, gingival recession, shaking teeth, presence or absence of crowding and/or malocclusion. The oral hygiene status was assessed using Simplified Oral Hygiene Index (OHI-S). The periodontal status was diagnosed as gingivitis and localised or generalised periodontitis based on Periodontal Screening and Recording (PSR) system. The dentist perceived need for treatment was also recorded.

## STATISTICAL ANALYSIS

Descriptive statistics was calculated for all the variables assessed. Independent t test was used to compare mean GOHAI between two groups and one-way ANOVA was used to compare mean GOHAI between more than two groups. The statistical significance was fixed at  $p < 0.05$ .

## RESULTS

The mean, standard deviation and response frequencies of the 12 items is shown in [Table/Fig-2]. Subjects reported greater impacts for Q7, Q9 and Q12. Least affected functions were swallowing (Q3) and speaking (Q4).

The mean score and standard deviation for physical dimension (Q1,2,3,4) was  $4.34 \pm 0.96$ , psychological dimension (Q6,7,9,10,11) was  $4.03 \pm 1.13$  and pain (Q8,5,12) was  $4.05 \pm 1.09$ .

A total of 320 patients visited the outpatient department during the study period among them 199 subjects fulfilled the selection criteria and agreed to participate. The participation rate was 62%. Analysis showed that women perceived greater negative impacts than men [Table/Fig-3]. The mean age of the study population was 34.76 years (SD 12.9). It was noticed that as age increased subjects perceived more negative impacts [Table/Fig-3]. Better OHRQoL was reported by uneducated subjects than their educated counterparts. Among educated participants, higher education status was associated with better perceived OHRQoL. Comparison of mean ADD-GOHAI score showed significant difference between subjects ( $p < 0.05$ ) [Table/Fig-3].

Retired and unemployed subjects perceived poor quality of life associated with oral health and more number of negative impacts in contrast to those who were employed. Statistical significance was seen in the scores between the groups ( $p < 0.001$ ) implying the influence of employment status [Table/Fig-3]. It was observed that subjects without any income and those earning less than 10,000 Indian rupees perceived lower OHRQoL.

**Oral Health Problems and GOHAI Scores:** Subjects complaining of bad breath reported poor OHRQoL and statistically significant difference was seen between the groups ( $p < 0.05$ ), suggesting that bad breath affected perceived OHRQoL [Table/Fig-4]. Comparison of the mean ADD-GOHAI scores based on presence or absence of bleeding from the gums showed statistically significant difference ( $p < 0.05$ ) [Table/Fig-4]. Respondents complaining of burning mouth reported more negative impacts on quality of life. Subjects with TMJ difficulties perceived greater impact on OHRQoL with statistical significance difference ( $p < 0.001$ ) in the scores [Table/Fig-4].

**Self Perceived Descriptives and GOHAI Scores:** Subjects who perceived their oral health as bad had lower scores and

ITEM	DIMENSIONS OF OHQoL	ITEMS IN GOHAI SCALE (In the past three months)
Q1	Physical function	How often did you limit the kinds or amounts of food you eat because of problems with your teeth or dentures?
Q2	Physical function	How often do you have trouble biting or chewing any kinds of food, such as tough meat or apples?
Q3	Physical function	How often were you able to swallow comfortably?
Q4	Physical function	How often have your teeth or dentures prevented you from speaking the way you wanted?
Q5	Pain or discomfort in the mouth	How often were you able to eat anything without feeling discomfort?
Q6	Psychosocial function	How often did you limit contacts with people because of the condition of your teeth or dentures?
Q7	Psychosocial function	How often were you pleased or happy with the looks of your teeth and gums, or dentures?
Q8	Pain or discomfort in the mouth	How often did you use medication to relieve pain or discomfort from around your mouth?
Q9	Psychosocial function	How often were you worried or concerned about the problems of your teeth, gums or dentures?
Q10	Psychosocial function	How often did you feel nervous or self-conscious because of problems with your teeth, gums, or dentures?
Q11	Psychosocial function	How often did you feel uncomfortable eating in front of people because of problems with your teeth or dentures?
Q12	Pain or discomfort in the mouth	How often were your teeth or gums sensitive to hot, cold, or sweets?

[Table/Fig-1]: Items in GOHAI scale [19].

ITEMS	MEAN	SD	ALWAYS		FAIRLY OFTEN		SOMETIMES		SELDOM		NEVER	
			N	%	N	%	N	%	N	%	N	%
Q1	4.2	1.0	1	0.5	13	6.5	37	18.6	38	19.1	110	55.3
Q2	4.0	1.1	5	2.5	16	8	42	21.1	47	23.6	89	44.7
Q3	4.5	0.8	0	0	5	2.5	25	12.6	23	11.6	146	73.4
Q4	4.6	0.7	2	1	1	0.5	21	10.6	23	11.6	152	76.2
Q5	4.2	1.0	6	3	6	3	32	16.1	34	17.1	121	60.8
Q6	4.2	1.1	7	3.5	14	7	23	11.6	34	17.1	121	60.8
Q7	3.7	1.2	12	6	20	10.1	51	25.6	43	21.6	73	36.7
Q8	4.4	0.8	0	0	6	3	25	12.6	44	22.1	124	62.3
Q9	3.7	1.0	8	4	19	9.5	43	21.6	74	37.2	55	27.6
Q10	4.0	1.0	5	2.5	14	7	37	18.6	50	25.1	93	46.7
Q11	4.3	0.9	5	2.5	7	3.5	23	11.6	38	19.1	126	63.3
Q12	3.8	1.0	6	3	21	10.6	44	22.1	63	31.7	65	32.7

[Table/Fig-2]: Descriptive statistics of the GOHAI scale and the frequency distribution of the responses for each item.

VARIABLE		NUMBER	%	MEAN ADD GOHAI (SD)	STATISTICAL TEST	MEAN SC GOHAI (SD)	STATISTICAL TEST
Gender	Male	127	63.8	50.79±6.84	t test 0.080 p>0.05	2.7±2.6	t test 0.124 p>0.05
	Female	72	36.2	48.91±7.88		3.4±3.1	
Age	≤ 30	96	48.2	51.98±6.06	ANOVA p<0.001	2.2±2.3	ANOVA p<0.01
	31-50	72	36.2	49.13±7.34		3.4±2.8	
	> 50	31	15.6	46.58±8.89		4.2±3.9	
Education	School education	60	30.2	48.28±7.64	ANOVA 0.037 p<0.05	3.5±2.9	ANOVA 0.07 p>0.05
	Degree/diploma	100	50.3	50.37±7.34		2.9±2.9	
	Post-graduation	35	17.6	51.88±5.81		2.2±2.5	
	Uneducated	4	2.0	55.75±5.90		0.75±1.5	
Occupation	Employed	142	71.4	51.02±6.77	ANOVA 0.001 p<0.01	2.7±2.6	ANOVA 0.23 p>0.05
	Unemployed	28	14.1	46.89±7.87		3.8±3.0	
	Student	21	10.6	51.04±6.51		2.8±3.1	
	Retired	8	4	42.75±9.51		5.3±4.6	
Income	≤10,000	59	29.6	49.93±7.37	ANOVA 0.111 p>0.05	3.1±2.7	ANOVA 0.18 p>0.05
	10,001 - 20,000	55	27.6	51.47±6.51		2.6±2.6	
	≥20,000	38	19.1	50.92±7.44		2.4±2.8	
	No income	47	23.6	48.10±7.63		3.6±3.3	
Frequency of brushing	Once a day	145	72.8	49.2±7.5	t test 0.005 p<0.01	3.3±2.9	t test 0.01 p<0.05
	Twice or more than twice a day	54	27.1	52.5±5.9		2.2±2.4	
Smoking	No	171	85.9	50.27±7.12	t test 0.44 p>0.05	2.9±2.8	t test 0.51 p>0.05
	Yes	28	14.1	49.14±8.24		3.3±2.8	

[Table/Fig-3]: Frequency, percentage distribution of the variables assessed in the study with mean ADD and SC GOHAI scores with statistical test for comparison between mean scores.

more number of negative responses. Comparison of means showed significant difference ( $p<0.001$ ) [Table/Fig-5]. None of the subjects reported poor general health. It was observed that as self-perceived general health and oral health status deteriorated the OHRQoL scores also worsened [Table/Fig-5].

A total of 85.4% of subjects felt that they were in need of dental treatment, they had also reported poorer OHRQoL [Table/Fig-5]. Subjects satisfied with their oral health had better OHRQoL when compared with subjects dissatisfied with their oral health. Subjects not happy with the appearance of their teeth with respect to colour, alignment, health etc., specified more problems on GOHAI scale [Table/Fig-5]. Furthermore, it was noticed that subjects with systemic problem reported poorer OHRQoL, and more negative responses. Comparison of both the mean scores between systemically healthy and diseased subjects showed significant difference statistically ( $p<0.01$ ) demonstrating that medical status affected the perceived oral health associated quality of life [Table/Fig-5].

**Oral Health Habits and GOHAI Score:** Subjects who brushed their teeth twice or more than twice daily had fewer negative impacts. Comparison of scores between groups based on their brushing frequencies showed significant difference statistically ( $p<0.05$ ) [Table/Fig-3]. Smokers had poor OHRQoL than non-smokers, yet statistically no significant difference was seen in both the mean scores [Table/Fig-3]. Respondents who had previously visited a dentist felt poorer OHRQoL when compared with those who had never visited a dentist. On statistical analysis the difference of mean ADD-GOHAI scores between the subjects based on their dental visit was significant ( $p<0.05$ ) [Table/Fig-5].

**Clinical Variables and GOHAI Scores:** On analysis it was seen that subjects with missing teeth, cervical abrasion, restorations, gingival recession and mobility had more impacts on OHRQoL. Comparison of means between the groups based on the presence or absence of the above clinical conditions showed statistically significant difference in both the mean GOHAI scores ( $p<0.05$ ). The subjects with good oral hygiene had better OHRQoL than those with fair or poor oral hygiene. Subjects with decayed

VARIABLE		NUMBER	%	MEAN ADD GOHAI (SD)	STATISTICAL TEST	MEAN SC GOHAI (SD)	STATISTICAL TEST
Bad breath	Yes	60	30.1	47.8 ± 7.0	t test 2.9 p<0.05	3.8±2.9	t test -2.6 p<0.05
	No	139	69.8	51.1 ± 7.1		2.6±2.7	
Bleeding gums	Yes	80	40.2	48.7 ± 7.3	t test 2.19 p<0.05	3.4±2.9	t test -1.85 p>0.05
	No	119	59.7	51.0 ± 7.2		2.7±2.9	
Burning mouth	Yes	11	5.5	47.0 ± 9.4	t test 1.46 p>0.05	4.0±3.9	t test -1.19 p>0.05
	No	188	94.4	50.2 ± 7.1		2.9±2.8	
TMJ problem	Yes	27	13.5	44.5 ± 6.0	t test 4.43 p<0.001	5.0±2.6	t test -4.03 p<0.001
	No	172	86.4	50.9 ± 7.0		2.6±2.7	
Self-perceived oral health	Excellent	10	5.02	56.7 ± 4.3	ANOVA 9.47 p<0.001	0.70±1.0	ANOVA 6.6 p<0.001
	Good	80	40.2	52.2 ± 7.0		2.4±2.7	
	Fair	100	50.2	48.3 ± 6.7		3.6±2.9	
	Poor	9	4.5	45.0 ± 9.1		5.0±3.3	
Self-perceived general health	Excellent	49	24.6	52.1 ± 5.9	ANOVA 8.865 p<0.001	2.2±2.0	ANOVA 8.137 p<0.001
	Good	99	49.7	50.9 ± 7.4		2.6±3.0	
	Fair	55	27.6	46.8 ± 7.3		4.2±2.9	
Diagnosis	Gingivitis	112	56.2	52.6 ± 5.9	ANOVA 23.29 p<0.001	2.0±2.3	ANOVA 23.13 p<0.001
	Localized chronic periodontitis	74	37.1	47.6 ± 7.3		3.8±2.9	
	Generalized chronic periodontitis	13	6.5	42.2 ± 7.5		6.5±3.0	

**[Table/Fig-4]:** Frequency, percentage distribution of the variables assessed in the study with mean ADD and SC GOHAI scores with statistical test for comparison between mean scores.

VARIABLE		NUMBER	%	MEAN ADD GOHAI (SD)	STATISTICAL TEST	MEAN SC GOHAI (SD)	STATISTICAL TEST
Visit to the dentist	Yes	145	72.8	49.4 ± 7.5	t test 2.11 p<0.05	3.1±2.9	t test -1.18 p>0.05
	No	54	27.1	51.8 ± 6.5		2.5±2.6	
Satisfaction with oral health	Yes	96	48.2	53.2 ± 6.1	t test -6.35 p<0.001	1.8±2.3	t test 5.5 p<0.001
	No	103	51.7	47.2 ± 7.1		4.0±2.9	
Patient need for dental treatment	Yes	170	85.4	49.6 ± 7.1	t test 2.19 p<0.05	3.1±2.9	t test -1.65 p>0.05
	No	29	14.5	52.8 ± 7.7		2.1±2.9	
Dentist need for treatment	Yes	190	95.4	49.8 ± 7.3	t test 2.12 p<0.05	3.0±2.9	t test -1.65 p>0.05
	No	9	4.5	55.1 ± 5.0		1.4±2.5	
Crowding / malocclusion	Yes	79	39.6	49.1 ± 7.5	t test 1.46 p>0.05	3.4±3.2	t test -1.7 p>0.05
	No	120	60.3	50.7 ± 7.12		2.7±2.7	
Esthetic concern	Yes	64	32.1	47.6 ± 6.4	t test 3.38 p<0.01	4.0±2.6	t test -3.83 p<0.001
	No	135	67.8	51.2 ± 7.4		2.4±2.9	
Medical problem	Yes	19	9.5	44.7 ± 7.9	t test 3.4 p<0.01	5.1±3.7	t test -3.5 p<0.01
	No	180	90.4	50.6 ± 6.9		2.7±2.7	
Wearing denture	Yes	31	15.5	48.0±8.9	t test 1.7 p>0.05	3.6±3.7	t test -1.3 p>0.05
	No	168	84.4	50.5±6.8		2.8±2.6	

**[Table/Fig-5]:** Frequency, percentage distribution of the variables assessed in the study with mean ADD and SC GOHAI scores with statistical test for comparison between mean scores.

teeth perceived more number of negative impacts and the mean difference in SC-GOHAI score was statistically significant between those with and without carious teeth ( $p<0.05$ ) [Table/Fig-6].

Study samples with crowding or malocclusion or trauma from occlusion had poor OHRQoL and more number of negative responses in comparison with those not having such clinical problems [Table/Fig-6].

Subjects with periodontitis had lower OHRQoL. Furthermore, cases of generalised periodontitis had more negative impacts than those with localised periodontitis. Statistically significant difference was seen between the groups ( $p<0.001$ ) [Table/Fig-4]. Poorer OHRQoL was perceived by subjects for whom the dentist felt that there was a need for dental treatment. Mean ADD-GOHAI score showed statistical significance ( $p<0.05$ ) [Table/Fig-5].

## DISCUSSION

Cohen and Jago identified the need to develop patient centred oral health status measurements due to lack of scientific evidence relating to psychosocial impact of oral health and or disease. Hence, comprehensive scales were developed to evaluate oral health specific status measures [20]. These indicators enable population based programmes for disease prevention, health promotion and allocation of funds for oral health improvement moreover, from a patient's perspective they enable more customised treatment planning based on subjective evaluation of needs and also to assess satisfaction following treatment [2,3].

GOHAI aims to complement the clinical indices by quantifying problems faced by the patient relating to physiological, physical and psychological dimensions. Literature search revealed limited

VARIABLE	NUMBER	%	MEAN ADD GOHAI (SD)	STATISTICAL TEST	MEAN SC GOHAI (SD)	STATISTICAL TEST
No. of teeth present	≤ 29 teeth	67	33.6	t test -1.50 p>0.05	49.0 ± 7.5	t test 1.44 p>0.05
	>29 teeth	132	66.3		50.6 ± 7.1	
No. of missing teeth	Nil	75	37.6	t test 2.8 p<0.05	51.9 ± 6.4	t test -2.52 p<0.05
	1 or more than one	124	62.3		48.9 ± 7.5	
No. of teeth with decay	Nil	51	25.6	t test 2.003 p>0.05	51.8 ± 5.7	t test -2.30 p<0.05
	1 or more than one	148	74.3		49.5 ± 7.7	
No. of teeth with cervical abrasion	Nil	158	79.3	t test 3.80 p<0.001	51.0 ± 6.7	t test -2.99 p<0.01
	1 or more than one	41	20.6		46.3 ± 8.1	
No. of teeth with restorations	Nil	144	72.3	t test 5.4 p<0.001	51.7 ± 6.5	t test -4.3 p<0.001
	1 or more than one	55	27.6		45.8 ± 7.5	
No. of teeth with crowns	Nil	176	88.4	t test 1.64 p>0.05	50.4 ± 6.9	t test -1.32 p>0.05
	1 or more than one	23	11.5		47.7 ± 9.2	
Oral hygiene status OHI (S)	Good	10	5.02	ANOVA 1.216 p>0.05	53.6 ± 4.4	ANOVA 0.18 p>0.05
	Fair	123	61.8		49.9 ± 7.1	
	Poor	66	33.1		49.8 ± 7.7	
No. of teeth with gingival recession	Nil	113	56.7	t test 6.6 p<0.001	52.8 ± 5.9	t test -6.271 p<0.001
	1 or more than one	86	43.2		46.5 ± 7.5	
No. of mobile teeth	Nil	176	88.4	t test 5.39 p<0.001	51.0 ± 6.7	t test -5.62 p<0.001
	1 or more than one	23	11.5		42.9 ± 7.3	

**[Table/Fig-6]:** Frequency, percentage distribution of the variables assessed in the study with mean ADD and SC GOHAI scores with statistical test for comparison between mean scores.

knowledge exploring OHRQoL among Indian subjects particularly among South Indians. As cultural background and ethnicity affects QoL perception we aimed to identify the factors influencing OHRQoL among this particular group of Tamil speaking South Indian population.

Physical functions like swallowing and speaking were least affected whereas, negative impacts were more commonly perceived for psychosocial dimensions like pleased with the appearance of teeth/denture, worried about the problems with teeth/denture and pain or discomfort in teeth. Difficulty in swallowing is commonly seen in elderly individuals attributed to xerostomia induced by drugs and chronic diseases. In the current study, majority of the subjects were younger than 30 years of age and very few subjects were medically compromised [21]. Perhaps the above population characteristics contributed to minimal negative impacts. Subjects with missing teeth and ill-fitting dentures generally experience difficulty in speaking and pronunciation [22,23]. As only a meagre 15.5% subjects were denture wearers and 33.6% were partially edentulous in the current study, perhaps minimal negative impacts were observed. Similarly, all the three dimensions assessed with GOHAI showed equivalent impacts and not much difference was noted.

Socio-demographic characteristics like age, gender, education and income seem to influence quality of life associated with oral health; however, the relationship is not yet clearly established. In the current study, females perceived poor OHRQoL. This could be attributed to the fact that females are generally more concerned about their oral health or probably to the sampling characteristics or the participation rates. This observation is in agreement with Ingle et al., Fotedar and Atieh et al., [5,6,24]. However, several studies disagree and report that no gender differences exists [20,25].

Oral health is said to be strongly age related [26]. With ageing there is an increased tendency for tooth loss, attachment loss, and poor oral hygiene maintenance. Furthermore, factors such as psychological issues, monetary constraints, dependency, and lack of family co-operation, systemic problems and multiple medications further worsen oral health. Steele et al., noted that age and tooth loss independently affected OHRQoL [27]. In this

study OHRQoL perception deteriorated with increasing age. This is in agreement with the findings of Einarson et al., and Lahti et al., [28,29]. However, McGrath and Bedi suggested that younger adults perceived more negative impacts on OHRQoL [30].

The association between oral health status and educational level has been analysed in a number of epidemiological studies. Paulander and colleagues concluded from their study that lower educational level related to poor oral hygiene, tooth loss, risk for caries and periodontal disease [31]. Better socio-economic status and awareness can be related to higher education which in turn results in better oral health associated quality of life. A gradient in perceived oral health associated QoL was observed in this study, wherein subjects with higher education levels perceived better OHRQoL. Similar findings were reported by Paulander et al., and Tsakos et al., [31,32]. Conversely, a discrepancy was observed in our results, wherein uneducated subjects reported very good OHRQoL. However, this need to be interpreted with caution as only four samples were in this group.

The association between oral health and socio-economic status has been well established. Individuals with lower socio-economic status are more probable to have poorer oral health, as shown by both clinical and subjective indicators [33,34]. Jain R et al., utilised modified Kuppaswamy scale for assessing socio-economic status in Indian population and observed a similar trend [35]. Our findings were in agreement with the above studies. However, we assessed economic status solely based on income per month which is just one determinant of socio-economic status; hence, this is a potential limitation of this study.

Oral health associated QoL was closely related to perceived oral and general health in this study. There was a gradient noted wherein better perception was associated with better OHRQoL. This finding concurs with the previous studies [24,35]. Romi et al., validated the Hindi version of GOHAI among subjects aged more than 55 years in Mumbai, India and observed that poor perceptions of oral and general health, low satisfaction with oral health, perceived need for dental care, presence of self-reported TMJ pain, burning mouth sensation, one or more missing or decayed teeth and bad breath were associated with low GOHAI scores [35]. Our results were very similar to the above study.

Temporomandibular Joint Disorders (TMD) are a common cause of orofacial pain and are associated with restricted mandibular movements and joint sounds. They have a significant impact on QoL. Fotedar et al., studied the impact of TMD to the self-perceived OHRQoL in Indian population and concluded that these patients had lower OHRQoL as compared to the general population [6]. Our study was concurrent with the above findings.

Adults who visit dentist regularly have better oral health status and better OHRQoL requiring less emergency treatment. In developing country like India, even though dental care is a part of primary health care, very few centres have dental services; moreover, dental insurance is at its primitive stage and majority of population cannot afford treatment at private clinics; hence, often people visit dentist only when in pain [36,37]. None of the study subjects had regular visiting pattern. Perhaps those who never visited dentist had no significant dental problems and so reported better OHRQoL in this study.

Dental caries is the most common reason for orofacial pain. Abhishek et al., and Rajagopalachari US et al., assessed the oral health-related quality of life among police personnel in South India and observed that decayed teeth negatively affected OHRQoL [7,38]. Similar findings were reported by Sanadhya S et al., and Ingle N et al., among Indian subjects [4,5]. The present study concurs with the above studies however; statistical significance was not seen in the mean ADD-GOHA1 scores. Severity of the carious lesion determines pain or sensitivity or food lodgement which in turn impacts QoL. Probably the subjects in this study had more of initial carious lesions.

Durham et al., identified that patients with chronic periodontitis reported significantly poorer oral health associated QoL than age-and gender-matched periodontally healthy patients, with significant functional, social and psychological impacts [39]. Ng SK and Leung demonstrated that subjects with bad breath, receding gums, shaking teeth had greater impacts on OHRQoL using OHIP-14 scale [10]. Consistent with the above studies, we observed that periodontitis patients in this study group perceived greater impacts on their OHRQoL.

## LIMITATION

The limitation of the present study was that elaborate periodontal charting was not done for each patient; instead, PSR was used for defining the periodontal status. However, clinical examination and treatment needs were determined by an experienced periodontist. The other limitations are cross-sectional design, small sample size and convenience sampling hence, inference cannot be generalised for the population. Additionally, social desirability response bias could influence the results by creating false relationships or might obscure the relationships between variables in self-reporting surveys. The strength of our study was that both clinical indicators of oral health and multi-item OHRQoL scale were used. The authors recommend that further studies with larger sample size should be carried out including subjects from different socio-economic background and varied age groups, so that more precise conclusions can be drawn regarding the impacts of oral health on the quality of life among this target study population.

## CONCLUSION

To the authors knowledge, this is the first study to assess impacts on OHRQoL using GOHA1 among Tamil speaking adults. The following conclusions can be drawn from this study within its limitations; minimal impact was seen in all the three dimensions assessed with the scale, demographic factors like age, education, employment status and income, self-perceived oral and general health status, satisfaction with oral health, perceived need for dental treatment, denture usage, oral problems like presence of bad breath, bleeding gums and TMJ problems influenced OHRQoL

negatively. Additionally, more the number of missing teeth, decayed teeth, cervical abrasion, gingival recession and tooth mobility poorer was the perceived OHRQoL. Finally, this study aims to highlight the importance of assessing OHRQoL in the clinical practice so that clinicians can identify the actual difficulties faced by the patients due to oral problems and formulate appropriate treatment plan and goals which are more patient oriented rather than concentrating only on the clinical end points of treatment.

## REFERENCES

- [1] Petersen P.E. The world oral health report 2003: Continuous improvement of oral health in the 21st century – the approach of the WHO global oral health programme. *Community Dent Oral Epidemiol.* 2003;31:3-24.
- [2] Locker D. Oral health and quality of life. *Oral Health Prev Dent.* 2004;2:247-53.
- [3] Gift HC, Atchison KA. Oral health, health, and health-related quality of life. *Med Care.* 1995;1:NS57-77.
- [4] Sanadhya S, Aapaliya P, Jain S, Sharma N, Choudhary G, Dobarina N. Assessment and comparison of clinical dental status and its impact on oral health-related quality of life among rural and urban adults of Udaipur, India: A cross-sectional study. *J Basic Clin Pharm.* 2015;6:50.
- [5] Ingle NA, Chaly PE, Zohara CK. Oral health related quality of life in adult population attending the outpatient department of a hospital in Chennai, India. *J Int Oral Health.* 2010;2(4):45-56.
- [6] Fotedar S, Sharma KR, Fotedar V, Bhardwaj V, Chauhan A, Manchanda K. Relationship between oral health status and oral health related quality of life in adults attending HP government dental college, Shimla, Himachal Pradesh-India. *Oral Health Dent Manag.* 2014;13:661-65.
- [7] Abhishek KN, Shamarao S, Jain J, Haridas R, Ajagannanavar SL, Khanapure SC. Impact of caries prevalence on oral health-related quality of life among police personnel in Virajpet, South India. *J Int Soc Prevent Communit Dent.* 2014;4:188-92.
- [8] Torabi M, Larizadeh MH, Safizadeh H, Afshar MK, Ahmadi NM. Quality of life and OHRQoL in head and neck cancer patients in Kerman, Ir. *Journal of Oral Health and Oral Epidemiology.* 2013;1:78-82.
- [9] Scapini A, Feldens CA, Ardenghi TM, Kramer PF. Malocclusion impacts adolescents' oral health-related quality of life. *Angle Orthod.* 2012;83:512-18.
- [10] Ng SK, Leung WK. Oral health-related quality of life and periodontal status. *Community Dent Oral Epidemiol.* 2006;34:114-22.
- [11] Sischo L, Broder HL. Oral health-related quality of life what, why, how, and future implications. *J Dent Res.* 2011;90:1264-70.
- [12] Cushing AM, Sheiham A, Maizels J. Developing socio-dental indicators-the social impact of dental disease. *Community Dent Health.* 1986;3:3-17.
- [13] Atchison KA, Dolan TA. Development of the geriatric oral health assessment index. *J Dent Educ.* 1990;54:680-87.
- [14] Slade GD, Spencer AJ. Development and evaluation of the oral health impact profile. *Community Dent Health.* 1994;11:3-11.
- [15] Leao A, Sheiham A. The development of a socio-dental measure of dental impacts on daily living. *Community Dent Health.* 1996;13:22-26.
- [16] Mc Grath C, Bedi R. Measuring the impact of oral health on quality of life in Britain using OHQoL-UK(W)(c). *J Public Health Dent.* 2003;63:73-77.
- [17] Adulyanon S, Vourapukjaru J, Sheiham A. Oral impacts affecting daily performance in a low dental disease Thai population. *Community Dent Oral Epidemiol.* 1996;24:385-89.
- [18] Strauss R, Hunt R. Understanding the value of teeth to older adults: influences on the quality of life. *J Am Dent Ass.* 1993;124:105-10.
- [19] Appukkuttan DP, Vinayagavel M, Balasundaram A, Damodaran LK, Shivaraman P, Gunashegara K. Linguistic adaptation and psychometric properties of Tamil version of general oral health assessment index-Tml. *Ann Med Health Sci Res.* 2015;5:413-22.
- [20] Cohen LK, Jago JD. Toward the formulation of sociodental indicators. *Int J Health Serv.* 1976;6:681-98.
- [21] Anurag Gupta B, Epstein JB, Sroussi H. Hyposalivation in elderly patients. *J Can Dent Assoc.* 2006;72:841-46.
- [22] Azevedo MS, Correa MB, Azevedo JS, Demarco FF. Dental prosthesis use and/or need impacting the oral health-related quality of life in Brazilian adults and elders: Results from a National Survey. *J Dent.* 2015; 43:1436-41.
- [23] Yen YY, Lee HE, Wu YM, Lan SJ, Wang WC, Du JK, et al. Impact of removable dentures on oral health-related quality of life among elderly adults in Taiwan. *BMC Oral Health.* 2015;15:1.
- [24] Atieh MA. Arabic version of the geriatric oral health assessment index. *Gerodontology.* 2008;25:34-41.
- [25] Tubert Jeannin S, Riordan PJ, Morel Papernot A, Moulin R. Dental status and oral health quality of life in economically disadvantaged French adults. *Spec Care Dentist.* 2004; 24:264-69.
- [26] John MT, Huijoe P, Miglioretti DL, LeResche L, Koepsell TD, Micheelis W. Dimensions of oral-health-related quality of life. *J Dent Res.* 2004; 83:956-60.
- [27] Steele JG, Sanders AE, Slade GD, Allen PF, Lahti S, Nuttall N, Spencer AJ. How do age and tooth loss affect oral health impacts and quality of life? A study comparing two national samples. *Community Dent Oral Epidemiol.* 2004;32:107-14.
- [28] Einarsen S, Gerdin E W, Hugoson A. Oral health impact on quality of life in an adult Swedish population. *Acta Odontol Scand.* 2009;67:85-93.

- [29] Lahti S, Suominen-Taipale L, Hausen H. Oral health impacts among adults in Finland: Competing effects of age, number of teeth, and removable dentures. *Eur J Oral Sci.* 2008;116:260-66.
- [30] McGrath C, Bedi R. Why are we 'weighting' an assessment of a self-weighting approach to measuring oral health-related quality of life? *Community Dent Oral Epidemiol.* 2004; 32:19-24.
- [31] Paulander J, Axelsson P, Lindhe J. Association between level of education and oral health status in 35, 50, 65 and 75 year olds. *J Clin Periodontol.* 2003;30:697-704.
- [32] Tsakos G, Sheiham A, Iliffe S, Kharicha K, Harari D, Swift CG, et al. The impact of educational level on oral health-related quality of life in older people in London. *Eur J Oral Sci.* 2009;117:286-92.
- [33] Wamala S, Merlo J, Bostrom G. Inequity in access to dental care services explains current socioeconomic disparities in oral health: The Swedish National Surveys of Public Health 2004-2005. *J Epidemiol Community Health.* 2006, 60:1027-33.
- [34] Sabbah W, Tsakos G, Chandola T, Sheiham A, Watt RG. Social gradients in oral and general health. *J Dent Res.* 2007;86:992-96.
- [35] Jain R, Dupare R, Chitguppi R, Basavaraj P. Assessment of validity and reliability of hindi version of geriatric oral health assessment index (GOHAI) in Indian population. *Indian J Public Health.* 2015;59:272.
- [36] Crocombe LA, Broadbent JM, Thomson WM, Brennan DS, Poulton R. Impact of dental visiting trajectory patterns on clinical oral health and oral health related quality of life. *J Public Health Dent.* 2012;72:36-44.
- [37] Gambhir RS, Brar P, Singh G, Sofat A, Kakar H. Utilization of dental care: An Indian outlook. *J Nat Sc Biol Med.* 2013;4:292.
- [38] Rajagopalachari US, Puranik MP, Sonde L. Impact of oral health on quality of life among police personnel in Bengaluru City, India: A cross-sectional survey. *J Indian Assoc Public Health Dent.* 2015;13:42.
- [39] Durham J, Fraser HM, McCracken GI, Stone KM, John MT, Preshaw PM. Impact of periodontitis on oral health-related quality of life. *J Dent.* 2013; 41:370-76.

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