



Dental Caries and Salivary Mutans Streptococci Level among a Group of Mothers and their Children in Relation to Feeding

Dr. Nuha Sh. El-Shamari . B.D.S., M.Sc. *

Dr. Wesal A. Al-Obaidi . B.D.S., M.Sc. **

Abstract

Dental caries is the most prevalent oral disease among children and young adults which is caused mainly by mutans streptococci. The relation of dental caries and salivary mutans streptococci between children and their mothers according to the type of child feeding was controversies.

A sample of 56 child-mother pairs with age range for children 3-4 year old and 25-30 year old for their mothers were examined. Dental caries was recorded following the WHO (1987) criteria. The Mitis Salivarius Bacitracin Agar was used for the cultivation of mutans streptococci.

None significant difference was found in dental caries and salivary mutans streptococci between the breast and bottle fed children ($P>0.05$). The percentage of caries free breast fed children was higher than that of the bottle fed children. Highly significant positive strong correlations were found between both groups of children and their mothers regarding dental caries experience and salivary mutans streptococci count.

The mother plays an important role in transferring salivary mutans streptococci and as a results dental caries to her child regarding both type of child feeding.

Keywords: Dental caries, salivary mutans streptococci, child feeding, child-mother pairs.

Introduction

Child feeding is a must of great importance to meet nutritional as well as emotional and psychological needs of the child. Allowing infants to sleep with a nursing bottle or to use it unsupervised during waking hours is clearly associated with an increased incidence of nursing caries. However; the association is not as clear regarding breast feeding ⁽¹⁾. The development of dental caries is a dynamic process of

demineralization of the dental hard tissues by the products of bacterial metabolism. This pathologic process is caused by mutans streptococci which considered the major pathogenic bacterial species in the caries process and they can be transmitted from person to person, mostly from mouth to mouth within families and in particular from mothers to their babies as soon as the first primary teeth erupt,

*Specialist Dentist in Preventive Dentistry, Preventive Special Care Centre in Al-Rusafa, Baghdad.

**Assistant Professor, Department of Pedodontics and Preventive Dentistry, College of Dentistry, University of Baghdad.

leading to increase the development of dental caries ⁽²⁾. There is no available study in Iraq related to child-mother dental caries and salivary mutans streptococci relation according to the type of child feeding, so this study was conducted.

Materials and Method

A sample of 56 child-mother pairs, with an age range 3-4 year old for the children and 25-30 year old for their mothers, was selected from different areas in Baghdad city. Teeth were examined with the aid of plane mirrors and dental explorers under a good light. Finding was recorded in the term of dmfs/DMFS for each child-mother pair respectively according to the WHO standard ⁽³⁾ and the Mitis Salivarius Bacitracin Agar was used for the cultivation of mutans streptococci. A questionnaire was distributed to the mothers about the feeding habits of their children.

Student's t-test and correlation coefficient were used to analyze the data at level of significance of 0.05.

Results

Table 1 reveals highly significant positive strong correlations were found between children dental caries experience and their mothers dental caries experience ($P < 0.01$) in both types of child feeding; breast and bottle feeding, not significant difference in dental caries experience between breast and bottle fed children. 8.92% of the total breast fed children and 3.57% of the total bottle fed children were caries free. On the other hand, none of the mothers were recorded to be caries free from both groups with nearly the same DMFS.

It was found that dmfs for the children increased with increasing the DMFS for their mothers among both

groups (Table 2). Table 3 cleared that the salivary Ms mean count of the breast fed children was lower than that of the bottle fed children but no significant difference between them was found ($P > 0.05$). Strong positive highly significant correlations were found between those children and their mothers regarding the Ms mean count. On the other hand, the correlation was found to be stronger concerning the breast feeding than of bottle feeding.

Regarding Ms grades, the children were divide into three groups, starting with the first group grade (0 –10) at which equal percentage of breast and bottle fed children was found (21.42%), the second group grade (11–20) at which the percentage of breast fed children was higher than bottle fed children and the vice versa for the last group grade. In all of these three grades, the mothers had greatly higher salivary Ms mean values from their children (Table 4).

Discussion

The mothers had higher salivary Ms mean count than their children because salivary Ms count associated significantly with older age ⁽⁴⁾. This result is in agreement with many studies ^(5, 6), but it is in disagreement with Al – Mashhadani study ⁽⁷⁾ who sated that salivary Ms count was higher in children than adults.

Although, no significant difference was found between breast and bottle fed children regarding salivary Ms level which disagrees with Abul – Eise study ⁽⁸⁾, bottle fed children had a higher level of salivary Ms mean count since bottle usage is one of the factors that may affect Ms colonization and acquisition in the oral cavity of the children ⁽⁹⁾. This finding is in agreement with other studies ^(10, 11, 12).

No significant difference between breast and bottle fed children regarding

dental caries experience; may be attributed to non significant difference between the two groups of children regarding salivary Ms mean count.

Highly significant positive strong correlation were found between mother – child pairs concerning salivary Ms mean count for both breast and bottle fed children. This result could be occurred due to that the mother regarded as the main source of Ms in her child⁽¹³⁾. This finding agrees with Antony and Munshi study⁽¹⁴⁾, while it disagrees with other studies^(15, 16). This result explain the highly significant positive strong correlations that were found among mother – child pairs in both types of feeding regarding dental caries which initiated by Ms. This result is in agreement with other studies^(8, 15, 17, 18). This may be due to that dental caries caused by Ms which can be transmitted from mouth to mouth within families, especially from mother to her infant. The child may affected by the bacteria present in the mother's oral cavity transmitted to the child via saliva by contact that occur between the child and his / her mother during feeding process, this feeding could be either breast feeding type and / or bottle feeding type. In either type of feeding, a contact would be maintained between the two closely related persons (child – mother) resulted in transmission of Ms from mother to her baby as soon as the first primary tooth erupted; leading to increased development of dental caries⁽¹⁹⁾. On the other hand, mother – child pair was living at the same environment and mostly having the same habits⁽²⁰⁾.

Although, highly significant positive strong correlations were found in Ms mean value between mothers and their children, the value of the correlation coefficient (r) was higher among breast feeding group than among bottle feeding group. This may

be attributed to the more close contact between breast fed children and their mothers than that for bottle fed children.

The percentage of the breast fed children was higher at the moderate Ms grade than that of bottle fed children as the breast milk supported moderate bacterial growth⁽¹⁰⁾. At the high grade, the percentage of bottle fed children was higher than that of the breast fed children; this may be attributed to inappropriate bottle feeding habits which lead to increase incidence of dental caries that is in fact caused by Ms^(20, 21).

The percentage of caries free breast fed children was higher than that of the bottle fed children since breast milk contain high concentration of immune factors that protect the child against infections such as dental caries which is one of the infectious disease⁽²⁾. Beside that, no significant difference in dmfs was found between breast and bottle fed children. This result was in agreement with some studies^(8, 22) and in disagreement with others^(23, 24). This finding can be attributed to the fact that although breast milk contain lactose which is the least cariogenic sugar, but it has the ability to cause dental caries, especially for the children sleep on breast all the night and left without dental surveillance, in addition to, bottle propping and sleeping the child with a bottle of formula milk or juice resulted in dental caries⁽²⁵⁾.

Dental caries is irreversible and accumulative disease in nature⁽²⁾. This fact was improved that the mothers indeed had a higher dental caries experience than their children.

Concerning dmfs grades, at the low grade (0 – 2), the percentage of breast fed children was higher than that of bottle fed children, this may be due to the protective effect of breast milk. At the higher grade (6 – 10), the percentage of the breast fed children

and their dmfs mean was higher than that of the bottle fed children, since the DMFS and Ms means of the mothers which were breast fed their children was higher than that of the mothers which were bottle fed their children.

References

- 1- Al-Dashti A, Williams S, Curzon M. Breast feeding, bottle feeding and dental caries in Kuwait; a country with low fluoride levels in the water supply. *Comm Dental Health*. 1995; 12(6): 42 – 47.
- 2- Axelsson P. An introduction to risk prediction and preventive dentistry. Quintessence publishing, Germany; 1999: 107 – 28.
- 3- World Health Organization. Oral health survey. Basic methods. 3rd ed. 1987, WHO, Geneva.
- 4- Raitio M, Mattonen M, Uhari M. Tooth brushing and the occurrence of salivary mutans streptococci in children at day care centers. *Caries Res*. 1995; 29(4): 280–4.
- 5- Togelius J, Bratthal D. Frequency of the bacterium *Streptococcus mutans* in the saliva of selected human populations. *Archs Oral Biol*. 1982; 27: 113-116.
- 6- Tappuni A, Challacombe S. Distribution and isolation frequency of eight streptococci species in saliva from predecidate and decidate children and adults. *J Dent Res*. 1993; 72(1): 31–6.
- 7- Al-Mashhadani A. Oral health status and salivary *streptococcus mutans* in relation to primary and permanent dentition. Master thesis submitted to the College of Dentistry, Baghdad University, 1996.
- 8- Abul-Eise Z. Maternal caries experience and salivary mutans streptococci in relation to their children in Baghdad city. Master thesis submitted to the College of Dentistry, Baghdad University, 2001.
- 9- Milnes A. Description and epidemiology of nursing caries. *J Public Health Dent*. 1996; 56: 38 – 50.
- 10- Alaluusua S, Mättö J, Grönroos L, Innitä S, Torkko H, Asikainen S, Jousimies-Somer H, Saareh M. Oral colonization by more than one clonal type of *mutans streptococcus* in children with nursing bottle dental caries. *Arch Oral Biol*. 1996; 41: 167 – 137.
- 11- Kreulen C, Soet H, Hogeveen R, Veerkamp J. *Streptococcus mutans* in children using nursing bottles. *ASDC J Dent Child*. 1997; 64: 107 – 111.
- 12- Erickson P, Mazhari E. Investigation of the role of human breast milk in caries development. *Pediatr Dent*. Mar–Apr 1999; 21(2): 86–90.
- 13- Caufield P, Li Y, Wang W. The fidelity of initial acquisition of mutans streptococci by infant from their mothers. *J Dent Res*. 1995; 74(2): 681–5.
- 14- Antony U, Munshi A. Sibling versus maternal *S. mutans* levels as related to dental caries. *J Clin Pediatr Dent*. 1997; 21(2): 145-50.
- 15- Korenstein K, Echeverri E, Keene H. Preliminary observations on the relationship between mutans streptococci and dental caries experience within black, white and Hispanic families living in Houston, Texas. *Pediatric Dent*. Nov – Dec 1995; 17(7): 445 – 50.
- 16- Roeters F, Van der J, Buregers R, Schaeken M. Lactobacilli, mutans streptococci and dental caries: a longitudinal study in 2 years old children up to the age of 5 years. *Caries Res*. 1995; 29(4): 272 – 9.
- 17- Alaluusua S, Myllarniemi M. *Streptococcus mutans* infection level and caries in a group of 5 years old children. *Caries Res*. 1989; 23: 190 – 194.
- 18- Aalltonen A, Tenovuori J, Lehtonen O, Saksala R. Maternal caries incidence and salivary close contact with children affect antibody levels to *streptococcus mutans* in children. *Oral Microbial Immunol*. Feb 1990; 5(1): 12 – 8.
- 19- Brice D. The etiology, treatment and prevention of nursing caries. *Compendium of Continuing Education in Dentistry*. 1996; 17(1): 92 – 98.
- 20- Buttner M. What physicians should currently observe in the area of dental health? *Gesundheit Swesen*. 1995; 57(11): 741 – 3.
- 21- Roberts G, Cleatome-Jones P, Fatti L, Richardson B, Sinwel R, Hargreaves J. Patterns of breast and bottle feeding and their association with dental caries in 1–4 years old South African children. 1. Dental caries prevalence and experience. *Community Dent Health*. 1993; 10(4): 405 – 413.
- 22- Richardson A, Boyd M, Conry R. A correlation study of diet, oral hygiene and dental caries in 457 Canadian children. *Community Dent Oral Epidemiol*. 1981; 5: 227–30.
- 23- Allen K. Bottle caries: an increase problem. *Aust Dent J*. 1981; 26: 403.
- 24- Frreman L, Martin S, Rutenborg G, Shirejian P, Skaria M. Relationship

between def, demographic and behavioral variables among multiracial preschool children. *J Dent Children*. May-June 1989; 205.

25- Chetan R, Indira K. Breast feeding promotion practical guidelines. In: Gupte S, ed. *Recent advances in pediatrics*. Jaypee Brothers, New Delhi; 1993: 51.

Table (1) Correlation coefficient and caries experience (dmfs/ DMFS) between children and their mothers according to child feeding

Feeding	Children dmfs	Mothers DMFS	Statistic
	Mean \pm SD	Mean \pm SD	
Breast	2.70 \pm 2.67	35.25 \pm 20.72	r =+ 0.76** P = 0.001 n = 28
Bottle	2.59 \pm 1.72	34.04 \pm 16.41	r =+ 0.61** P = 0.001 n = 28

** Highly significant

Table (2) Dental caries experience (dmfs grades) among the children and dental caries experience (DMFS) among their mothers according to child feeding

Feeding	dmfs grade	No	%	dmfs	DMFS
				Mean \pm SD	Mean \pm SD
Breast	0 – 2	19	33.92	1.26 \pm 0.87	5.89 \pm 3.66
	3 – 5	5	8.92	3.80 \pm 0.83	7.80 \pm 1.92
	6 – 10	4	7.14	8.25 \pm 1.70	14.75 \pm 4.64
Bottle	0 – 2	17	30.35	1.47 \pm 0.71	6.76 \pm 3.84
	3 – 5	9	16.07	3.89 \pm 0.78	9.00 \pm 1.65
	6 – 10	2	3.57	6.50 \pm 0.70	12.00 \pm 4.24

Table (3) Correlation coefficient and salivary mean count of Ms among children and their mothers according to child feeding

Feeding	Ms [#] of children	Ms [#] of mothers	Statistic
	Mean \pm SD	Mean \pm SD	
Breast	18.93 \pm 13.54	35.25 \pm 20.72	r =+ 0.63** P = 0.001 n = 28
Bottle	19.57 \pm 16.48	34.04 \pm 16.41	r =+ 0.51** P = 0.005 n = 28

[#] The values expressed by 10⁴ CFU/ ml saliva , ** Highly significant

Table (4) Salivary Ms grades among the children and their mothers according to child feeding

Feeding	Ms grade	No	%	Ms [#] of children	Ms [#] of mothers
				Mean \pm SD	Mean \pm SD
Breast	0 – 10	12	21.42	8.41 \pm 3.17	28.08 \pm 13.37
	11 – 20	9	16.07	17.11 \pm 2.75	30.00 \pm 18.54
	21 – 70	7	12.50	39.28 \pm 9.32	54.28 \pm 33.70
Bottle	0 – 10	12	21.42	7.25 \pm 2.41	23.08 \pm 6.21
	11 – 20	7	12.50	16.85 \pm 4.09	32.85 \pm 11.12
	21 – 70	9	16.07	38.11 \pm 16.60	49.55 \pm 17.65

[#] The values expressed by 10⁴ CFU/ ml of saliva