

## Impact of Self-Perceived and Normatively Assessed Dental Aesthetics on Oral Health Related Quality of Life Based on Age and Gender in A Private Dental College, Tiruvallur District, Tamilnadu: A Cross Sectional Study

S Gokul<sup>1</sup> V Sivapriya<sup>2</sup> S. Jeyamarthan<sup>3\*</sup> C. Nagappan<sup>4</sup>

<sup>1</sup>Senior Lecturer, Department of Prosthodontics, Priyadarshini Dental College and Hospital, Tiruvallur, India.

<sup>2</sup>PG Student, Department of Prosthodontics, Vinayaga Mission Shankaracharya Dental College, Salem, India.

<sup>3</sup>Senior Lecturer, Department of Public Health Dentistry, Priyadarshini Dental College and Hospital, Tiruvallur, India.

<sup>4</sup>Reader, Department of Prosthodontics, Karpaga Vinayaka Dental College and Hospital, Chengalpattu, India.

### ABSTRACT

**Background:** Dental aesthetics affects how people are perceived by society and how they perceive themselves, and this may also affect their oral health-related quality of life (OHRQoL). The aim of this study was to compare the impacts of self-perceived and normatively assessed dental aesthetics on the OHRQoL of a young adult population in a private dental college.

**Materials and Methods:** This was a cross-sectional study involving 200 undergraduate dental students, aged 15 to 25 years old. Data collection was carried out through oral examinations and self-administered questionnaires. Dental aesthetics of the students was assessed using the aesthetic component of the Index of Orthodontic Treatment Need.

**Results:** Statistically significant relationships ( $P < 0.05$ ) were recorded between both self-perceived and normatively assessed dental aesthetics of the students, respectively Gender ( $p = 0.882$ ), age ( $p = 0.287$ ). For the shortened version of the Oral Health Impact Profile scale, marked differences were also observed between the impacts recorded for both self-assessments and normative assessments, respectively.

**Conclusions:** Differences exist between the impacts of self-perceived and normatively assessed dental aesthetics on the OHRQoL of young adults, particularly in gender. This difference should be considered in orthodontic treatment planning for young adult populations.

**Keywords:** Self-Perceived, Dental Aesthetics, Oral Health.

### INTRODUCTION

Malocclusion is often conspicuous, so it might lead to adverse social reactions and a deficient self-concept. Correction of the malocclusion has been shown to improve body image of dental and facial features [1]. In addition, social and psychological effects are the key motives for seeking orthodontic treatment, oral health related quality of life (OHRQoL) can be considered as a useful

supplementary measurement for orthodontic treatment need and outcome. [2] some research has also shown that people may be judged by others based on their dental aesthetics; with poor dental aesthetics in children and adults associated with lower intelligence, whereas adults with ideal smiles are considered more intelligent and have a greater chance of finding a job, than do those with non ideal

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\*Correspondence Dr. S. Jeyamarthan.

Department of Public Health Dentistry, Priyadarshini Dental College and Hospital, Tiruvallur, India.

Email: Not Disclosed

smiles [3][4]. The clinician often uses traditional methods of measuring dental health and appearance, such as the Index of Orthodontic Treatment Need (IOTN) and the Dental Aesthetic Index; these cannot create a living picture of how people's daily lives are affected by oral health issues.[6][7] A major limitation of this approach is that it fails to take into account the way people really feel and therefore does not correspond to broader concepts of health and needs.[8] To overcome this shortcoming, research has focused on developing broader socio-dental concepts of oral health and as a result numerous socio-dental or oral health-related quality of life (OHRQoL) measures have been developed.[7] OHRQoL is defined as "a standard of health of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment,"[9] or "the absence of negative impacts of oral conditions on social life and a sense of dentofacial self-confidence." [10] Assessment of OHRQoL allows a shift from the traditional medical and dental criteria to assessment and care that focus on a person's social and emotional experiences and physical functioning in defining appropriate goals and outcomes.[8] These measures have mainly been used to assess the impact of oral health on daily life and the relationship between subjective and clinical measures, and at the same time exploring their use as a screening tool for clinical measures.[11] The use of OHRQoL measures as a part of the diagnostic procedures can provide information on priorities for treatment to maximize patient satisfaction.[12][13] Liu et al,[14] in a systematic review to assess the impact of malocclusion and orthodontic treatment need on quality of life, reported a modest association between malocclusion and the need for orthodontic treatment with quality of life. Two good examples of these standardized instruments are the shortened version of the Oral Health Impact Profile (OHIP-14) [15] and the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ).[16] but our study was completely based on only the oral health impact profile. The few studies that focused on adults have suggested that dental aesthetics can have direct effects on all OHRQoL values. [17-22] However, this study is to compare whether there is any difference between the impacts of self-perceived and normatively assessed dental aesthetics on OHRQoL in young adults. The need for

this study is further reinforced by the increasing percentage of adults seeking orthodontic treatment.[23] Thus, the aim of this study was to compare the impacts between self-perceived and normatively assessed dental aesthetics on the OHRQoL of a young adult population based on age and gender.

## MATERIAL AND METHODS

This was a cross-sectional study carried out with 240 undergraduate students aged 15 to 25 years, chosen randomly (both male and female). In addition, informed written consent was obtained from all students selected to participate in the study after it had been fully explained to them. The study was restricted to students who are not willing to participate. In addition, students with a current or previous history of orthodontic treatment were not excluded from the study.

Data were collected through self-administered questionnaires, and dental examinations performed by an orthodontist. Dental aesthetics was assessed using the aesthetic component of the IOTN (AC-IOTN)[23]. This was used to assess the self-perceived and normatively assessed dental aesthetics of the students. The AC-IOTN records any aesthetic impairment through a 10-point photographic scale with progressive degrees of aesthetic problems, ranging from 1 (most attractive) to 10 (least attractive). It consists of 10 photographs of anterior teeth displaying varying degrees of malocclusion. Each student was asked to select the photograph that best represented the attractiveness of his or her dental appearance. This was used as a measure of their self-perceived dental aesthetics. There was no time limit given to the subjects to study the photographs. The clinical examination (normative assessment) by the orthodontist was also carried out using this scale. The dental examinations and diagnostic criteria followed the World Health Organization's recommendations for oral health surveys.[24]

Participants were categorized into groups based on their AC-IOTN scores. The AC-IOTN was collapsed from a 10-point scale to a 3-point scale.

Photographs 1 to 4 represented no need for treatment; 5 to 7, borderline need for treatment; and 8 to 10 definite need for treatment on aesthetic

grounds. The simple-count method of the OHIP was done by counting the number of items to which a student responded "occasionally", "fairly often," and "often," which were regarded as impacts, and "hardly ever" and "never" were regarded as no impact. On the other hand, the sum OHIP involved summing the numeric response codes (0, never; 1, hardly ever; 2, occasionally; 3, fairly often; and 4, very often) for all 14 items to produce a single summary score for a subject. A sum OHIP score of 14 or less indicated no impact, and 15 or more indicated an impact.[25] An orthodontist was involved in determining the normatively assessed dental aesthetics of the students.

#### STATISTICAL ANALYSIS:

- Data was entered in Microsoft excel spread sheet and analysed using SPSS software (version 21).
- For test, a p value of <0.05 is to be considered statistically significant.
- *Chi-square test*: To assess the association between orthodontic treatment need and OHIP-14 responses.
- *Independent t test*: To compare the mean OHIP-14 between males and females.
- *Spearman correlation coefficient test*: To assess the correlation between the self perceived and

normatively assessed dental aesthetics and orthodontic treatment.

#### RESULTS

The final study sample included 200 subjects. Although 240 students were surveyed initially, data for 40 were incomplete, and thus those students were excluded from the final data analysis. Males made up 85 of the sample, and females made up 115. Only 5 students surveyed were currently receiving orthodontic treatment, and 3 other students had previously received orthodontic treatment. Thus, only 8 students had a current or previous history of orthodontic treatment.

In the self-rating of their dental aesthetics and orthodontic treatment need 146(73.0%) of the students rated their dentition aesthetically acceptable (AC-IOTN grades 1-4) and thus requiring no need for orthodontic treatment; 37 (18.5%) students rated themselves as having moderately acceptable aesthetics and thus in moderate need of orthodontic treatment; another 17(8.5%) rated themselves as having poor dental aesthetics and thus in definite need of treatment based on their age and gender (Table I) (Table II). There was no statistically significant difference in gender ( $p=0.912$ ) and age ( $p=0.823$ ) in the self-perceived dental aesthetics.

Table 1: Self-perceived dental Aesthetics and orthodontic treatment need of the students using the aesthetic component of the IOTN based on gender.

| Orthodontic Treatment Need |   | GENDER |        | Total  | Chi square | p value |
|----------------------------|---|--------|--------|--------|------------|---------|
|                            |   | MALE   | FEMALE |        |            |         |
| NO NEED                    | N | 61     | 85     | 146    | 0.184      | 0.912   |
|                            | % | 71.8%  | 73.9%  | 73.0%  |            |         |
| BORDERLINE NEED            | N | 16     | 21     | 37     |            |         |
|                            | % | 18.8%  | 18.3%  | 18.5%  |            |         |
| DEFINITE NEED              | N | 8      | 9      | 17     |            |         |
|                            | % | 9.4%   | 7.8%   | 8.5%   |            |         |
| Total                      | N | 85     | 115    | 200    |            |         |
|                            | % | 100.0% | 100.0% | 100.0% |            |         |

\*Chi square test ; p value < 0.05 is considered statistically significant

Table II: Self perceived dental Aesthetics and orthodontic treatment need of the students using the aesthetic component of the IOTN based on age groups.

| Orthodontic Treatment Need |   | AGE GROUPS |       |       | Total | Chi square test | p value |
|----------------------------|---|------------|-------|-------|-------|-----------------|---------|
|                            |   | 15-18      | 19-20 | 21-25 |       |                 |         |
| NO NEED                    | N | 13         | 38    | 95    | 146   | 1.519           | 0.823   |

|                 |   |        |        |        |        |  |  |
|-----------------|---|--------|--------|--------|--------|--|--|
|                 | % | 81.2%  | 73.1%  | 72.0%  | 73.0%  |  |  |
| BORDERLINE NEED | N | 2      | 11     | 24     | 37     |  |  |
|                 | % | 12.5%  | 21.2%  | 18.2%  | 18.5%  |  |  |
| DEFINITE NEED   | N | 1      | 3      | 13     | 17     |  |  |
|                 | % | 6.2%   | 5.8%   | 9.8%   | 8.5%   |  |  |
| Total           | N | 16     | 52     | 132    | 200    |  |  |
|                 | % | 100.0% | 100.0% | 100.0% | 100.0% |  |  |

\*Chi square test; p value < 0.05 is considered statistically significant

The normatively assessed dental aesthetics showed that 119 students (59.5%) had aesthetically acceptable teeth and no need for orthodontic treatment (AC-IOTN grades 1-4), 53 students (26.5%) had a moderate need for orthodontic treatment (AC-IOTN grades 5-7), and 28 students

(14.0%) had poor dental aesthetics (AC-IOTN grades 8-10) and a definite need for orthodontic treatment based on their age and gender (table III) (table IV). The normative assessment showed no statistically significant difference in gender (P=0.882) and age (p=0.287).

Table III Normatively assessed dental Aesthetics and orthodontic treatment need of the students using the aesthetic component of the IOTN based on gender.

| Orthodontic Treatment Need |   | GENDER |        | Total  | Chi square | p value |
|----------------------------|---|--------|--------|--------|------------|---------|
|                            |   | MALE   | FEMALE |        |            |         |
| NO NEED                    | N | 52     | 67     | 119    | 0.251      | 0.882   |
|                            | % | 61.2%  | 58.3%  | 59.5%  |            |         |
| BORDERLINE NEED            | N | 21     | 32     | 53     |            |         |
|                            | % | 24.7%  | 27.8%  | 26.5%  |            |         |
| DEFINITE NEED              | N | 12     | 16     | 28     |            |         |
|                            | % | 14.1%  | 13.9%  | 14.0%  |            |         |
| Total                      | N | 85     | 115    | 200    |            |         |
|                            | % | 100.0% | 100.0% | 100.0% |            |         |

\*Chi square test ; p value < 0.05 is considered statistically significant

Table IV Normatively assessed dental Aesthetics and orthodontic treatment need of the students using the aesthetic component of the IOTN based on age groups.

| Orthodontic Treatment Need |   | AGE GROUPS |        |        | Total  | Chi square | p value |
|----------------------------|---|------------|--------|--------|--------|------------|---------|
|                            |   | 15-18      | 19-20  | 21-25  |        |            |         |
| NO NEED                    | N | 10         | 32     | 77     | 119    | 5.000      | 0.287   |
|                            | % | 62.5%      | 61.5%  | 58.3%  | 59.5%  |            |         |
| BORDERLINE NEED            | N | 2          | 11     | 40     | 53     |            |         |
|                            | % | 12.5%      | 21.2%  | 30.3%  | 26.5%  |            |         |
| DEFINITE NEED              | N | 4          | 9      | 15     | 28     |            |         |
|                            | % | 25.0%      | 17.3%  | 11.4%  | 14.0%  |            |         |
| Total                      | N | 16         | 52     | 132    | 200    |            |         |
|                            | % | 100.0%     | 100.0% | 100.0% | 100.0% |            |         |

\*Chi square test; p value < 0.05 is considered statistically significant

A statistically significant association (P = 0.000) was observed between the self-perceived and normatively assessed dental aesthetics of the students. The Spearman correlation coefficient showed a weak but significant correlation (r=0.446; P =0.000) between the 2 assessments. 119 students

were rated by the orthodontists as having acceptable dental aesthetics and no need for orthodontic treatment; of them, 104 students rated themselves likewise, whereas 53 students were rated by the orthodontists as having moderately acceptable dental aesthetics and thus in moderate

need of orthodontic treatment, but only 14 agreed. Of the 28 students who were normatively assessed to have poor dental aesthetics and thus in definite need of orthodontic treatment, only 8 rated themselves likewise (Table IX ). A statistically significant association was not observed between the self-perceived dental aesthetics of the students and all 14 daily activities listed in the OHIP-14. (Table V )

Whereas, a statistically significant association were observed between the normatively assessed dental aesthetics of the students and 2 of the 14 daily activities listed in the OHIP-14 scale. (Table VI )

## DISCUSSION

The importance of evaluating OHRQoL among orthodontic patients relates to the impact of dental

aesthetics on social acceptance and self-concept. It has been shown that those with poor dental aesthetics such as malocclusion can develop feelings of self-consciousness and shame about their dental condition; in addition, their body self-concept might be negatively affected by their facial appearance.<sup>[26]</sup> Thus, the knowledge of self-perception of malocclusion, the assessments of orthodontic treatment need (self -perceived and professional), and comparisons for any given population are vital issues in modern orthodontic practice.[27]

In this study , statistical significance was not observed in association between self-perceived dental aesthetics and orthodontic treatment need based on OHIP-14 scale.(table V)

Table V: Relationship between OHIP-14 scores and Self-perceived dental aesthetics and orthodontic treatment need.

| OHIP – 14 Daily activity                     |           | N/<br>% | No<br>Need | Borderline<br>treatment | Definite<br>need | Total | Chi<br>square | p value |
|----------------------------------------------|-----------|---------|------------|-------------------------|------------------|-------|---------------|---------|
| Functional Limitation                        |           |         |            |                         |                  |       |               |         |
| Had problems<br>pronouncing<br>words         | No impact | N       | 132        | 34                      | 15               | 132   | 0.186         | 0.911   |
|                                              |           | %       | 90.4%      | 91.9%                   | 88.2%            | 90.4% |               |         |
|                                              | Impact    | N       | 14         | 3                       | 2                | 14    |               |         |
|                                              |           | %       | 9.6%       | 8.1%                    | 11.8%            | 9.6%  |               |         |
| Had worsened<br>sense of taste               | No impact | N       | 137        | 37                      | 15               | 189   | 3.561         | 0.169   |
|                                              |           | %       | 93.8%      | 100.0%                  | 88.2%            | 94.5% |               |         |
|                                              | Impact    | N       | 9          | 0                       | 2                | 11    |               |         |
|                                              |           | %       | 6.2%       | 0.0%                    | 11.8%            | 5.5%  |               |         |
| Physical pain                                |           |         |            |                         |                  |       |               |         |
| Had a painful<br>aching in the<br>mouth      | No impact | N       | 112        | 27                      | 14               | 112   | 0.584         | 0.747   |
|                                              |           | %       | 76.7%      | 73.0%                   | 82.4%            | 76.7% |               |         |
|                                              | Impact    | N       | 34         | 10                      | 3                | 34    |               |         |
|                                              |           | %       | 23.3%      | 27.0%                   | 17.6%            | 23.3% |               |         |
| Found it<br>uncomfortable to<br>eat any food | No impact | N       | 106        | 26                      | 12               | 143   | 0.454         | 0.978   |
|                                              |           | %       | 72.6%      | 70.3%                   | 70.6%            | 71.5% |               |         |
|                                              | Impact    | N       | 40         | 11                      | 5                | 56    |               |         |
|                                              |           | %       | 27.4%      | 29.7%                   | 29.4%            | 28.0% |               |         |
| Psychological discomfort                     |           |         |            |                         |                  |       |               |         |
| Have you been<br>self-conscious?             | No impact | N       | 98         | 24                      | 9                | 131   | 1.363         | 0.506   |
|                                              |           | %       | 67.1%      | 64.9%                   | 52.9%            | 65.5% |               |         |
|                                              | Impact    | N       | 48         | 13                      | 8                | 69    |               |         |
|                                              |           | %       | 32.9%      | 35.1%                   | 47.1%            | 34.5% |               |         |
| Felt tense                                   | No impact | N       | 98         | 24                      | 9                | 131   | 0.937         | 0.626   |
|                                              |           | %       | 67.1%      | 64.9%                   | 52.9%            | 65.5% |               |         |

|                                           |           |   |       |       |       |       |       |       |
|-------------------------------------------|-----------|---|-------|-------|-------|-------|-------|-------|
|                                           | Impact    | N | 48    | 13    | 8     | 69    |       |       |
|                                           |           | % | 32.9% | 35.1% | 47.1% | 34.5% |       |       |
| Physical disability                       |           |   |       |       |       |       |       |       |
| Had an unsatisfactory diet                | No impact | N | 107   | 31    | 12    | 150   | 1.927 | 0.381 |
|                                           |           | % | 73.3% | 83.8% | 70.6% | 75.0% |       |       |
|                                           | Impact    | N | 39    | 6     | 5     | 50    |       |       |
|                                           |           | % | 26.7% | 16.2% | 29.4% | 25.0% |       |       |
| Had to interrupt meals                    | No impact | N | 107   | 31    | 13    | 151   | 1.768 | 0.413 |
|                                           |           | % | 73.3% | 83.8% | 76.5% | 75.5% |       |       |
|                                           | Impact    | N | 39    | 6     | 4     | 49    |       |       |
|                                           |           | % | 26.7% | 16.2% | 23.5% | 24.5% |       |       |
| Psychological disability                  |           |   |       |       |       |       |       |       |
| Found it difficult to relax               | No impact | N | 112   | 31    | 11    | 154   | 2.419 | 0.298 |
|                                           |           | % | 76.7% | 83.8% | 64.7% | 77.0% |       |       |
|                                           | Impact    | N | 34    | 6     | 6     | 46    |       |       |
|                                           |           | % | 23.3% | 16.2% | 35.3% | 23.0% |       |       |
| Had been a bit embarrassed                | No impact | N | 107   | 23    | 14    | 144   | 2.800 | 0.247 |
|                                           |           | % | 73.3% | 62.2% | 82.4% | 72.0% |       |       |
|                                           | Impact    | N | 39    | 14    | 3     | 56    |       |       |
|                                           |           | % | 26.7% | 37.8% | 17.6% | 28.0% |       |       |
| Social disability                         |           |   |       |       |       |       |       |       |
| Had been irritable with other people      | No impact | N | 110   | 27    | 9     | 146   | 3.877 | 0.144 |
|                                           |           | % | 75.3% | 73.0% | 52.9% | 73.0% |       |       |
|                                           | Impact    | N | 36    | 10    | 8     | 54    |       |       |
|                                           |           | % | 24.7% | 27.0% | 47.1% | 27.0% |       |       |
| Had difficulty doing usual jobs           | No impact | N | 114   | 29    | 12    | 155   | 0.510 | 0.775 |
|                                           |           | % | 78.1% | 78.4% | 70.6% | 77.5% |       |       |
|                                           | Impact    | N | 32    | 8     | 5     | 45    |       |       |
|                                           |           | % | 21.9% | 21.6% | 29.4% | 22.5% |       |       |
| Handicap                                  |           |   |       |       |       |       |       |       |
| Felt life in general is less satisfactory | No impact | N | 114   | 30    | 11    | 154   | 2.256 | 0.689 |
|                                           |           | % | 75.1% | 81.1% | 64.7% | 77.0% |       |       |
|                                           | Impact    | N | 32    | 7     | 6     | 45    |       |       |
|                                           |           | % | 21.9% | 18.9% | 35.3% | 22.5% |       |       |
| Had been totally unable to function       | No impact | N | 128   | 31    | 15    | 174   | 0.419 | 0.811 |
|                                           |           | % | 87.7% | 83.8% | 88.2% | 87.0% |       |       |
|                                           | Impact    | N | 18    | 6     | 2     | 26    |       |       |
|                                           |           | % | 12.3% | 16.2% | 11.8% | 13.0% |       |       |

\*Chi square test; p value < 0.05 is considered statistically significant

whereas, statistical significance was observed in 2 out of OHIP-14 scale (physical pain and psychological discomfort) in association between

normatively assessed dental aesthetics and orthodontic treatment need of the student. (table VI)

Table VI Relationship between OHIP-14 scores and normatively assessed dental aesthetics and orthodontic treatment need.

| OHIP – 14 Daily activity | N/<br>% | No<br>Need | Borderline<br>treatment | Definite<br>need | Total | Chi<br>square | p value |
|--------------------------|---------|------------|-------------------------|------------------|-------|---------------|---------|
| Functional Limitation    |         |            |                         |                  |       |               |         |

|                                        |           |   |       |       |       |       |       |       |
|----------------------------------------|-----------|---|-------|-------|-------|-------|-------|-------|
| Had problems pronouncing words         | No impact | N | 107   | 49    | 25    | 181   | 0.330 | 0.84  |
|                                        |           | % | 89.9% | 92.5% | 89.3% | 90.5% |       |       |
|                                        | Impact    | N | 12    | 4     | 3     | 19    |       |       |
|                                        |           | % | 10.1% | 7.5%  | 10.7% | 9.5%  |       |       |
| Had worsened sense of taste            | No impact | N | 112   | 50    | 27    | 189   | 0.236 | 0.88  |
|                                        |           | % | 94.1% | 94.3% | 96.4% | 94.5% |       |       |
|                                        | Impact    | N | 7     | 3     | 1     | 11    |       |       |
|                                        |           | % | 5.9%  | 5.7%  | 3.6%  | 5.5%  |       |       |
| Physical pain                          |           |   |       |       |       |       |       |       |
| Had a painful aching in the mouth      | No impact | N | 91    | 36    | 26    | 153   | 6.335 | 0.04* |
|                                        |           | % | 76.5% | 67.9% | 92.9% | 76.5% |       |       |
|                                        | Impact    | N | 28    | 17    | 2     | 47    |       |       |
|                                        |           | % | 23.5% | 32.1% | 7.1%  | 23.5% |       |       |
| Found it uncomfortable to eat any food | No impact | N | 86    | 34    | 24    | 143   | 4.922 | 0.29  |
|                                        |           | % | 72.2% | 64.2% | 85.7% | 71.5% |       |       |
|                                        | Impact    | N | 33    | 19    | 4     | 56    |       |       |
|                                        |           | % | 27.7% | 35.8% | 14.3% | 28.0% |       |       |
| Psychological discomfort               |           |   |       |       |       |       |       |       |
| Have you been self-conscious?          | No impact | N | 81    | 28    | 22    | 131   | 6.229 | 0.04* |
|                                        |           | % | 68.1% | 52.8% | 78.6% | 65.5% |       |       |
|                                        | Impact    | N | 38    | 25    | 6     | 69    |       |       |
|                                        |           | % | 31.9% | 47.2% | 21.4% | 34.5% |       |       |
| Felt tense                             | No impact | N | 89    | 36    | 21    | 146   | 0.943 | 0.62  |
|                                        |           | % | 74.8% | 67.9% | 75.0% | 73.0% |       |       |
|                                        | Impact    | N | 30    | 17    | 7     | 54    |       |       |
|                                        |           | % | 25.2% | 32.1% | 25.0% | 27.0% |       |       |
| Physical disability                    |           |   |       |       |       |       |       |       |
| Had an unsatisfactory diet             | No impact | N | 94    | 34    | 22    | 150   | 4.529 | 0.10  |
|                                        |           | % | 79.0% | 64.2% | 78.6% | 75.0% |       |       |
|                                        | Impact    | N | 25    | 19    | 6     | 50    |       |       |
|                                        |           | % | 21.0% | 35.8% | 21.4% | 25.0% |       |       |
| Had to interrupt meals                 | No impact | N | 89    | 39    | 23    | 151   | 0.805 | 0.66  |
|                                        |           | % | 74.8% | 73.6% | 82.1% | 75.5% |       |       |
|                                        | Impact    | N | 30    | 14    | 5     | 49    |       |       |
|                                        |           | % | 25.2% | 26.4% | 17.9% | 24.5% |       |       |
| Psychological disability               |           |   |       |       |       |       |       |       |
| Found it difficult to relax            | No impact | N | 96    | 38    | 20    | 154   | 2.238 | 0.32  |
|                                        |           | % | 80.7% | 71.7% | 71.4% | 77.0% |       |       |
|                                        | Impact    | N | 23    | 15    | 8     | 46    |       |       |
|                                        |           | % | 19.3% | 28.3% | 28.6% | 23.0% |       |       |
| Had been a bit embarrassed             | No impact | N | 91    | 34    | 19    | 144   | 3.038 | 0.21  |
|                                        |           | % | 76.5% | 64.2% | 67.9% | 72.0% |       |       |
|                                        | Impact    | N | 28    | 19    | 9     | 56    |       |       |
|                                        |           | % | 23.5% | 35.8% | 32.1% | 28.0% |       |       |
| Social disability                      |           |   |       |       |       |       |       |       |
| Had been irritable with other people   | No impact | N | 93    | 33    | 20    | 146   | 4.736 | 0.09  |
|                                        |           | % | 78.2% | 62.3% | 71.4% | 73.0% |       |       |
|                                        | Impact    | N | 26    | 20    | 8     | 54    |       |       |
|                                        |           | % | 21.8% | 37.7% | 28.6% | 27.0% |       |       |

|                                              |           |   |       |       |       |       |       |      |
|----------------------------------------------|-----------|---|-------|-------|-------|-------|-------|------|
| Had difficulty<br>doing usual jobs           | No impact | N | 95    | 37    | 23    | 155   | 2.514 | 0.28 |
|                                              |           | % | 79.8% | 69.8% | 82.1% | 77.5% |       |      |
|                                              | Impact    | N | 24    | 16    | 5     | 45    |       |      |
|                                              |           | % | 20.2% | 30.2% | 17.9% | 22.5% |       |      |
| Handicap                                     |           |   |       |       |       |       |       |      |
| Felt life in general<br>is less satisfactory | No impact | N | 93    | 39    | 23    | 155   | 1.510 | 0.82 |
|                                              |           | % | 78.1% | 73.6% | 82.1% | 78.5% |       |      |
|                                              | Impact    | N | 26    | 14    | 5     | 45    |       |      |
|                                              |           | % | 21.8% | 26.4% | 17.9% | 22.5% |       |      |
| Had been totally<br>unable to function       | No impact | N | 101   | 46    | 27    | 174   | 2.678 | 0.26 |
|                                              |           | % | 84.9% | 86.8% | 96.4% | 87.0% |       |      |
|                                              | Impact    | N | 18    | 7     | 1     | 26    |       |      |
|                                              |           | % | 15.1% | 13.2% | 3.6%  | 13.0% |       |      |

\*Chi square test p value < 0.05 is considered statistically significant

Furthermore, although a statistically significant association was observed between the self-perceived dental aesthetics of the students and their normatively assessed dental aesthetics, the correlation between the 2 assessments was weak. This low level of correlation has also been recorded in other studies.[28-31]The significant but weak correlation observed in this study, in addition to the gender differences recorded for normatively assessed dental aesthetics, reinforces the differences between clinicians' and patients' perspectives. This further highlights the importance

Table VII Relationship between OHIP-14 scores and normatively assessed dental aesthetics and orthodontic treatment need based on Gender.

| Orthodontic Treatment<br>Need | OHIP-14    |            | p value      |
|-------------------------------|------------|------------|--------------|
|                               | Male       | Female     |              |
| No need                       | 14.11±7.34 | 15.63±5.99 | 0.16         |
| Borderline need               | 15.05±4.51 | 15.89±6.28 | 0.39         |
| Definite need                 | 17.11±7.34 | 19.63±5.99 | <b>0.04*</b> |

Independent t test: \*p value<0.05 – statistically significant

Table VIII Relationship between OHIP-14 scores and self perceived dental esthetics and orthodontic treatment need based on Gender.

| Orthodontic Treatment<br>Need | OHIP-14    |            | p value      |
|-------------------------------|------------|------------|--------------|
|                               | Male       | Female     |              |
| No need                       | 13.65±4.94 | 14.33±3.12 | 0.34         |
| Borderline need               | 14.03±4.43 | 14.96±7.11 | 0.71         |
| Definite need                 | 15.98±4.17 | 17.13±3.12 | <b>0.05*</b> |

Independent t test: \*p value<0.05 – statistically significant

A statistically significant association (P = 0.000) was observed between the self-perceived and

of establishing the patient's perception of dental aesthetics and considering this in orthodontic treatment planning. Relationship between OHIP-14 scores and normatively assessed dental aesthetics and orthodontic treatment need based on Gender showed statistical significance p value(p=0.04\*) [table VII]

Relationship between OHIP-14 scores and self-perceived dental aesthetics and orthodontic treatment need based on Gender showed statistical significance p value(p=0.05\*) ;[table VIII]

normatively assessed dental aesthetics of the students. The Spearman rank correlation coefficient

showed a weak but significant correlation ( $r = 0.446$ ;  $P = 0.000$ ) between the 2 assessments. 119 students were rated by the orthodontists as having acceptable dental aesthetics and no need for orthodontic treatment; of them, 104 students rated themselves likewise, whereas 53 students were rated by the orthodontists as having moderately

acceptable dental aesthetics and thus in moderate need of orthodontic treatment, but only 14 agreed. Of the 28 students who were normatively assessed to have poor dental aesthetics and thus in definite need of orthodontic treatment, only 8 rated themselves likewise (Table IX).

Table IX Association between self-perceived and normatively assessed dental esthetics and orthodontic treatment need of the students according to the aesthetic component of the IOTN.

| Self perceived IOTN |   | Normatively assessed IOTN |                 |               | Total  | Chi square value* | Spearman correlation coefficient** |
|---------------------|---|---------------------------|-----------------|---------------|--------|-------------------|------------------------------------|
|                     |   | NO NEED                   | BORDERLINE NEED | DEFINITE NEED |        |                   |                                    |
| NO NEED             | N | 104                       | 35              | 7             | 146    | 48.639            | 0.446                              |
|                     | % | 87.4%                     | 66.0%           | 25.0%         | 73.0%  |                   |                                    |
| BORDERLINE NEED     | N | 10                        | 14              | 13            | 37     |                   |                                    |
|                     | % | 8.4%                      | 26.4%           | 46.4%         | 18.5%  | p value           | p value                            |
| DEFINITE NEED       | N | 5                         | 4               | 8             | 17     | 0.000             | 0.000                              |
|                     | % | 4.2%                      | 7.5%            | 28.6%         | 8.5%   |                   |                                    |
| Total               | N | 119                       | 53              | 28            | 200    |                   |                                    |
|                     | % | 100.0%                    | 100.0%          | 100.0%        | 100.0% |                   |                                    |

\*Chi square test

p value < 0.05 is considered statistically significant

\*\*Spearman correlation coefficient test

p value < 0.05 is considered statistically significant

This study also had some limitations. The young adults were university undergraduates and do not represent the entire youth population of the district, which includes a large proportion of people with lower levels of education. Thus, these results cannot be extrapolated to the entire young adult population of Tiruvallur district, because studies have shown that the sociodemographic characteristics of the subjects can affect their OHRQoL.[11]

Additional OHRQoL information acquired from the patient would enhance normative orthodontic treatment need assessments, thus supporting the use of a socio-dental approach to orthodontic treatment planning in young adult populations. This study is expected to serve as a preliminary investigation, and it is hoped that the findings will be of benefit in planning orthodontic health care services for young adult populations.

## CONCLUSIONS

These results indicate that there are significant differences between the impacts of self-perceived

and normatively assessed dental aesthetics on the OHRQoL of young adults mainly based on their gender. These differences emphasize the importance of patient-centred evaluations, particularly with respect to dental aesthetics and OHRQoL for orthodontic treatment planning for young adults.

## CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

## REFERENCES

1. Kiyak, H. and Reichmuth, M. (2002) Body image issues in dental medicine. In Cash, T.F, Pruzinsky, T. (eds), Body Image: A Handbook of Theory, Research, and Clinical Practice. Guilford, New York, NY, pp. 342–350.
2. de Oliveira, C. and Sheiham, A. (2004) Orthodontic treatment and its impact on oral health-related quality of life in Brazilian adolescents. Journal of Orthodontics, 31, 20–27

3. Pithon MM, Nascimento CC, Barbosa GC, Coqueiro RD. Do dental aesthetics have any influence on finding a job? *Am J Orthod Dentofacial Orthop* 2014;146:423-9.
4. Langlois J, Kalakanis L, Rubenstein A, Larson A, Hallam M, Smoot M. Maxims or myths of beauty? A meta-analytic or theoretic review. *Psychol Bull* 2000;126:390-423
5. Sheiham A, Tsakos G. Health needs assessment. In: Pine CM, Harris R, editors. *Community oral health*. Edinburgh, United Kingdom: Elsevier Science Limited; 2006.
6. Gherunpong S, Sheiham A, Tsakos G. A sociodental approach to assessing children's oral health needs: integrating an oral health-related quality of life (OHRQoL) measure into oral health service planning. *Bull World Health Organ* 2006;84:36-42.
7. Locker D. Measuring oral health: a conceptual framework. *Community Dent Health* 1988;5:3-18
8. Department of Health. *An oral health strategy for England*. London, United Kingdom: Her Majesty's Stationery Office; 1994.
9. Inglehart MR, Bagramian RA, editors. *Oral health-related quality of life*. Chicago: Quintessence; 2002. p. 32.
10. Jamieson LM, Thomson WM, McGee R. An assessment of the validity and reliability of dental self-report items used in a National Child Nutrition Survey. *Community Dent Oral Epidemiol* 2004;32:49-54.
11. Feu D, de Oliveira BH, de Oliveira Almeida MA, Kiyak HA, Miguel JA. Oral health-related quality of life and orthodontic treatment seeking. *Am J Orthod Dentofacial Orthop* 2010;138: 152-9.
12. Johal A, Cheung MY, Marcene W. The impact of two different malocclusion traits on quality of life. *Br Dent J* 2007;202:E2.
13. Liu Z, Mc Grath C, H €agg U. The impact of malocclusion/orthodontic treatment need on the quality of life. *Angle Orthod* 2009;79: 585-91.
14. Slade GD. Derivation and validation of a short-form oral health impact profile. *Community Dent Oral Epidemiol* 1997;25: 284-90.
15. Klages U, Claus N, Wehrbein H, Zenter A. Development of a questionnaire for the assessment of the psychosocial impact of dental aesthetics in young adults. *Eur J Orthod* 2006;28: 214-23.
16. Silvola AS, Varimo M, Tolvanen M, Rusanen J, Lahti S, Pirttiniemi P. Dental esthetics and quality of life in adults with severe malocclusion before and after treatment. *Angle Orthod* 2014; 84:594-9.
17. Hassan AH, Amin HE. Association of orthodontic treatment needs and oral health-related quality of life in young adults. *Am J Orthod Dentofacial Orthop* 2010;137:42-7.
18. Claudino D, Traebert J. Malocclusion, dental aesthetic self-perception and quality of life in a 18 to 21 year-old population: a cross-section study. *BMC Oral Health* 2013;13:3.
19. Palomares NB, Celeste RK, de Oliveira H, Miguel JA. How does orthodontic treatment affect young adults' oral health-related quality of life? *Am J Orthod Dentofacial Orthop* 2012;141:751-8.
20. Klages U, Bruckner A, Zentner A. Dental aesthetics, self-awareness and oral health-related quality of life in young adults. *Eur J Orthod* 2004;26:507-14.
21. Khan M, Fida M. Assessment of psychosocial impact of dental aesthetics. *J Coll Physicians Surg Pak* 2008;18:559-64.
22. Variella M, Garcia-Cambia JE. Impact of orthodontics on the psychologic profile of adult patients: a prospective study. *Am J Orthod Dentofacial Orthop* 1995;108:142-8.
23. Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. *Eur J Orthod* 1989;6:249-56.
24. World Health Organization. *Oral health surveys: basic methods*. 4th ed. Geneva, Switzerland: World Health Organization; 1997.
25. Ikebe K, Watkins CA, Ettinger RL, Sajima H, Ndokubi T. Application of short-form oral health

impact profile on elderly Japanese. *Gerontology* 2004;21:167-76.

26. Zhang M, Mc Grath C, H€agg U. The impact of malocclusion and its treatment on quality of life: a literature review. *Int J Paediatr Dent* 2006;16:381-7.

27. Aikins EA, daCosta OO, Onyeaso CO, Isiekwe MC. Self-perception of malocclusion among Nigerian adolescents using the aesthetic component of the IOTN. *Open Dent J* 2012;6:61-6.

28. Kolawole KA, Ayeni OO, Osiatuma VI. Psychosocial impact of dental aesthetics among university undergraduates. *Int Orthod* 2012;10:96-109.

29. Bernabe E, Flores-Mir C. Normative and self-perceived treatment need of a Peruvian university population. *Head Face Med* 2006; 2:22.

30. Badran SA. The effect of malocclusion and self-perceived aesthetics on the self-esteem of a sample of Jordanian adolescents. *Eur J Orthod* 2010;32:638-44.

31. Keruoso H, Al Enezi S, Keruoso E, Abdulkarim E. Association between normative and self-perceived orthodontic treatment need among Arab high school students. *Am J Orthod Dentofacial Orthop* 2004;125:373-8.