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Original Research

A Complete Analysis of Quality of Life Measure and Esthetic Component in Indore Population

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Abstract:

Background: Dentists are becoming aware of the need to evaluate the patient's own perceived need for treatment and measure the difference that the esthetic treatment might bring to patients' daily life. Improvement of oral health and enhancement of psychosocial well-being are perceived benefits of esthetic treatment. The objective of our study was to compare quality of life (QOL) measure using psychosocial impact of dental esthetic questionnaire (PIDAQ) and esthetic component of dental esthetic index (DAI) in assessing esthetic treatment need and concern.

Materials and Methods: A cross-sectional study was designed to include 200 subjects of 18-25 years age group of young age population of Indore population. All the parameters of DAI and PIDAQ were measured according to decided format.

Results: A one-way ANOVA test was used to study the effect of malocclusion on all the four aspects of PIDAQ; highly significant difference was found between all the groups of PIDAQ and DAI ($P < 0.001$).

Conclusion: From our study, it is clear that there is no relation between PIDAQ and esthetic component of DAI this is due to dental esthetic is not just depend upon hard tissue, but it also depend upon soft tissue.

Key Words: Esthetic treatment, esthetic index, psychosocial impact, quality of life measure

Introduction

Health-related quality of life (HRQOL) is assumed to encompass many elements of an individual's life that are not accessible to the doctor and it may, therefore, be argued that the patient is the best person to judge their own HRQOL. It is generally accepted that HRQOL includes a number of domains. There is a wide range of potential domains and not all of them are relevant to all studies, but where possible, those that are relevant should be looked at.[1,2]

Locker[3,4] in 1988, the oral disease has traditionally been studied using clinical indices such as the decayed, missed, and filled teeth index, or community periodontal index of treatment needs. These indices, while remaining important in clinical practice, are a measure of existing or past dental diseases, and many in some situations is used to provide an indication of functioning of individual or the social and psychological impact of the disease.

The importance of HRQOL has been seen widespread acceptance in medicine although oral health status has only been seen in these terms in the last 10-15 years. The need for a compressive approach to study the social and psychological impact of oral disease was first realized in the late 1980s when Reisen *et al.* (1989)[5] used result of previously validated scales to determine the impact of several common, but serious dental condition (for example; Temporomandibular joint pain) on QOL. Their findings indicated that a number of the patients were affected in their home, work, social, and leisure activities as a result of their dental condition. Since this early work, the growing recognition of the importance of QOL in the field of dentistry has led to the development of a number of oral HRQOL instrument.[6]

There is still little research in the field of esthetic dentistry and HRQOL.

Given that many esthetic patients are children/young adolescents; there may be some potential barrier to the use of HRQL measure. This is particularly so with generic measures that may be lengthy, unduly complex and contain items, which appear irrelevant to the respondent. For these reasons, the condition-specific measure with a small number of relevant items should be perused. The issue is further complicated by the fact that most treatment is undertaken during adolescence when the individual is undergoing major life changes anyway, and it is feasible to develop HRQOL measure for use in esthetic dentistry and that valid and reliable data can be collected. These measures are likely to be of importance in the future in order to investigate treatment need and outcome.[7]

Demand for esthetic treatment is mainly motivated by personal concern about appearance and other psychosocial factors. However, traditional methods of estimating esthetic need or evaluating treatment outcome are mainly based on assessment of normative need and use, with occlusal indices or cephalometric measurements used to define need for or success/failure of treatment, these measures reflect only the viewpoint of professional, rather than consumer expectations, this is a serious shortcoming because there are considerable difference between professional and patient perception of dental appearance and the need for esthetic intervention.[8]

Traditional occlusal indices such as the dental esthetic index (DAI) evaluate the esthetic and anatomic component of malocclusion, but they do not give any information about how malocclusion affects a patient's self-image and QOL in terms of subjective well-being and daily functioning. Recently, there has been increasing interest in the incorporation of psychometric instruments that measure oral HRQOL (OHRQOL).[9]

The DAI developed by Cons and Jenny[10] in 1996 is a clinical based measure normative need, rather than perceived need.

DAI is considered to be a quick and useful index for identifying unmet esthetic treatment need and as a screening device for determining esthetic treatment priority. It has demonstrated a high degree of validity and reliability. Its validity has been recognized nationally and internationally by several government agencies like U.S. Indian Health Service (IHS).[11]

The DAI has also been adopted by the World Health Organization (WHO) as a cross-cultural index and as a model for the WHO's pathfinder survey protocol.

Psychosocial impact of dental esthetics questionnaire (PIDAQ) developed by Klages[12] is a 23-item psychometric instrument for assessment of esthetic. specific aspect of QOL, expressed in four domains: Dental-self-confidence (six items), social impact (eight items), psychological impact (six items) and esthetic concern (three items), to rate how much dental esthetic exerted a positive or negative impact a five-point Likert scale ranging from 0 to 4 is used (0 - indicates not at all; 1 - A little; 2 - Somewhat; 3 - Strongly; 4 - Very strongly). The purpose of the study was; to find the relation between DAI and PIDAQ.

Materials and Methods

A cross-sectional study was designed to include 200 subjects of 18-30 years age group of young age population from Indore population. Excluded were persons with any mental or behavioral disorder that reduced their ability for self-determination, as well as those who did not agree to participate or whose legal representative did not authorize participation in the study, adult with history of any esthetic treatment, with any congenital maxillofacial deformities.

Each participant was explained about the procedure to be carried out, and consent was obtained from them.

The examination was performed under normal illumination with the help of a mouth mirror, probe and William's probe, which was used to determine the overjet and overbite. For ease of examination, all the parameters of DAI were included.

The score of DAI parameters were subjected to DAI regression equation which is as follow.

(Missing teeth × 6) + crowding + spacing + (midline diastema × 3) + anterior irregularity on the maxilla + anterior irregularity on the mandible + (anterior maxillary overjet × 2) + (vertical anterior openbite × 4) + (anterior posterior molar relation × 3) + 13.

The points obtained from the regression equation were tabulated to a score for assessing the severity of the malocclusion. They were subjected to a four-point scale:
<25 - Minor malocclusion
26-30 - Definite malocclusion
31-35 - Sever malocclusion
>36 - Very severe malocclusion

PIDAQ

The PIDAQ is 23-item psychometric instruments for assessment of esthetic–specific aspect of QOL. Express in four domains: Dental self-confidence (six items), social impact (eight items), psychological impact (six items), and esthetic concern (three items). The PIDAQ instrument had been previously tested for its validity, reliability, and factorial stability across samples. The subject was asked to rate how much dental esthetic exerted a positive or negative impact using a five-point Likert scale ranging from 0 to 4.
0 - Indicate not at all
1 - A little
2 - Somewhat
3 - Strongly
4 - Very strongly

An overall PIDAQ score was obtained by summing all items scores and the sum of the items in each domain produced a sub-domain score. To ensure the same direction of scoring for all items of the questionnaire some domains had scores reversed to produce a consistent measure of the impact.

Ethical approval was obtained at the beginning of the study. The participants were informed about the examination procedures and were assured of the confidentiality of the collected information. Only those who gave consent were included in the research.

Those who gave the consent were taken in a group of 10 in the room and were explained about all the questions in detail and were given 30 min to fill the questionnaire.

After the questionnaire was filled by the participant, each were examined by the two well-trained examiners under normal illumination with the help of a mouth mirror, probe, William's probe which was used to determine the overjet and overbite. For ease of examination, all the parameters of DAI were included.

Result

Statistical analysis

The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 10. A score for each section of PIDAQ i.e. dental self-confidence, social impact, psychological impact and esthetic concern, was generated by adding up the response codes (i.e., 0-4) for the questions in that section. The overall PIDAQ score was calculated by adding up the score for each section.

The relationships between the variables were analyzed using rank correlation (Spearman's Rho). Differences were tested for significance using ANOVA, *post hoc* tests.

Analysis of variance popularly known as ANOVA test can be used in cases where there are more than two groups. In statistics, analysis of variance (ANOVA) is a collection of statistical models, and their associated procedures, in which the observed variance in a particular variable is partitioned into components attributable to different sources of variation. In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are all equal, and, therefore, generalizes *t*-test to more than two groups. ANOVAs are helpful because they possess an advantage over a two-sample *t*-test. Doing multiple two-sample *t*-tests would result in an increased chance of committing a type I error. For this reason, ANOVAs are useful in comparing three or more means.

The statistical software namely SPSS were used for the analysis of the data and Microsoft Word and Excel have been used to generate graphs, tables, etc. SPSS software is a comprehensive and flexible statistical analysis and data management solution. SPSS can take data, from almost all type files and used them to generate tabulation reports, charts and plots of distribution and trends, descriptive statistics and conduct the complex statistical analysis. If $P \leq 0.001$ is highly significant and $P < 0.05$ is significant.

The present cross-sectional study was carried out to evaluate the distribution of esthetic treatment need in the professional college student of Udaipur on the basis of DAI and its effect on the psychosocial impact of dental esthetic in young adults.

On the basis of DAI score the esthetic treatment need was divided into:

1. Minor malocclusion
2. Definite malocclusion
3. Severe malocclusion
4. Very severe malocclusion

All of the above groups were compared with the following four aspects of PIDAQ:

1. Dental self-confidence
2. Social impact
3. Psychological impact
4. Esthetic concern.

Table 1 showed the frequency distribution of DAI components among Indore adults.

A one-way ANOVA test was used to study the effect of malocclusion on all the four aspects of PIDAQ as shown in Table 2. The highly significant difference was found between

Table 1: Parameters of DAI.

Sr. no.	Parameters
1	Missing incisor, canine premolar teeth
2	Crowding in the anterior segment
3	Spacing in the incisal segment
4	Midline diastema in mm
5	Largest anterior irregularity in maxilla (mm)
6	Largest anterior irregularity in mandible (mm)
7	Anterior maxillary overjet (mm)
8	Anterior mandibular overjet (mm)
9	Anterior open bite (mm)
10	Anteroposterior molar relation Normal Half cusp One full cusp

DAI: Dental esthetic index

Table 2: Mean comparison between PIDAQ and malocclusion.

PIDAQ	Sum of squares	df	Mean square	*F*	Sig.
Dental self-confidence				0.238	0.870
Between groups	21.544	3	7.181		
Within groups	5924.331	196	30.226		
Total	5945.875	199			
Social impact				3.067	0.029*
Between groups	95.897	3	31.966		
Within groups	2042.983	196	10.423		
Total	2138.880	199			
Psychological impact				0.752	0.522
Between groups	31.587	3	10.529		
Within groups	2744.368	196	14.002		
Total	2775.955	199			
Esthetic concern				1.578	0.196
Between groups	22.728	3	7.576		
Within groups	941.272	196	4.802		
Total	964.000	199			
Total impact				0.545	0.652
Between groups	98.830	3	32.943		
Within groups	11838.670	196	60.401		
Total	11937.500	199			
DAI				246.037	0.000**
Between groups	5410.107	3	1803.369		
Within groups	1436.613	196	7.330		
Total	6846.720	199			

The test applied – ANOVA. **$P \leq 0.001$ is highly significant and $P < 0.05$ is significant.
DAI: Dental esthetic index, PIDAQ: Psychosocial impact of dental esthetic questionnaire

all the groups of PIAQ and DAI ($P < 0.001$). Multiple comparisons between groups using Pearson correlation and Spearman (Rho) has shown that significant negative correlations were found between esthetic treatment need, and all the four section of the psychosocial impact of dental esthetics in young adults.

It can be seen from the result that malocclusion was in increasing order from minor malocclusion to very severe malocclusion on the basis of DAI score.

Discussion

This cross-sectional study was designed to evaluate the esthetic treatment need in young age population young adults through DAI.

According to Jenny *et al.*,[10] The DAI attempts to incorporate the patient's perception into index, unlike the index of esthetic treatment need, the DAI links the clinical and esthetic component mathematically to produce a single score that combines the physical and esthetic aspect of occlusion. The esthetic component of the DAI is based on public perception of dental esthetic of 200 photographs of occlusion configuration.

The frequency of individual presenting with at least one missing tooth was 2% when it was compared to Spanish, Nigerian and Peruvian young adults it was found to be 3.7%, 3.5%, and 16.5%, respectively. These decreases in percentage in missing tooth can be due to increased awareness among professional college student as compared with general population. Dental crowding in at least one arch was found to be 31.5% as compared with Spanish, Nigerian and Peruvian young adults it was found to be 76.3%, 33.6%, and 90.6% respectively. When the remaining components of DAI were compared between young adults of Peruvian and Udaipur, the n% were higher among Peruvian young adolescent showing the more frequent distribution of malocclusion among Peruvian young adults than the Udaipur.

According to Isiksal *et al.*,[13] subject with ideal occlusion and class I patient treated with ideal occlusion and class I patient treated with or without extraction were not differentiated in smile esthetics by a panel of judges. Maxillary gingival display and the ultimate position of the anterior teeth have definite effect on smile esthetic; in our study the maxillary gingival display and the ultimate position of anterior teeth have not been considered this may explain why people with minor malocclusion and definite malocclusion have higher psychosocial impact score.

According to Heravi *et al.*,[14] incisor shape was the key determinant of the esthetic preference; round incisor were the most esthetic. It is recommended to improve smile esthetics by mildly rounding the mesial and distal corners of square incisors. In our study, the shape of anterior teeth was not considered though it has a significant effect on the psychosocial impact of dental esthetics.

According to Hassan *et al.*,[15] esthetic treatment need significantly affect mouth aching, self-consciousness, tension, embarrassment, irritability, and life satisfaction in both sexes. Furthermore, esthetic treatment need significantly affected taste and relaxation in both sexes. However, pronunciation and the ability to do jobs or function effectively were not significantly associated with esthetic treatment need in either sex.

The relatively poor psychosocial impact in Indore young adults could explain both the significant negative correlation between DAI and psychosocial impact, also DAI is objectively determined hard tissue finding were as psychosocial impact is subjectively determined in which soft tissue also play an important role, cases with sever malocclusion but well camouflage soft tissue mask the underlying skeletal defect this could be the possible reason why patient with severe and very severe malocclusion group have low score of psychosocial impact of dental esthetics. Furthermore, the patient with minor and definite malocclusion can have higher score of psychosocial impact of dental esthetics, if the involved teeth are visible during speech, smiling or causes functional interference also patient are less bothered about malocclusion in lower arch because it is less visible than the upper arch. Furthermore, the awareness of malocclusion is not widespread and also not aware what best can be obtained by esthetic treatment, they are also not aware of other problems caused by malocclusion it is the duty of orthodontist to explain all the problem when the patient comes to esthetic office for the treatment rather than mainly focusing on esthetics.

The importance of potential patient's perception about esthetic treatment cannot be overemphasized because it is the patients who receive treatment and need to gain satisfaction from improved esthetic and function.

The result of our study seems to show that Udaipur young adolescent's consciousness of their malocclusion did not agree with their objectively determined esthetic treatment need, also this study revealed some shortcomings of the DAI e.g. lack of measurement of buccal crossbite, posterior open bite, midline discrepancy and deep overbite (Otuyemi and Noar)[16] in addition, DAI measurement are carried out using a millimeter gauge, and small error in accuracy can have exaggerated effect due to the index weightings.

Conclusion

From our study, it is clear that there is no relation between PIDAQ and esthetic component of DAI this is due to dental esthetic is not just depend upon hard tissue but it also depend upon soft tissue which frames the hard tissue, during smile various components such as lip line, smile arc, upper lip

curvature, lateral negative space, smile symmetry, occlusal frontal plane, dental components such as size, shape, color, alignment and crown angulation, midline, arch symmetry, and gingival components such as its color, texture, contour, and height of the gingiva play an important role. Thus esthetic treatment need cannot be assessed with such OHRQOL questionnaire, so there is a need to refine the questionnaire for specific use in identifying an esthetic dentistry need.

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