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Psychological Impact of Malocclusions on Adult Orthodontic Patients at The Lagos State University Teaching Hospital - A Pilot Study

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Abstract

Background: There is an increased demand for adult orthodontics because adults are becoming more aware and concerned about dental aesthetics. The way most people perceive themselves is greatly linked to their facial attractiveness, and this affects their social and professional relationships. The aim of this study was therefore to assess the impact of dental aesthetics on oral health- related quality of life (OHRQoL) using the psychological impact of dental aesthetic questionnaire (PIDAQ).

Methods: This was a descriptive cross-sectional study of adults, aged 18 years and above who presented at the orthodontic clinic of Lagos State University Teaching Hospital for diagnosis. A total of 60 adults were recruited and surveyed using the PIDAQ and analyzed to check for internal consistency, A bivariate analysis was performed using the ANOVA test and Pearson's correlation coefficient. Multiple linear regression analysis was used to test the influence of socio-demographic factors on the PIDAQ scale and subscales.

Results: A total of 60 adult patients participated in the study with a 100% response rate. Sex distribution was 70% (n = 42) female and 30% (n = 18) male. Subjects were of 3 age groups: between 18 to 25 years (40%, n = 24), 26 to 40 years (46.7%, n = 28), and >40 years (13.3%, n = 8). The overall mean score for PIDAQ was 75.4 (SD = 20.5) with the social impact domain having the highest rating of 23.5 (SD = 7.7). Comparing age groups, significant differences were found in the psychological impact (p=0.003), social impact (p=0.010), aesthetic concern (p=0.044) and total PIDAQ scores (p=0.027). Those with tertiary education had the highest impact in dental self-confidence, aesthetic concern and total PIDAQ ($p<0.05$). Single status and absence of previous dental treatment had the highest impact in the psychological domain ($p<0.05$).

Conclusion: Perceived dental aesthetics had effects on the psychological well-being of the subjects. Age, marital status, level of education, and history of past dental treatment were all factors that significantly contributed to self-perceived aesthetics and psychosocial well-being.

Keywords: Orthodontics, Adult, Dental aesthetics, OHRQoL, LASUTH

ORIGINAL ARTICLE

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Introduction

According to the definition provided by the World Health Organization, Oral health quality of life (QoL) is defined as one's perception of their situation in life in terms of culture, value system, goals, expectations, standards, and priorities.[1] QoL is a subjective concept not visible to others and is based on individuals' perceptions of the different aspects of their lives. Nonetheless, many authors believe that QoL domains should be measurable both subjectively and objectively.[2,3] Several studies have reported the negative effect of impaired dental esthetics on daily life.[4,5] Oral Health-Related Quality of Life (OHRQoL) aims to evaluate the aetiology of oral diseases, interventions to prevent oral conditions, distribution of oral diseases in different populations, the treatment need and effect of oral conditions on daily activities.[5,6] This index can also help in the allocation of oral health care services.[7]

The Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) is a multiple-item

questionnaire developed in the German language, and then published in the English language; designed as a self-assessment tool for evaluating the effect of dental esthetics on the psychosocial status of young adults.[8] This questionnaire can discriminate between different degrees of dental esthetics determined by the IOTN-aesthetic component (IOTNAC) and the perception of occlusion (POS) index.[8] PIDAQ has been translated to several languages so far and its validity and reliability have been previously confirmed.[4,9–14]

The aim of this study was therefore to assess the impact of dental aesthetics on the oral health-related quality of life (OHRQoL) using the psychological impact of dental aesthetic questionnaire (PIDAQ).

Materials and methods

This was a cross-sectional descriptive study carried out at the orthodontic clinic of the Lagos State University Teaching Hospital (LASUTH), Ikeja Lagos state, a Tertiary Health Facility in Southwest Nigeria for a duration of 3 months. Adult patients (60) who presented on account of malocclusion were recruited before commencing orthodontic treatment using convenient sampling technique to determine the psychological impact of dental aesthetics on oral health-related quality of life using the psychological impact of dental aesthetics questionnaire (PIDAQ). The sample size was calculated by using a statistical formula for comparative research study by Isiekwe *et al*[15]

Inclusion criteria included adults aged 18 years and above who are of Nigerian descent, patients who have not undergone any orthodontic treatment in the past and who gave consent to participate in the study. Those who have facial asymmetry or deformities such as visual/hearing impairment, physical deformities, autism, and those with a history of trauma to their anterior teeth, visible carious lesions, dental hypoplasia or fluorotic lesions were excluded from the study.

All selected adult patients completed the PIDAQ prior to the start of orthodontic treatment. The version that was used in this study contained five items on sociodemographic information regarding age, gender, education, marital status, and religion. History of past dental treatment and the reasons for seeking orthodontic treatment were also obtained.

The PIDAQ is a 23-item tool that measures important aspects of the oral health-related quality of life, Dental Self-confidence (DSC), Social Impact (SI), psychological impact (PI), and Aesthetic Concerns (AC). It is made up of four subscales which represent 4 domains: aesthetic concern (AC; 3 items), psychological impact (PI; 6 items), social impact (SI; 8 items) and dental self-confidence (DSC; 6 items).

A five-point Likert scale was used ranging from 1 (no impact of dental aesthetics on quality of life) to 5 (maximum impact of dental aesthetics) for each item. The response options are as follows: 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree.

To ensure the same direction of scoring for all questionnaire items and to produce a consistent measure of impacts, the items in dental self-confidence DSC were scored in a reverse mode. The DSC, SI, PI, and AC scores were calculated by summing the participants' responses from the corresponding question items of each domain in the questionnaire. Additionally, the total PIDAQ score was calculated from the sum scores of the subdivisions AC, PI, SI, and the reversed scores of the positive domain DSC.

Data was analyzed with the IBM Statistical Package for Social Sciences (SPSS) for Windows Version 23.0. (IBM Corp., Armonk, NY, USA). The internal consistency of the instrument was calculated using Cronbach's alpha (α). Descriptive statistics of scores were obtained. Bivariate analysis was performed using the ANOVA test.

Results

A total of 60 individuals participated in this study with a 100% response rate with no missing data. Sex distribution was 70% (n = 42) female and 30% (n = 18) male. Participants were of 3 age groups: between 18 to 25 years (40%, n = 24), between 26 to 40 years (46.7%, n = 28), and >40 years (13.3%, n = 8). Of all participants, 13.3% (n = 8) had previous dental treatment while 16.7% (n = 10) sought orthodontic

treatment because they were referred by a dentist (Table 1).

The Cronbach's alpha coefficient of internal consistency was calculated to be 0.835 for the total PIDAQ score indicating a good internal consistency. The Cronbach's alpha coefficient was 0.868 for the aesthetic concern, 0.780 for social impact, 0.796 for Psychological impact, and 0.802 for dental self-confidence. The measurement reliability correlation coefficient was 0.977, 0.964, 0.929, and 0.955 for dental self-confidence, social impact, psychological impact, and aesthetic concern, respectively (Table 2).

Overall, the total mean score (SD) for the Psychosocial Impact of Dental Esthetic Questionnaire (PIDAQ) in the current study was 75.4 (SD = 20.5) with the highest rating given to the social impact domain (23.5, SD = 7.7) followed by the dental self-confidence (22.1, SD = 5.9), psychological (20.3, SD = 5.5), and aesthetic concern (9.5, SD = 3.6) domains respectively (Table 3).

There was a negative correlation between the total PIDAQ score (Pearson = 0.361, p <0.01) and age groups of the sample as shown in Table 4, indicating an inverse relationship. A negative correlation was also found between age and the dimensions of social impact, psychological impact and aesthetic concern.

The correlation of psychological impact with age (Pearson = -0.402, p <0.01) and marital status (Pearson = -0.321, p <0.05) was found to be negative while the relationship between psychological impact and history of past dental treatment was positive ((Pearson = 0.299, p <0.05).

The influence of the different sociodemographic characteristics on the results of the PIDAQ and its subscales scores is shown in Table 5. When age groups were compared, significant differences were detected for psychological impact (p = 0.003), social impact (p = 0.010) aesthetic concern (p = 0.047) and total PIDAQ score (p = 0.017). The results did not reveal any significant differences in the participants' ratings across all domains when compared based on gender, ethnicity, religion, and reason for seeking orthodontic treatment (p >0.05).

However, significant differences were detected with respect to educational background in dental self-confidence (p = 0.018), aesthetic concern (p = 0.044) and total scores (p = 0.027). Those who had tertiary education had the highest impact on OHRQoL compared to the rest of the participants.

The younger adults, unmarried, and those with no previous dental treatment displayed the highest impact in the psychological domain of PIDAQ (p < 0.05).

Table 1. Frequency and percentage of sociodemographic variables

Variables	Sub-categories	n (%)
Age	18-25 years	24 (40.0)
	26-40 years	28 (46.7)
	>40 years	8 (13.3)
Gender	Male	18 (30.0)
	Female	42 (70.0)
Ethnicity	Yoruba	42 (70.0)
	Igbo	8 (13.3)
	Hausa	3 (5.0)
	Others	7 (11.7)

Marital Status	Single	45 (75.0)
	Married	15 (25.0)
	Divorced	-
Educational background	Primary	-
	Secondary	4 (6.7)
	Postgraduate	40 (66.7)
	No formal education	16 (26.7)
Religion	Christianity	48 (80.0)
	Muslim	12 (20.0)
	Others	
History of past aesthetic dental treatment	Yes	8 (13.3)
	No	52 (86.7)
Reason for seeking orthodontics	Crooked teeth	18 (30.0)
	Spaced teeth	20 (33.3)
	Protruding jaw	12 (20.0)
	Referred by a dentist	10 (16.7)

Table 2. Reliability of measurements

Variables	R	P values
DSC	0.977	0.000***
SI	0.964	0.000***
PI	0.929	0.000***
AC	0.955	0.000***

Table 3. Mean and SD for PIDAQ subscale and total score

Domain	Mean	SD	Range
Dental self-confidence total score	22.1	5.9	8-30
Social impact total score	23.5	7.7	9-40
Psychological impact total score	20.3	5.5	6-29
Aesthetic attitude total score	9.5	3.6	3-15
PIDAQ total score	75.4	20.5	28 -114

Table 4. Correlation (Pearson correlation coefficient) between PIDAQ/ subscales and sociodemographic variables

Domain	Age groups	Gender	Ethnicity	Marital status	Educational background	Religion	History of dental treatment	Reason for ortho treatment
Dental self-confidence	-0.189	0.074	0.045	-0.084	-0.176	0.067	0.154	-0.18
Social impact	-0.384**	0.002	0.177	-0.202	-0.067	0.106	0.101	-0.167
Psychological impact	-0.402**	0.077	0.053	-0.321*	-0.133	0.039	0.299*	-0.102
Aesthetic concern	-0.310*	0.013	0.143	-0.117	-0.097	0.092	0.154	-0.184
PIDAQ total	-0.361**	0.045	0.118	-0.207	-0.129	0.086	0.19	-0.174

Table 5. Comparison of mean PIDAQ subscale and total scores among different sociodemographic variables

Variable	Sub-categories	DSC mean (SD)	P value	PI mean (SD)	P value	SI mean (SD)	P value	AC mean (SD)	P value	Total PIDAQ	P value
Age	18-25	23.1(6.2)		22.3(5.1)		26.7(8.0)		10.5(3.8)		82.6(21.2)	
	26-40	21.9(5.4)	0.322	20.2(4.5)	0.003**	22.2(6.2)	0.010*	9.4(2.7)	0.047*	73.6(16.1)	0.017*
	>40	19.5(6.7)		14.9(7.0)		18.3(8.5)		7.0(4.4)		59.6(24.6)	
Gender	Male	21.4(5.4)	0.575	19.7(5.8)	0.556	23.4(7.4)	0.988	9.4(3.3)	0.919	73.9(20.2)	0.732
	Female	22.3(6.2)		20.5(5.5)		23.5(7.9)		9.6(3.7)		76.0(20.9)	
	Yoruba	22.1(5.8)		20.3(5.2)		22.8(7.9)		9.3(3.6)		74.4(20.2)	
Ethnicity	Igbo	21.1(5.1)	0.73	20.1(5.3)	0.356	24.6(5.1)	0.267	10.0(2.4)	0.327	75.9(16.4)	0.363
	Hausa	19.7(8.7)		15.7(8.4)		19.3(8.3)		7.3(3.8)		62.0(29.1)	
	Others	23.9(7.1)		22.6(6.7)		28.1(8.0)		11.4(4.0)		86.0(23.4)	
Marital status	Single	22.3(5.7)	0.525	21.3(4.8)	0.012*	24.4(7.0)	0.122	9.8(4.4)	0.374	77.8(18.5)	0.113
	Married	21.2(6.6)		17.3(6.6)		20.8(9.3)		8.8(4.2)		68.1(25.0)	
Educational background	Secondary	18.8(7.4)		17.3(8.6)		18.5(8.4)		7.0(4.7)		61.7(27.0)	
	Tertiary	23.6(5.5)	0.018*	21.5(5.0)	0.053	24.9(7.4)	0.109	10.3(3.4)	0.044*	80.3(19.2)	0.027*
	Post graduate	19.1(5.5)		18.1(5.4)		21.2(7.6)		8.2(3.1)		66.6(19.0)	
Religion	Christianity	21.9(5.7)		20.2(5.5)		23.1(7.5)		9.4(3.6)		74.5(19.9)	
	Muslim	22.8(6.8)	0.612	20.8(6.0)	0.765	25.1(8.7)	0.42	10.2(3.6)	0.485	78.8(23.5)	0.516
History of past dental treatment	Yes	19.8(8.3)		16.1(7.5)		21.5(10.3)		8.1(4.7)		65.5(29.1)	
	No	22.4(5.5)	0.241	21.0(5.0)	0.020*	23.8(7.3)	0.442	9.7(3.4)	0.239	76.9(18.8)	0.146
Reason for seeking orthodontic treatment	Crooked teeth	22.7(6.5)		19.7(5.4)		23.2(6.6)		9.7(3.6)		75.3(19.8)	
	Spaced teeth	23.0(5.0)	0.463	22.0(5.2)	0.281	26.4(8.1)	0.148	10.5(3.4)	0.317	81.8(20.2)	0.222
	Protruding jaw	21.7(6.0)		20.5(5.2)		21.8(7.7)		8.9(3.7)		72.8(19.6)	
	Dentist referral	19.5(6.4)		17.9(6.5)		20.2(7.7)		8.0(3.6)		65.6(22.0)	

Discussion

This study aimed to assess the impact of dental aesthetics on the oral health-related quality of life (OHRQoL) of adults that sought orthodontic treatment using the psychological impact of dental aesthetic questionnaire (PIDAQ). The results showed that perceived dental aesthetics affected the psychological well-being of the subjects. Age, marital status, level of education, and history of past dental treatment were all factors that significantly affected self-perceived aesthetics and psychosocial well-being.

The first subscale, Dental Self-Confidence (DSC), examined the impact of dental aesthetics on the subject's emotional state. A recent study suggested that HRQoL instruments in dentistry should not only include a certain degree of detrimental effects of the oral condition but also deal with the subjective perception of well-being.[16] It has been suggested that positive and negative well-being correlate differently to psychosocial conditions.[17] It is important to measure the positive impacts of dental aesthetics on the affective state of a person. [18]

Social impact aims to give insight into the potential problems a person may encounter in a social situation due to the unfavourable dental appearance.[19] Past studies have shown that individuals perceived to be attractive are more likely to have a high-quality of dental aesthetics.[8,20,21] They are more prone to experience positive social interactions and positive evaluations by their peers. A greater social appearance concern in individuals with poor dental aesthetics may also be present, to the extent of being a social handicap. Onyeaso *et al*.[16] reported a high percentage of respondents who felt less confident as a result of their malocclusion.

The psychological impact of dental aesthetics is composed of items regarding a feeling of inferiority and despondency when the individual with unfavourable dental aesthetic compares himself or herself with others who have superior dental aesthetics.[3] Comparison plays an important role in psychological well-being and such upward comparison might result in depressing moods.[17]

The fourth subscale, Aesthetic concern, comprises statements referring to the dissatisfaction of a person's dental appearance when confronted with a mirror, photographic and/or video images. This finding correlated with inner insecurities and seemed to be related to the fact that the enhancement of dental aesthetics is a major motivation for people to seek orthodontic treatment.[22]

In this study, the scores varied across the subscales, with the Social impact having the highest score and the Aesthetic concerns the lowest. This is in contrast with the findings of Kolawole *et al*.[23] who reported Dental self-confidence as the highest subscale. This difference could be related to the difference in population sample because their study sample was from the university undergraduate student population. Research shows that correlated PIDAQ and DAI reported higher Aesthetic concern scores in participants with higher perceived orthodontic treatment needs based on DAI scores.[23,24]

The present research suggests an inverse relationship between age and the impact of perceived dental aesthetics on OHRQoL in adults. The younger age group had a greater impact on OHRQoL.[18,25,26] This may be due to the influence of social media on the definition and perception of beauty and aesthetics.[25]

However, another previous study found no correlation between the perception of dental aesthetics and the severity of malocclusions.[27]

The present study found that participants with a tertiary level of education had the highest impact of dental aesthetics on OHRQoL compared to other levels of education. In this study, those with tertiary education had reduced Dental self-confidence and increased aesthetic concerns. This result is similar to the research done by Kolawole *et al*.[23] where study participants were university undergraduate students.

Past dental treatment may contribute to a better OHRQoL because those who are satisfied with their appearance may be more self-confident and have higher self-esteem than those who are dissatisfied.[28,29] This may explain the significantly lower psychological impact of dental aesthetics on OHRQoL in participants with a history of past dental

treatment. Marital status was found to influence the impact of dental aesthetics on OHRQoL. This was in contrast to the research by Alhajj *et al*.[30] where single subjects rated their dental aesthetics better than their married counterparts. This may be related to other priorities and responsibilities that prevented focus on dental aesthetics. A limitation of this study is the fact that the study population was comprised of only patients seeking treatment at the orthodontic clinic, thus the findings may not entirely reflect that of the general population.

The findings from this study show that public health practices should be guided by considering the patients' perceptions of their dental appearance as an important aspect of patient management, in order to achieve higher levels of patient satisfaction, minimizing the risks of overtreatment and reducing costs by identifying those with a greater likelihood of benefiting from treatment.

Conclusion

Perceived dental aesthetics was found to affect the psychological well-being of the subjects. Age, marital status, level of education, and history of past dental treatment were all factors that significantly affected self-perceived aesthetics and psychosocial well-being. Patients' perceptions of psychosocial impact related to dental esthetics are multifactorial and are influenced by the subjective perceptions of the patient, thus care should be taken when planning dental and orthodontic services.

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