DOI: 10.7860/JCDR/2019/38200.12432

Original Article

Dentistry Section

Oral Health Practices, Status and Effect of Malocclusion on Quality of Life of College Going Individuals in Chennai, India

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ABSTRACT

Introduction: Diseases affecting oro-facial structures can present themselves in a spectrum varying from pain like in case of acute pulpitis to psychosocial effects like in malocclusion. Poor malocclusion causes poorer oral aesthetic self-perception, and affects emotional and social well-being health domains.

Aim: To assess the oral health related practices and status among college going students and to evaluate the effect of malocclusion on their quality of life.

Materials and Methods: A cross-sectional study was conducted among 710 subjects of age range 17-23 years. Oral health status was assessed using WHO basic oral health survey (2013), orthodontic treatment needs according to Index of Orthodontic Treatment Needs (IOTN) and oral health quality of life using Oral Health Impact Profile-14 (OHIP-14). Mann-Whitney test and Fisher's-exact test were used for statistical analysis.

Results: A total of 710 students were examined. It was seen that in the study population, only 290 (40.8%) knew that oral health affected general health and 501 (70.6%) had never visited dentist. The mean DMFT was 1.80+2.20 and 493 (69.4%) did not have any periodontal problem and 378 (53.2%) required orthodontic treatment ranging from little/mild to very severe orthodontic treatment need and it was seen that there was a difference in all the domains of OHIP-14 among the individuals in orthodontic treatment needed and not needed group and it was statistically very highly significant ($p<0.001$).

Conclusion: It was seen that the study population had poor dental attendance. The orthodontic treatment need was also high as it should had been initiated at an early age for correction which in turn could improve the oral health related quality of life among the individuals who needed orthodontic treatment.

Keywords: Dental caries, Dental fluorosis, Oral health knowledge, Periodontal problems

INTRODUCTION

Oro-facial structures are affected by diseases like dental caries, gingivitis, periodontitis, malocclusion, impaction, temporomandibular dysfunction and oral cancer and these problems can present themselves in a spectrum varying from e.g., pain like in case of acute pulpitis to psychosocial effects like in malocclusion [1,2]. In the south Indian population, the mean DMFT (Decayed, Missing and Filled Teeth) varied as 1.86±2.77, 4.63+4.04 and 7.95+9.67 among children [3], adults [4] and geriatrics [5], respectively and the prevalence of periodontal diseases was seen to be 16.1% and 67.8% among adults [4] and geriatrics [5], respectively. The prevalence of orthodontic treatment need was found to be 40.06% [3] among school children.

Malocclusion not only causes poor facial appearance, increased risk of caries, predisposal to periodontal diseases, increased risk of trauma, abnormalities in function like chewing, temporomandibular joint problems but also has psychological effect [1-3]. The causes of malocclusion are broadly classified according to Graber into: (i) general factors like heredity, congenital, environmental, metabolic conditions, nutritional deficiencies, abnormal habits; and (ii) local factors which concern with anomalies of teeth and oral structures [6]. When malocclusion is treated when the individual is young; there is advantage in scope of growth modification and harnessing natural growth factors [6]. But if the individual remains untreated for malocclusion during the growing phase, it serves as an indicator for missed treatment at the earlier age [7]. Studies have suggested a good association between malocclusion and quality of life [1,2]. Also, poor occlusion causes poorer oral aesthetic self-perception, and affects emotional, social well-being health domains [1,2,8-10]. Studies have suggested that orthodontic treatment improves the oral health quality of life among the individuals [11-13].

Considerable amount of research has been conducted among the children, adults and geriatrics, in the south Indian city but not much literature is available regarding oral health status and malocclusion among the young individuals who are studying in college who have an almost established dental occlusion by that age. Thus, this study was conducted to assess the oral health related knowledge, practices and status among college going students in south Indian city and to evaluate the effect of malocclusion on their oral health related quality of life.

MATERIALS AND METHODS

A cross-sectional study was conducted by the Department of Public Health Dentistry, Thai Moogambigai Dental College and Hospital, Chennai for a period of three months, from June to August, 2018 among various college students in Chennai. The ethical clearance was obtained from Dr. MGR University Ethical Review Board (Dr. MGRDU/TMDCH/2015-16/2412012), Chennai, India, in accordance with the Helsinki Declaration of 1975 as revised in 2013. The Chennai city is divided into three zones namely North, South and Central zones. One college was randomly selected from each zone and prior permission was obtained from the concerned authorities. The students who agreed to participate and were present on the day of examination, were included in the study. The students who were undergoing orthodontic treatment, those having any syndromes, chronic diseases like diabetes, neurological disorders or differently abled were excluded from the study. Also, the students who gave previous history of orthodontic treatment were excluded since the malocclusion for which they were treated would have caused proper tooth alignment and also the previous experience of quality of life during orthodontic treatment would act as bias while scoring the quality of life questionnaire. The students who qualified for the study were explained about the purpose of the study and informed consent was obtained from them. The individuals were interviewed for demographic characteristics, oral health knowledge and practices and their oral health related quality of life for malocclusion using

OHIP-14 [14] and the individuals were examined for their oral health status using WHO oral health assessment form for adults, 2013 [15] and malocclusion according to IOTN [16]. The instruments used were mouth mirror and CPITN probe for examining the dentition status, periodontal status, fluorosis, traumatic dental injuries and oral lesions and a ruler for assessing IOTN index. The collected data was kept confidential.

STATISTICAL ANALYSIS

The Normality tests Kolmogorov-Smirnov and Shapiro-Wilks tests results revealed that variables do not follow normal distribution. Therefore, to analyse the data Non-parametric method was applied. To compare OHIP-14 responses between treatment needed and not needed groups Mann-Whitney test was applied. To compare Domain scores and overall score between IOTN needs Kruskal Wallis test was used followed by Bonferroni adjusted Mann Whitney test for multiple pair wise comparison. To compare proportions between groups, Chi-Square test was applied, if any expected cell frequency was less than five then Fisher's-exact test was used. To analyse the data SPSS (IBM SPSS Statistics for Windows, Version 23.0, Armonk, NY: IBM Corp. Released 2015) was used. Significance level was fixed as 5% (α=0.05).

RESULTS

Sociodemographic Details

A total of 710 students were examined. The age of the study population ranged between 17-23 years (mean 18.13+1.19). Among the study population, 484 (68.2%) were males and 226 (31.8%) were females. Fifty-two (7.3%) subjects belonged to upper socio-economic status and 3 (0.4%) belonged to lower socio-economic status according to modified Kuppuswamy scale [17]. Among the study subjects, 560 (78.9%) resided in urban area, 88 (12.4%) resided in peri-urban area and 62 (8.7%) resided in rural area [Table/Fig-1].

Sociodemographic variables	n	Percentage%
Age in years (Mean±SD)	18.125+1.19	
17	258	36.3
18	238	33.5
19	131	18.5
20	47	6.6
21	27	3.8
22	4	0.6
23	5	0.7
Sex		
Male	484	68.2
Female	226	31.8
Place of residence		
Urban	560	78.9
Peri-urban	88	12.4
Rural	62	8.7
Socioeconomic status		
Upper	52	7.3
Upper middle	230	32.4
Lower middle	231	32.5
Upper lower	194	27.3
Lower	3	0.4

[Table/Fig-1]: Distribution of subjects according to sociodemographic variables.

Oral Health Practices

The oral health knowledge of the study population is given in [Table/Fig-2]. Among the study population, 501 (70.6%) had never visited a dentist and only 42 (5.2%) had visited dentist for regular check-up, and 97 (13.7%) had visited due to pain. Among them, 454 (63.9%) brushed once a day, 352 (49.6) of the subjects had the habit of regularly cleaning their tongue and 666 (93.8%) used toothpaste. Only 67 (9.4%) knew that that they were using fluoridated toothpaste.

	Frequency n	Percentage %
Oral health affects general health	290	40.8
Never visited a dentist	501	70.6
Visited dentist for regular check-up	42	5.2
Visited due to pain	97	13.7
Brushed once a day	454	63.9
Brushed twice a day	124	17.5
Irregular brushing habits	132	18.6
Habit of regularly cleaning their tongue	352	49.6
Used toothpaste	666	93.8
Used charcoal or ash	44	6.2
Used fluoridated toothpaste	67	9.4

[Table/Fig-2]: Oral health knowledge and practices of the study population.

Dentition Status

Among the study population, 388 (54.6%) had dental caries, 19 (2.7%) had missing teeth, 29 (4.1%) had filled teeth and the mean DMFT was 1.80+2.20.

Periodontal Disease Status

In the study population, 493 (69.4%) did not had any periodontal problem while 217 (30.6%) had bleeding gums. The individuals with bleeding gums had 1 to 32 affected teeth and only 5 (0.007%) had pockets.

Dental Fluorosis, Dental Trauma and Oral Mucosal Lesions

It was found that among the study subjects, 105 (14.8%) had fluorosis ranging from very mild to severe with moderate fluorosis being the most common finding which affected 41 individuals.

Among the study subjects, 114 (16.1%) had dental trauma ranging from fracture of enamel to missing due to trauma. And enamel fracture was the commonest (77) followed by dentine fracture affecting 29 individuals.

Among the study subjects, seven individuals had oral mucosal lesion presenting as ulceration and abscess.

Orthodontic Treatment Requirement and Quality of Life

The orthodontic treatment requirement need of the study population is given in [Table/Fig-3]. Among the study subjects, 332 (46.8%) did not require any orthodontic treatment while 378 (53.2%) required orthodontic treatment ranging from little/mild to very severe orthodontic treatment need. The distribution of demographic variables of subjects, according to; whether they required orthodontic treatment or not is given in [Table/Fig-4]. It was seen that age, gender, place of residence and socioeconomic status did not significantly affect treatment requirement for malocclusion [Table/Fig-5].

Orthodontic treatment required according to IOTN		Frequency n	Percentage %
Grade 1	**No need**	332	46.8
Grade 2	**Little/mild need**	196	27.6
Grade 3	**Borderline/moderate need**	125	17.6
Grade 4	**Severe need**	52	7.3
Grade 5	**Very severe need**	5	0.7
	Total	710	100.0

[Table/Fig-3: The Orthodontic treatment requirement need of the study population.

Variables		Treatment Needed					
		Not Needed		Needed		Total	
		n	%	n	%	n	%
Gender	Male	226	46.7	258	53.3	484	100.0
	Female	106	46.9	120	53.1	226	100.0
	Total	332	46.8	378	53.2	710	100.0
Age	17	121	46.9	137	53.1	258	100.0
	18	108	45.4	130	54.6	238	100.0
	19	66	50.4	65	49.6	131	100.0
	20	20	42.6	27	57.4	47	100.0
	21	14	51.9	13	48.1	27	100.0
	22	0	0 .0	4	100.0	4	100.0
	23	3	60.0	2	40.0	5	100.0
	Total	332	46.8	378	53.2	710	100.0
Residence	Urban	259	46.3	301	53.8	560	100.0
	Peri-urban	45	51.1	43	48.9	88	100.0
	Rural	28	45.2	34	54.8	62	100.0
	Total	332	46.8	378	53.2	710	100.0
Socioeconomic class	Lower	1	33.3	2	66.7	3	100.0
	Upper lower	103	53.1	91	46.9	194	100.0
	Lower middle	93	40.3	138	59.7	231	100.0
	Upper middle	112	48.7	118	51.3	230	100.0
	Upper	23	44.2	29	55.8	52	100.0
	Total	332	46.8	378	53.2	710	100.0

[Table/Fig-4]: Distribution of demographic variables of subjects according to orthodontic treatment need.

Chi-Square tests	Chi-square value	p-value
Gender * Treatment Needed	0.003*	0.959
Age * Treatment Needed	5.141†	0.533
Residence * Treatment Needed	0.799*	0.671
Socioeconomic class * Treatment Needed	7.825†	0.084

[Table/Fig-5]: Association of demographic variables with orthodontic treatment needed for malocclusion.
*Pearson's Chi-square test; †Fisher's-exact Chi-Square test

Since the frequency in grade 5 was very low [Table/Fig-3], grade 4 and grade 5 were clubbed together for further statistical analysis. The comparison of subjects' IOTN grade (grade of orthodontic treatment need) with OHIP-14 domains is shown in [Table/Fig-6]. It was seen that there was a difference in scores of all the domains of OHIP-14 namely functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social

Variables		IOTN				p-value*
		No need (332)	Little/ Mild need (196)	Borderline/ Moderate need (125)	Severe/ Very severe need (57)	
Functional limitation	Mean	47	1.62	2.29	3.00	<0.001†
	Std. Dev	1.029	2.011	2.253	2.260	
Physical pain	Mean	.65	1.61	2.36	2.26	<0.001†
	Std. Dev	1.383	1.962	2.208	2.248	
Psychological discomfort	Mean	.72	2.36	3.04	2.88	<0.001†
	Std. Dev	1.580	2.370	2.280	2.221	
Physical disability	Mean	.49	1.88	2.65	2.63	<0.001†
	Std. Dev	1.101	2.122	2.290	2.403	
Psychological disability	Mean	.39	1.54	2.35	2.44	<0.001†
	Std. Dev	1.002	1.965	2.280	2.420	
Social disability	Mean	.42	1.41	1.98	1.88	<0.001†
	Std. Dev	1.100	1.926	2.209	2.284	
Handicap	Mean	.31	1.11	1.73	1.28	<0.001†
	Std. Dev	.871	1.752	2.100	2.085	
Overall score	Mean	3.45	11.53	16.39	16.37	<0.001†
	Std. Dev	5.301	9.795	10.849	10.533	

[Table/Fig-6]: Comparison of study subjects' IOTN grade and domains of OHIP-14.
*Kruskal-Wallis Test; †p<0.001-very highly significant

Variables	IOTN Need	p-value*
Functional limitation	No need vs Little/Mild need	<0.001†
	No need vs Borderline/Moderate need	<0.001†
	No need vs Severe/Very severe need	<0.001†
	Little/Mild need vs Borderline/Moderate need	0.023§
	Little/Mild need vs Severe/Very severe need	<0.001†
	Borderline/Moderate need vs Severe/Very severe need	0.176
Physical pain	No need vs Little/Mild need,	<0.001†
	No need vs Borderline/Moderate need	<0.001†
	No need vs Severe/Very severe need	<0.001†
	Little/Mild need vs Borderline/Moderate need	0.006‡
	Little/Mild need vs Severe/Very severe need	0.287
	Borderline/Moderate need vs Severe/Very severe need	0.999
Psychological discomfort	No need vs Little/Mild need,	<0.001†
	No need vs Borderline/Moderate need,	<0.001†
	No need vs Sever /Very severe need	<0.001†
	Little/Mild need vs Borderline/Moderate need	0.052
	Little/Mild need vs Severe/Very severe need	0.258
	Borderline/Moderate need vs Severe/Very severe need	0.999
Physical disability	No need vs Little/Mild need,	<0.001†
	No need vs Borderline/Moderate need,	<0.001†
	No need vs Severe/Very severe need	<0.001†
	Little/Mild need vs Borderline/Moderate need	0.008‡
	Little/Mild need vs Severe/Very severe need	0.114
	Borderline/Moderate need vs Severe/Very severe need	0.999
Psychological disability	No need vs Little/Mild need,	<0.001†
	No need vs Borderline/Moderate need,	<0.001†
	No need vs Severe/Very severe need	<0.001†
	Little/Mild need vs Borderline/Moderate need	0.002‡
	Little/Mild need vs Severe/Very severe need	0.121
	Borderline/Moderate need vs Severe/Very severe need	0.999
Social disability	No need vs Little/Mild need,	<0.001†
	No need vs Borderline/Moderate need,	<0.001†
	No need vs Severe/Very severe need	<0.001†
	Little/Mild need vs Borderline/Moderate need	0.203
	Little/Mild need vs Severe/Very severe need	0.948
	Borderline/Moderate need vs Severe/Very severe need	0.999
Handicap	No need vs Little/Mild need,	<0.001†
	No need vs Borderline/Moderate need,	<0.001†
	No need vs Severe/Very severe need	<0.001†
	Little/Mild need vs Borderline/Moderate need	0.005‡
	Little/Mild need vs Severe/Very severe need	0.999
	Borderline/Moderate need vs Severe/Very severe need	0.439
Overall score	No need vs Little/Mild need,	<0.001†
	No need vs Borderline/Moderate need,	<0.001†
	No need vs Severe/Very severe need	<0.001†
	Little/Mild need vs Borderline/Moderate need	0.005‡
	Little/Mild need vs Severe/Very severe need	0.025§
	Borderline/Moderate need vs Severe/Very severe need	0.999

[Table/Fig-7]: Pairwise comparison of IOTN grades with domains of OHIP-14.
*Bonferroni adjusted Mann-Whitney test
†p<0.001-very highly significant; ‡p<0.01-highly significant; §p<0.05-significant

disability and handicap among the individuals with respect to grade of IOTN and it was statistically very highly significant (p<0.001).

The pairwise comparison of IOTN grades with domains of OHIP-14 is shown in [Table/Fig-7]. When OHIP-14 domains were compared with IOTN grade pairs, no treatment need versus Little/Mild need, Borderline/Moderate need, Severe need and Very Severe need, there was very highly statistically significant difference between the grades (p<0.001). When Little/Mild need vs. Severe/Very Severe need was compared in respect to functional limitation, the result was found to be statistically very highly significant (p<0.001). Also, it was seen that there was statistically highly significant difference (p<0.01) when Little/Mild need grade was compared with Borderline/Moderate need grade with respect to OHIP-14 domains viz., physical pain, physical disability, psychological disability, handicap and likewise in the overall OHIP-14 score. When Little/Mild need vs Borderline/Moderate need was compared in respect to functional limitation and overall OHIP-14 score; the result was found to be statistically significant (p<0.05).

DISCUSSION

A cross-sectional descriptive study was conducted among 17 to 24-year college going students in Chennai city to assess the need of orthodontic treatment and to know the effect of malocclusion on their quality of life. OHIP-14 was initially developed for elderly individuals yet it has been observed to be helpful in surveying quality of life for orthodontic needs by numerous authors [1,11,17]. Thus, it was utilised to assess the malocclusion related oral health quality of life in the present investigation.

The study population had poor dental knowledge as only 290 (40.8%) knew that a relationship existed between oral health and general health. The population had poor dental attendance as 501 (70.6%) of the population had never visited the dentist and 97 (13.7%) had visited only when they had pain. It is almost similar to the study done by Mulla SH et al., in Dharwad District, India, 68.09% had never visited the dentist [18], whereas in a study by Sohn W et al., 63% had regular dental visit [19]. This difference might be due to the presence of dental insurance among that population studied by Sohn W et al., the presence of which would have motivated that study population to utilise the benefits of insurance as 72% of them had dental insurance and dental insurance might be absent in the present population which could be the reason for under utilisation of dental services and visiting dentist only when they had dental pain [19].

In a study by Muttappallymyalil J et al., among adolescents in Kerala, 75% of the subjects brushed twice a day which is much higher from the present population where only17.5% brushed twice a day [20]. It may suggest that literacy rate may play a role in the difference because literacy rate in Kerala is 93.91% which is higher than in Tamil Nadu where literacy rate is 80.33% [21].

The mean DMFT of the study population is 1.80+2.20 and 45.4% were caries free and 54.6% had decayed, missing or filled teeth. This is in contrast to study done by Levin L et al., on young Israeli adults who had mean DMFT of 6.77 and only 13% were caries free [22]. The difference might be due to the food habits of the individuals. In a study by Sharda AJ et al., 46.2% had decayed teeth, mean DMFT was 1.37+1.84, 36.8% had healthy periodontium [23]. The dental caries incidence and DMFT was almost similar to the present study but the present study had more subjects with healthy periodontium; 69.4%. In a study by Kotecha PV et al., the prevalence of dental caries in normal fluoride area was 48.21% which was similar to the present study [24].

In a study by Kotecha PV et al., 39.21% had dental fluorosis and in a study by Saravanan S et al., 31.4% had fluorosis [24,25]. In the present study it was comparatively less at 14.8%. In a study by Ravishankar TL et al., Gupta S et al., and David J et al., 15.1%, 4.15% and 6% had traumatic dental injuries, respectively [26-28]. In the present study, 16.1% had TDI.

In a study by Ouedraogo Y et al., 56.8% had malocclusion which is almost similar to that of present study (53.2%) [29].

Among the study subjects, 332+196 (46.8+27.6=74.4%) had grade 1 and grade 2 of IOTN, 125 (17.6%) had borderline need and 52+5 (7.3+0.7=8.0%) had grade 4 and 5 IOTN. It is quite low when compared to a study done by Chen M et al., among young adults aged 18 to 25 years in China where 21.6% of the subjects did not have orthodontic treatment need (grades 1 and 2 of the IOTN), 50.5% of them had borderline need for orthodontic treatment and 27.9% did have definite orthodontic treatment need (grades 4 and 5 of the IOTN) [30]. And in a study by Lagana G et al., and Gudipaneni RK et al., IOTN grade 4 and 5 were found to be 17.0 % and 21% respectively [31,32]. The reason for this difference could be difference in the ethnicity of the population.

Quality of Life and Malocclusion

In the present study, it was seen that there was no difference in treatment needs requirement with respect to age, gender, place of residence and socioeconomic status suggesting that malocclusion affects both the genders and all the age groups equally and is spread over various place of residence and socio-economic status uniformly. It is similar to a study by Almerich-Silla JM et al., where they concluded that neither gender nor socioeconomic status played a significant influence in orthodontic treatment need [33].

In the present study, all the domains as well as overall score of OHIP-14 were found to be significantly affecting the quality of life of the individual. This suggests that the individuals with malocclusion perceived various complications as a result of malocclusion like trouble in pronunciation, self-consciousness and embarrassment. In a study by Masood Y et al., psychological discomfort domain had the negative highest impact on OHRQoL [1]. In a study by Rusanen J et al., physical pain as well as psychological discomfort and disability domains were the most commonly perceived oral impacts [34]. In a study by Claudino D et al., young adults with severe malocclusion had poorer oral aesthetic self-perception [2].

In the present study, it was seen that individuals with orthodontic treatment either Little/Mild need or Borderline/Moderate need or Severe/Very severe need had significantly higher OHIP-14 scores when compared with individuals requiring no treatment. This suggests that individuals requiring orthodontic treatment have poor quality of life.

LIMITATION

Chennai being a metropolitan city embraces a variety of ethnic groups but ethnicity was not considered in the present study. It is suggested that studies should be conducted among various ethnic groups present in south Indian population. Also, causative factors of malocclusion like oro-facial pernicious habits and heredity was not considered which affects development of malocclusion. It is recommended that diagnosis should be done at the earliest possible stage to prevent the development and establishment of malocclusion as it affects all the domains of the malocclusion. Further, research needs to be done on quality of life of patients before, during and after orthodontic treatment.

CONCLUSION

It was seen that the study population had poor dental knowledge and dental attendance. The orthodontic treatment need was also high and so was the effect of malocclusion on oral health quality of life. Thus, it is recommended that diagnosis should be done at the earliest possible stage to prevent the development and establishment of malocclusion as it affects all the domains of the malocclusion and its treatment should be initiated at an early age for correction which in turn could improve the oral health related quality of life among the individuals.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Aug 09, 2018**
Date of Peer Review: **Sep 07, 2018**
Date of Acceptance: **Nov 05, 2018**
Date of Publishing: **Jan 01, 2019**