

ORAL HYGIENE AND NUTRITIONAL STATUS OF CHILDREN AGED 1-7 YEARS IN A RURAL COMMUNITY

*S.N. OKOLO, G.A. CHUKWU¹, I. EGBUONU², F.A. EZEUGU³, C. ONWUANAKU⁴,
O.A. ADELEKE¹, A. HASSAN⁵ AND A. NGOE-NESOAH⁵

Departments of Paediatrics and ³Chemical Pathology, ⁴School of Medical Laboratory, Jos University Teaching Hospital, Jos-Nigeria. ¹The Intercountry Centre for Oral Health for Africa, PMB 2067, Jos-Nigeria. ²Department of Paediatrics, Nnamdi Azikiwe University Teaching Hospital, Nnewi-Nigeria and ⁵Noma Children Hospital, Sokoto-Nigeria.

SUMMARY

Introduction: Poor oral hygiene, measles and malnutrition have been implicated as predisposing factors to Acute Necrotizing Ulcerative Gingivitis (ANUG) and cancrum oris, common oral diseases prevalent among children ages 3-6 years in rural communities.

Objective: The study was aimed at reviewing the oral hygiene, nutritional and immunization status of children 13-84 months of age in a rural community.

Design: A cross sectional study.

Methods: Two hundred and thirty seven (237), 168 and 321 children and their parents from Illela, Gada and Gwadabawa respectively were interviewed using a pre-tested questionnaire to record the biodata and social status of the mother and measles immunization status of the children. The oral hygiene status of the children was determined using the plaque/debris index score. Their anthropometric measurements were also recorded.

Results: A total of 636 children aged 1-7 years were examined. Of these, 8.3% had plaque/debris index of zero. About twenty four percent (23.9%) had plaque/debris index of 1, while 55.2% had plaque/debris index of 2 and 12.6% had plaque/debris index of 3. There was no statistical difference between the females and the males ($p=0.333$), but a significant difference existed between the age groups ($p=0.001$). Of the study group, 84.3% were malnourished and only 11.3% were immunized against measles.

Conclusion: Poor oral hygiene, malnutrition and low measles immunization were common in the community. These conditions predispose to noma. Prompt and adequate intervention programmes such as systematic oral health, immunization and nutrition promotion programmes are urgently needed in these communities.

Keywords: Oral hygiene, nutritional status, measles immunization, children.

INTRODUCTION

Poor oral hygiene is a known important predisposing factor of some oral diseases like cancrum oris, periodontitis, acute necrotizing ulcerative gingivitis (ANUG) and gingivitis^{1,2}. The prevalence and severity of periodontal disease were considered to be relatively high in Africa during the 1960s, 1970s and early 1980s³. In fact it is still so today particularly among the deprived children of Africa living in the rural areas and city slums¹.

Recent hospital-based studies in Nigeria suggest that the incidence of ANUG is increasing among children¹. In recent years, there has been a global increase in the incidence of ANUG associated with Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS)^{1,2,4}. Acute necrotizing inflammation of marginal interdental papillae is considered a key antecedent lesion of noma⁴.

Oral hygiene and personal hygiene are about the cheapest form of preventive health measure. Though cheap, it is surprisingly one of the most ignored in practice especially in the underprivileged rural communities.

There is little reported data on oral hygiene practices among Nigerians³, but among these few published articles, studies on children age 7 years and below are completely absent, although this age group records the peak incidence of Noma. It is believed that the use of chewing stick is common in the rural Nigerian population³. The authors are, however, not aware of any clinical study demonstrating the cleaning efficacy of chewing stick with the aid of disclosing tablet, even though few ear-

* Author for correspondence

lier reports claimed that the mechanical effect of the frayed fibres and the chemicals released during the course of chewing may play the role in promotion of good oral hygiene⁵. While toothpaste/toothbrush has undergone several modifications in terms of the strength of the tuft, the shape and size of the handle to meet the need and challenges necessary for a good oral hygiene, chewing stick has remained the way it was handed down by our fore-fathers, despite its poor access to the lingual, palatal and inter-dental space.

Chewing sticks are usually very dry, hard and often the sole cleaning agent in the rural communities in developing countries because they are readily available and affordable.

The pre-school child does not have a good mastery of eye-hand co-ordination or small muscle control and also, cannot chew the hard chewing stick into a soft fray. How children, below the age of seven would benefit from chewing stick remains an important fundamental question in the promotion of good oral health and hence the reduction of the risk of developing cancrum oris, periodontitis, gingivitis and dental caries.

Poor oral hygiene, poverty, measles, chronic malnutrition, poor environmental sanitation and unsafe water supply have been identified as risk factors for Noma⁴.

This study was aimed at evaluating the nutritional, oral hygiene and measles immunization status of children aged 13-84 months in a rural community and thereafter suggest ways to improve them.

MATERIALS AND METHOD

This study was conducted in July 2001. The study populations were recruited from Gwadabawa, Illela and Gada, which are Local Government Areas (LGAs) within Sokoto State of Nigeria with high incidence of Noma. Three communities were randomly selected from each of the LGAs to represent the districts.

Illela, is a boarder town with Niger Republic, is about 78km from Sokoto; while Gada and Gwadabawa are 138km and 30km respectively from Sokoto town which is on the extreme North-Western part of Nigeria. There is no good access road or electricity within the LGAs headquarters and immediate environs. Source of water is mainly from a common well except in Gada where there are few individual wells. There is a Primary Health Care (PHC) centre in each of the communities

studied but no dental health facilities or trained dental health personnel.

A structured questionnaire was used to collect the demographic data of the mothers, measles immunization status of the children and the knowledge, attitude and practice of parents towards oral health. Three of the co-investigators administered the questionnaire, while the other two took the anthropometric measurements and conducted the physical examinations (weight and height were measured to the nearest 0.1cm and 0.1kg respectively). The nutritional status of the children was determined using weight-for-age; and the percentage of the population with weight less than two standard deviations below the expected from the international growth reference for a child's age and sex were deemed to be malnourished. The dentist in the team performed the oral examination of the index child under direct sunlight in the open. The oral hygiene status was scored using plaque/debris index⁶ from 0-3. Scores 0, 1, 2 and 3 represent good, fairly good, poor and very poor oral hygiene respectively. The results were recorded in the pre-printed diagnostic chart designed by the authors. The children were grouped into ages 13-36, 37-60 and 61-84 months for closer observation and better interpretation of results which were analyzed using the SPSS statistical package.

Consent was obtained from the State Ministry of Health, PHC directorate and community heads. Informed consent was obtained from the parents of the children. The study was conducted either in the village square or the primary health care center as was convenient.

RESULTS

A total of 636 children (329 males and 307 females) age 1-7years were studied. There were 237(123 males and 114 females), 168(87 males and 81 females) and 231 (119 males and 112 females) from Illela, Gada and Gwadabawa LGAs respectively.

Table 1 shows the oral hygiene status according to sex distribution. Only 8.3% of all the children [5.2% male and 3.1% females] had good oral hygiene (plaque index 0). Also 11.6% males and 12.3% females i.e. 55.2% had plaque/debris index of 2 and 6.9% males and 6.7% females i.e. 12.6% had plaque/debris index of 3. Overall, 34.9% male and 33.9% female i.e. 68.8% had plaque/debris index 2 or 3. There was no statistical significant difference between the male and the female value ($X^2 = 3.408$, $df = 3$, $p > 0.5$).

Table 1 Oral hygiene status according to sex distribution

Sex	Scores				Total
	0	1	2	3	
Male	33 5.2%	74 11.6%	178 28.0%	44 6.9%	329 51.7%
Female	20 3.1%	78 12.4%	173 27.2%	36 6.7%	307 48.3%
Total	53 8.3%	152 23.9%	351 55.2%	80 12.6%	636 100%

$\chi^2 = 3.408$, $df = 3$, $P = 0.333$

Table 2 shows the oral hygiene status according to age-group. In the age group 13-36 months, only 9.4% had plaque/debris index of 0 and 33.6% had plaque/debris index of 1. Whereas 53.8% had plaque/debris index of 2, 3.2% had plaque/debris index of 3. Overall, 57.0% had plaque/debris index of 2 & 3.

Table 2 Oral hygiene status according to age group distribution

Age Group	Plaque/debris index				Total
	0	1	2	3	
13-36	32 9.4%	115 33.6%	184 53.8%	11 3.2%	342 100%
37-60	15 7.1%	34 16.2%	117 55.7%	33 21.0%	210 100%
61-84	6 7.1%	3 3.6%	50 59.5%	25 27.8%	84 100%
Total	53 8.3%	152 23.9%	351 55.2%	69 12.6%	636 100%

$\chi^2 = 89.885$, $df = 6$, $p = 0.001$

In the age group 37-60 months, only 7.1% had plaque/debris index of 0 and 16.2% had plaque/debris index of 1, whereas 59.5% had plaque/debris index of 2 and 21.0% had plaque/debris index of 3. Overall, 76.7% had plaque/debris index of 2 or 3.

In the age group 61-84 months, only 7.1% had plaque/debris index of 0 and 3.6% had plaque/debris index of 1, whereas 59.5% had plaque/debris index of 2 and 27.8% had plaque/debris index of 3. Overall, 89.3% had plaque/debris index of 2 or 3. The difference between the various age groups was statistically significant ($\chi^2 = 89.885$, $df = 6$, $p < 0.001$).

In the overall population studied only 8.3% and 23.97% had a plaque/debris index of 0 and 1 respectively, whereas 55.2% and 12% had a score of 2 and 3 respectively. For oral hygiene practices,

57.5%, 26.6%, 8.3%, 6.9 and 0.8% did not clean teeth paste respectively. Only 11.3% of the children had measles immunization.

Ninety-five percent (95%) of the mothers had no formal education, while 3.5% had elementary/koranic education. The mothers are all full-time house-wives. Their source of drinking water was either from the well which was communally shared or from collected rain water. Using weight for age, 84.3% of the study group were malnourished.

DISCUSSION

In this study the percentage of children with good oral hygiene was very low. Only 8.3% and 23.9% of the study population had good and fairly good oral hygiene respectively, with children 13-36 months accounting for 5% and 18% while the children in the age group 37-60 and 61-84 months accounted for 2.4%; 5.3% and 0.9%; 0.5% respectively. The high percentage of good and fairly good oral hygiene in the age group 13-36 months compared to the other age groups is believed to be as a result of newly erupted teeth and because most of the teeth lie in the anterior segment of the arches where the teeth could be cleansed as the child bites on its clothing and other objects and not necessarily as a direct maintenance of the child's oral hygiene.

About 86.0% of the children studied were malnourished. Therefore, with this high prevalence of poor oral health against the background of malnutrition and low socioeconomic conditions in these rural children, a high prevalence and severity of periodontal disease can be expected in these 3 local government areas of Sokoto State of Nigeria. Richard and Barmes⁷ had earlier shown that socioeconomic and educational levels of populations are directly related to the oral cleanliness and inversely related to the prevalence and severity of gingivitis and periodontitis. Many other studies have attributed the high prevalence of oral disease and the low level of oral health awareness in Africa to ignorance, poverty and lack of education^{2,8}. In this study most of the mothers interviewed had no formal education and few with koranic education where oral health education was not taught. Most of the mothers (57.5%) did not know that the children have to be assisted in cleaning their teeth till they attained the age of seven.

However, majority of these children were between 13 and 36 months bracket and therefore it was not surprising that their mothers did not know that

their children's teeth should be cleaned. Others used either water and finger, or chewing sticks that have been chewed to form brush ends, or local herbs. These women were house wives who spent more time in the house. This denies them of vital societal motivating factors. The oral hygiene of the mothers that accompanied these children was not encouraging, and this will form part of another research. Another possible reason for this high percentage of poor oral hygiene may be due to the lack of primary dental services and dental health personnel in these nine communities, despite the fact that dental health has been incorporated into the PHC system. Awareness of simple oral health preventive measure (oral hygiene) is lacking. This lack of dental services in the rural areas has also been reported in Zambia⁸, and this may in fact represent the experience in the sub-Saharan African countries.

Another interesting finding in this study is the high level of malnutrition and low level of measles immunization coverage among the children. Oral hygiene, though a very cheap form of preventive health measure, surprisingly, has remained most neglected in these rural communities.

Oral health education like health in general, can work best when the state of the knowledge and the general oral habit of the recipient is taken into account⁸. Therefore, there is an urgent need to investigate the oral health status of children in the rural communities and identify strategies to improve on them. This is because oral health practices and care during childhood will determine the lifetime oral health status. This study has attempted to do this. The World Health Organization at Alma Ata emphasized the need to attain a level of health that will permit productive life at the highest possible level by the year 2000¹⁰. It is an emphasis that is directed to all health management disciplines of which oral health is an essential part. It imposes a challenge of developing culturally acceptable and sensitive programme that has the potential to provide knowledge and develop a health attitude in the population concerning oral health or by way of integrating scientific knowledge into traditional oral health beliefs¹¹.

CONCLUSION

This study has identified a high level of malnutrition, low measles immunization coverage and a high incidence of poor oral hygiene status in these children. There is therefore, an urgent need for a prompt and adequate intervention programmes

such as systematic oral health and nutrition promotion programmes for the children in these communities.

REFERENCES

1. Enwonwu C.O. Noma: A neglected scourge of children in sub-saharan. *WHO Bull OMS* 1995; 73: 541-545.
2. Enwonwu CO, Falker Jr, Idigbe EO, Savage KO. Noma (Cancrum Oris): Questions and answers. *Oral Dis* 1999; 5: 144-149.
3. Adegbenbo AO, and El-Nadcef MAI. National survey of periodontal status and treatment need among Nigerians. *Int Dent J* 1995; 45: 197-203.
4. Enwonwu CO, Falker WA, Idigbe. Orofacial gongrene (NOMA/Cancrum Oris) pathogenic mechanisms. *Crit Rev Oral Biol Med* 2000; 11(2): 159-171.
5. Wu CD, Darout IA, Skaug N. Chewing stick: timeless national tooth brushes for oral cleansing. *J of Periodontal Res* 2001; 36: 275-284.
6. Silness J and Loe H. Periodontal disease in pregnancy. II. Correlation between oral hygiene and periodontal condition. *Acta Odontologica Scandinavica* 1964; 22:121.
7. Richards ND and Barmes DE. Social factors in dental epidemiology. In: ND Richards and LK Cohen (eds). *Social Sciences and dentistry*. London: Quintessence 1: 318.
8. Otuyemi OD, Abidoeye RO and Dada D. Oral health knowledge, attitude and behaviour of 12 year-old sub-urban and rural school children in Nigeria. *Afri Dent J* 1994; 8: 20-25.
9. Noar J and Portuoy S. Dental status of children in a primary and secondary school in rural Zambia. *Int Dent J* 1991; 41: 142-148.
10. WHO-UNICEF, Alma-Ata. Primary Health care: Report of the International Conference on primary health care, Geneva. *WHO* 1978.
11. Lee KL, Schwar and Mak KYK. Improving oral health through understanding the meaning of health and disease in a Chinese culture. *Int Dent J* 1993; 43: 2-8.