Epidemiology of dental caries in children in Nigeria
Objectives

• To discuss the epidemiology of caries in both the deciduous and permanent dentition in children in Nigeria.
• To highlight the differences in the epidemiology of caries in the two dentition.
• To identify gaps in knowledge in the epidemiology of caries in children in Nigeria.
Introduction

- Caries results from an interplay of four factors – consumption of dietary sugars, presence of susceptible teeth, bacteria plaque and time.
- There are multiple factors that modulate the risk for caries. This include exposure to fluoride and preventive behaviours of the individual.
Prevalence of caries in permanent dentition

• In Ile-Ife, the caries prevalence in 12 years was 13.9%. The DMFT of 0.14 of which 77.2% remain untreated.

• In Benin prevalence is 33%, with low DMFT (0.65) and high levels of untreated caries (98.6%)

Adekoya-Sofowora el al, 2007; Okeigbemen, 2004
Prevalence of caries in permanent dentition - 2

- In Enugu, the caries prevalence ranged between 15.5% and 35.5% with DMFT of 0.16 to 0.85 and high levels of untreated decay (49.5% to 85.5%).

Udoye et al, 2009; Okoye et al, 2010; Okoye and Ekwueme, 2011
Prevalence of caries in permanent dentition - 3

- In Lagos caries prevalence ranged between 5.7% and 30.8%, with low DMFT (0.1-0.72) and high level of untreated caries. The restorative index was 1%.
- In Ibadan, reported prevalence is 11.2%, a restorative index of 3.45% and met need index of 0.11.

Prevalence of Early Childhood Caries

- In Ile-Ife, the prevalence of caries was 10.9% of which decay was the most prevalent form of caries seen (92%).
- In Lagos, prevalence of caries in preschool children was between 6.4% to 22.5%, with 95.6% of decayed teeth remaining untreated and a dmft of 1.2.

Changes in caries prevalence – deciduous dentition

- Caries prevalence increased from 17.9% to 20.4% over a three-year period in the deciduous dentition.
- There was a 26.1% increase in untreated caries in the deciduous dentition.
- The deft increased by 11.9% over the 3-year period.

Sofola et al (in Press)
Changes in caries prevalence – permanent dentition

• There was a 34.8% decline in caries prevalence in children with permanent dentition over a 3 year period.
• The mean DMFT was 0.02 at baseline and at conclusion of study.
• Absolute caries reduction was larger for females (75%).

Sofola et al (in Press)
Caries Incidence

• Caries incidence in children seen in Lagos was 9.9%
• 52.5% of children who had caries at inception developed new carious lesions.
• The relative risk of developing new caries is significantly higher in those who have caries.

Folayan et al, In Press
Geographical variability

• The prevalence of dental caries was higher in rural (35.5%) than in urban areas (15.5% to 24.1%) in Enugu.
• However reports from Benin shows that the caries severity was worse in urban than rural Benin (DMFT 0.72 vs 0.53).

Okoye et al, 2011; Okeigbemen, 2004
Geographical variability - 2

- Among the ethnic groups resident in Lagos, the Igbo and Edo/Delta had the highest caries experience while the Efik/Ibibio, Yoruba and Hausa had the lowest.
- There is very little data from the country to enable an objective assessment of differences in caries experience based on ethnicity.

Umesi_Koleosho et al, 2007
Gender differences

• Gender differences had been observed in caries severity in Nigeria.
• Females having higher DMFT in Lagos, Ibadan (DMFT 2.03 vs 1.78), Enugu (DMFT 0.54 vs 0.35) and Ile-Ife.
• No gender differences were observed in caries prevalence however, based on studies conducted in Lagos, Enugu and Ile-Ife.

Giwa, 2005; Umesi-Koleosho et al, 2007; Adeniyi et al, 2012; Denloye et al, 2005
Gender differences - 2

- However, when caries experience in deciduous and permanent dentition were combined, there an observed decreases in caries risk for females: females had a 43% reduced risk of having caries when compared to males. A male child whose daily consumption of sugar was equal to or greater than three times daily has dmft/DMFT greater than 3.0.

Folayan et al, 2007
Gender differences - 3

- The observed gender difference has been attributed to better oral hygiene practices of females.

Giwa, 2004; Folayan et al, 2007
Age differences

- In Lagos older adolescents were observed to have higher caries rates than the younger ones.
- In Enugu, the mean DMFT increased with age.
- For combined deciduous and permanent dentition, the risk of having a dmft/DMFT equal to or higher than 3 reduced by 20% for every year increase in age.

Age differences - 2

- For ECC, the severity was found to increase with age: the risk increased by 7% for every month increase in age and the dmft increased by 0.01 with every month increase in the age of the child.

Differences based on SES

• The role of socio-economic status (SES) in caries prevalence and severity is less clear.
• Some studies show that in Lagos, the SES had no influence on caries experience. However, in preschool children, the risk of caries increases by 23% as the SES decreases.
• In Ile-Ife however, the mean DMFT of children with high social status was higher than children with low social status.

Predisposing factors

Oral hygiene

• Children with poor oral hygiene are more susceptible to caries.

Predisposing factors

Flouride

• Students who used fluoridated toothpaste had less carious lesions.

• Boys who cleaned their teeth with chewing sticks had more caries than boys who used toothbrush and paste.

Okoye and Ekwueme, 2011
Flouride

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Predisposing factors - 3

Other preventive measures

- The use of fluoride containing toothpaste is high.
- The use of dental floss is however low: less than 10% of school children in Ile-Ife know about dental floss.
- Dental service utilisation is also very low varying between 15.5% in Enugu, 18.6% in Benin, and between 15.8% and 22.5% in Ile-Ife.
Predisposing factors - 4

- Factors that limit service utilisation include high cost of treatment, lack of pain, perceived lack of need of professional care.
- Predictors of low/no dental service utilisation include children living with single mothers or with no parents.

Idiakhoa, 2001; Ola et al, 2012; Folayan et al (In press)
Predisposing factors - 5

• Also, the type of school as a proxy for the socioeconomic status is a predictor of likelihood of having attended a dental clinic in the past: the lower the school fees, the less the likelihood of the child having attended a clinic.

*Ola et al, 2012*
Predisposing factors - 6

Tooth susceptibility

• There is little known about the susceptibility of teeth in children in Nigeria to caries.
• The risk of caries is high in patients with MIH.
• The prevalence of MIH in Ile-Ife is 12.7%.

Oyedele (work in progress)
Predisposing factors - 7

Tooth susceptibility - 2

- Neonatal under nutrition have been implicated development of enamel hypoplasia, reduced salivary secretion and low buffering capacity.
- The national under five malnutrition rate in Nigeria shows that 41% of children are stunted. The risk of enamel hypoplasia in these communities are high.
Predisposing factors - 8

Malnutrition

- The 2008 data indicate increase in wasting (thinness).
- Stunting (shortness) levels still high—above 40%.

Unicef, Nigeria 2011
Predisposing factors - 9

Unicef, Nigeria 2011
Predisposing factors - 10

• Study by Enwonwu (1973) in Nigeria shows that the prevalence of hypoplastic teeth in children from the high SES aged 0-4yrs is 0% while for children from low SES aged 0-4yrs is 21%.
Predictors of caries risk

• While there was an associated established between birth rank though this was not found to be a predictor of caries in children.

• Age is a predictor of caries risk: the dmft/DMFT reduced by 0.072 for every year increase in age.

Folayan et al, 2010
Predictors of caries risk - 2

• Sex is a predictor of caries risk: the dmft/DMFT is less by 0.25 in females compared with males.

• Having older siblings with caries is a caries risk factor: the dmft/DMFT of a child increases by 0.48 for every older sibling having caries.

Folayan et al, 2010
Predictors of caries risk - 3

• Maternal age and affect the risk of a child developing dental caries: for every year increase in the mother’s age the odds of child developing caries increases by one fold.

• Maternal attitude also affects the risk of a child developing dental caries: the child’s risk of having caries reduced by 15% with a unit increase in positive attitude of the mother.

Adeniyi et al, 2009
Daily consumption of sugar is a caries risk factor.
• The risk of caries increased by almost 2 folds for every increase in the frequency of daily consumption of sugar.
• The odds for having rampant caries was 1.5 folds for every increase in frequency of daily consumption of sugar.
• The threshold for rampant caries is a history of sugar consumption three or more times a day.

Folayan et al, 2007; Folayan et al (in Press)
Predictors of ECC

- Also the odds of having rampant caries in preschool children increased almost 4 fold with every score increase in oral hygiene index.
- Oral hygiene is however, not a risk factor for molar caries.
- Gender, birth rank, socio-economic status, tooth cleaning tool, who supervises toothbrushing, and tooth cleansing frequency had no impact on the dmft of the child.

Caries risk in ECC vary by area of residence

• The feeding pattern of children vary by residential area: children in the urban area most likely fed on demand and at bedtime, and children from the rural area most likely to have schedule feeding.
• The duration of breast feeding was longer amongst rural dwellers, and the tendency to leave tools and nipples in the mouth of the child at night were more common amongst urban dwellers.

Folayan et al, 2012
Caries risk in ECC vary by area of residence - 2

- ECC caries would result more from prolong breastfeeding in children from rural areas. This is a known predisposing factor for rampant caries in Nigerian children. The risk of rampant caries increases by 10% with every month increase in the duration of breastfeeding.

Folayan et al, 2010; Folayan et al, 2012
Caries risk in ECC vary by area of residence - 3

- ECC will result more from night feeding and leaving in children from urban areas. This also a known predisposing factor for caries: the risk of caries is 6 times higher in the presence of night feeding.
- The prevalence of caries was least amongst perirural dwellers.
- The dmft is higher in children in rural area.

Folayan et al, 2010; Folayan et al, 2012
Teeth affected in deciduous dentition

- There were significantly more lesions on the second mandibular molars than on the second maxillary molars.
- The chances of having a second mandibular molar carious is 4 times more than having a carious second maxillary molar.
- The chances of having a maxillary incisal caries was 8 times more when compared to a mandibular incisal.

Sho-Silva, 2004; Folayan et al, 2007
Teeth affected in permanent dentition

- Caries was most prevalent in the molars (63%).
- The first molars (46.5%) were more affected followed by the second molars (44.2%).
- Caries occurred more often in the mandibular molars (69.8%) than in the maxillary molars (23.2%).
- In the maxilla, caries was more prevalent in the left (17.9%) than in the right side (8.6%).

Predictors of caries in children include:

A. Age: caries risk increases as the age increases
B. Sex: Dmft/DMFT is higher in boys than girls
C. Maternal age: As the age increases, caries risk decreases
D. Maternal attitude: caries risk decreases with positive maternal attitude
Predictors of Early Childhood Caries:

A. The risk of rampant caries increase with poorer oral hygiene status.
B. The dmft is higher in children from the urban area
C. The risk for rampant caries increases with increase in duration of breastfeeding.
D. The risk of rampant caries increases with night feeding.
Quiz 3

Teeth affected by caries:

A. Caries was most prevalent in the premolars.
B. The first primary molars were more affected than the second primary molars.
C. Caries occurred more often in the mandibular molars than in the maxillary molars.

• In the permanent dentition, caries was less prevalent in the left maxilla than in the right maxilla.
Acknowledgement

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