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# To Evaluate The Relationship Between Maternal Streptococcus Mutans Level During Pre And Postpartum With Their Children- A Systematic Review

Dental Science

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## ABSTRACT

**Objective:** The aim of this systematic review was to evaluate the relationship between maternal streptococcus mutans level with that of their children.

**Methodology:** PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guideline was used. A search of articles in PubMed, PubMed Advanced Search, MEDLINE, Cochrane Database of Systematic Reviews, SCI. articles published between January 2001- December 2015 were included in the screening process. Studies were included only if Comparison of Streptococcus mutans level of women during and after delivery with their children.

**Conclusion:** There is a positive relationship between maternal streptococcus mutans level and child's streptococcus mutans. Since streptococcus is known to be the main causative factor for dental caries initiation, it was found that mother with high streptococcus have high dmft score and also their child has high dmft score as well

## KEYWORDS:

Streptococcus mutans, Dental Caries, Child, Pregnant Women, Dmft.

### Introduction

Dental caries affects children and adults alike all over the world. Despite progress made in caries control over the years by the protective effects of fluoride, increased efforts in oral health promotion, widespread health education, and remarkable advances in treatment options, dental caries remains the most common chronic childhood disease.

Severe early childhood caries (S-ECC), a particularly aggressive form of dental caries affecting young children. It is strongly linked to the mutans streptococci, most notably Streptococcus mutans and Streptococcus sobrinus[1]
Children who acquire MS at an earlier age are at greater risk for developing caries than those who acquire MS at a later age.[2]

Mothers frequently have an intimate contact with their children during the first two years of their life. It is believed that it is in this period that Streptococcus mutans are initially transferred, in such a way that the maternal salivary levels guide the colonization and the disease extension in their children.[3]

Maternal-child transmission of oral bacteria is one such potential mechanism, leading to caries development in early period of life. Maternal bacterial strains can be detected in children and high maternal salivary mutans streptococci (MS) challenge is associated with earlier child MS acquisition.4 Few studies have found that high maternal streptococcus mutans were found to be associated with high child streptococcus mutan level, therefore, this review was done so as to find the association between the two Aim- The aim of this systematic review was to evaluate the relationship between maternal streptococcus mutans level with that of their children.

NULL hypothesis- There is no relationship between maternal streptococcus level and childhood caries.

### Methodology-

This systematic review was conducted by following PRISMA guideline principles.

### Focused question-

PICO analysis- Population included in the study are pregnant women and their children and compared caries record and Streptococcus mutans level in both. The outcome was analysed that "Is there any relationship between maternal streptococcus mutans level with that of their children."

**Eligibility criteria-** Studies were included in which women dmft and streptococcus mutans level were analyzed during and after pregnancy period along with their child's Streptococcus mutans level.

The studies were included which were published during January 2001– December 2015.

The articles were published in English
Studies that recorded other factors other than mutans level were not included.

### Information Criteria

For identification of studies included or considered for this review, detailed computerized literature search strategies were carried out on the following databases. PubMed, PubMed Advanced Search, MEDLINE, Cochrane Database of Systematic Reviews, SCI. articles published between January 2001- December 2015 were included in the screening process.

The following MeSH terms were used in various combinations: streptococcus mutans, pregnancy, dental caries, childhood caries.
Reference list of the reviews and of the identified randomized trials were also checked for possible additional studies.

**Study selection-**

Total of 1676 studies were identified from electronic database searching. The record were analysed and duplicate were removed after reading titles and abstract. After exclusion 25 studies remained and screened. The data were assessed according to selection criteria and 21 studies were excluded as studies did not meet the inclusion criteria. Remaining 4 studies were included for the study

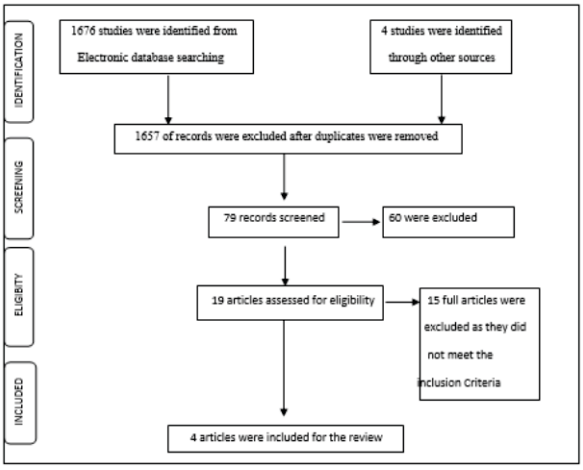


**Figure 1**. Selection process for study inclusion in the review.

**Data items-**

Variables included for the study are- streptococcus mutans level and dmft score of pregnant women during and post-partum period along with comparison of their child's Streptococcus mutans level.

**Outcome and prioritization-**

Studies were included only if Comparison of Streptococcus mutans level of women during and after delivery with their children.

Additional outcomes were also seen to be affected by oral hygiene maintainence, fluoride therapy during pregnancy, sociodemographic.

**Result**- The present study was conducted to evaluate any relationship between maternal streptococcus mutans level with that of their children. The 4 studies were included in this review.

According to Guler et al6, after applying the preventive treatment program in the test group, statistically significant differences in both the plaque index and the number of Streptococcus mutans colonies were observed (P=0.001). There was a significant relationship of the number of Streptococcus mutans colonies of the control and test groups with those of the babies Another study was conducted by Chaffee et al4, in which they found that Salivary MS and LB levels were greater among mothers of caries-affected children versus caries-free children. Mothers with higher salivary MS challenge were more likely to have MS-positive children (>0 CFU/mL), but maternal LB challenge was not a statistically significant predictor of child LB-positive status. Adjusting for socio-demographics, feeding and care practices, and maternal dental status, higher maternal salivary challenge of both MS and LB over the study period predicted nearly double the child caries incidence versus lower MS and LB Y. Li et al7 found that maternal gestational age, Streptococcus mutans level, caries score, sexually transmitted disease infection experience (p = 0.01), and family income (p = 0.03) had significant effects on the acquisition of Streptococcus mutans. Among infants who became infected, those delivered by Caesarean section acquired Streptococcus mutans 11.7 months earlier than did vaginally delivered infants.

According to Karen et al8, the adolescents of the prevention group revealed a share of 92.3 % caries-free dentition. Mean DMF-T was 1.4±2.6. The control group showed a significantly higher mean DMF-T of 3.8±3.2 and revealed 71.4 % of caries-free dentition. The prevention group showed a significant lower PSI of 1.2±0.8 compared to the control group (2.1±0.4).

Therefore, in the present study it was inferred that there is a positive relationship between maternal streptococcus mutans level and child's streptococcus mutans. Since streptococcus is known to be the main causative factor for dental caries initiation, it was found that mother with high streptococcus have high dmft score and also their child has high dmft score as well.

**Table 1.** Author, Sample, And Intervention Details For The 4 Studies Included In The Review

| AUTHOR AND YEAR | Sample size | STUDY DESIGN | AGE OF MOTHER | AGE OF CHILD | MATERNAL SM | CHILD SM | MATERNAL DMFT | CHILD DMFT | SOCIO-DEMOGRAPHIC | ORAL HYGIENE STATUS | FLUORIDE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Li et al, 20057 | 218 | Prospective Cohort | 18 or more | Followed upto 42 months | + | + | + | + | | | |
| B.W. Chaffe 20144 | 361 | Prospective Observational Cohort | 18-33 yrs | 36 Months | + | + | + | + | + | + | + |
| Guler et al, 20116 | 60 | Experimental Study-Non-Randomised Control Trial | 25-30 yrs | 8th weeks (Approx 2 months) | + | + | + | - | | + | + |
| Karen Meyer 20148 | 86 | Longitudinal Study | 20-37 | Up to 18-19 yrs | + | + | + | + | | + | + |

**Table 2.** Authors, Results and Conclusion for the Studies Included In the Review

| AUTHORS AND YEAR | RESULTS | CONCLUSION |
|---|---|---|
| **Li et al, 20057** | The C-section infants acquired S. mutans at a younger age compared with the vaginally delivered infants | An infant born by C-section from a mother with a low socioeconomic status, and who experienced tooth decay, acquired S. mutans earlier than did a normal vaginally born infant. |
| **B.W. Chaffee 20144** | Salivary MS and LB levels were greater among mothers of caries-affected children versus caries-free children. Mothers with higher salivary MS challenge were more likely to have MS-positive children | Maternal salivary bacterial challenge not only is associated with oral infection among children but also predicts increased early childhood caries occurrence. |

| | | |
|---|---|---|
| **Guler et al, 20116** | After applying the preventive treatment programin the test group, statistically significant differences in both the plaque index and the number of S. mutans colonies were observed | Streptococcus mutans is commonly transferred from mothers to their babies, and the preventive program applied to the pregnant women reduced both the amount of plaque and S. mutans colonization and thus had a positive effect. |
| **Karen Meyer 20148** | The adolescents of the prevention group revealed a share of 92.3 % caries-free dentition. Mean DMF-T was 1.4±2.6. The control group showed a significantly higher mean DMF-T of 3.8±3.2 and revealed 71.4 % of caries-free dentition. The prevention group showed a significant lower PSI of 1.2±0.8 compared to the control group | An "early oral health care promotion" starting during pregnancy may cause a sustained and long-term improvement of the oral health of young adults. |

## Discussion

The present review is to systematically search and critically appraise the substantial literature on the evaluation of the relationship of streptococcus mutans level during pre- and postpartum with child caries incidence. Systematic reviews are an important tool for studying the relationship of streptococcus mutans level of mother and dental caries in children. They can also provide information on costs and benefits, and sometimes on the process of delivery. It is important as well that this review will contribute towards the development of new methodologies needed to conduct reviews in the area of dentistry, such as the relationship between dental caries and oral health.

The vertical mother-child relationship of this transmissibility has been emphasized through the years. Poor maternal dental health might enhance caries development in subsequent generations through multiple mechanisms— genetic, behavioral, infectious, and social.9 Multiple studies have documented maternal-to-child transfer of caries-causing oral bacteria.10 MS have the capacity to produce acids, and are therefore considered "potential cavity formers".

Maternal bacterial challenge continues to merit consideration among the multiple individual, familial, and community risk factors for early childhood caries. Association estimates changed little after adjustment for various socio-demographic, feeding/care, and maternal dental measures, suggesting limited confounding by these variables. Berkowitz et al (2003) reported in a study that mothers with high salivary Streptococcus mutans count, that is exceeded 105 colony forming units (CFU) were about nine times more likely to pass the causative bacteria on to their children than mothers with low salivary Streptococcus mutans count.[11]

Our study highlights the contribution of maternal bacterial challenge in early childhood caries. In the present systematic review, there were four studies included according to the inclusion criteria for the study.

B.W. Chaffee4 calculated the association of maternal salivary bacterial challenge (mutans streptococci [MS] and lactobacilli [LB]) from pregnancy through 24 months' postpartum with child caries incidence at 36 months. They found Salivary MS and LB levels were greater among mothers of caries-affected children versus caries-free children. Mothers with higher salivary MS challenge were more likely to have MS-positive children, but maternal LB challenge was not a statistically significant predictor of child LB-positive status.

Li Y et al7 found that maternal gestational age, Streptococcus mutans level, caries score, sexually transmitted disease (STD) infection experience, and family income had significant effects on the acquisition of Streptococcus mutans. Among infants who became infected, those delivered by Caesarean section acquired Streptococcus mutans 11.7 months earlier than did vaginally delivered infants.

Karen et al8 concluded An "early oral health care promotion" starting during pregnancy may cause a sustained and long-term improvement of the oral health of young adults.
Guler et al6 found Streptococcus mutans is commonly transferred from mothers to their babies, and the preventive program applied to the pregnant women reduced both the amount of plaque and Streptococcus mutans colonization and thus had a positive effect.

## Conclusion

Maternal salivary bacterial challenge not only is associated with oral infection among children but also predicts increased early childhood caries occurrence. Streptococcus mutans is commonly transferred from mothers to their babies, and the preventive program applied to the pregnant women reduced both the amount of plaque and Streptococcus mutans colonization and thus had a positive effect. Streptococcus mutans infection in pre-dentate infants can occur especially in those with mothers who have poor oral hygiene. Pregnant mothers who had numbers of Streptococcus mutans exceeding 105 CFU affected Streptococcus mutans acquisition by their babies. Streptococcus mutans is transferred to babies from their mothers, and the preventive program applied to prospective mothers reduced both the amount of plaque and Streptococcus mutans colonization and thus had a positive effect. In order to avoid the transfer of MS from mother to child, the extent of the mother's infection needs to be assessed. Results of the study showed that selected dental caries preventive measures were effective and significantly improved women's oral health during pregnancy.

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