

Prevalence of Signs and Symptoms of Temporomandibular Disorders in Young Nigerian Adults

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Abstract. *The objective of this study was to determine the prevalence of signs and symptoms of TMD in young Nigerian adults and to establish a baseline for comparison with other studies. It consisted of a cross-sectional study at Obafemi Awolowo University, Ile-Ife, Nigeria in 1997. The subjects consisted of 308 medical and dental students (207 males and 101 females) randomly selected from a Nigerian University. Their ages ranged from 17 to 32 years with a mean age of 23 ± 3.0 years. They were assessed according to the criteria of Helkimo (1974).*

Whilst 26.3 per cent of the subjects reported mild symptoms (Ai I) of TMD, only 2.9 per cent reported severe symptoms (Ai II). Similarly, 46 per cent showed mild dysfunction signs (Di I), whilst 16.5 and 0.3 per cent exhibited moderate (Di II) and severe (Di III) signs of TMD, respectively. No significant relationships were found between sex, anamnestic index, and the clinical dysfunction index scores. However, there were low but significant correlations between anamnestic index scores (Ai) and the recorded signs (Di), as well as the clinical dysfunction scores (CDS).

There is some evidence to show that signs and symptoms of TMD occur amongst Nigerians, although restricted lateral and protrusive mandibular movements contributed significantly to clinical dysfunction scores. This report contrasts with what is found in western societies regarding the low prevalence of TMJ pain.

Index words: Helkimo Index, Prevalence, Signs, Symptoms, Temporomandibular Joint Disorders.

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Introduction

The growing public interest in oral health has increased the demand for treatment of temporomandibular disorders (TMD). It is therefore important and valuable to have epidemiological data to estimate the proportion and distribution of these disorders in the population. Many of such studies have been reported, and several indices and criteria have been developed (Nilner and Lassing, 1981; Lundeen *et al.*, 1988; Mohlin *et al.*, 1991; Glass *et al.*, 1993; De-Kanter *et al.*, 1993; Delcanho, 1994; Verdonck *et al.*, 1994; Nourallah and Johansson, 1995). Although these studies have shown that the prevalence of signs and symptoms of TMD vary considerably, a simple comparison is difficult because of lack of uniform criteria. One of the most widely used indices is that developed by Helkimo (1974) which combined anamnestic and clinical dysfunction index.

The aetiology of TMD remains a subject of controversy and is generally viewed as multifactorial. Nevertheless, a number of studies have implicated occlusal interferences and psychological factors as more important than other

variables in providing explanation for TMD (Mohlin *et al.*, 1991; Egermark and Thilander, 1992; Mintz, 1993; Verdonck *et al.*, 1994). Other investigators have looked at the correlation between orthodontic treatment and TMD signs and symptoms in various age groups. However, such associations have not been clearly established (Reynder, 1990; Sadowsky, 1992).

Reports have revealed that signs and symptoms may be as high as 88 per cent and 57 per cent respectively (Rugh and Solbergh, 1985; Okeson, 1989). Marrant and Taylor (1996) have attributed such differences to subclinical TMD.

Apart from the variation in severity, reports have shown that signs and symptoms of TMD increase with age (Behrents and White, 1992). Furthermore, these clinical features have also been found to fluctuate when individuals are examined on different occasions (Kopp, 1977).

Whilst literature abounds on TMD in the developed and some developing countries (Agerberg, 1974; Nilner and Lassing, 1981; De-Kanter *et al.*, 1993; Glass *et al.*, 1993; Probert *et al.*, 1994; Levitt and McKinney, 1994; Verdock *et al.*, 1994; Delcanho, 1994; Marrant and Taylor, 1996), very little has been reported in sub-Saharan Africa (Khan, 1990; Mazengo and Kirveskari, 1991). To the best of our knowledge, there are no such reports on Nigerians. The

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purpose of this study was therefore to determine the prevalence of signs and symptoms of TMD in a young, Nigerian, adult population. The database established would provide a good baseline for comparison with other studies and for future research.

Subjects and Methods

The sample consisted of 308 medical and dental students (207 males and 101 females) from the College of Health Sciences, Obafemi Awolowo University, Ile-Ife in south-western Nigeria. A list of all the students were made from their tutorial lists and one in every two subjects was selected. Their ages ranged from 17 to 32 years with a mean age of 23.7 ± 3.0 years. All the year 1 and year 3 students were excluded because they were not available at the time of the study. At each examination, only those who agreed to participate in the study were included. None of the students had any history of orthodontic treatment.

A questionnaire was designed to assess only the anamnestic and clinical dysfunction according to Helkimo (1974). The anamnestic examination was based on the reported symptoms by the students and classified according to anamnestic dysfunction index (Ai) as 0, I, or II. The clinical examinations were based on mandibular opening, with allowance for incisor overbite. Protrusive movement was measured in millimetres giving allowance for incisor overjet. Deviations or deflections of the mandible on opening were rated. The temporomandibular joints (TMJ) were examined for pain and sound. Similarly, the masticatory muscles (temporalis, masseter, medial pterygoid) were palpated for tenderness. In addition, the lateral pterygoid muscle was examined against forced contraction. Depending on the clinical dysfunction score (CDS) following clinical examination, each student was classified as having a clinical dysfunction index (Di) of 0 (0 point), I (1–4 points), II (5–9 points) or III (10–25 points). In this study, no reference was made to the occlusal component of the index.

All the examinations were carried out by one of the authors who was previously trained and calibrated in the use of the index. The use of one examiner in this study ensured continuity of interpretation of the answers provided by the subjects. To confirm intra-examiner reliability in this study, 25 students were randomly selected for a repeat clinical examination on the same day as the original examinations to reduce the risk of symptom fluctuation (Kopp 1977). The results showed perfect agreement between the two examinations.

Chi-square tests were used to compare sex differences in anamnestic and dysfunction index scores. Correlation coefficients were calculated between the anamnestic and dysfunction index scores. Statistical calculations were done by using the Arcus Pro-stat DOS version 3 (Medical Computing, West Lancashire, UK) software package.

Results

In the present investigation, data were pooled because there were no statistically significant differences in sex and reported symptoms ($P = 0.17$) or in the clinical signs of

TMD ($P = 0.23$). Whilst over 70 per cent ($n = 218$) reported no symptom (Ai 0), 81 (26.3 per cent) had mild symptoms (Ai I) and 9 (2.9 per cent) reported severe symptoms (Ai II). Similarly, 114 (37 per cent) showed no sign of dysfunction (Di 0); 142 (46 per cent) showed mild dysfunction symptoms (Di I); 51 (16.5 per cent) demonstrated moderate dysfunction symptoms (Di II), while only 1 (0.3 per cent) suffered severe dysfunction symptoms (Di III; Figure 1).

Mandibular movement in three planes is shown in Table 1. The majority (95.5 per cent) of the subjects demonstrated maximal mouth opening capacity of 40 mm or more while 4.5 per cent showed restricted vertical movement. Similarly, about one-third (left 30.5 per cent; right 35.7 per cent) showed restricted lateral mandibular movements, while 48.1 per cent demonstrated limited protrusive movement.

An analysis of the signs of TMD showed, impaired range of mandibular movement as the most frequently recorded sign (58 per cent) in Nigerians (Table 2). Furthermore, the clinical dysfunction scores showed that 62.8 per cent presented with one or more clinical signs of dysfunction. The highest recorded score was 13 points (Figure 2). The linear correlation coefficient (r) between the reported symptoms (Ai) and the recorded signs (Di) was 0.20, and between the reported symptoms (Ai) and the clinical dysfunction scores (CDS) was 0.17. Although these values were low, they were statistically significant ($P < 0.05$).

Discussion

This population group was chosen for the study because, on the basis of previous reports of TMD (Clark and Mulligan,

TABLE 1 Movement capacity of mandible in the 308 examined Nigerians

| | No. (%) |
|--------------------------------|------------|
| Maximum vertical opening | |
| ≥ 40 mm | 294 (95.5) |
| 30–40 mm | 14 (4.5) |
| < 30 mm | 0 (0.0) |
| Maximum left lateral movement | |
| ≥ 7 mm | 214 (69.5) |
| 4–6 mm | 74 (24.0) |
| 0–3 mm | 20 (6.5) |
| Maximum right lateral movement | |
| ≥ 7 mm | 198 (64.3) |
| 4–6 mm | 87 (28.2) |
| 0–3 mm | 23 (7.5) |
| Maximum protrusion | |
| ≥ 7 mm | 160 (51.9) |
| 4–6 mm | 117 (38.0) |
| 0–3 mm | 31 (10.1) |

TABLE 2 Distribution of Nigerians with recorded signs of temporomandibular disorders

| | No. (%) |
|--|------------|
| Impaired range of mandibular movement | 179 (58.1) |
| TMJ sound/deviation | 25 (8.1) |
| Masticatory muscle pain (on palpation) | 10 (3.2) |
| TMJ pain (on palpation) | 8 (2.6) |
| TMJ pain on movement | 9 (2.9) |

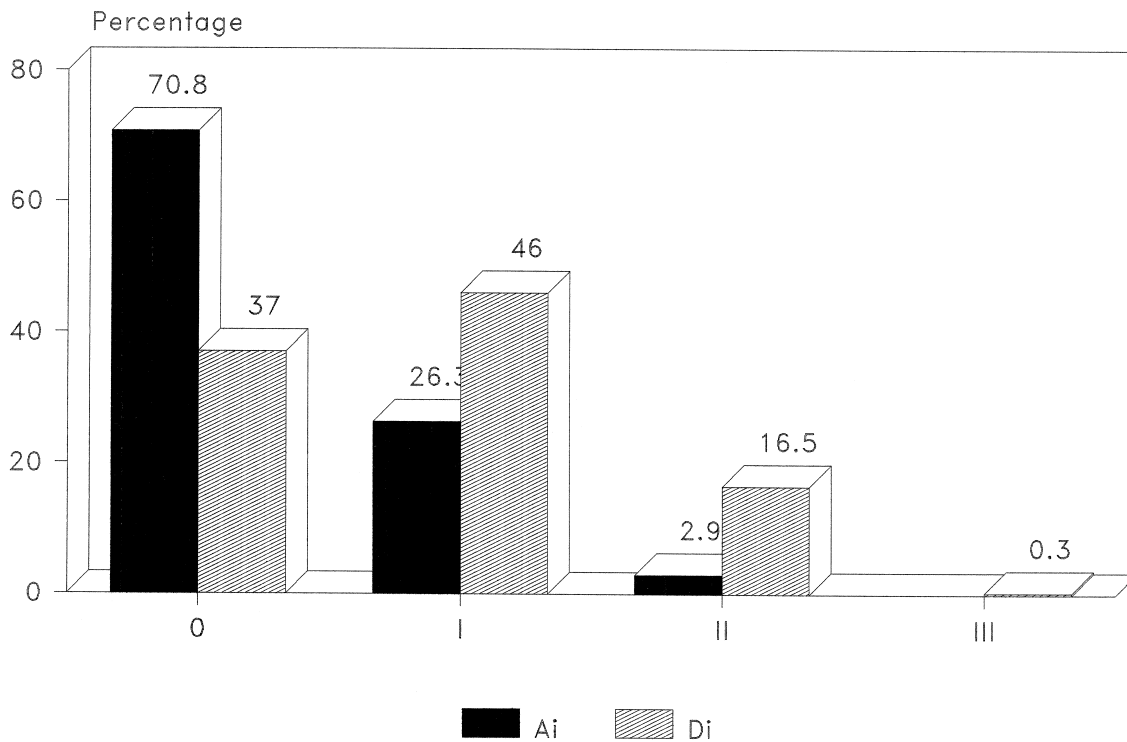


FIG. 1 Percentage distribution of the Helkimo anamnestic (Ai) and clinical (Di) dysfunction index in 308 young Nigerian adults. Ai0 comprised individuals with subjectively symptom-free TMD, while AiI and AiII represented those with mild and severe symptoms respectively. Di0 showed individuals with clinically symptom-free TMD, while DiI, DiII, and DiIII showed mild, moderate and severe dysfunction, respectively.

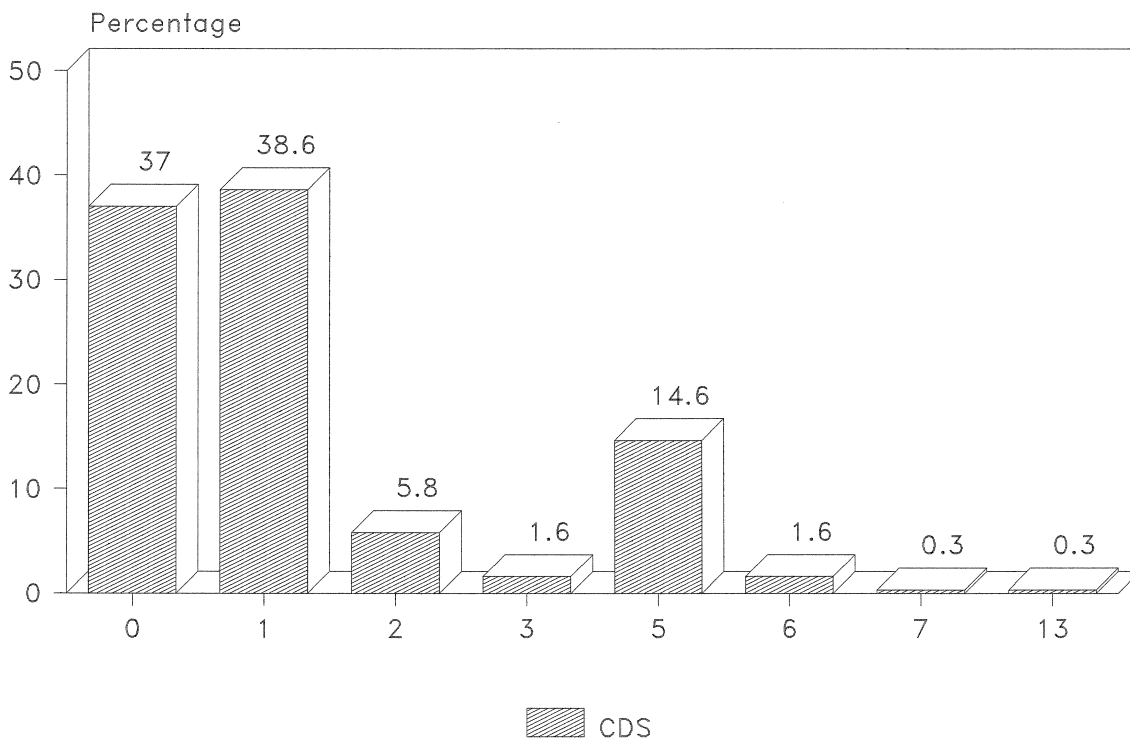


FIG. 2 Percentage distribution of the clinical dysfunction scores (CDS) in 308 young Nigerian adults. Score 0 corresponded to the clinically symptom-free individuals (Di0), scores 1–4 points represented individuals with mild dysfunction (DiI), while 5–9 points and 10–25 points showed moderate (DiII) and severe dysfunction (DiIII), respectively.

1984), they represent most individuals seeking treatment, and the subjects were readily available. However, their medical-dental background could influence the outcome of this investigation.

The lack of sex differences in reported symptoms and clinical signs of TMD as revealed by this study tends to agree with other investigations (Nilner and Lassing, 1981; Glass *et al.*, 1993) although De Kanter *et al.* (1993) found a higher incidence of TMD in females. This may be attributed to the finding that more females seek treatment for TMD than males (Probert *et al.*, 1994; Levitt and McKinney, 1994).

Perceived symptoms of TMD (anamnestic index) recorded in the present study conform to generally reported values, despite 57 per cent and 12 per cent recorded by Helkimo (1979) and Abdel-Hakim (1983), respectively. Previous reports using other criteria indicated that joint sounds were the commonest specific symptom (Nilner and Lassing 1981; Verdonck *et al.*, 1994). This could not be elicited directly in this study because the index did not separate TMJ sound and deviation on opening and closing movements. This is probably one of the limitations of this criteria.

Interestingly, studies have showed a wide variation in the prevalence of clinical signs of TMD. While Mazengo and Kirveskari (1991), and Nourallah and Johansson (1995) recorded 40 and 37 per cent, respectively, Helkimo (1979) and Carlson (1984) revealed even higher values of between 61 and 73 per cent. It would appear that the high value recorded in this study was to a large extent influenced by over one-half of the subjects (58.1 per cent) that demonstrated impaired range of mandibular movement. Furthermore, almost one-third of the subjects examined exhibited limited lateral and protrusive movements. Although no obvious reason could be offered to explain these restrictions, it may not be unrelated to our observation that a substantial proportion of the subjects are not simply accustomed to making such movements. Therefore, this finding should be interpreted with caution as it may infer that Nigerians have an impaired ability to perform lateral and protrusive excursions.

Pain is known as an important feature of TMD because it is the most important reason for seeking treatment (Greene *et al.*, 1969), the results of this investigation revealed that less than one-tenth of the subjects showed clinically detectable pain from the temporomandibular joint. Our findings are inconsistent with those of Lundeen *et al.* (1988) where pain was reported as the commonest sign. This is significant as it is either that the pain is not severe enough to bother them and they have gradually adapted to it or they may be totally ignorant of where to seek for treatment. For example, we observed that some patients did not realise that TMD could be managed by the dentist.

Low correlation coefficients between reported symptoms and the recorded signs as well as clinical dysfunction scores does not necessarily suggest that a significant proportion of the population have TMD. Hence, the ambiguity of the index makes our results open to various interpretations. For example, the impaired lateral and protrusive movements which immensely contributed to the clinical dysfunction scores in this study may not actually be a problem as no study has been carried out to determine the

normal range of mandibular movement for the Nigerian population.

Although the Helkimo's index has been widely used, it has obvious limitations in the assessment of TMD. Paramount is the issue of validity, which makes its general applicability insufficient. It would appear that a rather arbitrary set of cut-off points and values for the different classes within the subscales have been selected and therefore not weighted accordingly. In addition, the question of unidimensionality of the index needs to be resolved. Van der Weele and Dibbet (1987) opined that, apart from TMJ pain, other signs and symptoms highlighted in the index leave the question of diverging biological background of TMD. However, they concluded that even though the index may be acceptable as a valuable instrument in assessing dysfunction, much is still needed to be done in order to improve the existing scale.

The present study, being a cross-sectional observation, should be followed by a long-term study in the near future.

Conclusions

1. There is some evidence to show that signs and symptoms of TMD occur amongst Nigerians, although restricted lateral and protrusive mandibular movements contributed significantly to clinical dysfunction scores.
2. This report contrasts with what obtains in western societies where a higher prevalence of TMJ pain was recorded.
3. Further study is required to determine the normal range of mandibular movements and to compare the results of the present study with those from other groups of the population.

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