# Perceived, desired, and normatively determined orthodontic treatment needs among orthodontically untreated Nigerian adolescents

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**Summary**

**This study assessed perceived, desired, and normative need for orthondontic care in a randomly selected (n=567) Nigerian children aged 12-18 years (mean age, 14.6 ± 1.5), in Ibadan city.**

**Perceived and desired needs were collected using a pre-tested questionnaire. Normative need was assessed on all participants by one orthodontist using the Dental Aesthetic Index.**

**Results revealed 13.8% of the children having very severe or handicapping malocclusion with treatment considred mandatory; 9.7% with severe malocclusion and treatment highly desirable; 19.0% having definite malocclusions with treatment elective and 57.5% had normal or minor malocclusions with no treatment or slight treatment need. About 48.4% of the children desired orthodontic care and 81.7% perceived the need for orthodontic care. No statistically significant gender differences (P>0.05) were observed in perceived, desired and normatively determined orthodontic treatment needs as well as between socioeconomic backgrounds.**

**Although considerable proportion of the adolescents perceived, desired and objectively needed orthodontic care, a discrepancy was observed as some who had near 'ideal occlusion' felt the need for treatment while some who had handicapping malocclusion felt otherwise. Therefore, in orthodontic counselling of Nigeria adolescents, attention should be paid to how the child perceives his/her dentition.**

**Keywords:** ***Malocclusion, Dental aesthetic index, Nigerian adolescents, Orthodontic treatment needs, Perceived and desired needs for othodontic care.***

**Résumé**

Cet étude a évalué le besoin perçu, désiré, normatif pour des soins orthodonties chez des enfants nigérians âgés de 12 à 18 ans. (âge moyen, 14,6 ±1,5) choisis au hasard dans la grande ville d'Ibadan.

De besoins perçus et désirés ont été collectionnés à travers un questionnaire pré-teste. Le besoin normatif a été évalué chez tous le participants par un orthodontiste avec l'utilisation d'Indexe Esthétique Dentaire. Des résultats avaient indiqué 13,8% des enfants atteints de la mal occlusion grave de sorte que traitement devient obligatoire, 9,7% atteints de la mal occlusion grave et traitement tout à fait obligatoire, 19,0% atteints de la mal occlusion sûre (traitement jugé facultatif) tandis que 57,5% n'avaient aucune occlusion normale ou mal occlusion inférieure qui n'exige pas du traitement.

Environ 48,4% des enfants désirent des soins orthodonties et 81,7% ont perçu le besoin des soins orthodonties. Statistiquement, on n'a pas remarqué aucune différence à l'égard du sexe P<0,05 en ce qui concerne le besoin de tratement orthodontie perçu, désiré et déterminé normativement, de même entre le contexte socioéconomique.

Quoique une proportion considérable des adules centés perçus, aient désiré et d'une manière objective, besoin des soins orthodonties, on a remarqué un désaccord parce que certaines personnes atteintes de l'occlusion idéale avaient senti le besoin de traitement tandis que certaines d'autres atteintes de la mal occlusion handicapée ont pensé autrement. Donc, en matière de l'activité de conseil orthodontie des adolescents nigérians, on doit faire attention à comment un enfant perçoit sa dentition.

## Introduction

Several reports have been made on the prevalence of malocclusion among Nigerian children and young adults[1-7]. The first study[8] on orthodontic treatment need among rural Nigerians reported about 62% not requiring treatment using the Index of orthodontic treatment need (IOTN). Depending on the study populations, the definitions of need and the methodologies applied, the percentage of adolescents and adults considered to be in need of orthodontic treatment in many societies has varied from 10% to 76%[9-13].

Subjective need of the treatment or desire for treatment should be differentiated from objective need of treatment. An important factor in determing treatment need is the individual's perception of his/her own malocclusion[14].

Frequently, dissatisfaction with one's dental appearance has been a strong motive to seek dental treatment[15,16]. However, often a discrepancy between dentists' and patients' perceptions of dental appearance[17] and estimates of orthodontic treatment need [9,10,18] is noted.

The aim of this study was to compare the perceived, desired and objectively determined orthodontic treatment need among orthondontically untreated adolescents in Ibadan, Nigeria.

## Subjects and methods

The survey was conducted in the city of Ibadan. The total sample consisted of 620 subjects between 12 and 18 years of age. They were drawn from five secondary schools in different parts of the city including schools attended by the children of the elite in the town and those mainly attended by the common members of the society.

In this study, the socio economic status of a child was based on the type of school the child attended, the educational and occupational level of the parents.

In February 2001, a questionnaire was distributed to the students. Due to misplaced and incorrectly filled in questionnaires by some students, the final sample comprised 567 students with the mean age of both sexes as 14.6 ± 1.5 (SD).

The questionnaire included the following questions: (1) Name (2) Age (3) Sex (4) Parents educational level/occupation (5) Are you satisfied with the way your teeth come together or are arranged? (6) Do you want to have your teeth straightened or rearranged (orthodontic treatment)?

**Correspondence*

Voluntary informed consent was obtained from all study participants and the study protocol was approved by the relevant authority.

All clinical examinations were carried out in the school compound under natural illumination using sterile instruments. Examinations were carried out blind, i.e. the examining orthodontist was not told whether the subject currently felt any need for treatment.

Objective treatment need was assessed by using Dental Aesthetic Index (DAI) as described by the World Health Organisation[19]. All the 10 components were measured (Table 1) for each participant by one orthodontist.

***Reproducibility test***

Intra-examiner reliability was tested by re-examining fifty randomly selected school children from the sample. The re-examinations were carried out four weeks after the first examination.

***Statistical analysis***

The statistical analysis of the data was based on chi-square statistic and correlations for reproducibility, using chi-square ($X^2$) analysis, significant differences in perceived, desired for orthodontic care as well as in normatively assessed need for orthodontic treatment were tested.

**Results**

Intra-examiner reproducibility of the objective treatment need estimates tested using spearman rank

**Table 1 The standard DAI regression equation**

| | DAI components | Rounded weights |
|---|---|---|
| 1. | Number of missing visible teeth (incisors, canines and premolars teeth in the maxillary and mandibular arches) | 6 |
| 2. | Crowding in the incisal segments: 0 = no segment crowded, 1 = 1 segment crowded, 2 = 2 segments crowded. | 1 |
| 3. | Spacing in the incisal segment: 0 = no spacing, 1 = 1 segment spaced, 2=2 segments spaced. | 1 |
| 4. | Midline disstema in millimetre | 3 |
| 5. | Largest anterior irregularity on the maxillar in millimetre | 1 |
| 6. | Largest anterior irregularity on the mandible in millimetre | 1 |
| 7. | Anterior maxillary overjet in millimetre | 2 |
| 8. | Anterior mandibular overjet in millimetre | 4 |
| 9. | Vertical anterior openbite in millimetre | 4 |
| 10. | Antero-posterior molar relation, largest deviation from normal either left or right: 0 = normal, 1 = ½ cusp either mesial or distal, 2 = one full cusp or more either mesial or distal | 3 |
| 11. | Constant | 13 |
| | Total | DAI Score |

**Table 2 Distribution of perceived, desired and normatively assessed orthodontic treatment needs for Nigerian children (n = 567)**

| Type of need | | M (292) n | % | F (275) n | % | Total (567) n | % | $X^2$ | P-value |
|---|---|---|---|---|---|---|---|---|---|
| Perceived need: | | | | | | | | | |
| | Yes | 233 | (79.8) | 230 | (83.6) | 463 | (81.7)* | | |
| | No | 59 | (20.2) | 45 | (16.4) | 104 | (18.3) | 454.6 | 0.000001 |
| Desired need: | | | | | | | | | |
| | Yes | 135 | (46.2) | 111 | (404) | 246 | (48.4)** | | |
| | No | 157 | (53.8) | 164 | (59.6) | 321 | (56.6) | 7.81 | 0.005 |
| Normative need (DAI Scores) ≤ 25 (Normal or minor malocclusions with no treatment or slight treatment need): | | 164 | (56.2) | 162 | (58.9) | 326 | (57.5) | | |
| 26 – 30 (Definite malocclusion with treatment elective): | | 59 | (20.2) | 49 | (17.8) | 108 | (19.0) | | |
| 31 – 35 (severe malocclusion with treatment highly desirable): | | 30 | (10.3) | 25 | (9.1) | 55 | (9.7) | | |
| ≥ 36 (very severe or handicapping malocclusion with treatment considered mandatory): | | 39 | (13.3) | 39 | (14.2) | 78 | (13.8) | | |

* *Perceived need versus Normative need* $X^2 = 184.62$, $P < 0.01$
** *Desired need versus Normative need* $X^2 = 3.87$ $P < 0.01$

**Table 3 Normative need by perceived need among Nigerian children**

| Normative need | Perceived need (n=567) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | | | | | | No | | | | |
| | M | | F | | Total | | M | | F | | |
| | n | % | n | % | n | % | n | % | n | % | Total |
| Normative/Elective (n=434) | 181 | (4.17) | 180 | (41.5) | 361 | (83.2) | 42 | (9.7) | 31 | (7.1) | 73 (16.8) |
| Highly desirable (Severe)/Mandatory (handicapping) (n=133) | 52 | (39.1) | 50 | (37.6) | 102 | (76.7) | 17(12.8) | | 14 | (10.5) | 31 (23.3) |

$X^2 = 2.86, P>0.05$

**Table 4 Normative need by desire for orthodontic care among Nigerian children**

| Normative need | Desire for orthodontic care (n=567) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | | | | | | No | | | | |
| | M | | F | | Total | | M | | F | | |
| | n | % | n | % | n | % | n | % | n | % | Total |
| Normal/Elective (n=434) | 98 | (22.6) | 85 | (19.6) | 183 | (42.2) | 127 | (29.3) | 124 | (28.6) | 251(57.8) |
| Highly desirable (Severe)/Mandatory (handicapping) (n=133) | 40 | (30.1) | 28 | (21.1) | 68 | (51.1) | 30 | (22.6) | 35 | (26.3) | 65 (48.9) |

$X^2 = 3.31, P>0.05$

order correlation coefficient was considered very good (r = 0.98; P< 0.001) based on Dental Aesthetic Index.

Table 2 shows the distribution of perceived, desired, and normatively assessed orthodontic treatment needs in the overall sample. Perception for orthodontic treatment need was found in 81.7% of the sample, which was statistically significant (P<0.001). Desire for such care was recorded in 48.4% of the population while 56.6% did not show desire for orthodontic care and the difference was significant (P<0.001). Statistically significant differences (P<0.01) were obseved between perceived need and normative need as well as between desired need and normative need for orthodontic treatment. Less than half of the sample (42.5%) needed orthodontic treatment as determined by the Dental Aesthetic Index (DAI); however 13.8% of this sub-sample had very severe or handicapping malocclusions.

Both perceived and desire for orthodontic treatment (Tables 3 and 4) were invariant across normatively determined need for orthodontic care. Children with severe or handicapping malocclusions were not found more likely to perceive or desire orthodontic care than children with normal occlusion or elective orthodontic treatment needs.

Desire for orthodontic care did not veary across socio-economic backgrounds (Table 5). Children from middle/high socioeconomuic backgrounds desiring treatment (62.2%) were not more likely to want orthodontic care than children from lower socioeconomic status (P>0.05).

**Table 5 Socio economic status by desire for orthodontic care among Nigerian children**

| Socio economic | Desire for orthodontic care (n=553) | | | |
|---|---|---|---|---|
| | M | | F | |
| | n | % | n | % |
| Middle/High socio economic class (n=344) | | | | |
| ≤ 25 | 117 | 34.0 | 81 | 23.5 |
| 26 – 30 | 44 | 12.8 | 23 | 6.7 |
| 31 - 35 | 24 | 7.0 | 10 | 2.9 |
| ≥36 | 29 | 8.4 | 16 | 4.7 |
| Total | 214 | 62.2 | 130 | 37.8 |
| Low socio economic class (n = 209) | | | | |
| ≤ 25 | 65 | 31.1 | 56 | 26.8 |
| 26 – 30 | 22 | 10.5 | 13 | 6.2 |
| 31 – 35 | 16 | 7.7 | 7 | 3.3 |
| ≥ 36 | 19 | 9.1 | 11 | 5.3 |
| Total | 122 | 58.4 | 87 | 41.6 |

$X^2 = 0.80, P > 0.05.$

## Discussion

The sample was obtained from five schools in different parts of Ibadan. Thus, this could be taken as representative of the children in the city. The blind arrangements prevented the examiner's subjective expectation from affecting the results.

A major finding from this study is that according to the DAI, 13.8% of the children needed mandatory orthodontic treatment out of the 42.5% who deserved orthodontic care. The reality is that not all those who deserved mandatory orthodontic care would be able to have such services. This is partly because there are few orthodontists available in the country and dental services in Nigeria is largely by fee-for-service treatment and not many parents can afford the high cost of orthodontic services in Nigeria.

Another major finding from this study is that 48.4% of

this sample wanted orthodontic care, a figure more than the normatively determined proportion of these Nigerian children who qualified for orthodontic care (42.5%). However, just as found in other earlier studies[21-25], cross tabulation between subjective and objective orthodontic treatment need showed major discrepancies between these measures. Among those children with very severe or handicapping malocclusion, 76.7% of them perceived the need while 51.1% of them desired orthodontic treatment. However, only 42 children with DAI scores of 36 and above indicated interest in having orthodontic treatment. This suggest that even if treatment were to be offered to these children with handicapping malocclusions, only about 7% of them would avail themselves of such services. Searcy *et al*[22] found a corresponding 5% among USA Army recruits. This present finding support the view that outside dentofacial aesthetics, self-perception of occlusal appearance and attitude toward malocclusion and orthodontic treatment are important factors in the individual's decision to obtain orthodontic treatment[26].

No significant gender differences in objective need ($P>0.05$) were observed in the present study which is in agreement with previous studies[27,28]. Though earlier studies[29,30] have shown that demand for othodontic care is highly correlated with family income and socioeconomic status, no preference for orthodontic care by children from higher socioeconomic status, against those from lower socioeconomic backgrounds was noted in this study. This is due partly to the fact that most of these children indicated their true desire for orthodontic care. However, the reality of fee-for-service, in the absence of free school dental service in Nigeria, which their parents will be faced with when trying to secure such services for them might end up making distinct separation among this children.

## Conclusion

In conclusion, the results suggest that for effective orthodontic care, attention should be paid to how these adolescents perceive their dentitions. We recommend that Nigerian government should do more concerning the orthodontic care of the adolescents in our secondary schools by at least reasonably subsidizing such services or making the proposed National Insurance Health Scheme functional and relevant. Such intervention will not only bring an improvement in the dental health of our children and the future Nigerian adults, but will impact positively on the the psychosocial life of the people.

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