

## PERIODONTAL CONDITIONS AS MEASURED BY CPITN IN SUDANESE ADOLESCENTS AND ADULTS IN TWO CITIES IN SUDAN

Raouf W. Ali, BDS, Cert Perio, MSc\*, Tryggve Lie, DDS, Cert Perio, Dr Odont\*\*

لقد أجريت هذه الدراسة لتحديد نسبة انتشار الأمراض اللثوية وتقدير الحاجة العلاجية في مجموعة من السودانيين. وقد اشتملت الدراسة على ٢٦٤ فرداً، ١٢٦ طفلاً و١٣٨ بالغاً. أظهرت النتائج أن انتشار الأمراض اللثوية عالٍ في الأطفال حيث إن ٩٥,٢٪ مصابون بجيوب لثوية عمق ٥-٤ ملم و٤٪ مصابون بجيوب عمق ٦ ملم فأكثر. في مجموعة البالغين ٤٤-٣٥ سنة، كانت نسبة المصابين بجيوب لثوية عمق ٥-٤ ملم وعمق ٦ ملم فأكثر تبلغ ٧١٪ و٢٦٪ على التوالي. بينما كانت نسبة الإصابة في البالغين عمر ٦٤-٤٥ سنة تساوي ٤,٦٥٪ بالجيوب عمق ٥-٤ ملم و٥,٣٥٪ بالجيوب عمق ٦ ملم فأكثر. كل الأفراد في جميع المجموعات العمرية يحتاجون إلى إرشادات في صحة الفم وجميعهم تقريباً يحتاجون إلى إزالة الرواسب القلحية لأكثر من ٥ في كل فرد ٤٠٪ من الأطفال و٣٠٪ من البالغين يحتاجون لمعالجة لثوية معقدة في ١,٠٪ و٤,٠٪ في كل فرد على التوالي.

This study examines the prevalence and severity of periodontal conditions and estimates the periodontal treatment needs by CPITN in groups of Sudanese subjects. Study sample was grouped according to age and a total of 264 subjects were examined, 126 adolescents and 138 adults. Results indicated that the prevalence of periodontal disease among adolescents was high, with 95.2% having pockets 4-5 mm and 4% having pocket depths  $\geq$  6 mm. In the 35 to 44 years age-group, 71 % of the subjects had 4-5 mm pockets and 26% had pockets  $\geq$  6 mm. Among the 45 to 64 years age-group, 64.5% had 4-5 mm pockets and 35.5% had pockets  $\geq$  6 mm. All subjects in all age-groups needed oral hygiene instructions, and almost all required calculus removal for more than 5 sextants per subject. Complex (surgical) periodontal treatment was needed by 4% of adolescents to treat about 0.1 sextants per person, and by more than 30% of all adults to treat about 0.4 to 0.8 sextants per person.

### Introduction

The prevalence and severity of periodontal diseases are relatively high in Africans with marked variability between different geographical areas and socioeconomic groups.<sup>1</sup> Periodontal disease is the most prevalent oral health problem in countries like Nigeria,<sup>2</sup> Swaziland,<sup>3</sup> Uganda<sup>4</sup> and Tanzania.<sup>5</sup>

Some African populations have severe periodontal disease even at an early age. A recent report on periodontal conditions in adolescents by a WHO team,<sup>6</sup> Tanzania and Sierra Leone were classified among the countries with the highest level of severity.

In Sudan, Emslie<sup>7</sup> reported high prevalence of periodontal disease which was closely associated with poor oral hygiene. Since then, the periodontal conditions have not been surveyed in any Sudanese population and, likewise, information on the prevalence and severity of periodontal disease and dental caries was scarce. Thus, a complete oral health examination of a population sample was carried out during the period January to March 1991.

This study describes the periodontal conditions and estimates the treatment needs of Sudanese

Received 28/06/92; revised 29/09/92 and 12/10/92; accepted 13/10/93

\* Researcher, Department of Periodontology, University of Bergen and Laboratory for Oral Microbiology and Center for International Health, Armauer Hansen Building, N-5021, Bergen, Norway.

\*\* Professor, Department of Periodontology, School of Dentistry, University of Bergen, Bergen, Norway.

Address reprint requests to: Dr. R.W. Ali

adolescents and adults using the Community Periodontal Index of Treatment Needs (CPITN).<sup>8</sup>

## Materials and Methods

### Survey population

Samples were selected from areas inside and around the cities of Khartoum and El-Obeid. Population in these cities is considered a representative sample for the middle area of Sudan. Adolescents were selected from the final class of two intermediate schools of the two cities, 75 subjects from Khartoum and 51 from El-Obeid. Adults examined in Khartoum were 37 subjects from a farm and 39 from a local market, whereas in El-Obeid adults examined were 30 subjects from a bank and 32 from a local market. In each site, a list of available subjects was prepared and every second subject was then examined. Due to time limitation in the local markets, some subjects selected from two market sites were examined at their homes. A total sample of 264 individuals was examined, 126 adolescents and 138 adults.

### Examinations

WHO Oral Health Assessment Form was used to record information on periodontal disease, dental caries and oral anomalies. Periodontal examination was performed with the WHO periodontal probe\* in accordance with the recommendations for using the CPITN.<sup>8</sup> For adults, index teeth examined were 17, 16, 11, 26, 27, 37, 36, 31, 46, 47; while for adolescents, index teeth were 16, 11, 26, 36, 31 and 46.<sup>10</sup> Six sites were probed around each of the CPITN index teeth; mesiobuccal, mesiolingual, distobuccal, distolingual, mid-buccal and mid-lingual. The higher score was recorded for each sextant according to the CPITN scoring system.<sup>8</sup>

Subjects were examined while seated on a straight chair with a tall back on which the head could rest. Daylight was used at all examination sites. All examinations were performed by one examiner, a qualified periodontist.

### Data handling

The forms were submitted to the WHO/Oral Health Unit in Geneva where data were analyzed,

\* LM-Dental, Finland.

tabulated and stored. In this study, samples were divided into three age-groups: 15 to 19 years, 35 to 44 years, and 45 to 64 years. The CPITN data were examined to determine the overall prevalence and severity of periodontal conditions among the three age-groups.

## Results

### Periodontal conditions

Among the adolescents, 15 to 19-year age-group, 95.2% had probing pocket depths 4-5 mm and 4% had probing depths 6 mm or more [Fig. 1]. No subject was completely without symptoms of periodontal disease. Only 0.8% had bleeding on probing as their highest CPITN score calculated by sextant with a mean number of 3.4 sextants per individual had some degree of pocketing; 3.3 sextants per individual had pockets 4-5 mm while a mean number of 0.1 sextants had pockets 6 mm or more [Fig. 2]. A mean number of 0.1 sextants per individual was graded as healthy.

No individual in the adult age-groups (35 to 44 years and 45 to 64 years) was completely free from signs of periodontal disease [Fig. 1]. In age-group 35 to 44 years, 71.3% had 4-5 mm pockets and 25.7% had pocket depths 6 mm or more; only 3% had calculus as their highest CPITN score [Fig. 1]. In the oldest age-group, 64.5% had pocket depths 4-5 mm and 35.5% had pockets 6 mm or more [Fig. 1].

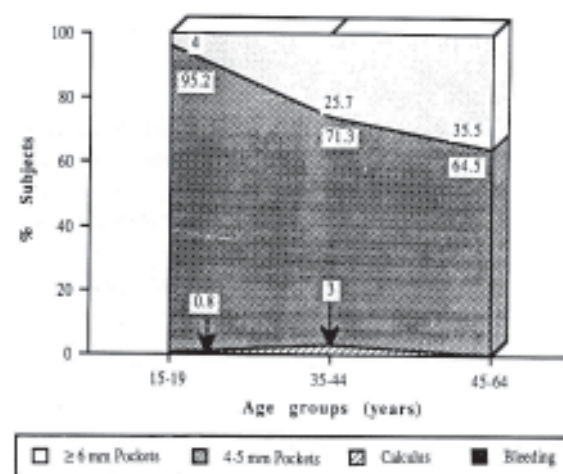


Figure 1. Prevalence of periodontal conditions in 15-19, 35-4 and 45-64 years age-groups. Prevalence refers to the percentage of subjects according to the highest CPITN score recorded for each subject.

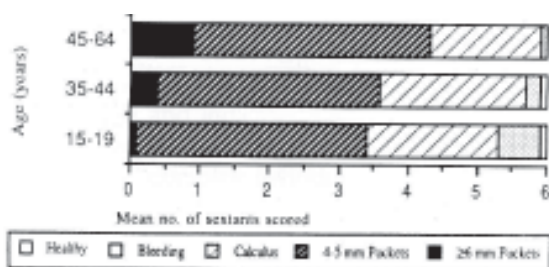


Figure 2, Severity of periodontal conditions (mean number of sextants by score per subject) in 15-19, 35-44 and 45-64 years age-groups.

Calculated by sextants, the age-group 35 to 44 years had a mean number of 4 sextants per individual with pockets, 3.6 of which had pockets 4-5 mm and 0.4 had pockets 6 mm or more [Fig. 2]. In the oldest age-group, a total of 5 sextants per subject had some degree of pocketing, 4.2 of which had pockets 4-5 mm and 0.8 had pocket depths 6 mm or more [Fig. 2].

**Periodontal treatment needs**

All subjects examined in this study needed oral hygiene instruction and motivation, classified as treatment need 1 (TN<sub>1</sub>) in the CPITN system. This indicates that no individual had a total absence of pockets and bleeding on probing.

Treatment need 2 (TN<sub>2</sub>) in the CPITN system includes a need for subgingival scaling in addition to oral hygiene instruction and motivation. Among the three age-groups, 99.2% of the adolescents and all adult subjects needed this type of treatment as shown in Table 1. The mean number of sextants per subject needing TN<sub>2</sub> in each age-group were 5.3, 5.7 and 5.8, respectively (Table 1).

Treatment need 3 (TN<sub>3</sub>) means complex periodontal treatment and includes possible surgical treatment of pockets 6 mm or more in addition to TN<sub>2</sub> type of treatment. A total of 4%

adolescents, 25.7% of the middle age-group and 35.5% of 45 to 64-year age-group needed this treatment (Table 1). The mean number of sextants per subject needing TN<sub>3</sub> type of treatment in each age-group were 0.1, 0.4 and 0.8, respectively (Table 1).

**Discussion**

Oral health programs are presently planned for by many African countries. Such programs, when based on precollected data on different oral conditions, may facilitate the implementation of appropriate dental health services. In this respect, determination of the prevalence and severity of periodontal disease and dental caries in a population is mandatory. Information on the periodontal health status in the Sudan population is scarce. To date, except for the report of Emslie,<sup>7</sup> there is a paucity in publication concerning the prevalence and severity of periodontal diseases in Sudan.

The CPITN is a practical approach for screening populations because of its simplicity which enables rapid assessment of individuals for periodontal conditions relative to treatment needs. In addition, the results of CPITN surveys from many countries around the world are now received, analyzed and stored at the Global Oral Data Bank (GODB) at the WHO Headquarters in Geneva<sup>6,9</sup> as shown in Table 2 and Fig. 3. This permits the comparison to be done between different populations. Consequently, groups at higher or lower risks and possible social, economical and geographical factors that might affect the distribution and severity of periodontal conditions can be identified. Data for Sudan in the GODB was inadequate, hence, CPITN was used in this study to determine the prevalence and severity of periodontal conditions

Table 1. Periodontal treatment need (TN) among the three age-groups related to percentage of subjects involved and mean number of sextants per subject. TN<sub>2</sub> = calculus removal and oral hygiene instruction. TN<sub>3</sub> = complex periodontal treatment (including surgery).

Age group	No. of subjects	%	TN <sub>1</sub>		TN <sub>2</sub>	
			Sextants per subject	% subject	Sextants per subject	% subject
15-19	126	99.2	5.3	4	0.1	
3.3-44	101	100	5.7	25.7	0.4	
45-64	37	100	5.8	35.5	0.8	

Table 2. Percentage of subjects and mean number of sextants per subject aged 35 to 44 years with pocket depths 4-5 mm and 6 mm or more. CPITN data for some developing countries from the GODB (Miyazaki et al, 1991).

Country	No. of subjects	Subjects (%)		Subjects (mean no.)	
		4-5 mm	> 6mm	4-5 mm	>6 mm
Bangladesh	78	34	65	5.2	2.1
Central Africa	108	52	32	3.1	0.8
Kenya	199	49	14	2.5	0.2
Libya	80	53	34	2.5	0.6
Morocco	794	28	14	1.2	0.3
Tanzania	124	63	7	2.2	0.1
Zimbabwe	159	3	1	0.1	0.0
Sudan <sup>1</sup>	101	71	26	3.6	0.4

<sup>1</sup> Sudan data from this study

and, at the same time, to facilitate comparisons with other populations.

In this study, the prevalence of periodontal disease among adolescents was high, with 95.2% of the 15 to 19-year age-group having pockets 4-5 mm and 4% having pocket depths 6 mm or more. This situation is serious and alarming. Comparing the adolescents data on periodontal conditions stored at the GODB,<sup>6</sup> few countries were classified as having more severe conditions than what has been observed in the present study [Fig. 3]. Poor oral hygiene may be a factor for this high prevalence and severity among investigated adolescents. Further analysis of our data may clarify this matter.

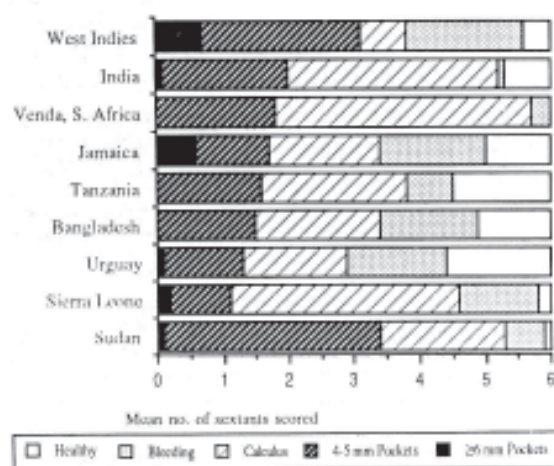


Figure 3. Severity of periodontal conditions (mean number of sextants by score per subject) in Sudanese 15-19 years age-group (present data) compared to data of age matching groups from other countries (data from Miyazaki et al, 1991).

The age-group 35 to 44 years was considered as "Key group" by WHO because most population revealed signs of all oral diseases and various stages of periodontal conditions that could be investigated.<sup>10</sup> Table 2 compares the prevalence and severity of periodontal conditions of the 35 to 44-year age-group (present data) with the data reported by WHO for populations from other countries having similar socioeconomic characteristics.<sup>9</sup> The data indicated that our samples had the second highest prevalence and severity as compared with Bangladesh. In the oldest age-group of the present sample, 64.5% had pockets 4-5 mm and 35.5% had pockets 6 mm or more.

In his study, Emslie<sup>7</sup> used the periodontal index<sup>11</sup> (PI) to examine the severity and prevalence of periodontal diseases in Sudan but this does not allow for a direct comparison with the CPITN data of the present study although some trends may be seen. He found out that the mean PI scores were 1.4 for the 15 to 19-year age-group and 2.5 for the 30 to 39-year age-group. According to the PI scoring system, these scores indicate that most of the individuals in two age-groups only had chronic gingivitis and pocketing was not common. On the other hand, our data clearly indicated that most of the surveyed individuals in age-groups 15 to 19 and 35 to 44 years had different degrees of pocketing. This discrepancy may be due to differences in survey samples and study design, but it may also indicate a deterioration of the periodontal status of the Sudanese population during the last two decades.

In the present study, all subjects in all age-groups

needed oral hygiene instructions, and almost all of them required calculus removal for more than 5 sextants per person. This reflects the poor level of oral hygiene and indicates the magnitude of the efforts required to overcome the situation. Additionally, complex periodontal treatment was needed by 4% of the adolescents to treat about 0.1 sextant per person and by more than 30% of all adults to treat about 0.4 to 0.8 sextant per person.

The results of this study may have implications for the periodontal health services in Sudan. The ultimate goal is to reduce the prevalence and severity of periodontal diseases. Nationwide preventive programs should be planned and implemented to improve the oral hygiene level. Since periodontal diseases are prevalent and severe even at an early age, preventive programs should be started among children at schools. However, subgroups at higher or lower risks should be identified so that the efforts can be concentrated on those groups. Further analysis of our data may identify the existence of such groups.

### References

1. Enwonwu CO. Review of oral diseases in Africa and the influence of socioeconomic factors. *Int Dent j* 1981;31:29-38.
2. Sheiham A, Jeboda SO. Periodontal disease in Nigeria. The problem and possible solutions. *Odontostomatol Trop* 1981;4:211-19.
3. Klausen B, Fanoe JG. An epidemiologic survey of oral health in Swaziland. *Community Dent Oral Epidemiol* 1983;11:63-8.
4. Jensen K, Kizito EK, Langebaek J, Nyita TA. Dental caries, gingivitis and oral hygiene among schoolchildren in Kampala, Uganda. *Community Dent Oral Epidemiol* 1973;1:74-83.
5. Kerosuo E, Kerosuo H, Kallio P, Nyandini U. Oral health status among teenage schoolchildren in Dar es Salaam, Tanzania. *Community Dent Oral Epidemiol* 1986;14:338-40.
6. Miyazaki H, Pilot T, Leclercq MH, Barmes DE. Profiles of periodontal conditions in adolescents measured by CPITN. *Int Dent J* 1991;41:67-73.
7. Emslie RD. A dental health survey in the Republic of the Sudan. *Br Dent J* 1966;120:167-78.
8. Ainamo J, Barmes DE, Beagrie BG, Cutress TW, Martin J, Sardo-Infirri J. Development of the World Health Organization (WHO) community periodontal index for treatment needs (CPITN). *Int Dent J* 1982;32:281-91.
9. Miyazaki H, Pilot T, Leclercq MH, Barmes DE. Profiles of periodontal conditions in adults measured by CPITN. *Int Dent* 1991;41:74-80.
10. World Health Organization. *Oral Health Surveys, Basic Methods*. 3rd ed. Geneva: World Health Organization, 1987.
11. Russell AL. A system of classification and scoring for prevalence surveys of periodontal disease. *J Dent Res* 1956;35:350-59.