

Studies of Bacterial Agents Associated with Dental Caries in Owerri, Imo State

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Abstract— An epidemiology study on dental caries was carried out in Federal Medical Central (F.M.C) Owerri Imo State Nigeria. A total of 45 specimens were collected which involved 30 Females and 15 males of various ages in May 2015 – July 2016 using standard microbiological methods. Informed consent was sought and obtained from patients after the objectives of the study had been carefully explained to them. Each patient was examined clinically for signs and symptoms of dental caries and a swab of each identified lesion was taken. In addition, a pre-tested questionnaire was administered on each patient to identify their nutritional habits. The results showed that out of 45 specimens collected, 30(66.6%) were positive for dental caries while 10(22.2%) were not infected, which involved 20 (66.6%) Females and 10 (33.3%) males. The prevalence of dental caries decreased with increase in age of patients with the 0-25 (60.0%) years group being the most affected while those patients aged 26 – 70 years (40.0%) were the least affected group. Also, the occupation related prevalence showed that students were the most affected group. The result further revealed that dental caries rate was significantly higher in non-tooth paste users 20(66.6%) than in paste users 10 (33.3%). The organisms commonly isolated from dental caries lesions included streptococci mutant, staphylococcus aureus and escherichia coli. In conclusion, the result of the study revealed that dental caries is common among students. Therefore there is need for public health enlightenment in the public health implication also maintain good oral practices, daily oral hygiene and ensure regular visits to dentists.

Keywords—Bacterial agents, Prevalence, Dental caries, Gender, Imo state

I. INTRODUCTION

Dental caries also known as tooth decay or cavities is a disease which damages the structures of teeth. Specifically, in dental caries, the mineralized tissues of tooth undergo progressive destruction from the surface of the tooth (Todar, 2002). The occurrence of dental caries is widespread and the disease can lead to pain, tooth loss, infection, and in severe cases, death. An estimated 90% of school children worldwide and mostly adults have had cavities (Alanen et al., 2002). The disease is more severe in countries in Asia and Latin America than those in Africa.

Tooth decay is caused by acid producing bacteria, which is responsible for the most damage in the presence of fermentable carbohydrates such as sucrose and glucose (Todar, 2002). The bacteria agents commonly associated with dental caries are *streptococcus mutants* and *streptococcus sobrinus* (el – Nadeef et al., 1998). The acidic PH levels in the mouth affect the teeth because of their high mineral content. Depending on the extent of tooth decay, various treatments can be used to restore the teeth to proper form, function

esthetics but to date there is no known method to regenerate large amounts of tooth structure.

Consequently, Dental Health Associations of many countries advocate use of preventative measures such as regular oral hygiene and dietary modifications etc, to avoid developing dental caries (Den – Besten and Berkowtz, 2003). The bacteria that colonize the surface under certain conditions produce sufficient acids to demineralize the enamel covering of the tooth crown or the cementum covering the root, which eventually cause the destruction of dentin (Andevson and Bales, 2003). As the destruction of the dentin progresses, along with breakdown of the organic components, the bacteria invade the dead tissues and infect the pulp chamber resulting in toothache. The infection can ultimately destroy the pulp tissues and extend through the apical openings of the roots and into the surrounding periodontal tissues (el – Nadeef et al., 1998). The sites of caries development have been correlated with the presence of dental plaque containing one of a number of *streptococci mutants* notably in humans, *streptococcus mutants* and *streptococci sobrinus*. These microorganisms are cariogenic because of their ability to generate considerable amounts of acid as a result of their metabolic of carbohydrates, as well as their ability to survive in any acid environment. Each time a carbohydrate-rich substance is ingested, acid is formed. Therefore, the frequency of ingestion and physical consistency of fermentable carbohydrate are important factors are caries formation.

II. MATERIALS AND METHODS

The study was carried out in Owerri, Imo State, Nigeria. The capital city has a Federal Medical Center (F.M.C), a school of nursing and some specialist dental clinics.

III. ANALYSIS OF THE SAMPLE

Isolation of bacterial agents from specimen was done using cultural method as described by Cheesbrough (2002), Suleman and Ibrahim (2002), Fawole and Oso (2004), Prescott *et.al* (2007) and Uwaezuoke (2006). The specimens were inoculated on sterile agar media, and then incubated at 37°C for 24 hours. The incubation was done with the lids of the petri dishes on the floor of incubation and the bottom containing the medium upper most to avoid condensation. After the incubation, colonies formed were described for morphological appearances and then colonies were picked and sub-cultured on nutrient agar in order to obtain a pure culture. Stock cultures of isolates were maintained on nutrient agar slant for further identification using various biochemical test.

The isolates were identified using colonial and cellular characteristics then biochemical properties.

IV. RESULT

The result of the study showed that out of the 45 patients examined for dental caries 30(66.6%) were infected while 10(33.3%) were uninfected (Table I). The gender related prevalence of dental caries showed that females (66.6%) had more caries than male (33.3%). The occupational distribution of dental caries in the study area us in (Table III). Table IV shows the prevalence of dental caries according to paste and non paste users. Table V summaries the bacteria isolated from dental caries patients *streptococci mutans* were the most prevalent organism (50.5%) while *E.coli* were the least prevalent.

TABLE I Gender-Related prevalence of dental caries in study area.

Gender	Number Examined	Number Positive	%
Male	20	10	33.3
Female	25	20	66.6
Total	45	30	99.9

The result of the study showed that out of the 45 patients examined for dental caries, female recorded the highest infection rate 20(66.6%) while male had the least of 10 (33.3%).

TABLE II. Age related prevalence of dental caries in the study area.

Gender	Number Examined	Number Positive	%
0 - 25	25	18	60.0
26 - 70	20	12	40.0
Total	45	30	100.0

TABLE III. Occupational distribution of dental caries in the study area.

Occupation	Number Examined	Number Positive	%
Trader	15	10	33.3
Students	20	15	50.0
Civil Servant	10	5	16.6
Total	45	30	99.9

Table III shows the occupational related distribution of dental caries in the study area. The prevalence of dental caries was highest (50.0%) in students, while civil servants were the least affected group (16.6%).

TABLE IV. Prevalence of dental caries according to paste and non – paste users.

Patients	Number Examined	Number Positive	%
Paste Users	20	10	33.3
Non-Paste Users	25	20	66.6
Total	45	30	99.9

Table IV shows the prevalence of dental caries amongst tooth paste users and non-paste users. Non paste user had the highest infection rate of 20(66.6%) while paste users had the least of 10(33.3%).

Table V summaries the bacteria isolated from dental caries patients. *streptococci mutans* were the most prevalent organism (50.0%) whole *escherichia.coli* were the least prevalent (16.6%).

TABLE V. Bacteria isolated from dental caries.

Bacteria Isolate	Number Examined	Number Positive	%
<i>streptococcus mutans</i>	20	15	50.0
<i>staphylococcus aureus</i>	15	10	33.3
<i>escherichia coli</i> (E.coli)	10	5	16.6
Total	45	30	99.9

V. DISCUSSIONS

Dental disease is a growing public health problem in Nigeria. At present, very few studies have been carried out on dental disease to determine its actual prevalence's. The prevalence of dental caries and pulpitis were higher in the study participants aged 0-25yaers 18(60.0%) than those aged 26-70 years 12(40.0%). The higher prevalence is attributed to the usual and common habits of children and adolescent in consuming sugar and sugary diet such as swab, chewing gum, ice cream, cake etc. at random. This helps in the development of thick plaque, thus increasing the risk of having caries and pulpitis which is an extension of the carious process.

The gender related prevalence of dental caries showed a higher rate in females 20(66.6%) than in male 10(33.3%) patient. The higher prevalence among females may be as a result of the female hormone PROGESTERONE which dilates blood vessels thereby aiding inflammation and inhibition of the repair of collagen, the structural protein that supports the gum (Adegboembo, 1995). In addition, female as part of their nature are more inclined to consume sugary diets which encourage bacterial growth and dental decay.

The prevalence of dental caries was recorded highest in students 15(50.0%) the least recorded among civil servant 5(16.6%) and pupils among students than traders is attributable to difference in diet since children and adolescents consume increase quantities of sugar and sugary foods than older peoples. This finding could be associates with the fact that most tooth pastes contain fluoride and other substances which have antibacterial activities and consequently reduces the risk of developing dental caries. Also, the rate of salivary flow is reduced at night since much chewing is done after such meal. This decrease in salivary flow reduces the buffering effect of saliva and demineralization of tooth surfaces, therefore increasing the risk of dental caries.

VI. CONCLUSION

The result of this study has shown that dental caries is common in people of different sexes, ages and occupational group in Owerri, Imo State Nigeria. Thus, there is need for improved oral hygiene habit and dental care amongst the populace. In conclusion, it is recommended that persons with dental problems should maintain good oral heath, practice daily oral hygiene and ensure regular visits to the dentist.

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