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Keywords: CPITN; periodontal status; treatment needs

SUMMARY

The Community Periodontal Index of Treatment Needs (CPITN) was used to assess the periodontal status of 213 handicapped persons attending seven institutions in Johannesburg. Fewer than 2% had healthy mouths, 8% had bleeding only, followed by calculus (46%), shallow pockets (40%) and deep pockets (4%). The mean number of sextants with bleeding or higher score was 5.9. Oral hygiene instruction was indicated for 98% and prophylaxis for 90% of the participants. The CPITN was easily used in the disabled population but may overestimate treatment need in view of the current understanding that periodontal disease does not automatically progress from a low CPITN level to the next. A more appropriate measure of treatment need in handicapped persons is required.

OPSOMMING

Die CPITN (Community Periodontal Index of Treatment Needs) is gebruik om die periodontale status van 213 gestremde persone wat aan sewe inrigtings in Johannesburg verbonde was, te bepaal. Minder as 2% van persone het gesonde monde gehad, in 8% was daar slegs bloeding van die gingiva, gevolg deur tandsteen (46%), vlak sakkies (40%) en diep sakkies in 4%. Die gemiddelde aantal sekstante met bloeding of hoër graderings was 5.9. In 98% van gevalle was mondhigiëne voorligting nodig en profilakse in 90%. Die CPITN was in maklike instrument om in gestremde persone te gebruik maar mag die beraamde behandelingsbehoeftes oorskry in die lig van huidige sienings dat periodontale siektes nie outomaties vorder van 'n lae CPITN-vlak na die volgende nie. 'n Meer gepaste maatstaf van behandelingsbehoeftes is nodig vir gestremde persone.

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Introduction

A disabled person is one who suffers from any continuing disability of body, intellect or personality which is likely to interfere with normal growth, development and capacity to learn (Molteno, 1984).

A disability is any restriction or lack of ability to perform an activity in a manner or within a range considered normal for a human being. The term 'handicap' refers to conditions that are associated with disabilities that cause a person to function in daily life in ways that are significantly different from other persons of the same age (McIvor and Machen, 1986). According to the World Programme of Action Concerning Disabled Persons (1983) there is a large and growing number of persons with disabilities worldwide with evidence that their life-expectancy is increasing.

There is a serious lack of reliable information on the nature and prevalence of disability in South Africa. In the past, disability issues were viewed chiefly within a health and welfare framework. This led to a failure to integrate disability figures into mainstream government statistical processes. In its October 1995 survey, the Central Statistical Service reported a disability prevalence of approximately 5% in South Africa (Department of Health, 1997). The lack of organised dental care for this group, the elective nature of dental care and the potentially important consequences of untreated oral disease highlight a dental public health problem that needs to be addressed (Rudolph and Chikte, 1993).

Periodontal diseases are the most common non-contagious group of conditions afflicting humans (Jeffcoat,

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McGuire and Newman, 1997). Reported surveys on the epidemiological and aetiological factors affecting oral health of the disabled are varied (Tesini, 1980). Most investigators agree that oral hygiene is poorer, and periodontal disease levels are higher, in a disabled population compared with a 'normal' population (Hunter, 1987). The prevalence and severity of periodontal disease in the disabled are usually associated with factors such as disability type, age, socio-economic status, institutionalisation, availability of dental care and type of treatment offered (Tesini, 1980). With increasing age, corresponding increases in the severity of periodontal disease have been observed, while institutionalised disabled persons have higher disease levels than their non-institutionalised counterparts (Cutress, 1971). Problems such as learning difficulties, motivation and manual dexterity have also been identified as critical barriers in the achievement and maintenance of adequate oral hygiene levels in disabled groups (Brown, Morilleau and Cross, 1980).

The World Health Organisation (WHO) has been collecting data on periodontal diseases since 1969 using the Periodontal Index of Russel and the Simplified Oral Hygiene Index, both of which have limitations (Barmes, 1994). Some of the problems encountered were difficulties with reproducibility of measurements, and in estimating the magnitude and severity of periodontal conditions. In an attempt to correct these limitations, the Community Periodontal of Index Treatment Needs (CPITN) was devised and adopted in 1983 with the view to provide a global standard of measurement of treatment needs of diverse populations for use by health planners and administrators (Page and Morrison, 1994). The CPITN is based on the measurement of bleeding, calculus and pocket depth. The index has been widely used so that the WHO Global Oral Data Bank now contains extensive CPITN data from many countries around the world (Pilot and Miyazaki, 1994). Very few studies (Pieper, Dirks and Kessler, 1986; Holland and O'Mullane, 1986; Bamjee, 1986) using the CPITN, however, have been done in disabled populations. Studies among the disabled are needed by health planners to describe their periodontal status, to identify and understand their treatment needs and to plan adequately for dental care.

The objectives of the present study were to determine the periodontal health status of disabled persons using the CPITN, and to assess the treatment needs of the same population.

Materials and methods

Ethical approval for the study was granted by the Committee for Research on Human Subjects through the University of the Witwatersrand, Johannesburg. Dentate subjects were randomly selected from all seven institutions for the handicapped in three suburbs of Johannesburg – Coronationville-Bosmont, Lenasia and Eldorado Park. Two of the seven institutions were semi-residential, and five were day-care centres providing educational and remedial services for physically handicapped and mentally retarded children and young adults.

The CPITN (Ainamo *et al.*, 1982) was determined by a single examiner (YB) who examined each subject seated in an armrest chair under room fluorescent lighting using mouth retractors, mouth mirrors and the WHO 6-5-20 probe (WHO, 1978; Ainamo *et al.*, 1982). Clinical and demographic findings were recorded and entered into an IBM main frame computer to provide descriptive statistics with SAS (1985).

Results

A total of 213 handicapped persons (102 females and 111 males) with an age range of 8 - 58 years were examined. The distribution of the categories of disabled persons were: mental – 53%; physical – 10.3%; epileptic – 9.9%; sensory – 10.3%; Down syndrome – 21.8%; other conditions – 8.5%. The degree of mental retardation varied from mild to severe.

An analysis of the CPITN score showed that fewer than 2% of the total sample were free from periodontal disease whereas bleeding occurred in approximately 8% of the sample. Most frequently found conditions were calculus (46%) and shallow pockets (40.4%). Bleeding was found more among females than males and increased with increasing age. The youngest age group (8 - 14 years) had the highest calculus prevalence (65.6%). Pockets of 6 mm or more were detected in fewer than 4% of subjects and were highest in the older age categories. Bleeding and calculus were more frequently found as the highest CPITN score among institutionalised persons than among those who reside at home, while the reverse was true for deep pockets (Table I).

Bleeding and calculus were present in almost all sextants irrespective of age, gender or institutionalisation. Shallow pockets occurred mostly in two or more sextants while the mean number of deep pockets per sextant was 0.2. Calculus was the most prevalent finding in adolescent groups, while calculus and shallow pockets were more prevalent in adult groups (Table II).

Almost all subjects required oral hygiene instruction (TN1), while the need for professional prophylaxis (TN2) ranged from 85% to 94% . The need for complex care (TN3) was low (< 3%), although it reached almost 7% in the 20 - 29-year-old category and the residential group and almost 14% in the 30 - 39-year-old group (Table III).

Table I. Number and percentage of subjects by the highest CPITN score (results rounded to one decimal point)

SUBJECTS	*N*	0 no perio-dontal treatment	1 bleeding only	2 calculus	3 shallow pockets	4 deep pockets
Total	213	1.9	8.0	46.0	40.4	3.8
Gender						
Female	102	2.9	9.8	46.1	38.2	2.9
Male	111	0.9	6.3	45.9	42.3	4.5
Age						
8 - 14	61	0.0	11.5	65.6		
15 - 19	83	2.4	8.4	41.0	47.0	1.2
20 - 29	47	2.1	4.3	34.0	53.2	6.4
30 - 49	22	4.5	4.5	36.4	40.9	13.6
Residence						
Institution	182	1.7	8.2	46.7	40.1	3.3
Home	31	3.2	6.5	41.9	41.9	6.5

Table II. Mean number of sextants by CPITN score

SUBJECTS	*N*	0 no perio-dontal treatment	1 + 2 + 3 + 4 bleeding or higher	2 + 3 + 4 calculus or higher	3 + 4 shallow pockets or higher	4 deep pockets	x exclude
Total	213	0.1	5.8	5.4	2.6	0.17	0.1
Gender							
Female	102	0.1	5.8	5.2	2.4	0.07	0.06
Male	111	0.06	5.9	5.5	2.9	0.3	0.08
Age							
8 - 14	61	0.03	5.9	5.3	1.3	0.03	0.0
15 - 19	83	0.2	5.8	5.3	2.9	0.1	0.01
20 - 29	47	0.02	5.9	5.7	3.7	0.3	0.08
30 - 49	22	0.05	5.5	5.3	3.2	0.7	0.4
Residence							
Institution	182	0.08	5.8	4.9	2.1	0.3	0.08
Home	31	0.1	5.9	5.6	3.1	0.2	0.03

Discussion

The study showed that the CPITN system has been applied to this special group of persons, namely disabled persons in a clinically practical way, based on the recommendations of the WHO (1978) and Ainamo *et al.* (1982). Examination, even in this special group of subjects, required minimal equipment and very little time per person (some 3 - 5 minutes).

The term disabled is used here to encompass several specific conditions. Comparisons between various studies are difficult because of a variance in sampling methods, lack of calibration of examiners, lack of standardisation of examination techniques and variables measured as well as restriction in the use of radiographs. Variables such as specific conditions, age, gender, institutionalisation and medication are some of the factors that should be considered when comparing the results of the current study with other research findings.

The high prevalence of bleeding and the need for periodontal treatment in this study were similar to findings from CPITN studies on the disabled in Germany (Pieper, Dirks and Kessler, 1986) and the United Kingdom (Holland and O'Mullane, 1986). Complex periodontal therapy was required by considerably fewer persons in this study, some 3%, compared with the 17% needed by institutionalised adult male psychiatric

Table III. Assessment of periodontal treatment needs (TN1, TN2 and TN3)

SUBJECTS	*N*	TN1 Oral hygiene instruction	TN2 Prophylaxis	TN3 Complex care
Total	213	98.1	90.1	3.8
Gender				
Female	102	97.1	87.3	2.9
Male	111	99.1	92.8	4.5
Age				
8 - 14	61	100.0	85.5	1.6
15 - 19	83	97.6	89.2	1.2
20 - 29	47	97.9	93.6	6.4
30 - 49	22	95.4	90.9	13.6
Residence				
Institution	182	98.3	90.1	3.3
Home	31	96.8	90.3	6.5

subjects in South Africa (Rudolph and Chikte, 1993), and the 17% required by long-term residents of a hospital for the intellectually handicapped and psychiatrically ill in New Zealand (Whyman, Treasure and Brown, 1995). Almost 14% of the 30 - 49-year-old groups, however, required complex care.

Within the disabled population studied it is clear that periodontally healthy mouths are uncommon, the bleeding-calculus complex stands out as the predominant condition, and deep pocketing is relatively rare. Almost all the persons examined required oral hygiene instruction, plaque control and motivation. More than 80% of this sample were in need of professional prophylaxis in five or more sextants per person but only a few required complex care. These observations have important implications for type and number of personnel required for the treatment of the disabled. The scope of almost all the treatment needed is within the clinical competency of dental auxiliaries. It is clear that professional prophylactic care would require unrealistically high numbers of personnel. Manji and Sheiham (1986) argue that this is not only unrealistic but is also based on the assumption that all calculus must be removed. Current views on treatment of periodontal disease indicate that intervention is not required for all deviations from 'health' and that the CPITN may overestimate treatment need (Page and Morrison, 1994).

The periodontal disease paradigm at the time that the CPITN was formulated was that accumulation of plaque and calculus caused gingivitis which, over a period of time, progressed to periodontitis manifested by the formation of periodontal pockets; pockets once formed, were thought to deepen progressively until tooth loss occurred. Based on these ideas, treatment consisted of removal of plaque and elimination of periodontal pockets, generally by surgical means. The public health implications of periodontal disease are being re-evaluated, since it is now realised that periodontal disease does not affect all people, or all sites, equally. Gingivitis and periodontitis are regarded as separate entities, and gingivitis progresses to severe periodontal destruction in only a small proportion of the population. Destructive periodontitis is believed to consist of a group of diseases with a fairly similar symptomatology, some of which may have an element of specificity. Periodontitis is no longer regarded as a continuously ongoing process, but a disease which progresses in bursts, with long periods of quiescence and remission, or even permanent stability (Page and Morrison, 1994). These new concepts of the disease in relation to the validity of the CPITN may have invalidated the index as a means for treatment assessments in populations (Holmgren, 1994).

Despite change in the concepts of the disease, the prevention of periodontal conditions is still based on regular clinical as well as adjunctive methods of plaque removal. Gingival inflammation manifested by bleeding indicates a need for oral health education. Improvement can be brought about largely through continuous self-care through the regular and effective removal of plaque and forms a prerequisite for other periodontal treatment. Cutress, Ainamo and Sardo-Infirri (1987) considered the elimination of bleeding on probing to be the prime goal even if further treatment is not available. At present the recognised approach to effective plaque control is through mechanical removal of the material. The use of mechanical means to maintain an adequate level of oral hygiene in disabled individuals is difficult, time-consuming and of doubtful effectiveness (Chikte *et al.*, 1991). While some individuals are capable of being taught basic oral hygiene procedures, others, because of learning disabilities and muscular inco-ordination, will always need help. Chemical control of plaque, for example with chlorhexidine mouth rinses, can offer an effective alternative to conventional mechanical means.

The relevance of the routine removal of calculus has been questioned. Gaare *et al.* (1990) have shown that substantial improvements in gingival health can be achieved by oral hygiene instruction alone even in individuals with large amounts of calculus and that scaling provided no additional benefit. In teenagers, Clerehugh and Lennon (1986) found subgingival calculus to be the best predictor of subsequent attachment loss. In subjects with endemic calculus, however, the predictive value may not be the same. Owing to the difficulties in the provision of oral health instruction in a disabled population, the removal of subgingival and supragingi-

val calculus would facilitate the limited self-performed oral hygiene that may be taking place.

The CPITN code 3 indicates the need for scaling and root planing while code 4 indicates complex treatment. The treatment is based on the premise that periodontal destruction progresses in a continuous manner. At any given point, however, most periodontal pockets in most patients are disease-inactive and interventions may have little or no effect on pocket depth. The pocket elimination philosophy implicit in the CPITN leans towards the use of surgical techniques which produce greater initial reductions in probing depths than non-surgical approaches. This may be inappropriate not only in terms of current concepts of treating periodontal disease but also because generally a handicapped population may not be very co-operative and easily manageable (Braham and Morris, 1985).

Although dental auxiliaries can undertake much of the clinical treatment indicated by the CPITN, there is a need for additional training and preparation for dental care providers combined with specialist support in handicapped populations (Stiefel, Truelove and Jolly, 1990; Holland and O'Mullane, 1990).

Conclusion

The CPITN has been shown to be a simple, rapid, inexpensive, useful and readily applicable method for the assessment of the periodontal status and treatment needs in the disabled population for use by health planners. The index provides useful data on the periodontal profile of the disabled community, the magnitude of the needs and the type of health personnel required. In the population studied, bleeding and calculus were endemic, shallow pocketing was moderate, and deep pocketing rare. The treatment needs indicated by the CPITN lead to unrealistically high estimates of resources. This is a limitation of the CPITN because recent advances in understanding of periodontal disease question the basic assumption of the index that there is an automatic progression from one CPITN level to the next. Modification of treatment needs determined by the CPITN are required to take into account the special needs of disabled patients.

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