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Research Article

Psychosocial Impact of Malocclusion: Findings from A Tertiary Hospital in South-South Nigeria

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Abstract

Background: Malocclusion can cause a lack of confidence and a resultant psychosocial effect on an individual. This study aimed to assess the psychosocial effect of malocclusion on orthodontic patients.

Procedures: A cross-sectional study based on a validated semi-structured questionnaire - Psychosocial Impact of Dental Aesthetic Questionnaire (PIDAQ) was conducted. The questionnaire elicited information on socio-demographic data (Section A), the psychosocial impact of malocclusion before treatment (Section B), and during treatment (Section C). Data was imputed and uploaded for analysis using IBM SPSS version 26. Descriptive and inferential statistics were done and the level of significance was set at $P \leq 0.05$.

Findings: One hundred and thirty-five (135) patients were involved in this study including females (78, 57.8%), and males (57, 42.2%) with a mean age of 19.32±7.008 years. Most were in the 10-19 years age group, followed by the 20-29 years participants. The 30-39 years group had the highest PIDAQ score signifying a higher psychosocial impact of malocclusion, while the 40-49 years group participants had the lowest. Mean PIDAQ scores for all subscales before treatment in males and females showed statistically significant differences between the two genders except for Self-confidence which had a P-value of 0.292. Participants of tertiary level had greater psychological, social impact and more aesthetic concerns of malocclusion yet better self-confidence.

Conclusion: The psychosocial impact of malocclusion was remarkable across genders and different age groups though significantly more in the 30-39-year-olds, and females. Educational level appears to significantly influence the individuals.

Keywords: malocclusion; psychosocial impact; self-confidence; aesthetic concern

Introduction

Malocclusion can be considered as a physical disability as it restricts a person's social relationships, and hence their opportunities (Dalaie et al, 2018). Individuals desire to have a sense of belonging and to be socially accepted. When there is a lack or deficiency in this expectation, a person becomes unsatisfied with his/ her self-appearance with a resultant lack of confidence, which is a psychosocial burden (Seehra et al, 2011). This dissatisfaction with their self-appearance makes some individuals seek orthodontic treatment to get their malocclusion treated. Studies (De Oliveira &Sheiham, 2004; Bellot-Arcis et al, 2015; Bellot-Arcis et al, 2013; Twigge et al, 2016 & Grewal et al, 2019) have shown that malocclusion is associated with a psychosocial impact on individuals especially as the condition worsens and it's been revealed that correcting the malocclusion improves the individuals' psychosocial, social impacts, and aesthetic concerns. Many have been seen to feel happier during treatment, from the positive changes they see in their dentition. Over time, it's become necessary to have an objective tool to measure the psychosocial effect of malocclusion on patients. The commonly used tool for this is the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) (Klages et al, 2006), which has proven to be valid and reliable in adolescents and young adult orthodontic patients. This questionnaire, originally applied in German among people aged 18 to 30 years, has long been translated into English and used around the globe across different age boundaries. It objectively measures the quality of life linked to dental aesthetics.

Although studies (Kanmodi et al, 2020; Onyeaso & Sanu, 2005; Onyeaso et al, 2005 & Akpasa et al, 2022) have investigated the psychological impact of malocclusion among adolescents in North and South-West Nigeria, an extensive literature search found a dearth of information reporting the situation among orthodontic patients in South-South Nigeria. Orthodontic treatment has been carried out over ten years in a tertiary hospital in Port Harcourt, South-South region of Nigeria. This study was conceived to assess the psychosocial impact of malocclusion among orthodontic patients in University of Port Harcourt Teaching Hospital (UPTH), a tertiary healthcare center and a major hub for orthodontic services in South-South Nigeria.

Methods

This was a cross-sectional study carried out over an 8-months period among orthodontic patients at the Department of Child Dental Health, University of Port Harcourt Teaching Hospital, Rivers State, Nigeria. Informed consent was obtained from participants willing to complete the study questionnaire among patients undergoing treatment at the time. Data was collected using a semi-structured, self-administered questionnaire - PIDAQ. The questionnaire had three sections. Section A elicited socio-demographic data, while Sections B and C respectively elicited information on the Psychosocial impact of malocclusion before treatment and during treatment based on four subscales: Social Impact, Aesthetic Concern, Dental Self- confidence and Psychological Impact, each rated on a five-point Likert scale. Information obtained was imputed and analyzed using IBM SPSS version 26. Frequency distribution tables were generated for categorical variables and inferential statistics were done with t-test and Chi-square test. The test of significance was set at a P- value ≤ 0.05. The study was approved by the Ethics and Research Committee (ERC) of the University of Port Harcourt Teaching Hospital (UPTH/ADM/90/S.11/VOL.XI/1837).

Results

The data was systematically analyzed to describe the socio-demographic patterns of participants and findings in different subscales of the PIDAQ. Furthermore, inferential tests were performed to determine the influence of factors such as age, gender, and educational level of patient on the psychosocial impact of malocclusion.

Patients' Socio-demographics

The study involved one hundred and thirty-five (135) patients of which 78 (57.8%) were females and 57 (42.2%) were males with a mean age of 19.32 ± 7.008 years. Most of the patients, 74 (54.8%) were of tertiary educational level. In terms of the occupational identity of patients, there were 50 (37.6%) students, 24(17.8%) civil servants, 7(5.2%) Business tycoons, and 5(3.7%) Content writers. Most of the patients were ages 10-19 years (87, 64.4%), followed by 20-29 (37, 27.4%), 30-39 years (8, 5.9%), and 40-49 years (3, 2.2%). Most, 120(88.9%) were single, while only 14(10.4%) were married.

Parents' Socio-demographics

Parental occupation showed similar pattern for Fathers and mothers: Civil servants - Fathers, 93(68.9%); Mothers, 88 (65.2%); Business tycoons - Fathers, 33(24.4%); Mothers, 42(31.1%); Retirees - Fathers, 7 (5.2%); Mothers, 5 (3.7%). Similarly, parents' levels of education were symmetrical for fathers and mothers: Tertiary - fathers, 119(88.1%); mothers, 117 (86.7%); Secondary - fathers, 14 (10.4%), mothers, 18 (13.3%).

PIDAQ subscales (Table 1)

1. Dental Self-Confidence: the mean value before treatment was 8.21 + SD 6.62 which increased after treatment to 18.67+ SD 6.57. (Table 1)

2. Social Impact: the mean Likert score before treatment was 13.46, with SD 8.64, and decreased to 9.14 ± SD 7.44 after treatment. (Table 1). There was a statistically significant difference between before treatment and after, with a P-value of 0.001.

3. Psychological Impact: Before treatment, the mean value was 12.62 with SD 7.52 while during treatment, the mean decreased to 6.03 with SD 5.43 showing a reduction in psychological distress. The P-value was 0.0001 showing a statistically significant difference between before and after treatment. (Table 1)

4. Aesthetic Concern: Before treatment, the mean Likert score was 7.82 ± 4.91, and reduced during treatment to a mean Likert value of 4.22 ± 4.33, showing a reduction in the patients' aesthetic concerns during treatment (Table 1).

Then Overall, the mean PIDAQ Score before treatment was 42.05 ± 16.58, and during treatment, 38.07 ± 15.11, showing a reduced psychosocial impact during treatment.

	Before treatment		During treatment			
	Mean	SD	Mean	SD	t-test	p-value
Self-confidence total score	8.21	6.62	18.67	6.57	-15.179	0.0001
Social impact total score	13.46	8.64	9.14	7.44	4.998	0.0001
Psychological impact total score	12.62	7.52	6.03	5.43	9.807	0.0001
Aesthetic concern total score	7.82	4.91	4.22	4.43	7.098	0.0001
PIDAQ SCORE	42.05	16.58	38.07	15.11	2.722	0.007

Table 1: Psychological impact of malocclusion among treated orthodontic patients.

Age group and Psychosocial impact of malocclusion:

Dental self-confidence: Before treatment, The 20-29-years-old age group had a mean Likert score of 7.54 being the least and the 40-49-years-old age group with a mean of 12.00 being the highest but no statistically significant difference across the age groups shown with P-value 0.696. (Table 2) During treatment; the 20-29 years age group showed the lowest mean Likert score of 16.65 and the highest by 30 39 years age group with 22.00 but there was no statistically significant difference in the mean Likert scores seen across age groups shown with P-value, 0.100 (Table 2)

Social Impact: Before treatment; the 20-29 years age group showed the highest mean Likert score of 15.32 and least by the 40-49- years old age group with 5.33 but there was no statistically significant difference in the mean PIDAQ scores across the age group, (P- value 0.166). (Table 2) During treatment; the 20-29 years age group showed the highest Likert score of 12.62 and least seen among the 30-39 years age group with 6.13

and there was a statistically significant difference in the mean scores across the age groups as shown with P-value 0.007. (Table 2)

Psychological Impact: The 30-39 years age group had the highest mean Likert score of 16.00, and the 40-49 years age group had the lowest with 9.00 before treatment. The P-value was 0.098 which showed no statistical significant difference among the age groups. (Table 2) During treatment, the 40-49 years age group had a mean Likert score of 12.00 while the 30-39 had a mean score of 3.63, and there was a statistically significant difference in the mean Likert scores across the age groups as seen with P-value 0.003. (Table 2)

Aesthetic concern; before treatment, the 20-29 years age group was found to have a mean Likert score of 8.54, and the least found among the 40-49 years age group with 5.00. The P-value was 0.551, with no statistically significant difference across the age groups. During treatment, the 40-49 years age group was found to have a mean Likert score of 8.00 and the 30-39 years age group had 3.88, the P-value was 0.35 showing there was no statistical significant difference across the age groups. (Table 2) Overall, the highest PIDAQ score, 48.13 was found among the 30-39 years age group before treatment while during treatment, the highest PIDAQ score, 47.33 was found in the 40-49 years age group. (Table 2)

	Age group								**p-value**
	10-19		**20-29**		**30-39**		**40-49**		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Before treatment									
Self-confidence total score	8.30	6.49	7.54	6.88	8.88	5.64	12.00	11.36	0.696
Social impact total score	12.82	8.59	15.32	8.64	14.88	8.63	5.33	5.51	0.166
Psychological impact total score	11.62	7.39	14.54	7.14	16.00	6.55	9.00	13.89	0.098
Aesthetic concern total score	7.56	5.08	8.54	4.41	8.38	4.50	5.00	7.81	0.551
PIDAQ SCORE	40.21	15.98	45.95	17.04	48.13	16.26	31.33	23.16	0.141
During treatment									
Self-confidence total score	19.24	6.62	16.65	6.20	22.00	5.35	18.33	9.07	0.100
Social impact total score	7.94	6.16	12.62	9.23	6.13	6.77	9.00	7.94	0.007
Psychological impact total score	5.14	4.82	8.16	5.69	3.63	4.10	12.00	12.00	0.003
Aesthetic concern total score	3.90	4.25	4.76	4.55	3.88	4.42	8.00	8.00	0.359
PIDAQ SCORE	36.22	13.83	42.19	17.57	35.63	11.61	47.33	20.60	0.145

Table 2: Age groups and Psychosocial impact of malocclusion.

	GENDER				**t-test**	**p-value**
	Male		**Female**			
	Mean	**SD**	**Mean**	**SD**		
Before treatment						
Self-confidence total score	8.96	7.07	7.65	6.25	1.059	0.292
Social impact total score	11.51	7.28	14.88	9.29	-2.339	0.021
Psychological impact total score	10.28	6.14	14.33	7.99	-3.299	0.001
Aesthetic concern total score	6.43	4.52	8.82	4.97	-2.853	0.005
PIDAQ SCORE	37.07	15.37	45.69	16.57	-3.026	0.003
During treatment						
Self-confidence total score	18.32	7.05	18.94	6.23	-0.395	0.694
Social impact total score	9.789	8.419	8.667	6.658	0.861	0.391
Psychological impact total score	5.84	5.52	6.17	5.40	-0.342	0.733
Aesthetic concern total score	3.82	4.07	4.51	4.68	-0.842	0.401
PIDAQ SCORE	37.77	16.33	38.28	14.26	-0.099	0.921

Table 3: Gender and Psychosocial impact of malocclusion.

	LEVEL OF EDUCATION				**t-test**	**p-value**
	Secondary		**Tertiary**			
	Mean	**SD**	**Mean**	**SD**		
Before treatment						
Self-confidence total score	8.30	6.37	8.14	6.86	.085	.932
Social impact total score	12.28	7.96	14.43	9.10	-1.422	.157
Psychological impact total score	11.28	7.51	13.73	7.39	-1.872	.063

Aesthetic concern total score	7.05	5.08	8.45	4.72	-1.646	.102
PIDAQ SCORE	38.79	15.16	44.74	17.30	-2.054	.042
During treatment						
Self-confidence total score	19.30	7.02	18.16	6.17	1.150	.252
Social impact total score	6.967	5.199	10.932	8.502	-3.158	.002
Psychological impact total score	4.54	4.30	7.26	5.97	-2.976	.003
Aesthetic concern total score	3.57	3.98	4.76	4.73	-1.506	.134
PIDAQ SCORE	34.38	12.18	41.11	16.62	-2.548	.012

Table 4: Educational level of participants and Psychosocial impact of malocclusion.

Gender and Psychosocial impact of malocclusion

Self-Confidence: Before treatment, the males had a mean Likert score of 8.96 while females had 7.65, with P-value, 0.292 showing no statistically significant difference. During treatment, males had a mean Likert score of 18.32, while females had 18.94 with a P-vale of 0.694 showing no statistically significant difference.

Social Impact: Before treatment, the males had a mean Likert score of 11.51 and the females had 14.88, P-value 0.021 showing a statistical significant difference between genders. During treatment, the males had a mean Likert score of 9.789 and the females had 8.667, P-value of 0.391 showing no statistically significant difference between genders.

Psychological impact: Before treatment, a mean Likert score of 10.28 was found among the male participants and 14.33 for the females with a P-value of 0.001 showing a statistically significant difference between the two genders. During treatment, the male participants were found to have a mean Likert score of 5.84 and the female participants, 6.11 with a P-value of 0.733 showing a non-statistical significant difference between the genders.

Aesthetic concern: Before treatment, male participants had a mean Likert score of 6.43 while the females had 8.82 with a P-value of 0.005 showing a statistically significant difference. During treatment, the males had a mean Likert score of 3.82 and females, 4.51 with a P-value of 0.401 showing a non-statistical significant difference.

Overall PIDAQ score before treatment for males was 37.07 and females 45.69 with a P-value of 0.003 showing a statistically significant difference between the two genders. During treatment; the overall PIDAQ score was 37.77 for males and 38.28 for females with a P-value of 0.921 showing insignificant statistical difference.

Educational level and Psychosocial impact of malocclusion

Self-confidence: The mean Likert score for secondary school participants was 8.30 while tertiary was 8.14 before treatment with a P-value, of 0.932 showing no statistically significant difference between the two educational levels. During treatment, the mean Likert score for the secondary school participants was 19.30 while the tertiary was 18.16, P-value was 0.252 showing an insignificant statistical difference between the two.

Social Impact: Secondary school participants had a mean Likert score of 12.28 and tertiary had 14.43 before treatment. There was no statistical significant difference between the two as the P-value was found to be 0.157. During treatment, the mean scores were 6.967 for the secondary participants and 10.932 for the tertiary participants with a P-value of 0.002 which showed a statistically significant difference between the two educational levels.

Psychological impact: The mean Likert score for secondary school participants was 11.28 while for tertiary participants, it was 13.73 before treatment. The P-value was 0.063 while during treatment, the mean scores were 4.54 and 7.26 for secondary school and tertiary participants, respectively with a P-value of 0.003, tertiary participants had the higher psychological impact of malocclusion than secondary-level participants.

Aesthetic Concerns: Before treatment, the mean Likert score for secondary and tertiary participants was 7.05 and 8.45, respectively. During treatment, the mean scores were 3.57 and 4.76, respectively which showed that the tertiary participants had more aesthetic concerns about their malocclusion.

Overall PIDAQ score before treatment for secondary is 38.79 and 44.74 for tertiary participants with a P-value of 0.042 showing a statistically significant difference between patients of the two educational levels. During treatment, secondary participants had a PIDAQ score of 34.38 and 41.11 for tertiary participants with a P-value of 0.012 which means there was a statistically significant difference between the two.

Discussion

Malocclusion can have various negative effects on the well-being of individuals. These effects could vary depending on the age groups, gender, and educational levels of the individuals involved. In this survey, more females than males were found to seek orthodontic treatment, which could mean they are more concerned about their appearance. This is consistent with reports from previous studies (Motloba et al, 2016; Badran & Khateeb, 2013 & Harris & Gassell, 2011) where twice as many females than males sought orthodontic treatment. The mean PIDAQ score before orthodontic treatment in this study was found to be 42.05, which is comparable to that seen in a previous study (Motloba et al, 2016) showing a significant psychosocial impact of malocclusion on orthodontic patients. The PIDAQ finding here however is different from that of a previous study (Gassen et al, 2022) with PIDAQ 37.02. The difference seen in this study could be that this survey had patients of various age groups not just young adults as seen in the previous survey. In our study, we found that most patients treated were single, similar to what was seen in a study by Gassen et al, 2022. This pattern could be because individuals not married tend to be more particular about their dental appearance as this can affect their social interaction and connectiveness. The 30-39 years age group had a total PIDAQ score of 48.13 which was the highest among the studied groups showing this group had the highest negative psychosocial impact and the lowest PIDAQ score was found among the 40-49 years age group before treatment. This could be because this age group has lived longer than other age groups and has accepted whatever malocclusion

they have, not letting it affect their psychosocial well-being. This report was similar to previous ones (Akpasa et al, 2022; Motloba et al, 2016; Badran & Khateeb, 2013 & Wahab et al, 2021) where age was found not to have a significant association with the psychosocial impact of malocclusion. During treatment, the PIDAQ score for all age groups reduced except for the 40-49 years age group. This report could be due to the bracket material (stainless steel) used for the orthodontic treatment of these patients which might not be aesthetically pleasing for this age group (older) compared to the younger age groups and also the treatment progress may not have been as fast as they had envisaged. The finding in this survey that age was not found to have a significant association with the psychosocial impact of malocclusion contrasted with a previous report (Illijazi et al, 2021) as age was found to play a role in the psychosocial impact of malocclusion. Female participants in this current study had a higher total PIDAQ score of 45.69 as compared to males, 37.07 and there was a statistically significant difference between genders. This finding showed females had a greater psychosocial impact of malocclusion than males. This report was similar to findings from previous studies, (Twigge et al, 2016; Wahab et al, 2021; Nazir et al, 2014; Venete et al, 2017; Christopherson et al, 2009 & Dzemidzic et al, 2023). For the subscales, the males displayed higher DSC mean scores in comparison to the females though the differences were not statistically significant in this survey. This contravenes a previous report (Motloba et al, 2016) where male studied participants had lower self-esteem compared to females however similar to reports of previous studies (Harris & Gassell, 2011 & Jawad et al, 2015). The educational level of participants also had a role to play in the psychosocial impacts of malocclusion as patients at the tertiary level were found to have a higher PIDAQ score than the secondary-level ones. This means that they had negative psychosocial impact of malocclusion and the difference was statistically significant. Contrarily, a previous Nigerian study (Akpasa et al, 2022) showed that academic level had no significant association with the psychosocial impact of malocclusion.

Conclusion

Age, gender, and educational level of orthodontic patients were found to have a relationship with the psychosocial impact of malocclusion, however, gender and educational level had a significant relationship. There was a reduced psychosocial impact of malocclusion on patients during treatment than before treatment. It is therefore important to encourage orthodontic treatment for patients with malocclusions.

Limitation of the Study: The psychosocial impact of malocclusion during treatment was not assessed at a specific month for all patients after the commencement of orthodontic treatment to have all the patients at a similar level of assessment.

Recommendations

1 Evaluation and treatment for malocclusion should be considered in the overall management of individuals with psychosocial disorders.

2 Subsidizing the treatment of malocclusion would enhance the psychological health of affected patients who are unable to afford orthodontic treatments. We therefore recommend a subsidy policy by the government.

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Conflict of Interest: The authors declare there was no conflict of interest in carrying out this research.

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