Exclusive breastfeeding and its relevance to infant teething

***Chukwu GA, **Ogbonna C, *Gyang MF, ***Okolo SN.**

*Intercountry Centre for Oral Health for Africa (in collaboration with WHO) Jos.
**Department of Community Health, Jos University Teaching Hospital Jos.
***Department of Peadiatrics, Jos University
Teaching Hospital Jos.

Abstract

Objective: To determine the relevance of exclusive breast-feeding practice, in the development of healthy oral tissue among teething infants.
Materials and Method: A cross sectional study design of children aged 6-36 months were studied in 14 wards of Jos North Local Government Area. A multistage sampling technique was adopted in selecting 1081 mothers who qualified and were interviewed using structured interviewer questionnaire on their knowledge and perception on common complaints during teething in children. The index children were examined for number and type of teeth erupted using mouth mirror under natural light.
Result: One thousand and eighty-one mothers and their babies were interviewed and examined; out these 16.5%, 38.7% and 44.8% babies were of age groups 6-12, 13-24 and 25-36 months respectively; 50.2% were female and 49.8% were male. Of the babies examined 62.4% were exclusively breast-fed. There was a significant association between maternal educational status and knowledge of teething complaints. Three hundred and twenty-six (30.1%) babies had cough during their teething period. The high percentage of babies that were exclusively breast-fed that never experienced cough during teething was found to be statistically significant (p = 0.000). Three hundred and forty-nine (32.3%) babies experienced drooling of saliva during teething. The high percentage of babies that were exclusively beast-fed and did not experience drooling of saliva during teething was found to be statistically significant (p = 0.000). Three hundred and fifty-two (32.6%) babies were observed to bite objects during teething. The high percentage of babies that were exclusively breast-fed but did bite object were found to be statistically significant (p = 0.000). Seven hundred and forty-two (68.6%) babies had diarrhoea during teething; out of these 459(42.5%) were exclusively breast-fed and it was however not found to be statistically significant (p = 0.559).
Conclusion: This study draws attention to the relatively poor anecdotal evidence related to symptoms associated with the teething process. The result has also demonstrated that exclusive breast-feeding is not only able to reduce the symptoms ascribed to teething, but also promote the development of a healthy oral tissue.

Key words: Breastfeeding, teething, development, oral tissues

Introduction

Exclusive breast feeding (EBF) means giving only breast milk in the first six months of life unless medically indicated[1]. The human breast milk, even in economically deprived populations has been found to sufficiently satisfy the caloric and protein requirement of growing infants[2]. The advantages of breast-feeding are well documented particularly with regard to infectious diseases, nutritional status, mother-child bonding, birth spacing and infant mortality[1]. The optimal growth and development of the oral tissue, most importantly the teething process, and the prevention of childhood oral disease as well as oral manifestation of debilitating child hood diseases depend largely on the nutrients provided in the milk of the mother. The neonate inherits much of its immunity from the mother through transplacental transfer of immunoglobulin (passive immunity)[3]. This passive immunity is maintained relatively after birth through breast-feeding. By the end of the first month the baby's gamma globulin level would have decreased to one half the original level with corresponding decrease in immunity.[3] The Gamma globulin titre only returns to normal level between the age of 12-20 months[3]. Incidentally this period of immunological struggle coincides with teething period. Teething complaints are confined almost exclusively to eruption of the deciduous dentition[4]. Apart from impacted third molar the eruption of the other permanent dentition is symptom free[5]. The age at which breast-feeding infants are first given supplementary food is of public health importance because of the risk of diarrhoeal disease from contaminated foods[6], it could also induce an unwarranted challenge on the poorly developed active immunity of the child and may be responsible for some of the symptoms witnessed at this stage. The World Health Organization (WHO) and United Nation International Children Emergency Fund (UNICEF) recommended the first six months of birth as the period of Exclusive Breast-Feeding (EBF)[7]. The EBF rate in Nigeria was found to be 2% in 1990[1]. Teething is the physiological upward movement of the teeth into the oral cavity. Teething may be natal, when the teeth erupt before birth; it may be neonatal, when the teeth erupt in the first month of life[8]. Normal teething commences between the ages of 4-8 months. Teething has

been held responsible for a considerable number of early childhood illnesses like diarrhoea, constipation, cold, skin rash, wakefulness at night, irritability, fever, toothache, and drooling that the infant suffer at this stage[4,5,9]. This misconception could be responsible to a large extent for infant morbidity and mortality at this stage. A recent survey of a large group of paediatricians about what they do for teething infants, showed that virtually all prescribed medication such as pain killers of varying strengths, sedation and local anesthetics, containing variable amounts of mercury and opiates[4,5]. Purgatives and emetics are also recommended even if the child was experiencing diarrhoea before hand[4]. However in some rural African communities where there is high level of illiteracy, poverty and ignorance, herbal preparations are often applied to the skin of the infants and some wear "talisman" around the neck, wrist, waist and/or ankle to protect the child.

Studies have demonstrated the beneficial effect of EBF in reducing childhood diseases like diarrhoea, respiratory infection, allergy, and sudden infant death syndrome.[10] However, in the African region, few studies have addressed the relevance of EBF to the development of healthy oral tissues. This study was carried out to determine the relevance of exclusive breast-feeding practice to teething and development of healthy oral tissue among teething infants.

Materials and Methods

The study was conducted in Jos North Local Government Area (JNLGA) of Plateau State Nigeria which has an estimated population of 311,346 projected at 2.8% growth rate from the 1991 census figure[7]. It is made up of one administrative district, which has fourteen wards and twenty village areas. The population in JNLGA is a conglomerate of the various tribes in Nigeria with Beroms and Anagutas as the dominant ethnic group. Traders, civil servants and farmers of the middle to low socio-economic group mainly inhabit the LGA. The Jos University Teaching Hospital (JUTH), State Specialist hospital, twenty Primary Health Care centers, two mission Hospitals and over 100 privately owned clinics are situated in the LGA.

A cross sectional study design of children aged 6-36 months were studied in 14 wards of Jos North Local Government Area. To enhance the reliability of the result we took 1000 as our sample size and rounded up to 1100 to take care of attrition. The sample size per ward was by simple proportion base on the projected 1991 census figure. A multistage sampling technique was adopted in selecting 1081 mothers and their children. The sampling units were children between the ages of 6month and 36months. The fourteen wards in the LGA were listed and house-to-house sampling of index child was done. From a centrally located point a bottle was spun to determine the direction of movement in each of the wards. The first household in that direction formed the starting point. Only household with qualified index child was sampled. Exclusion criteria, incase of mothers with more than one child within the sampling age range, only one of the children is taken. Structured interviewer questionnaire was used to collect all necessary information from mothers relating to their knowledge and perception of common symptoms during the eruption of first set of teeth. Oral examination was done under natural light with the use of mouth mirror. The number and type of teeth already erupted were recorded in a chart

Approval for the study was obtained from the Chairman of the LGA through the office of the Coordinator, Primary Health Care Programme and the Ward Heads. Also, the aims and objectives of the study were communicated to the mothers. Only those mothers who consented were enrolled into the study.

The results were analyzed using SPSS version 14 statistical package. Differences between proportions were analyzed using Chi-square test at 0.05 level of significance.

Result

A total of 1081 mothers and index babies were interviewed and examined respectively, with 16.5%, 38.7% and 44.8% of the babies having age groups of 6-12, 13-24 and 25-36 months respectively. The female babies constituted 50.2% of this population. **(Table 1)**. In the study, 923(85.4%) mothers believed that some of the complaints were teething symptoms, while 86(8.0%) believed they were not necessarily teething symptoms and 72(6.7%) claimed no knowledge of the possible causes of the symptoms **(Table 2)**. Six hundred and seventy-five (62.4%) babies were exclusively breast-fed **(Table 3)**.

The study revealed that 282(26.1%) of the babies had their first of set teeth erupting between 4-5 months. Out of these 172(15.0%) were exclusively breast-fed while 110(10.2%) were not. Out of 495(45.8%) of babies that had their first set of teeth erupting between 6-7 months; 331(30.6%) were exclusively breast-fed while 164(15.2%) were not **(Table 3).**

Table I - Age and gender distribution of infants

Age	Gender		
Age (months)	**Male**	**Female**	**Total**
6-12	92 (8.5%)	86 (8.0%)	178 (16.5%)
13-24	198 (18.3%)	221(20.4%)	419(38.7%)
25-36	248 (22.9%)	236 (21.8%)	484 (44.8%)
Total	538 (49.8%)	543 (50.2%)	1081 (100%)

Table 2- Knowledge of teething complaint and mother's educational status

Mother's educational	Knowledge of teething complaint			
status	**Don't know**	**Yes**	**No**	**Total**
None	10 (0.9)	208 (19.2)	8 (0.7)	226 (20.9%)
Primary	15 (1.4%)	250 (23.1%)	39 (3.6%)	304 (28.1%)
Secondary	38 (3.5%)	402 (37.2%)	33 (3.1%)	473 (43.8%)
Tertiary	9 (0.8%)	63 (5.8%)	6 (0.6%)	78 (7.2%)
Total	72 (6.7%)	923 (85.4%)	86 (8.0%)	1081 (100%)

$c^2 = 24.100$, df = 6, p = 0.001.

(Table 4) shows the relationship between teething symptoms observed by mothers and breastfeeding practice. Fever was the most frequent symptom observed and reported in 465 (43%) of the exclusively breastfed while convulsion was the least reported, 9 (0.9%).

The study showed that 969(89.6%) of the mothers took

TABLE 3- First tooth eruption time and breast-feeding practice.

Eruption time (months)	exclusive breatfeeding Yes	No	Total	p value
4-5	172 (15.9%)	110 (10.2%)	282 (26.1%)	0.000
6-7	331 (30.6%)	164 (15.2%)	495 (45.8%)	0.000
8-9	109 (10.1%)	72 (6.7%)	181 (16.7%)	0.006
10-12	55 (5.1%)	48 (4.4%)	103 (9.5%)	0.490
>12	8 (0.7%)	12 (1.1%)	20 (1.9%)	0.371
Total	675 (62.4%)	406 (37.6%)	1081 (100%)	

Table 4 - Teething complaints observed by mothers' against EBF practice.

Teething Complaints		EBF practice Complaint	No complaint	Total	P value
cough	yes	240 (22.2%)	85 (7.9%)	325 (30.1%)	
	no	435 (40.2%)	321 (29.75%)	756 (69.9%)	0.000
drooling of saliva	yes	272 (25.2%)	77 (7.1%)	349 (32.3%)	
	no	403 (37.3%)	329 (30.4%)	732 (67.3%)	0.000
biting of object	yes	257 (23.8%)	95 (8.8%)	352 (32.6%)	
	no	418 (38.7%)	311 (28.8%)	729 (67.4%)	0.000
diarrhoea	yes	459 (42.5%)	283 (26.2%)	742 (68.6%)	
	no	216 (20.0%)	123 (11.4%)	339 (31.4%)	0.559
facial rash	yes	47 (4.3%)	12 (1.1%)	59 (5.4%)	
	no	628 (58.1%)	394 (36.4%)	1022 (94.5%)	0.005
fever	yes	465 (43.0%)	282 (26.1%)	747 (69.1%)	
	no	210 (19.4%)	124 (11.5%)	334 (30.9%)	0.844
insomnia	yes	76 (7.0%)	28 (2.6%)	104 (9.6%)	
	no	599 (55.4%)	378 (35.0%)	977 (90.4%)	0.018
restlessness	yes	54 (5.0%)	28 (2.6%)	82 (7.6%)	
	no	621 (57.4%)	378 (35.0%)	999 (92.4%)	0.507
night crying	yes	24 (2.2%)	17 (1.6%)	41 (3.8%)	
	no	651 (6o.2%)	389 (36.0%)	1040 (96.2%)	0.599
convulsion	yes	9 (0.9%)	2 (0.2%)	11 (1.0%)	
	no	666 (62.4%)	404 (37.4%)	1070 (99.0%)	0.182

Table 5- Mothers noticing the sequence of their baby's teeth eruption before other members of the family and EBF practice.

Mothers noticing eruption Sequence		EBF practice Complaint	No Complaint	Total	p value
first teeth	yes	606 (56.1%)	363 (33.6%)	969 (89.6%)	
	no	69 (6.4%)	43. (4.0%)	112 (10.4%)	0.000
other teeth	yes	443 (41.2%)	208 (193%)	651 (60.5%)	
	no	230 (21.4%)	195 (18.1%)	425 (39.5%)	0.000

notice of the eruption of the first set of their baby's teeth before any other member of their family. The number of mothers who practiced exclusive breastfeeding that took notice of the eruption of their baby's first set of teeth against the mothers who did not practice EBF was found to be statistically significant (P=0.00). The same relationship was observed for the eruption of subsequent set of teeth between EBF and non EBF mothers (p 0.000) **(Table 5).**

Discussion

It is an established fact that human beings inter-alia are conscious of their surrounding in a certain predictable ways and as a result, they have developed specific ways, procedures, and understanding on managing their problems[11]. The ways and procedures are reflection of the society's general health conception[12]. With reference to this specific subject " teething" parents and caretakers are therefore apprehensive of what symptoms teething actually causes. Local understandings, definitions and management however, vary due to cultural, geographical and socio-economic variation[12]. One thing is sure, when it comes to teething, every baby is different[13]. In this study 85.4% of the mothers believed that teething causes at least one symptom mentioned in the questionnaire. A related study in Turkey and Australia reported 98.8% and 85% respectively[14,15]. Surprisingly 82.1% of Nigerian nurses share this same believe as the mothers[16]. Though, 6.7% of mothers in this study claimed they had no knowledge of the possible causes of symptoms during teething, 8.0% of mothers believed that teething process is symptom free. There was a significant association between maternal educational status and knowledge of teething complaints (P = 0.001). In the Turkish study only one of the respondents believed that teething has no associated symptom[15].

The age at which the first set of teeth begin to appear in the oral cavity differs among infants. Sometimes infants are born with one or more teeth, usually mandibular deciduous centrals[8], while neonatal teeth erupts in the first month of life. Normally, eruption of deciduous teeth commences between 4-6 months, and indeed some infants could celebrate their first birthday without any tooth. In this study, it was observed that 71.9% of the children had there first set of teeth erupting between 4-7 months, while 1.9% of the infants celebrated their first birth day without teeth in their mouth. The eruption time in the Turkish study was 3-17 months[15]. It was observed in this study that, babies that were exclusively breastfed had their 1st set of teeth erupting earlier than the non exclusively breastfed babies and this was found to be statistically significantly ($P < 0.05$). The reason for this difference may be attributed to the effect of the suckling process on the erupting teeth, which may in a way facilitate/encourage the movement of the erupting teeth into the oral cavity.

Though, coughing have been widely reported to be associated with teething[4,14,16], 69.9% of the mothers did not observe their baby coughing during teething; only 22.2% of babies exclusively breastfed had cough during teething. The high percentage of babies that were exclusively breast-fed that never experienced cough during teething was found to be statistically significant (P = 0.000). Passive immunity is maintained relatively after birth through breast-feeding. Exclusive breast-feeding has been documented to prevent respiratory infections by way of boosting the baby's immunity[17]. Drooling of saliva has been reported as one of the early signs of teething. In this study 32.3% of mothers reported that their babies drooled saliva during teething. It is known that the salivary gland becomes increasingly active from the third month of life[13]. Authors believe that at 3months the infants lack the mastery of the act of deglutition and hence the excess

saliva that the child produce during this stage of life drools out of the mouth. It was of note in this study that there was a significant difference between infants that were exclusively breast-fed that did not experience drooling and those that did ($P < 0.05$). The authors are of the view that, the suckling effect may result in early mastery of the act of deglutition. Biting of objects have widely been reported as one of the cardinal signs of teething[14,15]. In this study only about 32.6% of mothers claimed that, their infants were biting objects including their fingers during teething. Biting of objects is an essential step in the child's developmental milestone, and may contribute to the excessive salivation noticed during this stage. Most of the symptoms that are ascribed to teething may be linked to this stage when infants begin to dip all kinds of objects into their mouths. A related study reported that, there was a strong relationship between the eruption of infants' incisors, their living condition and individual progress in health development[18]. Diarrhoea, from past studies has ever remained a recurring decimal as symptom of teething[14,16]. In this study 68.6% of mothers claimed that their infants had diarrhoea during teething. The percentage of babies exclusively breast-fed without diarrhoea was however not statistically significant ($P = 0.559$). Diarrhoea is symptom of gastrointestinal disorder. A possible reason for this is that the teething infants dip all kinds of vices into their mouths and contaminants may be responsible for this symptom. Facial / body rash was also commonly reported as one of the symptoms of teething. The high percentage of babies that were exclusively breast-fed but did not have facial rash during teething was found to be significant ($P = 0.005$). There is a documented evidence that exclusively breast-fed infants are healthier[1,17] and therefore have better tendency to resist infection[17]. Though 69.1% of babies were reported to have had fever during teething, there was however, no statistically significant difference between those exclusively breast-fed and those that were not ($P >0.05$). This finding is controversial, as some studies reported that teething causes low grade fever[13-16], while few claimed that teething was never associated with fever[13]. Malaria is known to be endemic in this part of the world and may account for the high percentage of fever observed and reported by mothers in this study. Insomnia was also widely reported as symptom of teething[13,14]. There was however, a significant difference between those that were exclusively breast-fed and those that were not ($P < 0.05$). Exclusively breast-fed infants who were otherwise healthier were likely to exhibit resounding sleeping pattern. Day time restlessness have been reported as a common occurrence[14-16]. However there was no significant difference between those exclusively breast-fed and those that were not ($P > 0.05$). In this study 3.8% of infants experienced night crying. However there was no significant difference between those exclusively breast-fed and those that were not ($P > 0.05$). A previous study suggested that in 6-12 months old infants, much of the evening and night crying that is attributed to teething may be due to bad habit formation and mismanagement[4]. Convulsions have long been held as one of the symptoms of teething, in this study only 1.0% of the mothers reported that their infants had convulsion during teething, though there was no significant difference between those exclusively breast fed and those that were not ($P > 0.05$). Saliva is known to be high in K^+, Na^+ and Ca^+; these cations are known to be important in neuromuscular transmissions. Infants that may have drooled excessively without concomitant replacement of these ions may suffer not only dehydration but also depletion in K^+, Na^+ and Ca^+ and thus could convulse.

When it comes to teething, nothing is certain[13], as no one has been able to prove what symptoms teething really cause. Scientific studies are impossible[13]. In this study 16.0% of the mothers did nothing, but simply termed whatever condition their baby was going through as teething. This by far holds the gravest consequence of all the misinformation and management that has been built around teething over the years; and may largely be responsible for the mortality ascribed to teething. Only 0.5% of the mothers took their infants to the dentist while 56.1% went to the hospital. 0.7% of mothers patronized the services of traditional healers. This study revealed that 21.3% of the mothers resorted to self-medication. Information revealed that family pressure, most especially those that come from mother and mother in-law of nursing mothers play a role in determining what measure the mother may take during teething. This may not be strange as grand mothers and older generations are regarded as "custodians" or that they have the experience and wisdom which the young nursing mother lacks[1]. A study carried out in Ibadan, reported that the older and more experienced nurses and males ascribed the afore mentioned symptoms to teething process[16]; which is suggestive of the kind of advice they are likely to impact on the nursing mothers.

Exclusive breast-feeding has been shown to promote mother-child bonding[1,17]. The results of this study buttressed this finding as mothers who exclusively breast-fed their babies first noticed the eruption of their baby's first set of teeth before any member of their family.

conclusion

This study draws attention to the relatively poor anecdotal evidence related to symptoms associated with teething process. Teething is a normal physiological growth, and thus, can not be a pathway to contracting a defined infectious disease. The result of this study has demonstrated that exclusive breast-feeding is not only able to reduce the symptoms ascribed to teething, but also promote the development of a healthy oral tissue, though, some of the inferences drawn by the authors needs further research.

Acknowledgement

This work was supported by a research grant from World Health Organization Regional Office for Africa (WHO AFRO) through the Regional Centre for Oral Health Research and Training Initiative (RCORTI) for Africa (In Collaboration with the World Health Organization), Jos. We are grateful to Prof. CO Enwonwu, Dr. IS Danfillo Prof. ES Akpata, and Dr. CA Adekoya-Sofowora, for reviewing the proposal. We thank Jos North Local Government Authority (LGA), community heads, and mothers for their cooperation during the data collection. Our appreciation goes to John Tamo for his contribution during the fieldwork and Mr. P Jalo, for analyzing the data. We thank Dr. O Adeleke, for proof reading the proposal and the final report.

References

1. Chikaike O, Okolo SN, Ezeogu A. Factors influencing exclusive breast-feeding in Jos Plateau State, Nigeria. West Afr J Med 2000; 19:107-110.
2. Okolo SN, Okonji M, Ogbonna C, Ezeogu AF, Onwuannaku C. Level of calcium, Aluminum and Chromium in serum of exclusively breastfed infants at six month of age in savanna Nigeria. West Afr J Med 2001;20: 13-16.
3. Arthur CG. Medical Physiology, Immunity. Seventh Ed. W. B. Saunders Company.1986, p1003
4. Ashhley MP. It's only teething. A report of the myth and modern approaches to teething. Brit Dent J 2001;191: 4-8.
5. Dana U. Homeopatic Pediatrics Safer, Saner Medicine for our Children Homeopathic Educational Services. 1996, 1-3.
6. Roberta JC, Brown KH, Canahuati J, Dewey KG. Determinants of growth from birth to 12 months among breast-fed Honduran infants in relation to age of introduction of complementary foods. Paediatrics 1995; 96: 504 - 510.
7. WHO/UNICEF. The Innocenti Declaration on the protection, promotion and support of breast-feeding. WHO/UNICEF. 1990, p1.
8. Aderinokun GA, Onadeko MO. Prematurely erupted deciduous teeth in a Nigerian baby - A case report. Afr Dent J 1990; 4: 25-27.
9. Tasanen A. The eruption of teeth in children. Ann Pediatr F1968; 14:1-41.
10. Aletha AK, Hannelore TL. Paediatric Dentistry Fauchard and Before. Int Dent J 1993; 43: 239-244.
11. World Health Organisation. Management and prevention of diarrhoea: Practical guideline, 3rd ed, Geneva, 1990.
12. Mirgissa K, Fekadu A. Ethnograghic study of diarrhoea disease among under five children in Mana District, Jimma Zone, Southwest Ethiopia. Ethiop J Health Dev 2000; 14: 77-83.
13. Teething: Akron Children's Hospital. www.akronchildrens.org
14. Wake M, Hesketh K, Allen MA. Parents beliefs about infant teething: a survey of Australian parents. J Paed Child Health 1999; 35: p446.
15. Baykan Z, Sahin F, Bayzova U, Ozcakar B, Baykan A. Experience of Turkish parents about their infants teething. Child Care Health Dev 2004 ; 30: 331-336.
16. Bankole OO, Danloye OO, Aderinokun GA. Attitude, belief and practice of some Nigerian nurses towards teething in infants. Odontostomatol Trop 2004; 27: 22-26.
17. Okolo SN, Adewunmi YB, Okonji MC. Current breast-feeding knowledge, attitude and practice of mothers in five rural communities in the savannah region of Nigeria. J Trop Pediatr 1999 ; 45: 323-326.
18. Kurlej W, Porwolik K, Porwolik M, Puzynski M. The effect of an infants environmental conditions and state of Health on the teething of the primary incisors. Folia Morphol (Earsz) 2000; 63: 59-61.