Assessing Quality of Life using the Oral Health Impact Profile (OHIP-14) in Subjects with and without Orthodontic Treatment need in Chennai, Tamil Nadu, India

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ABSTRACT

Introduction: Dental ailments like malocclusion affect not only the functional ability and aesthetic appearance of the person but also the psychological aspect of the individual.

Aim: The aim of the present study was to the find relationship between quality of life and dental malocclusion among school going adolescents in Tamil Nadu, India.

Materials and Methods: A cross-sectional study was conducted among 342 subjects of age range 14-19 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).

Results: A total of 342 subjects were interviewed and examined. The mean DMFT score was 1.86±2.77. A 203 (59.4%) did not require any orthodontic treatment while 139 (40.6%) had orthodontic treatment need ranging from mild to very severe. It was seen that malocclusion affected some aspects of OHIP-14 significantly namely functional limitation, psychological discomfort and psychological disability. The comparison of OHIP-14 scores between treatment needed and treatment not needed was highly significant (p<0.001).

Conclusion: Hence, it is stated that there is an urgent need to educate the school children and in turn their parents regarding the malocclusion for its treatment to prevent any effect on quality of life of the young adults.

INTRODUCTION

Oral health is essential for general health and well being. Traditional indicators for dental diseases measure only the physical components of the disease and are short of measuring the psychological components. Dental diseases especially the ones like malocclusion and traumatic dental injuries affect not only the functional ability and aesthetic appearance of the person [1,2] but also the psychological aspect of the individual which in turn may influence the self-esteem, socializing and inter-personal relationship of the individual, thus disturbing Oral Health Related Quality of Life (OHRQoL) [3]. To measure the OHRQoL, various instruments have been used in the past like the sickness impact profile [4], rand dental health index [5], The Geriatric Oral Health Assessment Index (GOHAI) [6], dental impact profile [7], Oral Health Impact Profile (OHIP) [8], subjective oral health status indicators [9], dental impact on daily performance [10], etc to name a few. OHIP developed by Slade GD and Spencer AJ in 1994 [8] and short form OHIP-14 as modified by Slade GD in 1997 [11] had originally been used to assess oral health quality of life in geriatric population, however, it has also been used to assess quality of life in individuals with malocclusion and has been found reliable [12,13].

The measurement of OHRQoL provides not only the treatment need and outcome but also provides data based on which the researchers, health planners and oral healthcare providers can plan appropriate preventive and management services for the future. The epidemiological studies in the past show a good association between quality of life and malocclusion [12-14]. However, in South Asian Indian region especially in adolescent population; the relationship between quality of life and dental malocclusion has not been explored. Hence, we aimed to assess the demographic variables, oral health status, oral health self-perception and OHRQoL among school going adolescents in Tamil Nadu, India.

MATERIALS AND METHODS

A cross-sectional pilot study was conducted at a randomly selected school in Chennai, Tamil Nadu, India, having both urban and rural adolescents. A total of 1500 students from Class 1 to 12 were screened in the school. Inclusion criteria was the age range between 14-19 years. Based on the inclusion criteria, 354 students within the age group of 14-19 years were selected for the study. The students with systemic illnesses such as Type I diabetes, neurological disorders like epilepsy or any type of chronic illnesses were excluded from the study. The students who were absent during the survey period and who denied participation were also excluded from the present investigation. Among 354 students, two were suffering from Type I diabetes, two students presented with a history of epilepsy and 8 denied participation. Thus, finally 342 students met the inclusion criteria who readily agreed for the study was selected. 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 selected subjects were informed about the study and written informed consent was obtained from the school authorities and parents of the participants. The subjects were interviewed using OHIP-14 [8] and were examined using WHO basic oral health survey format (2013) [15]. The dentition status, periodontal status, fluorosis, traumatic dental injuries and oral health lesions were assessed using mouth mirror and CPITN probe [15]. The orthodontic treatment needs was assessed using IOTN [16] with a mouth mirror and ruler. The data collected from the subjects were kept confidential.

According to Slade SD and Spencer AJ, the OHIP [8] intends to measure social impact of oral disorders and makes use of theoretical hierarchy of oral health outcomes. The index provides a comprehensive measure of self-reported dysfunction, discomfort and disability arising from oral conditions, the dimensions of which are based on Locker's conceptual model of oral health [8]. The

responses are rated on a 5-point Likert scale: 0 = never; 1 = hardly ever; 2 = occasionally; 3 = fairly often; 4 = very often/every day. The OHIP-14 scores can range from 0 to 56 and are calculated by summing the ordinal values for the 14 items. The domain scores can range from 0 to 8. Higher OHIP-14 scores indicate worse and lower scores indicate better OHRQol [8].

The IOTN is one of the most commonly used occlusal indices to assess the orthodontic treatment needs among children and adults. The Dental Health Component (DHC) of the IOTN is a modification of the index previously used by the Swedish Dental Board [17]. The DHC has five grades ranging from grade one, 'no need', to grade five, 'very great need' [16]. The severity of the worst single occlusal trait determines the allotment of grade of IOTN. The following hierarchical scale is used to record the worst: missing teeth, overjet, crossbites, displacement of contact points and overbite (including open bite) [16].

The individuals were seated on a chair and examined under natural light. Based on the scores of IOTN, the subjects were dichotomized; the subjects requiring the treatment were grouped as "treatment required group" and who did not require treatment were grouped as "no treatment required group."

The subjects' orthodontic treatment requirement needs were compared with their dentition status, periodontal status, enamel fluorosis, dental erosion, dental trauma and oral mucosal lesion and OHIP-14 questionnaire response.

STATISTICAL ANALYSIS

The collected data was analysed using SPSS version 21.0. For comparing percentages of demographic variables, Pearson's Chi square test was used. For OHIP-14, the descriptive statistics; mean and standard deviation were estimated. Mann Whitney U test was used to compare ranks for OHIP-14 among the treatment and no treatment groups.

RESULTS

Demography: A total of 342 subjects were interviewed and examined for the present study. The age of study population ranged from 14–19 years; mean age being 15.93 years. Among them, 57.3% (196) were males and 42.7% (146) were females. The distribution of subjects according to their sociodemographic features is shown in [Table/Fig-1].

Dentition status: Among 342 subjects, 144 (42.1%) of subjects had experienced dental caries in their lifetime. The mean DMFT score was 1.86±2.77. Mean number of decayed teeth were 1.77±2.65, mean number of teeth missing due to dental caries was 0 and mean number of filled teeth due to dental caries were 0.02±0.19. None of them had preventive pit and fissure sealants.

Periodontal disease status: Among the study population, 293 (85.7%) had healthy periodontium and 49 (14.3%) had bleeding gums. None of them had periodontal pockets and loss of attachment.

Dental fluorosis, dental trauma and oral mucosal lesions: Subjects affected with fluorosis were 23 (6.7%) and 44 (12.9%) had fractured teeth due to dental trauma. None of them had any oral mucosal lesion.

Orthodontic treatment requirement: Among the study population, 203 (59.4%) subjects did not require any orthodontic treatment while 139 (40.6%) had orthodontic treatment need ranging from mild to very severe as given in [Table/Fig-2].

[Table/Fig-3] shows the comparison of demographic variables, dentition status and dental trauma among subjects with and without orthodontic treatment needs. Subjects with missing teeth for reason other than dental caries (congenitally missing and lost due to trauma) had significantly higher need for orthodontic treatments (p=0.040) than their counterparts with no missing teeth.

[Table/Fig-4] shows comparison of subjects' OHIP-14 responses with their orthodontic treatment needs. It was seen that subjects

Sociodemographic variables	N	Percentage %
Age (Mean ± SD)	15.93	
14	27	7.9
15	104	30.4
16	104	30.4
17	85	24.9
18	18	5.3
19	4	1.1
Sex		
Male	196	57.3
Female	146	42.7
Income		
≤15000	274	80.1
15000 - 50000	52	15.2
> 50000	16	4.7
Frequency of brushing		
Never	7	2.0
Once a month	6	1.8
2-3 times a month	10	2.9
Once a week	5	1.5
2-6 times a week	10	2.9
Once a day	281	82.2
Twice or more a day	22	6.4
Did not answer	1	0.3

[Table/Fig-1]: Sociodemographic distribution of the sample.

Orthodontic treatment required according to IOTN		Frequency N	Percentage %
Grade 1	No need	203	59.4
Grade 2	Little/ mild need	70	20.5
Grade 3	Borderline/ moderate need	48	14.0
Grade 4	Severe need	17	5.0
Grade 5	Very severe need	4	1.2
	Total	342	100.0

[Table/Fig-2]: Distribution of subjects according to orthodontic treatment needs based on Index of Orthodontic Treatment Needs (IOTN).

with orthodontic treatment needs had significant functional limitation, psychological discomfort and psychological disability when compared to their peers without orthodontic treatment need (p<0.001). Mean Rank for OHIP-14 scores among subjects with and without orthodontic treatment needs showed significant differences between the groups (p<0.001).

DISCUSSION

A cross-sectional descriptive study was conducted among 14 to 19-year school going children in Chennai city to assess quality of life using the OHIP-14 in subjects with and without orthodontic treatment need.

No history of previous or ongoing orthodontic treatment among the study subjects suggested that there is either a general lack of awareness for the orthodontic treatment or financial barrier to undergo orthodontic treatment among the study population.

In our study, 42.1% of the population had untreated dental caries, illustrating the need for a public health program for the treatment as well a health education for preventing further occurrence of new carious lesions. This was in accordance with a study conducted by Dash JK et al., among 15-year-old students and Joshi N et al., among 12-year-old children; where the prevalence of dental caries was found to be 62.2% and 77% respectively [18,19]. However,

Variable		No treatment required group		Treatment required group		Total		p-value*
		N	Percentage %	N	Percentage %	N	Percentage %	
Age	14	16	59.3	11	40.7	27	100.0	0.832
	15	61	58.7	43	41.3	104	100.0	
	16	63	60.6	41	39.4	104	100.0	
	17	52	61.2	33	38.8	85	100.0	
	18	10	55.6	8	44.4	18	100.0	
	19	1	25.0	3	75.0	4	100.0	
	Total	203	59.4	139	40.6	342	100.0	
Gender	Male	118	60.2	78	39.8	196	100.0	0.712
	Female	85	58.2	61	41.8	146	100.0	
	Total	203	59.4	139	40.6	342	100.0	
Income	<= 15000	163	59.5	111	40.5	274	100.0	0.649
	15000 - 50000	29	55.8	23	44.2	52	100.0	
	> 50000	11	68.8	5	31.3	16	100.0	
	Total	203	59.4	139	40.6	342	100.0	
Decayed teeth	No	118	57.8	86	42.2	204	100.0	0.488
	Yes	85	61.6	53	38.4	138	100.0	
	Total	203	59.4	139	40.6	342	100.0	
Missing teeth (due to reason other than caries)	No	196	60.7	127	39.3	323	100.0	0.040*
	Yes	7	36.8	12	63.2	19	100.0	
	Total	203	59.4	139	40.6	342	100.0	
Filled teeth	No	198	58.9	138	41.1	336	100.0	0.407
	Yes	5	83.3	1	16.7	6	100.0	
	Total	203	59.4	139	40.6	342	100.0	
Fluorosis	No	191	59.9	128	40.1	319	100.0	0.468
	Yes	12	52.2	11	47.8	23	100.0	
	Total	203	59.4	139	40.6	342	100.0	
Dental trauma	No	176	59.1	122	40.9	298	100.0	0.772
	Yes	27	61.4	17	38.6	44	100.0	
	Total	203	59.4	139	40.6	342	100.0	

[Table/Fig-3]: Comparison of demographic variables, dentition status and dental trauma among subjects with and without orthodontic treatment needs.
Person's Chi square test was used
* p<0.05 – significant

OHIP-14 Dimensions	Treatment need	N	Mean Rank	p-value*
Functional limitation	No required	203	164.46	0.003†
	It required	139	181.79	
Physical pain	No Need	203	167.24	0.125
	Needed	139	177.73	
Psychological discomfort	No Need	203	160.11	0.001‡
	Needed	139	188.14	
Physical disability	No Need	203	169.13	0.235
	Needed	139	174.96	
Psychological disability	No Need	203	166.23	0.010†
	Needed	139	179.20	
Social disability	No Need	203	173.29	0.254
	Needed	139	168.88	
Handicap	No Need	203	173.22	0.339
	Needed	139	168.99	
Total OHIP-14	No Need	203	155.88	0.001‡
	Needed	139	194.31	

[Table/Fig-4]: Comparison of subjects' with and without orthodontic treatment needs with OHIP-14 dimensions.
Mann-Whitney Test was used
†p<0.01 – significant
‡p<0.001 – highly significant

once a day and 6.4% brushed twice a day suggesting that the study subjects were maintaining good oral hygiene. This is similar to the study done by Sharda J et al., 37.3% brushed once daily, 58.0% of the respondents brushed at least twice daily and 4.7% brushed after every meal [24].

OHIP-14 was originally developed for elderly people but has been found to be useful in assessing quality of life for orthodontic needs by many authors [12,13,25]. Hence, it was used to assess the malocclusion related oral health quality of life in the present study. Among the study population, 40.6% needed orthodontic treatment. In studies by Guaba K et al., Baskaradoss JK et al., Tak M et al., and Hassan AH and Amin Hel S, 29.2%, 15%, 33.3% and 85.2% had malocclusion and required treatment respectively [26-29]. The comparison of OHIP-14 and malocclusion showed that there was no difference (p>0.05) among the genders, suggesting that in the present generation both males and females were conscious about their appearance which was similar to study by Hassan AH and Amin Hel S [29] but contrary to a study by Masood Y et al., in which females had slightly higher oral health impact profile scores thanmales [12].

In our study, it was seen that subjects who had requirement for orthodontic treatment had significantly higher OHIP-14 mean rank scores than subjects who did not require orthodontic treatment. It was also seen that malocclusion significantly affected some domains of OHRQoL namely functional limitation, psychological discomfort and psychological disability. Similarly, in a study done by Hassan AH and Amin Hel S, mouth aching, self-consciousness, tension, embarrassment, irritability and life satisfaction were the factors which were significantly affected in both sexes [29]. Navabi N et al., conducted a similar study in which only the domain functional limitation had significant difference between treatment and no orthodontic treatment required groups [13]. In a study by Chen M et al., psychological discomfort and the psychological disability domains had the greatest effect which is similar to our study [30]. A systematic review by Dimberg L et al., states that malocclusions have negative effects on OHRQoL, predominantly in the dimensions of emotional and social well being [31]. Choi S et al., found that with the increase in severity of malocclusion, there was deterioration in the OHRQoL of the individual [32]. Simões RC et al., also concluded that children who had severe malocclusion had greater negative

in our study, the prevalence of dental caries was found to be comparatively less which may be due to the fact that the selected population was practicing proper oral hygiene measures.

In our study, the mean DMFT (decayed, missing, filled teeth), mean DT (decayed teeth), mean MT (missing teeth) and mean FT (filled teeth) were 1.86±2.77, 1.77±2.65, 0 and 0.02±0.19 respectively. Dhar V et al., also showed a higher DMFT (2.07) whereas Grewal H et al., showed the DMFT index which was lower than the present study (0.8250±1.3437) [20,21]. The filled teeth component was marginal which may be due to the fact that in this study population either the awareness regarding treatment for oral diseases was low or it might be that this set of population did not prioritize the treatment for oral diseases. Contrarily, in a study by Moses J et al., 19.02% and 23.29% of males and females respectively within the age group of 12-15 years had filled teeth [22].

In our study, periodontal status of subjects was quite satisfactory with only 14.3% having bleeding gums and no subjects had periodontal pockets. In a study by Levin L et al., 25.94% of children had bleeding gums and 34.26% of participants had ≥5 mm of periodontal pockets [23]. In our study, 82.2% brushed their teeth

impact on OHRQoL compared to those with mild or no malocclusion which was similar to the present study [33].

It is seen that the malocclusion in esthetic areas can make the adolescents more conscious in their appearance. In a study by Masood M et al., the individuals with increased overjet had significantly poorer OHRQoL than individuals with normal overjet [34]. The presence of irregularly placed teeth, especially anterior teeth, can cause the individual either to place hand over mouth while smiling and sometimes talking or talk sparsely which may in turn categorize them as introvert [14]. The study population in our study being adolescent group was also self-conscious with regard to their facial appearance. It is seen that the self-perception of individuals depends on their severity of malocclusion; greater the severity, poorer the self-perception [14].

LIMITATION

Some of the limitations of the study were that the sample was not intended to represent the entire adolescent population in Chennai but to give an overview of children's orthodontic treatment needs. Thus, the sample size was limited. In future, adolescent children with larger sample size are needed to elucidate the effect of malocclusion and treatment needs. Also, longitudinal studies are required to evaluate the improvement in quality of life following orthodontic treatment.

CONCLUSION

Malocclusion may negatively affect the OHRQoL. Hence, this condition should be diagnosed early and treated to prevent further compromise in overall health quality of life of the individual. There is also an urgent need to educate the school children and in turn their parents regarding the malocclusion and its treatment and its timely management in order to prevent the psychological trauma.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.