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Age in Years, Food Consumption Pattern and Tooth Problem/Tooth Loss Among Preschool Children Owerri Settlements in Imo State, Nigeria

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Abstract: The effect of age in years, food consumption pattern and prevalence of Dental carries among preschool children in settlements of Owerri metropolis, Imo State, Nigeria was investigated. It was aimed to determine the related risk and causative factors of early childhood caries among preschool children residing in areas of Owerri, Imo State. The schools used for this study were Imo State University staff school, Orlu road primary school, Owaelu- Uratta primary school and Nekede primary schools respectively. Data were collected through a questionnaire and were distributed to the parents of the preschool subjects under the study area. The data were analysed using frequencies and percentage and, the mean results obtained were analysed using ANOVA (SPSS 2.10 version). The research revealed, incidence of caries of between 5-50% following findings. Dental caries is associated with parental occupation with 50% and among the rural areas studied; Owaelu- Uratta primary school had the highest caries risk with 40%. However, risk factors of dental caries observed ranged between 2.5% to 57. 5% and 7.5% to 77.5% for pre- school children. Prescisely. Orlu road primary school had the least caries risk with 5%. The highest risk factor was found to be as a result of food consumption pattern of frequent sugar intake, ready availability of snacks, also occasional and ineffective cleaning or brushing of teeth. However, the lowest risk factor was seen as a result of drinking fluoridated water, low sugar intake and frequent cleaning of teeth. The study recommended that dietary counseling should be encouraged to parents and care givers so as to modify the children's diet, inclusion of dental health care in school curriculum at all levels and also the socio-economic status of families should be raised through increasing their income and wages.

Keywords: Age, Food Consumption Pattern, Dental Caries, Preschool Children, Owerri Settlements

1. Introduction

Early childhood caries is considered as a serious public health problem as it is a complex disease of primary dentition which relates serious behavioural issues that afflict mainly the infants and toddlers. Dental caries is considered the most common ignored chronic disease among children. This is due to the formation of adherent masses on the teeth (plaque). Frequent intake of sugar and sweet foods and drinks leads to dental caries. Bacteria act on the sugar (sucrose) and releases lactic acid and other acids thus causing dental caries [9] It is formed the breakdown of sugar in the diet by bacteria [14]. This is a medical term for tooth decay, including cavities in teeth. Early childhood caries is recognized as a dull, white dematerialized enamel that quickly advances to obvious decay along the gingival margin. Dietary habits, Socio- economic status working status of mother, oral hygiene habits of mother and infants and frequent intake of medications are certain risk factors for this condition.

Obiakor, P. N [16] described dental caries as an example of interaction of nutrition and infection. Early childhood caries, if left untreated the deleterious effects are malocclusion phonetic problems and sub-optimal health. Incidence of early dental caries in preschool children in settlements of Owerri, Imo State, Nigeria was investigated. In contrast, with modernization, changing diets and more frequent consumption of fermentable carbohydrates, dental caries has increased in the developing countries, particularly in urban areas of Africa, Asia and Latin

America [16]. This study aimed to determine related, risk and causative factors of early childhood caries among preschool children residing in areas of Owerri, Imo State.

2. Methodology

Prevalence of early dental caries incidence in preschool children in rural- urban settlements in Imo State was investigated. Owerri is an urban and semi- urban area and shares all features of urbanization just like its counterpart in the country; Nigeria. The schools that were used are Orlu road primary school, Owaelu-Uratta Primary School and IMSU staff school, Nekede primary school all in Owerri Municipal. Survey design has to do with personal interview, questionnaire, observation, telephone interviews etc.

Survey design has to do with personal interview, questionnaire, observation, telephone interviews etc.

2.1. Sample Selection

Four primary schools (two primary schools and two children ministries) in Owerri L. G. Areas were used as samples for the study. About 50 preschool children between the ages of 2-5 years were used for the study. The preschool were grouped into male (25) and female (25) according to their ages. A questionnaire was given to their parents to fill in order to collect information on their socio- economic status, dietary and oral hygiene habits of their children.

2.2. Sample Size Determination

A sample is usually a percentage or a number of the population to be determined by the researcher using the sample size determination formular.

$$n = \frac{N}{1+N(e)^2}$$

Wheren=Sample size
N=population size
1=constant
e=error margin usually 5%(0.05)
The sample is thus derived as

$$n = \frac{57}{1+57(0.05)^2}$$

$$= \frac{57}{1+57(0.0025)}$$

$$= \frac{57}{1+0.1425}$$

$$= \frac{57}{1.1425}$$

$$N=49.89$$

$$\cong 50$$

$$N=50$$

Sample size to be used is 50

2.3. Validation of Methods of Study

Validation is the process of determining the degree to which an instrument measure what it suppose to measure.

The researcher, made sure that in the research that all questions in the research questions, significant of study and statement of the problem were all included. The instrument used in this study benefited from a face validity.

2.4. Limitations of the Study

In conducting this research, the following problems were encountered:

a. Inadequate research fund: Insufficient finance is one of the major hindering factor of a successful research work. The researcher provides all finance to be used in the work which may not be sufficient to conduct the research effectively.
b. Lack of research material: Research materials are vital tools in every research and the inability to get hold of one hinders the research from doing an effective work or slows down the work.
c. Lack of research equipment: In recent times, data collected from issuing out questionnaire need to be run using computersin order to get the desired information. The inaccessibility of modern equipment such as computer slows down the researchprocess as the manual method is then used in the analysisof data which is time consuming and tedious.

2.5. Data Collection

The data was collected through primary sources. Primary source involves the use of questionnaire administration to schools and also the use of personal interview. A self tested questionnaire containing question on socio- economic status, oral hygiene habits of children and feeding (dietary). Secondary data was gathered through consultation of books, journals and periodicals etc.

2.6. Data Analysis

The statistical model, SPSS 2.10 version was used to analyse the data obtained and collected. Analysis of variance (ANOVA) was used, it shall be based on the responses to questions in the questionnaire. Anova is used here to test the validity of answers.

3. Results

The data presented in a tabular form and simple percentagewere assigned to each response. This chapter centered on the section B of the questionnaire which involved the Research questions.

Table 1 above shows that 40 respondents answered and returned the questionnaire given to them, only 10 did not return theirs. This shows that out of 50 questionnaires that were distributed 80%was returned while 20% were not returned.

Table 1. *Personal data of preschool children /information in rural and urban areas of imo state.*

Sex, Age and Class of the preschool children		
Sex	**Response (No)**	**percentage (%)**
Male	15	47.1
Female	25	52.9
Total	40	100
Age		
2years	11	27.5
3 years	12	30
4years	10	25
5years	7	17.5
Total	40	100
Class/Level and School		
Orlu Road Primary School	5	12.5
IMSU Staff School	13	32.5
Nekede Primary School	10	25
OwaeluUratta Primary. School	12	30
Total	40	100

Table 1 Indicate that out of 40 respondents 47.1% are made while 52.9% are female. According to their age in years 27.5% were 2years old, 30% were 3years old, 25% were 4years old and 17.5% were 5 years old and according to their class and school, 12.5% representsOrlu road primary school, 32-5% represents IMSU staff school, 25% represents Nekede primary school and 30% represents OwaeluUratta primary school

Table 2. *Socio demographic characteristics of the family of the preschool children.*

person you live with	**Response**	**%**
Father and mother	9	22.5
Mother alone	14	35
Father alone	7	17.5
Guardian	10	25
Total	40	100

Occupation	**Orlu Road Primary school**	**IMSU Staff School**	**Nekede Primary School**	**OwaeluUratta Primary School**	**Total**	**%**
Farming	4	7	3	6	20	50
Civil servant	1	5	6	3	15	37.5
Doctor	0	1	0	1	2	5
Lawyer	0	0	1	2	3	7.5
Total	5	13	10	12	40	100

From the table above, this shows the socio – demographic characteristics of the family of the preschool children, where 22.5% of the preschool children lives with their father and mother, 35% lives with mother alone, 17.5% lives with father alone and 25% lives with their guardians. According to the occupation of their parents, 50% of their parents engage in farming, 37.5% are civil servants, 5% are doctors and 7.5 are lawyer.

SECTION B:

Table 3. *Incidence of early dental caries/tooth decay in preschool children.*

Variable	**Orlu RoadPrimary school**	**IMSU Staff School**	**Nekede Primary School**	**OwaeluUratta Primary School**	**Total**	**%**
Do you have what is called tooth decay?						
Yes	2	4	5	5	16	40
No	3	9	5	7	24	60
Total	5	13	10	12	40	100
How many times do you clean your teeth a day?						
Once	4	11	9	7	31	77.5
Twice	-	2	-	4	6	15
After every meal	-	-	-	-	-	-
I don't Clean at all	1	-	1	1	3	7.5
Total	5	13	10	12	40	100

The above table shows that 16 respondents out of 40 respondents have tooth decay which is 40% and 24 respondents out of 40 respondents are caries free which is 60%. And 77.5% of the preschool childrenclean their teeth once, 15% clean theirs twice, undecided for after every meal and 7.5% do not clean at all.

Table 4. *Snack /Food Consumption, Fruits intake and Intake of sugary foods at night by the Preschool Children.*

Variable	Orlu Road Primary School	IMSU Staff School	Nekede Primary School	OwaeluUratta Primary School	Total	%
What food do you like best?						
Biscuits	2	2	1	0	5	12.5
Sweet	1	2	0	4	7	17.5
Cake	0	1	0	0	1	2.5
Rice	0	0	0	1	1	2.5
Yam	0	0	0	3	3	7.5
All of the above	2	8	9	4	23	57.5
Total	5	13	10	12	40	100
How often do your parents give you fruits?						
Once	2	1	2	2	7	17.5
Occasionally	-	6	3	3	12	30
Never	3	6	5	7	21	52.5
Total	5	13	10	12	40	100
Do you feed your child with sugary foods like (tea, ice cream, sweets, etc) at night?						
Yes	4	11	8	10	33	82.5
No	1	2	2	2	7	17.5
Total	5	13	10	12	40	100

The table above shows that out of 40 respondents, 12.5% loves taking biscuits, 17.5% loves taking sweets, 2.5% loves taking cake, 2.5% loves eating rice, 7.5% loves eating yam and 57.5% loves taking all the foods. Also, it shows that 17.5% takes fruits once, 30% out of the 40 respondents takes fruits occasionally and 52.9% never took fruits. And this indicates that 82.5% of parents feed their child with sugary foods at night while 17.5% do not.

Table 5. *Dental treatment and visit to the Dentist/Dental check up.*

Variable	Orlu RoadPrimary School	IMSU Staff School	Nekede Primary School	OwaeluUratta Primary School	Total	%
Where was your tooth problem treated?						
Chemist	-	4	1	6	11	27.5
Dental Centres	-	1	-	-	1	2.5
At home with herbs	4	4	5	3	16	40
Not treated at all	1	4	4	3	12	30
Total	5	13	10	12	40	100
Has either of your parents taken you for a dental check up?						
Yes	1	3	2	2	8	20
No	4	10	8	10	32	80
Total	5	13	10	12	40	100

Table 5 above shows that 27.5% treated their tooth problem in the chemist, 2.5% treated theirs in dental centres, 40% treated theirs at home with herbs and 30% did not treat theirs at all. And it also shows that 20% out of the 40 respondents take their child for a dental check up while 80% do not take their child for a dental check up.

Table 6. *Age in years when they had tooth problem/Tooth loss and other conditions experienced by the Preschool Children.*

Age	Response (No)	%
How old were you when you lost a tooth to decay?		
2years	5	12.5
3years	5	12.5
4years	3	7.5
5years	3	7.5
Total	16	40

	Orlu	IMSU	Nekede	Owaelu	Total	%
Which other conditions did you have when you had this tooth problem?						
Dry mouth	-	1	-	4	5	12.5
Discoloration of the teeth	-	4	3	5	12	30
Malnutrition	5	8	7	3	23	57.5
Mental disorder	-	-	-	-	-	-
Total	5	13	10	12	40	100

Dental caries	Orlu	IMSU	Nekede	Owaelu	Total	%
Urban	2	4	-	-	6	
Rural	-	-	5	5	10	

Dental caries	Orlu	IMSU	Nekede	Owaelu	Total	%
Caries free	3	9	5	7	24	
Total	5	13	10	12	40	

Table 6 above shows that 12.5% had dry mouth, 30% had discoloration of the teeth, 57.5% had malnutrition and undecided on mental disorder and also shows that in urban settlements, a total of 6 children had dental caries while in rural settlements, 10 children had dental caries and 24 were caries free Dental caries according to settlements.

4. Discussion, Conclusion and Recommendation

4.1. Discussion

Sex, Age and class distribution of the preschool children

The Table 1 shows the distribution of the questionnaire according to the sex, age and class of the preschool children, where 47.1% were found to be males and 52.9% to be females. According to [1], Dental caries occursmore in male children than female children due to the fact that male children has increasein physical activity thus there isincrease demandfor more food. This table also shows the age of the preschool children in years, 27.5% were 2 years, 30% were 3years, 25% were 4 years and 17.5% were 5years old respectively. According to the data [7] approximately 23%-37% of children aged 2-5 years had experienced dental caries in primary teeth. The above table indicates the distribution and return of questionnaire according to class/schools with 12.5% representingOrlu road primary school, 32.5% representing IMSU staff school, 25% representing Nekede primary schooland 30% representing Owaelu-Uratta primary school. Dental Caries is experienced more in children between the ages of 2 and 3years olds as they depend on their parents for food and oral hygiene habits.

Socio-demographic characteristics of the family of the preschool children

The Table 2 also shows that 22.5% of preschool children lives with both parents, 35% lives with their mother alone, 17.5% lives with their father alone and 25% lives with their guardians. According to [19] suggested that early childhood caries is most commonly found in children who are born to single mothers, whose parents have low education level, especially those of illiterate mothers. The above table also shows the occupation of the parents of the preschool children with 50% of mothers found to be non-working thus contributing to this disease due to low income. In previous study, 52.9% of mothers werefound to be non-working and this is in accordance with previous studies. According to [19] suggested that early dental caries is more commonly found inchildren who live in poverty, who are born to single mothers, whose parents have low education level especiallythose ofilliterate mothers. Hence, a strong association was found between occupation of the parent and caries incidence in the study. Oral disease in children is higher among poor and disadvantaged population groups and also found in people with low income and education levels due to unhealthy diet, poor oral hygiene and social determinants.

Furthermore, children from low socio-economic status families show higher caries prevalence due to their inability to obtain professional oral health care services, care for themselves and even eat a balanced diet.

The Prevalence of Dental Caries and oral hygiene habits of preschool children.

The Table 3 shows that the prevalence of dental caries in rural and urban settlement in Owerri, Imo State is 40% which is in accordance to [9] "in far East Asia, the prevalence and severity of early childhood caries ranged from 36% to 85%. From this randomly selected study, 40% out of the total of 50 preschool children revealed that the prevalence of early dental caries still militate in both the rural and urban settlements of Imo State. According to data [7] "the prevalence of dental caries is a public health problem for both rural and urban and approximately 60%-90% school aged children suffer from dental caries and the prevalence reported in western countries is varied. From this study, children from rural areas were more affected than their urban counterparts. This could be due to poor access to dental care in those areas, lack of awareness to this problem and also lack of nutrition education. According to [20] "the prevalence of caries of caries in the early 1980's was high. However, the prevalence of dental caries varies with the study location in Nigeria, ranging between 13.9% to 17.4% in the semi-urban settlements of llelfe to between 11.2% and 48.0% in urban areas such as Benin, Enugu, Lagos.

The table 3 also indicated the oral hygiene habits of children with 77.5% brushing their teeth once and 15% brushing theirs twice which is in contrast with previous study that found 76.1% of children having brushing habit twice a day. Oral hygiene habits of preschool children are modeled by family behaviour particularly maternal behaviour which is related to the caries prevalence in their children [21]. Preschool children neither understand nor know how to maintain good oral hygiene. Parental assistance and guidance are essential to reduce the risk of developing caries. There is a need for prolonged parental participation in the cleaning of preschool children's teeth andit calls for aneffective and efficient parent educationregarding oral health careand preventive strategies which can easily be implemented and eventually reduce caries incidence, since many ofour attitudes and habits concerning food andhealth are acquired inearly childhood. Preschool children should be given assistance to brush twice a day and also rinse the mouth with water after brushing so as to reduce the efficacy of the fluoride tooth paste in the prevention of caries.

Snack/Food Consumption, Fruits intake and Intake of sugary foods at night by the Preschool Children.

The table 4 shows the consumption of in between meal,

foods/snacks taken mostly by the preschool children with 57.5% consuming all foods made of fermentable carbohydrates thus contributing to dental caries. From previous study, those that consumed snacks was 61.7% which is in contrast with the present study. The present study supports earlier studies which stated that frequent consumption of sugary foods, snacks and drinks increases the risk for caries [23]". This is due to the readily availability of snacks consumed mostly by the children that is normally given to them by their parents and the prevalence of dental caries was seen to rise in those with increased snack frequency. This can be in form of candies, chocolate, sweets and soft drinks.

The above table4 also shows the percentage of preschool children that takes fruits. 52.5% of them did not take fruits at all which increases the occurrence of this disease. The consumption of fruits and vegetables promotes proper oral hygiene in preschool children more especially infants and toddlers. According to [13] this helps to promote health and reduce the risk of dental caries. Table 4. Table 4 further shows the percentage according to mothers feeding their children with sugary foods like (tea, ice-cream, sweets) at night. 82.5% feeds their children with sugary foods which is in accordance with earlier studies which states that "frequent consumption of foods, snacks and drinks in between meals increases the risk for caries [3]. And increasing the frequency of sugar intake increases the odds of developing dental caries so lowering sugar intake can reduce it.

Dental treatment and visit to the Dentist/Dental check up

Table 5 shows the percentage according to dental treatment, where 30% did not treat theirs at all which contributes to the incidence of this disease in preschool children. According to [9], untreated decay in school aged children doubles from 14% to 31% when a child is from a low income household and thus it is in accordance with the present study. This is as a result of the low income of the family and low knowledge of the dental disease. When caries is left untreated, it can lead to infection, which can spread to other parts of the body including the brain. There have been two reported cases of children dying from brain abscess resulting from untreated caries. For children, persistent pain from untreated caries decrease the quality of life of the child, interrupting the ability to learn, play, eat and sleep. Although children who suffer from chronic pain may live fulfilling and productive lives, and persistent pain causes the child to lose school hours, thus they spent less productive time in school as the pain interfere with the ability of the child to concentrate. [23] The table also shows that 80% of parents do not take their child for dental check up. According to [6] found those with a household income problem thus delaying visit to a dentist and spend less time on their personal and daily oral hygiene. Furthermore, irregular attendance can worsen the situation thus the child experiences pain, misses school and becomes malnourished. And during the visit to a dentist there should be dental health education given to the parents of the preschool child to establish good oral hygiene and dietary habits to prevent further occurrence of this disease as a measure to reduce the consumption of sugars and promote the effective use of fluoride toothpaste [3].

Age in years when they had tooth problem/Tooth lossand other conditions experienced by the Preschool Children

The Table 5 shows the age in years when they lost a tooth to decay. Children from 2 to 3 years are those mostly affected by this condition. Caries prevalence was seen to increase with age, which is in accordance with previous study. As children growolder; change in their dietary habits and oral hygiene practices pose a greater cariogenic challenge [15]. The table6 shows the other conditions experienced by the preschool children with 57.5% experiencing malnutrition. This is due to unhealthy diet, poor oral hygiene and low socio-economic status of the families. According to [19], dental caries is found more in children living in poor economic conditions and due to malnutrition, these children have an increased risk of preference for sugary foods (fermentable carbohydrates) and exposure to fluorine is probably insufficient. Poor feeding exacerbates the effects of pain on concentration and energy, and thus leads to malnutrition. The ability of the child to eat healthy foods is greatly reduced as the pain interfere with inability of the child to concentrate, so the ability of the child to take on the task of a full day in school is being diminished and also reduces the ability to eat healthy foods [3].

4.2. Conclusion

The study revealed that early dental caries is a prevalent and common disease of childhood. Infants and toddlers are mostly affected by this condition as they are dependent on their parents or caregivers for diet and oral hygiene method. Dental caries in general and early childhood caries in particular represents a serious public health problem for all children. Dental caries is painful, expensive to treat and can harm nutrition and overall health.

There is an urgent need to implement preventive and curative oral health programs for preschool children in rural and urban areas more especially the rural areas.

A more effective and acceptable preventive programs should be:

1) Implemented during the baby steps of a child's life.
2) Primary prevention must start in the prenatal stage to fulfill the needs of pregnancy through diet counseling.
3) Parents should be encouraged to avoid bad feeding habits and to instruct and supervise their children in tooth brushing.
4) Mothers should take their children for regular examinations before the age of one year.
5) Infants and young children should be provided with a balanced diet in accordance with the Dietary guidelines for Americans published by the U.S department of Agriculture and the U.S department of Health and Human Services (USDHHS).
6) Unrestricted and at will consumption of liquids, beverages and foods containing fermentable carbohydrates (examples juice drinks, soft drinks, milk and starches) can contribute to decay.
7) Unrestricted and at will intake of sugary liquids during the day or while in bed especially at night should be discouraged.

4.3. Recommendations

The following recommendations are made based on the findings of this study.

1) Pregnant mother's diet should be nutritionally adequate to enhance well formed teeth in childhood.
2) Health education should be given to all, to create awareness on the dangers associated with neglect of oral health.
3) Dietary counseling should be encouraged so as to modify individuals diet.
4) Inclusion of dental health care in school curriculums at all levels.
5) Use of fluoride toothpaste which is cost effective should be advocated for when brushing children's teeth.
6) Parents as models, should ensure they maintain good oral health behaviour since these influence their children's oral health behaviour.
7) Children from three years and above should receive at least two dental checkups over a 12 (twelve) month period (Recommendation from American academy of pediatrics dentistry).
8) Parents and caregivers should avoid prolonged exposure to sugary drinks while baby sleeps-when saliva flow is induced.
9) Mothers should put only water in their baby's bottle at bedtime or naptime.
10) Pregnant women should get prenatal care, eat healthy diet that include folic acid to prevent neural tube defective, cleft lip and palate.
11) Socio-economic status of families should be raised through creating enabling environment by increasing their income and wages.
12) Training on good oral hygiene and early introduction to tooth brushing in children need be stressed.

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