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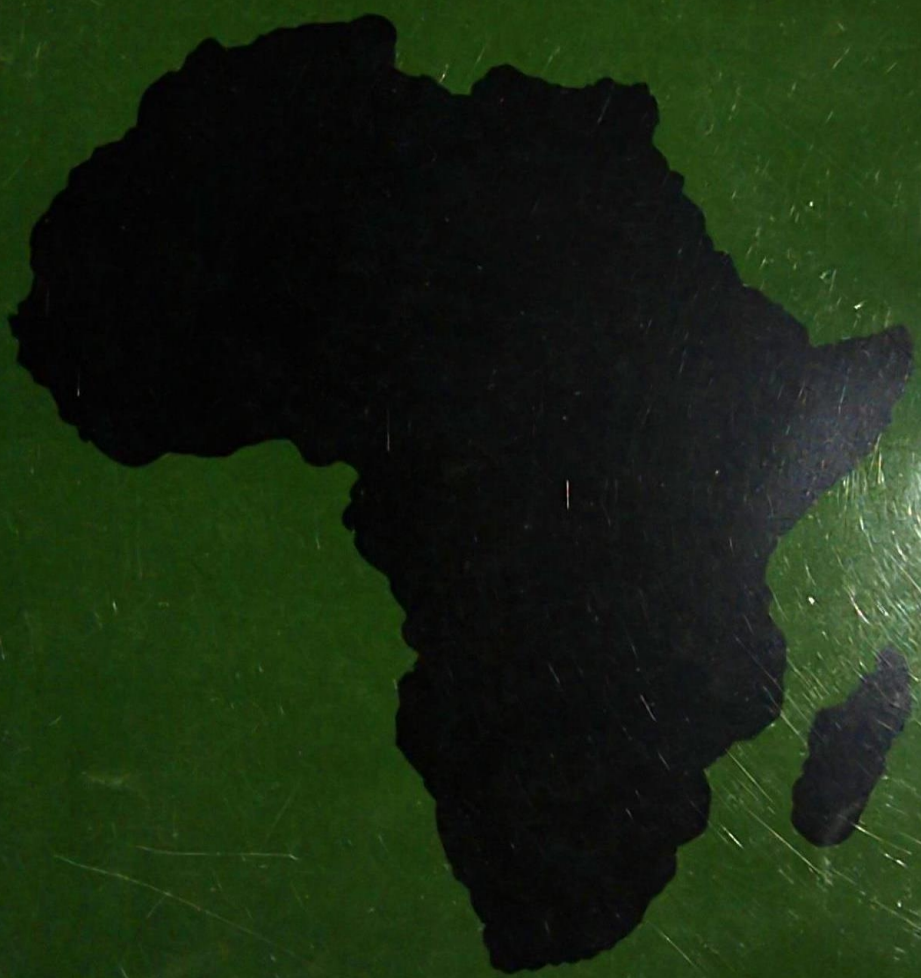

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Oral health education needs of diabetic patients in Ibadan

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Summary

Previous studies on this group showed very high perceived oral health needs of diabetics. The author therefore considered it necessary to investigate their oral health education needs. This study seeks to highlight the oral health knowledge, attitude and practices of the group with the view of designing a dental health education programme which can be incorporated into the already existing health education programme for diabetics. The study was conducted on a sample of 120 adult registered diabetic patients from the two diabetes clinics in Ibadan, University College Hospital (U.C.H.) and Ring Road Government Hospital. The study also included fifty healthy adult non-diabetic volunteers for comparism. Glycaemic control was determined by estimating their fasting blood glucose F.B.G. Four trained interviewers interviewed the participants on their oral health knowledge, attitude and practices as well as on vulnerability factors such as educational status, gender, occupation, location and age. Nineteen (19) diabetic patients and fourteen (14) non-diabetic participants were excluded from the study. This study highlights the comparable oral health knowledge, attitude and practices of diabetic patients with the non-diabetic participants. The study shows the good knowledge of all groups on the frequency of tooth cleaning (86.1%, 84.6% and 95.2%), their poor knowledge on the necessity of regular dental clinic attendance (25%, 23.1% and 45.2%) and the effect of diet on their oral health (2.8%, 31% and 29%). Less than 50% of the subjects knew the cause of periodontal disease. Majority of diabetic patients do not know factors in diabetics that can contribute to oral ill health and most importantly quite a number of diabetics (53.9% and 46.8%) were not aware of the need for glyceamic control to prevent and control oral infections in diabetics. The positively established attitudes of many subjects towards oral health is unequivocal. The habit of tooth cleaning either with toothbrush and paste or with chewing stick is entrenched in the participants. The influence of educational status was highly significant on the frequency of tooth-brushing. Removal of calculus being the highest perceived need in a previous study, in this group, is not consistent with the regular tooth cleaning habits expressed in this study. However, previous researchers have emphasised the efficiency rather than frequency of cleaning as the more important aspect of tooth cleaning. Thus, this study seems to have confirmed previous studies. This study brings into focus the establishment of a positive attitude prior to knowledge without it being followed up with a health directed behaviour.

Keywords: *Knowledge, attitude, practices, oral hygiene, dental clinic attendance, diabetics*

Résumé

Dans les etudes precedentes, on s'est apercu d'une tres grande necessirte' pour la sante orale chez les diabetiques. L'auteur a donc considene necessaire d'investiguer sur la necessite' de l'education de la sante orale. Cette etude envisage de chercher a mettre en lumiers connaissance de la sante orale, l'attitude et les pratoques du groupe en vue de projeter un programme de sante dentaire qui purrait etre incorprer dans le programme de sante dentaire qui existe deja pour les diabetiques. L'etude avait ete fait sur les specimens de 120 adultes diabetiques dans 2 (deux) hopitaux des diabetiques a Ibadan, Centre Hospitalier Universitaire (UCH) et l' hopital du l'etat d'oyo a Ring Road. Dans l'etude 50 adultes de bonne sante et non-diabetique volontaire pour control a ete inclu. Le control de glycemic etait detemine pour le taux sanguin de glucose a jeune. Quatre specialists ont interoges les participants sur leur savoir de la sante orale leur attitude et pratique ainsi que sur les facteurs dé vulnerabilete le statat educationel, le genre l'occupation, lieu d'habitat et lage. Dix-neuf diabetiques et quatorze (14) non-diabetique avaient ete exclu de l'etude. Cette etude met en lumie la comparison du savoir, l'attitude et les pratiques de la sante orale chez les diabetiques et les non-diabetiques. L'etude montre la connaissance de tous les groupes sur la frequence du nettoyage dentaire. (86.1%, 84.6% et 95.2%). L'ignorance de la necessite de visite le dentiste (25.20, 23.1 et 45.2%) l'effect de la nutrition sur la sante orale ou buccale. (28%, 31%, 29%). Moins de 50% de sujects cornaissaient la cause de la maladie periodental. La majorite des diabetiques ne connaissaient pas les facteurs diabetiques qui penvent contribuer aux maladies buccales et plus important. Certain diabetiques (53.9% et 46.8%) ne sont pas au courant de la necessite de controller le taux de glycemie dans le but de prevenir et controller les infections orales chez les denx groupes. L'attitude de certains diabetiques de maintenir la sante orale est inequivoque. La methode dè brossage chez les participants ne sont pas consideree. Le nivean d'education etait tres significatil sur la frequence de brossage. Le fait d'enlever les tartes ayant ete d'une necessite importante dans l'etude precendente, dans ce groupe ceci n'est pas evident avec le brossage regulier des dents observe dans cette etude. Neamoins, les chercheurs ont insistes sur l'efficacite au lieu de la frequence de nettoyage dentaire comme plus important. Ceci etant, cette etude parait avoir confirme les etudes precedentes. Cette etude met en lumere l'etablissement d'une attitude positive avant la connaissance sans que ce soit survi, pa l'habitude de rester soigner.

Introduction

In the epoch of human history, our ways of life, habits and life style have assumed major importance in the etiology of medical as well as oral diseases especially major diseases such as dental caries and periodontal disease[1]. Information from the global oral data bank (GODB) systems exhibit deterioration of oral health in the developing countries. It expresses a continuous increase in the trend of oral caries prevalence and a high prevalence of periodontal disease in these countries[2, 3]. Poor oral hygiene among many Nigerians in this environment has been observed in previous studies [4, 5, 6]. Though periodontal disease is highly prevalent, it is a preventable disease[7]. Bacterial plaque is a direct cause of periodontal disease and high levels of plague lead to periodontal disease[7, 8]. Various studies have demonstrated the extent

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The mean age of the subjects was 52.09 (SD 15.66). Using a modification of the social class stratification which is based on occupation[16], 33.6% of the participants were identified as belonging to social class IV (lower class), 57.3% to social class III (lower middle class), 5.3% to social class II (upper middle class) and 3.8% to social class I (upper class). A great percentage of the subjects are illiterates (44.5%) whilst 18.1% had post secondary school education.

As to residential location, 85.8% of the subjects live in the indigenous urban areas, whilst 9.2% and 4.2% live in the semi-urban and rural areas. F.B.G. values of the subjects is depicted in Table I. Their oral health knowledge, attitude and behaviour are illustrated in table 2 whilst the effect of some vulnerability factors on the above mentioned variables is higlkighted in table 3.

Educational status had a considerably significant influence on frequency of tooth cleaning behaviour. (x^2 = 13.98 DF21 $P < 0.003$) of the subjects. More subjects with higher educational status were brushing twice daily (Table 3). Educational status had a significant influence on knowledge about regular dental visit [x^2 13.87 DF 18 $P < 0.008$] knowledge of vulnerability of diabetics to gum infections [x^2 10.16 DF 18 $P < 0.04$] and knowledge of neccessity of glyceamic control in the prevention and control of oral infections in diabetics [x^2 - 13.20 DF 18 $P < 0.01$].

Gender did not have a statistically significant impact on knowledge attitude and behaviour of the study group. It was slightly significant in the attitude towards infection of the gum. ($P < 0.04$). A greater number of men in this study were more concerned about infections of the gum and teeth than women (Table 3).

Table 1: Mean FBG values of subjects in the study

	Healthy non-diabetic subjects n = 36	NIDDM controlled n = 33	IDDM controlled n = 6	NIDDM uncontrolled n = 46	IDDM uncontrolled n = 16
mean FBG value mml/l	3.2 (SD ± 1.16)	4.5 (SD ± 1.17)	4.38 (SD ± 1.77)	11.14 (SD ± 3.59)	12.1 (SD ± 5.38)

Knowledge

A very high percentage of the subjects [86.1%, 84.6% and 95.2%] were well informed on the frequency of tooth cleaning but poorly informed on the role of diet in oral health and the necessity of regular dental clinic attendance. More subjects in both diabetic groups [31% and 29%] were more knowledgeable about the role of diet in oral health than the non-diabetic group [2.8%]. Many subjects did not know the cause of periodontal disease. Most importantly, quite a number of diabetics [53.9% and 46.8%] were not aware of the need for glyceamic control, in the prevention and control of oral infections in diabetics. Table 2.

Attitude

Generally, many subjects in all the groups showed positive attitude towards care of the teeth and gum. However, this was more prominent in the two diabetic groups [79.5% and 90.3%] than in the non-diabetic group [69.4%]. Diabetics expressed more concern about infections of the gum and teeth [74.3% and 79.0%] than the non-diabetic group [52.8%]. Quite a number of both diabetics and non-diabetics claim they clean their teeth for the purpose of keeping them healthy (Table 2).

Behaviour

Many of the subjects [91.6%, 92.3% and 100%] claim they clean their teeth a minimum of once daily, of which [47.2%, 43.6%, 33.9%] claim they clean their teeth twice daily. Quite a percentage of the subjects [47.2%, 43.6%, 19.3%] claim they use both the tooth-brush and toothpaste as well as the chewing stick. The use of chewing stick alone was more prominent among uncontrolled diabetic subjects [43.5%]. Very few of the subjects [25.6%, 32.2% and 33.3%] depend solely on the tooth-brush and tooth-paste as a method for maintaining oral hygiene.

Many subjects in the diabetic groups than the non-diabetic group were compelled to attend the dental clinic due to dental problems (Table 2).

Discussion

Very few diabetic patients come to the dental clinic for check ups[13]. The few who come, report very late when the state of their oral health is seriously compromised[13]. The oral health knowledge, attitude and practices of the diabetic patients is comparable to that of the non-diabetic group. This is not beyond expectation because, it reflects the oral health knowledge, attitude and practices of the society in Ibadan. Thus, the oral health knowledge, attitude and practices of the subjects will be discussed in general.

Generally, with the exception of the frequency of tooth cleaning, the subjects were poorly informed on all other factors that will promote their oral health. The association of diet with diabetes may be a contributing factor to the higher percentage of diabetic subjects who were knowledgeable about the effect of diet on oral health. Of interest is the fact that many of the interviewees were aware of the possible prevention and treatment of gum disease. Various studies have discussed extensively the vulnerability of diabetics to gum disease[9, 10] and the issue of infection resulting in serious complications in them[17]. Diabetics not having adequate knowledge of oral health that will equip them to maintain their health in general is not desirable. Obviously, there is a great need to improve on dissemination of oral health messages to the public. Knowledge as a necessary factor in changing oral health behaviour has been extensively discussed in other studies [12].

The positively established attitudes of the subjects towards oral health is unequivocal. This epitomises various studies which have demonstrated that the objectives of health education, that is, knowledge, attitude and behaviour, do not have to be established in the above sequence[18]. Any one of them could be established before the others. Thus tooth brushing behaviour or oral cleaning behaviour is a norm that is established during primary socialization and becomes valued with knowledge[19]. Thus, a previous study in this group has demonstrated very high perceived oral health needs in

of periodontal disease and various pathologies encouraging its progress in diabetics[9,10]. Microangiopathy, altered leucocyte chemotaxis, increased oral plaque and calculus formation and abnormal collagen metabolism all contribute to the vulnerability of diabetics to periodontal infections[9,10].

In the prevention of these diseases much emphasis has been laid on factors such as knowledge, attitudes, beliefs and emotions and the way these may be subject to behaviour modification techniques[11]. "The traditional health education perspective aims to change the knowledge and attitudes of individuals or groups, with a view of encouraging the adoption of health related behaviours"[12]. The approach commonly used relies solely upon the provision of knowledge about the threat to oral health and the teaching of skills necessary to avoid or cope with these threats[12]. This approach is based on studies which have demonstrated that both adults and children lack basic knowledge about diseases and methods of prevention[12].

Previous studies on this group revealed a high perceived oral health need, yet participants had a very low demand for oral health care, due to the lack of perception of the seriousness of oral diseases[13]. This study showed that cost, location of oral health services and the way services were discharged were not the main barrier to oral health care[13]. It therefore became necessary to carry further enquiries into their knowledge of, attitude and behaviour to oral health and oral diseases. It is the aim of this study to determine the oral health education needs of diabetic patients in Ibadan.

Materials and methods

The study was conducted on a sample of 120 adult registered, diabetic patients attending University College Hospital (U.C.H) and Ring Road government hospital diabetes clinics, the two diabetes clinics in Ibadan. The above sample included seventy five (75) patients from U.C.H. and forty five (45) patients from Ring Road government hospital. The non-diabetic group included (50) fifty healthy adult volunteers, within the same age range as the diabetic patients (22 years to 83 years), attending a well-established private hospital, Mobolaji Hospital. University College Hospital is a tertiary health care institution whilst Ring Road and Mobolaji Hospitals are secondary health care institutions. Assessment of glyceamic control of diabetic patients was from fasting blood glucose test (F.B.G.). For diabetic patients from U.C.H. the F.B.G. results of the month they were interviewed was recorded from their hospital records. Many diabetic patients from Ring Road hospital could not afford the F.B.G. test and depended on the urine test. Consequently their blood samples were taken and the F.B.G. test was conducted for them at U.C.H. F.B.G test was conducted for the volunteers to confirm that they were not diabetic.

The subjects were grouped into uncontrolled N.I.D.D.M (Non-Insulin dependent diabetes mellitus), uncontrolled I.D.D.M. (Insulin dependent diabetes mellitus), controlled N.I.D.D.M, controlled IDDM and healthy non-diabetic subjects, depending on the methods of control and their fasting blood glucose result. F.B.G. results equal to or below 6.3 mmol/l was regarded as control and values more than this as uncontrolled[14].

Four school teachers, who are eloquent in English, Pigeon English and Yoruba were trained in the use of the questionnaire. They then tested this questionnaire on ten other teachers individually. The four interviewers showed good agreement on all the questions.

The interviewers explained the nature of the study to the subjects, interviewed and filled the questionnaires for them. Interviewers interviewed diabetic patients from both hospitals on diabetic clinic days consecutively until the required number for each hospital was met. Participating non-diabetic volunteers were interviewed in the private hospital.

The questionnaire consisted of coded questions enquiring into the oral health complaints of subjects, their oral clinic attendance pattern, oral cleaning habits and methods, educational status, age, occupation, social habits (such as smoking, chewing kola nuts etc.) oral health knowledge, attitude and practices. For diabetic patients it included questions on the method of diabetes control used and duration of diabetes.

Method of analysis

Attitude was determined as a binary outcome, indicating positive or negative attitude, depending on whether they are likely to encourage good oral health behaviour or poor oral health behaviour. Attitudes considered as contributing positively to good oral health behaviour in the authors opinion are, if a patient regards care of the teeth and gum important, considers everyday cleaning of the teeth necessary, views gum infections as serious and has health of the gum and teeth as the main purpose for brushing the teeth.

Knowledge was determined as a binary outcome indicating well-informed or poorly informed individual. An individual is considered to be well informed if he knows that he is to brush twice daily, visit the dental clinic regularly every six months and eat a balanced diet rich in vitamins and minerals and low in refined carbohydrates. Knowledge of the cause of periodontal disease, vulnerability of diabetics to periodontal disease and the need for glyceamic control in the prevention and control of oral infections was regarded as being well informed.

Oral health behaviour was determined as a binary outcome indicating good or poor oral health behaviour. What constitutes a good oral health behaviour in the author's opinion and as documented in other studies are regular, daily and conscious cleaning of the teeth[15]. Twice cleaning of the teeth daily is regarded as the minimum frequency acceptable for a preventive oral health behaviour[15]. Regular attendance to the dental clinic at least once every year[15] and eating a balanced diet rich in vitamins and minerals and low in refined carbohydrates are attributes of a good oral health behaviour.

Educational status, geographic location, gender and socio-economic status were regarded as vulnerability factors influencing, knowledge, attitude and oral health behaviour of the study group.

The information collected was computed on a computer programmed with a statistical package for social sciences. The frequency distribution and the percentage frequency of the variables were determined. Chi-square test was used to determine association between variables and its P values were used to determine the significance of the association.

Results

Nine U.C.H. diabetic patients whose hospital records were not accessible and 10 Ring Road diabetic patients who had eaten before the test were excluded from the study. Of the 50 non-diabetic subjects fourteen were excluded when they refused to have blood samples taken from them for the F.B.G test. The group comprised of 56.2% female and 43.8% male.

Table 3: Effect of vulnerability factors on knowledge attitude and behaviour of interviewers

	Illiterate	Primary school education	Secondary school education	Post secondary skill training	Post secondary school education	Others	P-value	Female	Male	P-value	Total
	61	26	19	7	19	5		77	60		137
Behaviour											
Tooth cleaning once daily	55	24	19	5	19	3	0.58	71	54	0.65	125
Tooth cleaning twice daily	20	15	9	3	15	3	0.007	36	29	0.74	65
Regular dental clinic attendance	1	5	1	0	3	0	0.68	7	3	0.45	10
Knowledge											
Frequency of tooth cleaning	49	26	18	3	18	4	0.40	66	52	0.87	118
Balance diet including fruits and vegetables and reduce sugary foods.	15	5	4	2	8	3	0.47	18	19	0.28	37
Regular dental clinic visits	17	6	6	1	13	0	0.008	23	20	0.66	43
Causes of gum disease.	34	12	8	1	7	4	0.49	35	31	0.47	66
Vulnerability of diabetics to gum infections.	24	17	7	2	13	2	0.04	38	27	0.61	65
Necessity of glyceamic control in the prevention and control of oral infections in diabetics.	25	7	10	1	14	4	0.01	32	29	0.43	61
Attitude											
Care of the teeth and gums	51	18	15	4	17	4	0.23	58	51	0.16	109
Regular cleaning of the teeth	45	17	17	5	16	4	0.35	56	48	0.32	104
Infections of the gums and teeth	40	17	13	4	17	4	0.32	48	47	0.04	95

which are not well developed. Also a greater percentage of them are illiterate or have very little education. The significant influence of educational status on the oral health practices of the subjects in this study exemplifies previous studies in other parts of the world[8]. Poor socioeconomic status and poor education are known to contribute to poor health knowledge and health behaviour in a community[8]. In developed countries, females are known to have a better oral health behaviour than males. This was not expressed in this study.

Conclusion

This study brings into focus the establishment of a positive attitude prior to knowledge and without it being followed up with a health directed behaviour. This brings into saliency the need for knowledge in harnessing a behaviour and the influence of vulnerability factors in behaviour development.

(1) Despite the adequate knowledge of subjects on tooth cleaning frequency, they may not be well versed in cleaning their teeth efficiently.

(2) Lack of knowledge on and poor oral health practices in other important factors that promote oral health, such as diet, regular dental clinic visits and causes of periodontal disease was clearly demonstrated in the subjects.

(3) Positive attitude towards factors that contribute to oral health was shown by the subjects.

(4) Educational status was highly influential on the level of oral health practices and knowledge of some factors that promote oral health such as knowledge about regular dental visit, vulnerability of diabetics to gum disease and necessity of glyceamic control in the prevention and control of oral diseases.

Recommendation

The discrepancy between their positive attitude with their already established tooth cleaning behaviour on one hand and their high perceived need as well as their poor knowledge regular clinic attendance and diet on the other hand, bri into saliency areas of oral health education which need atte most in the subjects. Oral health education shoul incorporated into the already existing health educa programmes for diabetics. Such a programme should incl teaching of tooth cleaning skills that will result in effic removal of dental plaque. It should include giving informat on and encouraging practices that enhance oral health. Al it should include creating awareness of the common diseases and for diabetic patients, factors that c compromise their oral health as a result of their dia condition.

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Table 2: Oral health knowledge attitude and behaviour of interviewers

	Healthy non-diabetic subjects N = (36) %	Controlled diabetic patients N = (39) %	Unconrolled diabetic patients N = (62) %
Knowledge			
Need to clean my teeth a minimum of twice daily.	86.1	84.6	95.2
For healthy teeth and gums need to eat a balance diet including fruits and vegetables and reduce sugary foods.	2.8	31	29
Regular dental clinic visits every six months.	25	23.1 53.8	45.2 41.9
Causes of gum disease	44.4		
Vulnerability of diabetics to gum infections.	63.9	38.5	43.5
Glycaemic control in the prevention and control of oral infections in diabetics.	33.3	46.1	53.2
Diseases of the gum can be prevented	64.5	53.8	56.4
Attitude			
It is important to care for the teeth and gum.	69.4	79.5	90.3
It is necessary to clean my teeth and gum everyday.	52.8	74.3	87.1
I consider gum and teeth infections seriously.	52.8	74.3	79
I clean my teeth for the purpose of having healthy teeth and gums	55.6	38.5	62.9
Behaviour Frequency of cleaning the teeth			
Not at all	5.6	5.1	0
Twice daily	47.2	43.6	33.9
Once daily	33.3	38.5	58.1
More than twice daily	11.1	10.2	8.1
Not everyday	2.8	2.6	0
Oral clinic attendance			
Regular	11.11	2.6	8.1
When I have problem	33.3	43.6	41.9
Never attended	55.6	53.8	50

and regular dental clinic attendance was observed in this study. Various research on attitudes have shown that what people say is not necessarily a guide to what they will do or what they do and that opinion and action are influenced by a different set of antecedent and situational variables[20]. This explains the lack of correlation between their attitude and their dental clinic attendance.

The oral hygiene practice of all the groups are consistent with their knowledge of and attitude to oral cleaning. The dental clinic attendance behaviour of all the groups is poor and this correlates with their knowledge on the necessity of regular dental clinic attendance. Majority of the subjects are diabetic and do not depend on sugary diet. Generally very few people take fresh fruits on regular basis whilst majority of the population take their vegetables cooked[21,22]. The behaviour of reduced consumption of sugary food among the diabetic groups is oral health related, rather than directed. Even though a high percentage of the participants claim they brush their teeth regularly everyday, which is also supported by the observations on their knowledge and attitude, it is not consistent with a previous study on their perceived oral health needs in which removal of calculus was the highest perceived need[13]. Few studies have highlighted the efficiency of cleaning, rather than the frequency, as the more important aspect of cleaning the teeth and brushing the teeth efficiently once daily will keep plaque at low levels compatible to gingival health[23,24]. This point is illustrated by the dose response curve of plague and gingivitis[24]. Calculus removal being the highest perceived oral health need may point to the poor efficiency of cleaning in this study group.

Recent studies on oral health education have demonstrated the failure of various behavioural models to achieve desired results in study groups[20] and have expressed the disadvantage of looking at behaviour change in isolation[1]. Various researches have highlighted the influence of environmental factors such as socioeconomic status, gender, education and socio-cultural, in establishing behaviour. It is known that people of low socio-economic group have poor oral health behaviour [8] Majority of the subjects are from the low socioeconomic group and even though they come from the urban area, they are really from the indigenous areas

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References

1. Hunt SM and Macleod M. Health and behavioural change, some lay perspective Community Medicine 1987; 9, 1: 68-76.
2. World Health Organisation. Global oral data bank W.H.O. Geneva 1993.
3. World Health Organisation. Towards a better health future. Oral health for a healthy life. W.H.O. 1994:1-3
4. Taiwo JO. Oral hygiene status and Necrotizing ulcerative gingivitis in Nigerian Children, J. Periodontal 1993; 63: 1071-1074.
5. Kubota K, Wantaobe IT and Hollist NO et al. Oral Survey in Nigeria Part 4, Prevalence and Severity of Periodontal Diseases. Bull Tokyo Med. Dent. Univ. 1988; 35: 11-17.
6. Enwonwu CO. Review of oral diseases in Africa and influence of socio-economic factors. Int. Dent. J. 1981; 1: 29-38.
7. Sheiham A. Dental cleanliness and chronic periodontal disease. Studies on British population Brit. Dent. J. 1970; 129: 143-418.
8. Green JC. Oral hygiene and periodontal disease Amer. J. Public Health 1963; 53: 913.
9. Sandholm L, Swanlgung O, Rytomaa I, Kaprio E A and Meanpaa J. Morphotypes of subgingival microflora in diabetic adolescents in Finland. J. Periodontal 1989; 95: 26.
10. Wilson TG. Periodontal disease in individuals with diabetes. Diabetes Care 1991 14, 5. 375.
11. Freeman R, Maizels J, Wyllie M and Sheiham A. The relationship between health related knowledge, attitudes and dental health behaviour in 14-16 year old adolescents. Community Dental health 1993; Dec. 10: 4 397-404.
12. Locker D. Oral health education. An introduction to behavioural science and dentistry London: Tavistock/Routledge 1989; 161-176.
13. Taiwo JO and Akinlade K. Oral health needs and barriers to oral health care of patients with diabetes in Ibadan, Nigeria. Afr. Journal Med. Pract. 1997; 4: 2 51-63.
14. Ohwovoriole AE F, Fasanmade OA and Johnson T O. Assessment of diabetic control, an African Perspective. Diabetes International Digest 1994; 5(2); 47.
15. Health Education Authority. The scientific basis of dental health education, a policy document 3rd edition. London. Health Education Authority 1989.
16. Taiwo J O. Effect of social class on the prevalence and severity of necrotising ulcerative gingivitis in Nigerian children. African Journal of Medicine and Medical Sciences 1996 25 357-360.
17. Rifat Naghmi. Skin disorders in diabetes mellitus. International diabetes Digest July 1993 4-3.
18. Rayner JF and Cohen LK. School dental health education. In Social Sciences and Dentistry eds Richards N.D. and Cohen L K. London Federation Dentaire Internationale. 1971 pp275-307.
19. Green LW, Johnson KW. Health Education and health. Health care and the Health professions ed Mechanic D. London Coller Macmillan 1983; 744-765.
20. Wrightsman L S. Characteristics of positively scored and negatively scored items from attitude scales. Psychological reports 1965; Dec. 171: (3) 898.
21. Enwonwu CO and Edozien JC. Epidemiology of periodontal disease in Western Nigerians in relation to socioeconomic status Arch Oral Biology 1970; 15: 1231-1244.
22. Jelliffe DB. Assessment of the nutritional status of the community W.H.O. Geneva 1966.
23. Theilade E, Wright WH, Jensen SB and Loe H. Experimental gingivitis in man. A longitudinal clinical and bacteriological investigation. Journal of Periodontal Research 1966; 1:1-13..
24. Sheiham A. Current concepts in health education. In Shanley D.B. ed. Efficacy of treatment procedures in periodontics. Chicago, Quintessence Publishing Co. Inc. 1980.