

The Effect of Breast and Bottle Feeding on Dental Caries in Preschool Children

ENAS OTHMAN¹, TAGHREED JARADAT¹, BASMA ALSAKARNA¹, AYMAN F ALELAIMAT¹, RANIA ALSADDI²

¹Pediatric Dentist, Royal Medical Services King Hussein Medical Center, Amman Jordan

²DDS, Royal Medical Services Department of Dentistry, Amman Jordan

Corresponding Author: Enas Othman, Email: enasothman@yahoo.com, Phone: +962775819448

ABSTRACT

Introduction: This study evaluates the effect of breast and bottle feeding on the severity and age of onset of early childhood caries (ECC). This prospective study conducted at the dental clinic of King Hussein Medical Center between March 2020 and July 2020. All preschool children who attended to the dental clinic suffering from dental caries were included in the study.

Methodology: All preschool children who attended to the dental clinic suffering from dental caries were included in the study. A detailed history was obtained regarding age, gender, medical diseases, dental history, duration, frequency, and patterns of infant feeding. The patients were divided into 3 groups; the 1st group are those with exclusive breast feeding, the 2nd group are those with exclusive bottle feeding and the 3rd group are those with mixed bottle and breast feeding. The age of onset of the caries was recorded. The severity of dental caries using DMFT index was explored in the groups. The obtained data was analyzed and compared with other studies.

Results: 240 patients with aged between 3 and 6 years (mean 4.6±1.1) were enrolled in the study. About 55% of them were males. The commonest method of feeding for children was combined breast and bottle feeding (43%) followed by exclusive breast feeding (34%) and bottle feeding (23%). The highest DMFT score was found among patients with bottle feeding (4.9). The highest DMFT scores and earlier onset of caries were observed among patients who were breast fed (5.2, 3.2) or bottle fed (4.8,3.1) for more than 2 years respectively. Patients who were fed at night or those with frequent daily feeding at a rate of more than 6 times were associated with more severe forms of dental caries.

Conclusion: Bottle feeding, nocturnal feeding and prolonged and frequent breast feeding were associated with more severe forms and earlier onset of dental caries in preschool children. Therefore, exclusive daily breast feeding at a rate not exceeding 6 times daily and for a duration not exceeding 12 months is recommended as a habit of feeding for infants.

Key words: Breast feeding, Bottle feeding, Dental caries

INTRODUCTION

Early Childhood Caries (ECC) is defined as presence of at least one decayed, missed or filled tooth surfaces in any primary tooth in a child less than six years of age [1]. It is a major health problem in the world particularly in developing countries. There is a wide geographical variation regarding its prevalence in the world. It was reported to be 24% in Germany and 90% in Indonesia [2,3]. Regarding regional countries, it was reported to be 75% in Saudi Arabia and (62-73%) in Jordan [4,5]. A lot of risk factors were implicated in the development of dental caries like age, sex, race, geographic location, and social class [6]. However, diet and oral hygiene remains the most important ones since they are modifiable [7].

There is a controversy regarding the effect of breast and bottle feeding on the development of ECC [8,9]. The aim of this study is to explore the effect of breast and bottle feeding on the development of ECC in preschool children regarding severity and age of onset.

METHOD

This prospective study conducted at the dental clinic of King Hussein Medical Center between March 2020 and July 2020. All preschool children who attended to the dental clinic suffering from dental caries were included in the study. A detailed history was obtained regarding age, gender, medical diseases, dental history, duration, frequency, and patterns of infant feeding. The patients

were divided into three groups; the first group are those with exclusive breast feeding, the second group are those with exclusive bottle feeding and the third group are those with mixed bottle and breast feeding. The age of onset of the caries was recorded. The severity of dental caries using DMFT index was explored in the groups. The obtained data was analyzed and compared with other studies.

RESULTS

240 patients with aged between three and six years (mean 4.6±1.1) were enrolled in the study. About 55% of them were males. The commonest method of feeding for children was combined breast and bottle feeding followed by exclusive breast feeding and bottle feeding. Table 1 summarizes the rates of each method of feeding.

Table 1, method of feeding in relation to age of caries onset and DMFT scores.

Type of feeding	Mean age	Number (%)	Mean age of caries onset (yrs)	DMFT score
breast	4.5	81 (34%)	4.5	3.1
bottle	4.6	55 (23%)	3.2	4.9
both	4.7	104 (43%)	3.9	4.1
Total	4.6	240 (100%)	3.9	3.9

Almost half of the patients were breast fed only for less than six months durations while in bottle fed children a duration of six to 12 months was the most encountered rate. the rates of feeding durations in relation to age of

caries onset and DMFT scores are summarized in table 2 and 3.

Table 2 , the duration of breast feeding in relation to age of caries onset and DMFT scores.

Duration of breast feeding	Number (%)	Mean age of caries onset (yrs)	DMFT score
<6 months	89 (48%)	4.9	3.7
6-12 months	66 (36%)	4.7	3.1
1-2 years	26 (14%)	3.9	4.2
>2 years	4 (2%)	3.2	5.2
Total	185 (100%)	4.6	3.5

Table 3, the duration of bottle feeding in relation to age of caries onset and DMFT scores.

Duration of bottle feeding	Number (%)	Mean age of caries onset (yrs)	DMFT score
<6 months	62 (39%)	4.8	3.2
6-12 months	74 (47%)	4.2	3.8
1-2years	17 (11%)	3.7	4.4
>2 years	6 (3%)	3.1	4.8
Total	159 (100%)	4.3	3.7

The highest age of caries onset and lowest DMFT scores were found among patients with no nocturnal feeding the rates of nocturnal method of feeding in relation to age of caries onset and DMFT scores are summarized in Table 4.

Table 4, nocturnal method of feeding in relation to age of caries onset and DMFT scores.

Nocturnal feeding method	Number (%)	Mean age of caries onset (yrs)	DMFT score
Breast feeding	62 (26%)	3.8	3.5
Bottle feeding	73 (30%)	3.6	4.4
Both breast and bottle	85 (35%)	3.9	4.1
none	20 (9%)	5.2	2.4
Total	240 (100%)	3.9	3.9

The main age of caries onset and DMFT scores in patients who were either exclusively breastfed or bottle fed at a frequency of six times daily or less were comparable to those who were fed at a rate of more than six times daily by the same method of feeding. The rates are summarized in table 5.

Table 5, the relationship between the frequency of feeding and the mean age of caries onset and DMFT scores.

Type and frequency of feeding	Number (%)	Mean age of caries onset (yrs)	DMFT score
Breast feeding ≤ 6 times/day	15 (19%)	4.9	2.7
Breast feeding >6 times/day	66 (81%)	4.4	3.2
Bottle feeding ≤ 6 times/day	12 (21%)	3.9	4.6
Bottle feeding >6 times/day	43 (79%)	3.0	5.0

There was no statistical difference between patients who were breastfed, bottle-fed and those with combined breast- and bottle-feeding regarding age, gender, race, geographic location, social, dietary habits, and oral hygiene.

DISCUSSION

Although breastfeeding is highly recommended by the World Health Organization (WHO), there is variability among different communities regarding the response to those recommendations [10]. In Jordan, breast feeding is culturally supported by religious people and the community and encouraged by the government. The effect of feeding method on the rates of ECC is still not well explored. Some studies reported that breast feeding is associated with higher rates of p ECC while other studies found no association [11,12]. On the other hand, a lot of studies found higher prevalence of ECC among children who were bottle fed when compared with those who were exclusively breast fed [13,14].

In the present the prevalence of ECC was not investigated among children who were breast or bottle-fed. However, earlier onset of ECC and higher score of DMFT were significantly associated with bottle feeding when compared with exclusively breastfed children (P value <0.05). In the present study the lowest DMFT scores were observed in children who were breast fed between six and 12 months. Prolonged breast feeding was significantly associated with higher DMFT scores and earlier onset of ECC (P value <0.05). This indirectly suggests the adverse impact of prolonged breast feeding on the development of ECC, but the method of study may not permit for precise conclusion. Prolonged breastfeeding result in prolonged contact of enamel with human milk which may induce acidogenic conditions with subsequent softening of enamel Folayan et al reported higher rates of ECC among children who were breast fed for more than 1 year in Nigeria [15,16]. Similar results were also achieved by Yonezu[17]. On the other hand, Moynihan et al did not find any association between prolonged breast feeding and ECC when they reviewed and compared different studies conducted worldwide [18]. Unlike breastfed children the lowest DMFT score were recorded among patients who bottle fed for a duration of less than six months. In addition, if we compared patients who were exclusively breast fed with children who were exclusive bottle fed higher DMFT score and younger onset of caries were encountered in children with breast fed of a duration less than six months or those with a duration of more than 12 months.

Lower DMFT score was reported among patients who were not fed at night regardless the method of daily feeding. However, a slightly not significant lower DMFT score was observed among patients who were breast fed at night when compared with those who were bottle fed. The American Dental Association's (ADA) recommends suspending nocturnal feeding after the eruption of the child's first tooth as it may lead to an increased risk of caries [19]. Olatosi et al got along with this study when they reported a significantly higher prevalence of ECC in children who were bottle-fed at night than those who were not [20].

The highest DMFT score and early onset of ECC were observed among patients who were breast fed at a frequency of more than six times while patients who were breast fed at a frequency of six times or less had the lowest DMFT scores and later onset of ECC (P value <0.05). Feldens et al also found more sever forms of ECC among patients who were breast or bottle fed at a rate of seven

times daily or more the may be explained by the fact that frequent feeding may increase the exposure of the enamel to acidogenic conditions which will result in softening of enamel [21].

In conclusion, breast feeding seems to protective for development of ECC since mores severe forms and earlier onset of dental caries were observed among patients with bottle feeding compared with those with breast feeding. However, the present study showed that prolonged and frequent breast feeding had adverse impact on the severity of ECC and resulted in earlier onset of caries.

CONCLUSION

Bottle feeding, nocturnal feeding and prolonged and frequent breast feeding were associated with more sever forms and earlier onset of dental caries in preschool children. Therefore, exclusive daily breast feeding at a rate not exceeding 6 times daily and for a duration not exceeding 12 months is recommended as a habit of feeding for infants.

REFERENCES

- American Academy of Pediatric Dentistry. Policy on early childhood caries (ECC): classifications, consequences, and preventive strategies. *Pediatr Dent*. 2016; 38: 52- 54.
- Bissar A, Schiller P, Wolff A, Niekusch U, Schulte AG. Factors contributing to severe early childhood caries in south-west Germany. *Clin Oral Invest*. 2014; 18: 1411- 1418.
- Kakanur M, Nayak M, Patil SS, Thakur R, Paul ST, Tewathia N. Exploring the multitude of risk factors associated with early childhood caries. *Indian J Dent Res*. 2017; 28: 27- 32.
- Al-Meedani LA, Al-Dlaigan YH. Prevalence of dental caries and associated social risk factors among preschool children in Riyadh, Saudi Arabia. *Pak J Med Sci*. 2016; 32: 452- 456.
- Sayegh, A., Dini, E., Holt, R. and Bedi, R. Caries in preschool children in Amman, Jordan and the relationship to socio-demographic factors. *International Dental Journal* 2002; 52: 87-93. doi:10.1111/j.1875-595X.2002.tb00606.x
- Hunter PB. Risk factors in dental caries. *Int Dent J*. 1988 Dec;38(4):211-217.
- Chen, KJ, Gao, SS, Duangthip, D, Lo, ECM, Chu, CH. Prevalence of early childhood caries among 5-year-old children: A systematic review. *J Invest Clin Dent*. 2019; 10:e12376. <https://doi.org/10.1111/jicd.12376>.
- Avila WM, Pordeus IA, Paiva SM, Martins CC. Breast and Bottle Feeding as Risk Factors for Dental Caries: A Systematic Review and Meta-Analysis. *PLoS One*. 2015;10(11):e0142922. Published 2015 Nov 18. doi:10.1371/journal.pone.0142922.
- Karen GP, Gustavo GN, Marco AP, et al. Impact of Prolonged Breastfeeding on Dental Caries: A Population-Based Birth Cohort Study. *Pediatrics* 2017;140 (1) e20162943; DOI: 10.1542/peds.2016-2943.
- World Health Organization Breastfeeding. [(accessed on 27 September 2019)]; Available online: <https://www.who.int/topics/breastfeeding/en>.
- Kotlow LA. Breastfeeding: A cause of dental caries in children. *ASDC J Dent Child*. 1977;44:192–193.
- Iida H, Auinger P, Billings RJ, Wieitzman M. Association between infant breast feeding and Early Childhood Caries in the United States. *Pediatrics* . 2010;120:944–952.
- Ribeiro NM, Ribeiro MA. Breastfeeding and early childhood caries: a critical review. *J Pediatr* . 2004;80:199–210.
- Haag DG, Jamieson LM, Hedges J, et al. Is There an Association between Breastfeeding and Dental Caries among Three-Year-Old Australian Aboriginal Children?. *Nutrients*. 2019;11(11):2811.
- Çolak H, Dülgergil CT, Dalli M, Hamidi MM. Early childhood caries update: A review of causes, diagnoses, and treatments. *J Nat Sci Biol Med*. 2013;4:29–38
- Folayan MO, Sowole CA, Owotade FJ, Sote EO. Impact of infant feeding practices on caries experience of preschool children. *J Clin Pediatr Dent*. 2010;30:297–301
- Yonezu T, Ushida N, Yakushiji M. Longitudinal study of prolonged breast or bottle feeding on dental caries in Japanese children. *Bull Tokyo Dent Coll*. 2006;47:157–160
- Moynihan P., Tanner L.M., Holmes R.D., Hillier-Brown F., Mashayekhi A., Kelly S.A.M., Craig D. Systematic Review of Evidence Pertaining to Factors That Modify Risk of Early Childhood Caries. *JDR Clin. Transl. Res*. 2019;4:202–216.
- Dentistry. The. Policy on Early Childhood Caries (ECC): Classification, Consequences, and Prevention Strategies. 2011. [2014 September 31].
- Olatosi OO, Sote EO. ASSOCIATION OF EARLY CHILDHOOD CARIES WITH BREASTFEEDING AND BOTTLE FEEDING IN SOUTHWESTERN NIGERIAN CHILDREN OF PRESCHOOL AGE. *J West Afr Coll Surg*. 2014;4(1):31–53.
- Feldens CA, Giugliani ER, Vigo A, Vitolo MR. Early feeding practices and severe early childhood caries in four year old children from southern Brazil: A birth cohort study. *Caries Res*. 2010;44:445–452