Maternal caries experience and mutans streptococci in relation to their children in Baghdad city.

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Abstract:

The aim of this study was to investigate the association between the maternal dental caries, birth order on early childhood caries. Material and methods sample subjects consist of 126 mother-child pairs, age of children range between 30-54 months, DMFS/dmfs represent the caries experience, salivary samples were taken for counting streptococcus mutans. Results showed that maternal caries experience and salivary mutans streptococci have significant association with their children the sequence of child in the family effect the caries experience of the child. Conclusion these findings are compatible with the hypotheses that adult oral diseases are associated with the probability of exposure to infectious agent and earlier bacterial colonization during childhood.

Keywords:

Mutans streptococci, DMFS, dmfs, dental caries, saliva.

Introduction:

Dental caries is the most common infectious disease affecting humans. The principle causative agents are a group of streptococcal species collectively referred to as mutans streptococci of which streptococcus mutans and streptococcus sorbinus are the most important agents of human caries [1,2].

Mutans streptococci (MS) first colonize infant teeth from 19-31 month of age, a period described as the "window of infectivity"[3]

Saliva is regarded as the most important vehicle of transmission of mutans streptococci via physical contact, [4] or use of shared subjects e.g. spoons or forks [5]. Mothers are considered to be the most important source of infection for the child [6]. So Maternal oral health may be a predictor for offspring oral health and interventions for the mother may be necessary to prevent transmission of MS, therefore infants whose mothers have dental disease at high risk for early childhood caries [7].

Birth order may dictate the age of exposure to common childhood infections, under the assumption that firstborn children are not exposed until they enter school, while later born children are exposed at an earlier age through their older siblings. Familial transmission maybe a risk factor for progression of caries [8]. Person to person transmission of MS occurs via saliva increase the likelihood of bacterial colonization early exposure in nursery schools through other children. On the basis of these previous studies, this study was conducted to examine the association between maternal dental caries, birth order, nursery school and risk of early child hood caries which may affect routine activities of these children.

Material and methods:

The sample subjects of this study consisted of 126 mother -child

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pairs who's selected randomly from maternal and child health center from different areas of Baghdad city. From October to December 2000.

The age of children range from 30-54 months. Subject selected with no history of systemic disease or any respiratory disease, not under anti microbial therapy for at least 5 days before examination time.

Salivary sample: 1 ml of stimulated saliva by sugarless chewing gum is collected for estimation of mutans streptococci from mother mouth and 0.5 -1ml of stimulated saliva from the child.

After determination of pH of saliva, dilution of 0.1 ml saliva were established inoculum was taken from 10^4 Mitis salivarious bacitracin Agar.sample was classified into 3 groups according to the salivary mutans level by the mean of colony forming unit per ml saliva (CFU/ml) (9) :-

Low	0	CFU
Moderate	1-50	CFU
High	>50	CFU

Dental caries examination based on criteria of dmft/dmfs [10] for primary teeth and DMFS for permanent teeth order.

Statistical analysis: Calculation of the statistical parameters, mean and standard deviation was carried out estimation of significance of difference between mean values using student's t-test and ANOVA test, and chi-square test for contingency tables. The analysis was accepted at $P<0.05$ as the limit of significance.

Results:

The total samples were 126 mother-child pairs. The age of children range from (30-54) month, the age was divided into 2 groups. 1st group from (30-42) months and the 2nd group from (43-54) months.

The dmfs mean of boys was higher than girls (5.62 ± 1.45 and 4.72 + 2.32) respectively the difference was significant.

The mean and standard deviation of dmfs of the older group is more than the younger one but with out significant differences (5.36 ± 2.03 and 4.89 ± 2.04) respectively.

It was found that the mothers dental caries experience was (DMFS ± 21.43 ± 7.85) while dmfs for all children 5.1 ± 2.04 , there was a positive correlation between child caries and mother's caries experience ($r=0.199$, $P<0.05$) and also the dmfs had a positive correlation with the age of the child ($r=0.211$, $P>0.05$)

Table (1) revealed the number of colony count unites of streptococcus mutans and salivary pH among children according to the gender and there was a significant difference between boys and girls for both CFU and pH.

Table (1): Mean and standard deviation of salivary mutans count and salivary pH among children according to gender.

Gender		No.	Mean ±SD	T-test	
				t-value	P-value
CFU	Boys	72	41.152 ± 11.136	2.443	0.016*
	Girls	54	35.759 ± 13.628		
PH	Boys	72	7.083 ± 0.610	2.576	0.011*
	Girls	54	7.388 ± 0.718		

*Significant P< 0.05

Result finding shows that the CFU of older children is more than the younger group but with out significant differences while the salivary pH was statistically significant (Table 2).

Table (2): Mean and standard deviation of salivary mutans count and salivary pH among children according to the Age.

Age/month		No.	Mean ± SD	T-test	
				t-value	P-value
CFU	30-42	68	38.517 ± 12.828	0.268	0.789
	43-54	58	39.117 ± 12.311		
PH	30-42	68	7.362 ± 0.475	2.314	0.022*
	43-54	58	7.088 ± 0.786		

*Significant P< 0.05

The distribution of children and their mothers according to the level of salivary mutans count was illustrated in Table (3), 70.6% of children with moderate level (1-50) CFU) while 51.6% of mothers with high level (> 50 CFU). The differences was highly significant (t=4.372, P<0.0001)

Table (3): Distribution of the children according to the level of the salivary mutans count.

CFU/ml Level	Child		Mother	
	No.	%	No.	%
0	2	1.6%	0.00	0.00%
1-50	89	706%	61	48.4%
50-	35	27.8%	65	51.6%
Total	126	100%	126	100%

Table (4-AandB) express the dmfs/DMFS for each level of ANOVA test , F-value 2.15 show no significant differences in the level of CFU and mean of caries experience of children and by t-test a highly significant difference in the level of CFU and mean caries experience for mothers , t=2.83 , P<0.01.

Table (4-A): Caries experience mean + SD of the children among levels of salivary mutans count.

CFU/ml Level	dmfs	ANOVA test	
	Mean ± SD	F-value	P-value
0	5 ± 0.000	2.152	0.121
1-50	4.876 ± 1.987		
50-	5.714 ± 2.149		
Total	5.111 ± 2.044		

Not significant P>0.05

Table (4-B): Caries experience mean ± SD of mothers among levels of salivary mutans count.

CFU/ml Level	DMFS	t-test	
	Mean ± SD	F-value	P- value
1-50	19.447 ± 9.075	2.833	0.005**
50-	23.307 ± 5.999		
Total	21.438 ± 7.855		

** Highly significant P<0.01

Biochemical tests on streptococcus mutans isolated from saliva of mother child pairs revealed that there were 2 groups of biotypes were identified according to the ability of mutans streptococci to ferment carbohydrates.

The biotype I was the predominant the results found that (79.4%) of mother child pairs were having similar biotype I and only 3.2% of the pairs have identical biotype IV and (17.4%) of them have different biotypes of mutans streptococci (I and IV) figure (1).

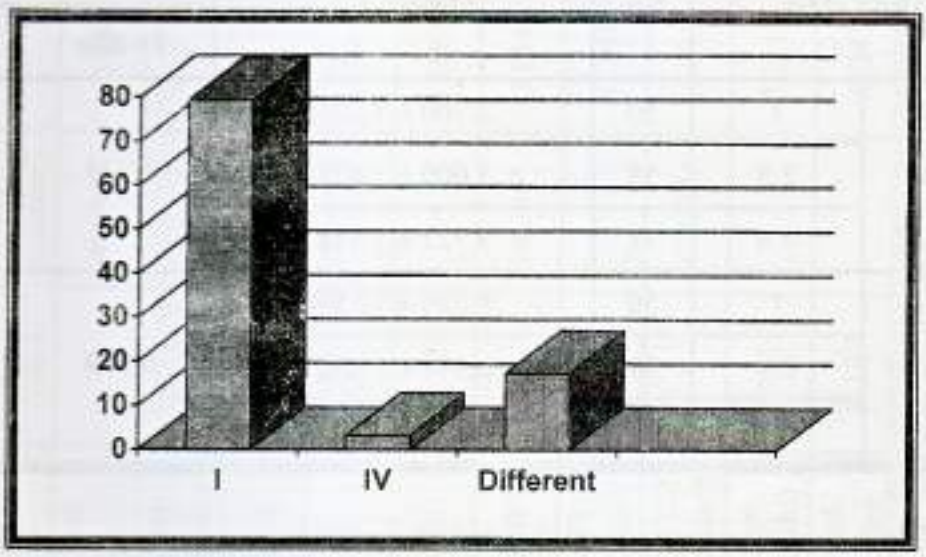

Figure (1): Distribution of the mother-child pairs according to the mutans streptococci biotype.

Results showed a positive statistical significant correlation between biotype of mother and biotype of the child (r=0.177, P<0.05).Table (5) showed that the effect of nursery schools on biotype of the child was with no significant differences between children attended to the nursery and others who did not.

Table (5): Effect of nursery school on difference or similarity of child's biotype with his mother.

Nursery	Biotype		Total	
	Similar	Different		
	No %	No %	No	%
Yes	34 (27%)	8 (6.3%)	42	(33.3%)
No	70 (55.6%)	14 (11.1%)	84	(66.7%)
Total	104 (82.5%)	22 (17.5%)	126	(100%)

X2=0.11 Not significant P>0.05

Sequence of the children in the family was divided into 3 groups in this study. The first group was the 1st child only. The second group was containing the second and third child. The fourth, fifth and sixth child was with third group (more than > 4).

Table (6) revealed the mean and SD of these groups in respect to caries experience and salivary mutans count.

By ANOVA test, it was appeared that a significant increase in the mean of dmft when the number of child's sequence increase. F=3.545.

Table (6): Caries experience and salivary mutans count mean + SD of children according to the child birth older.

Birth older		No.	Mean ± SD	ANOVA test	
				f-value	P-value
Dmft	1	50	2.760 ± 1.221	3.545	0.032*
	2,3	58	3.000 ± 1.426		
	> 4	18	3.722 ± 1.178		
CFU/ml	1	50	38.320 ± 12.531	0.189	0.828
	2,3	58	40.444 ± 11.907		
	> 4	18	40.444 ± 11.907		

* Significant P<0.05

The correlation between all the studied variables among mother and children are illustrated in table (7).

Table (7): Correlation among mothers and children according to many variables.

	PH (child)	PH (mother)	dmfs	DMFS	dmfs	DMFt	CFU (child)	CFU (mother)	Age (child)	Sequence(child)
PH (child)		0.204*	-0.054	0.021	-0.029	0.017	-0.192	0.182*	0.213*	0.107
PH (mother)	0.204*	-	-	-0.013	-	-0.296**	0.080	0.231*8	-	-
dmfs	-0.054	-	-	-	-	0.184*	0.149	0.095	0.211*	0.045
DMFS	-	-0.013	0.199*		0.367**	-	0.197*	0.256**	-	-
dmft	-0.029	-	0.806**	0.367**	-	0.238	0.153	0.102	0.280**	0.0240**
DMFT	-	-0.296*	0.184*	0.695**	0.238**	-	0.069	0.033	-	-
CFU (child)	-0.192	-	0.149	0.197*	0.153	0.069	-	0.388**	0.090	0.109
CFU (mother)	-	-0.231**	0.095	0.256**	0.102	0.033	0.388**	-	-	-
Age (child)	0.213*	-	0.211*	-	0.280**	-	0.090	-	-	0.016
Birth older	0.107	-	0.045	-	0.240**	-	0.109	-	0.016	-

(Pearson correlation coefficient)
*Significant (P<0.05)
** Highly significant (P<0.01)

Discussion:

To our knowledge this is the first study to provide information data on the maternal caries experience and it relation to their children in Baghdad. Infants whose mothers have dental caries are at higher risk for early childhood caries.

The result of this study showed that caries experience mean by dmfs for children 5.11 which was lower than that detected by ALMashadani[11] 9.65 among 4-years old and higher than Al-Sammarai [12] (4.84).

Caries experience of mothers was high[11] , increased dental caries in mothers may be attributed to the irreversibility and accumulative nature of disease. The positive correlation between children and mothers caries experience in agreement with other steadies [13, 14]. Significant differences caries experience between boys and girls [15].

The frequency of occurrence of salivary mutans streptococci in this study is high [13,16]. There is significant difference in mean between boys and girls [17]. The study displays that mean of salivary mutans count of mother is significantly higher. In reverse to other study [11] the mother-child pairs have significant correlation[18] and disagreement with other studies [14] who find it with low or no significance.

Further, no, significant difference m the levels of salivary mutans counts and mean of caries experience among children To explain that these mutans streptococci may be transmitted from the mother, and the children will be carriers of this one etiological factor, but the caries disease may not appear until further factors, such as diet, come into play, but among mothers a significant relation between the levels of salivary mutans count and caries experience was present.

Child's salivary mutans count and caries experience of the mothers had a significant positive correlation in this study. This finding is in agreement with other study [7] who reported that the salivary level of mutans streptococci was higher in the children of mother with high DMFS values compared to the children of mothers with low DMFS values.

Type 1 biotype of mutans streptococci is the predominant type between mother-child pairs. (79.4%) mother-child pair in this study have similar biotype (I), 3.2% of mother-child pairs have similar biotype (IV) of mutans streptococci, (17:4%) of mothers pairs have different biotype of mutans, streptococci. The result showed a significant correlation between mother and her child for having the same biotype this may confirm that specific MS strains transmit from mother to her infant.[1]

In the present study, the girls found with higher mean of salivary pH than boys. This may due to more salivary mutans count in boys than girls, this may lead to more acid production in boys.

For the same reason, the younger children have a significant higher salivary pH than the older group of children, because the younger children have less salivary mutans count, this lead ,to less acid production so higher salivary pH recorded for the younger.

No significant difference between mothers and children in mean salivary pH in present study may due to the same dietary habit and brushing habit and the close relation between mother and her child and the previous studies reach to their conclusion may due to that they examine adult and children not mother and her child.

Another finding is the positive correlation between the salivary pH of the mother and her child salivary pH in this study showed an inverse relationship with the caries experiences of the mothers and the children.

As explained by Van-Houte[21] this may be fact that reduced salivary pH will favor the growth of acidogenic microorganisms and enhance dental caries.

Although the mean caries experience and salivary mutans count .of the child higher in children attending day care nursery school than the children didn't,with no significant difference between them. Further investigation in this study express that the similarity in biotype of mutans streptococci was higher than the different biotype weather these children attend the nursery school or not. As it appears from this result, the nursery school had no effect on difference or similar biotype of mutans streptococci.

Concerning dental caries and birth order of children the results showed a highly positive correlation especially with the 3rd group of more than 4 in sequence, the caries experience was higher than the 1st and 2nd child. The transmission of caries pathogen via salive which can be transmitted among family members[22].

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