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What is the Role of Educating Pregnant Mothers in Prevention of Early Childhood Caries - A Systematic Review

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Abstract: ***Purpose: To summarize the evidence of the efficacy of oral health education provided to expectant mothers for preventing Early Childhood Caries (ECC). Materials & Methods: The search strategy included clinical trials in the Cocraine Oral Health groups trial registered, Pubmed, Google scholar, Science direct, Reference lists of identified randomized control trials (RCT's) and review articles were included. Studies were selected according to the predefined inclusion and exclusion criteria. Results: The search identified 390 studies, only four of which were included. Risk ratios were calculated. The quality of the evidence was accessed by the Grade approach. Meta - analysis could not be performed. Conclusion: Oral health educational programs for expectant mothers may have a positive impact in preventing ECC.***

Keywords: Early childhood caries, oral health education, Randomized control trial

1. Introduction

- Early childhood caries (ECC) is a significant public health issue that effects the pre - school children. It is defined as " the presence of one or more decayed (non cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six. There are various recommendations by organization such as The American Academy of Paediatrics (AAP), the American Academy of Paediatric Dentistry (AAPD) on preventive protocols.
- Proper prenatal care is essential. Oral health care providers are in a position to encourage pregnant females to seek care for oral health with their obstetrician and other primary care providers throughout their pregnancy. Likewise, dental care providers or obstetricians are able to counsel patients regarding good oral health habits, including the importance of professional oral health care during pregnancy. Dental visits during pregnancy are safe, effective, and encouraged.[1, 2] The diet of the pregnant adolescent can affect the health of the child. A healthy diet is necessary to provide adequate amount of nutrients to the mother - to - be and the unborn child.
- A systematic review incorporating a randomised control trial would be the gold standards method to assess the efficacy of such preventive interventions. Hence, following the PRISMA guidelines, the PICO (Patients/ Population, Intervention, Comparison group and outcomes) research question for our review was - , "What is the role of educating pregnant mothers in prevention of early childhood caries?"
- The purpose of this review was to summarise the evidence for the efficacy of oral health educational programmes provided to expectant mothers for preventing ECC and further to determine the most effective intervention programme.

Aim and objectives

Aim

The aim of this study is to summarize the evidence of the efficacy of oral health education provided to expectant mothers for preventing Early Childhood Caries (ECC).

Objectives

1) To determine the effectiveness of oral health education started during pregnancy on early childhood caries.
2) To determine the effectiveness of caries preventive measures started during third trimester of pregnancy on the caries experience of mothers and their infants.

2. Methodology

The PRISMA statement was used as the basis for reporting the systematic review findings. Criteria for inclusion and exclusion Search strategies were conducted over three databases to include a range of current research PubMed. Literature, Google database, Cocraine oral health group trials registering in September 2020 that related to the research aims were included.

To reach saturation, key papers were also hand searched to screen for relevant literature. All types of quantitative study designs with a control or comparison group were included in this review. Studies retrospectively assessing outcomes of oral health interventions were also included given they described a comparison group.

Studies were included regardless of their methodological quality provided they (a) were Randomised Control Trials incorporated with atleast one oral health interventions in pregnant females; delivered the intervention to participants who were expectant mothers (antenatal period) or mothers with young infants up to 24 months (postnatal period); (b) outcomes were initially measured when the child was under 5 years; (c) reported on interventions delivered by non - dental health professionals, including oral health promotion, oral health assessments/ screening, and referral of participants to dental services, or the intervention was delivered as part of a multidisciplinary team; (d) measured changes in oral health outcomes of children clinically; (e) measured changes in oral health behaviours of mothers or children; all the studies in English language.

Studies were excluded according to the following criteria: parents/caregivers other than mothers were the focus of the intervention; No restrictions were placed on study setting; however, articles were excluded if they were published in a language other than English.

Selection process - The search retrieved 1551 records from the three databases and extracted 418 further articles from the reference lists of key papers. Duplicates were removed and further papers were screened by the reviewer for relevance to the research aims. Total of 4 articles were finally selected which matched the inclusion criterias for this systematic review.

Types of Bias	Regia Luzia ZANATA et al; 2003	Ali Khani Jeihooni et al; 2017	Rena Takahashi et al; 2017	Plutzer & Spencer; 2008
Selection Bias	+	+	+	+
Performance Bias	-	-	+	-
Detection Bias	+	+	+	+
Attrision Bias	+	+	-	-
Reporting Bias	?	-	+	+
Other Bias	?	?	?	?

Data extraction process - Data were extracted from each article independently and included study details, aims, design, population demographics, type of non - dental health professionals who delivered the intervention, type and description of intervention, and outcome measures, all of which were described with the time of intervention delivery (i. e. antenatal, postnatal or both periods). If the methods or results of papers were inadequately described, we referred to literature cited within the study.

Outcomes and prioritization The oral health outcomes of children, as defined by prevalence of ECC or decayed, missing or filled surfaces (dmfs) and teeth (dmft), were the primary outcome measures to determine the clinical effectiveness of the intervention on improving their oral health. Oral health behaviours were the secondary outcome measure and included variables such as oral health knowledge, practice and dental service uptake as they can assist in predicting future dental outcomes.

Assessment of bias was done using the Cochrane handbook for systematic reviews of intervention which included methods used to generate allocation and blinding, incomplete outcome of data, reporting bias, attrision bias etc.

3. Result

From all the relevant searches and eliminating the duplicates, the final number of studies included in this review was only four. PRISMA format was used to describe the no. of reports, eligibility criteria. The intervention methods varied across studies and included oral health education, oral health assessment/screening, diet counselling, fluoride supplements & referrals of participants to dental services. The characteristics and outcome of all included studies are mentioned in table no.1.

Reduction in Caries incidence was the result of three studies and also the betterment in maternal oral health practices.

Interventions in the studies included in this review also involved written oral health promotion materials such as postcards, pamphlets, brochures, leaflets, posters displayed in clinics, letters to remind parents about a child's dental appointment and a toolkit containing educational material. Some visual tools were also used in interventions and consisted of educational video and DVDs.

Author, year, reference	Country	Study design	Sample size description	population	Intervention	Mode of delivery of intervention	Outcome measures	P - value	Potential conflicts of interest
Régia Luzia ZANATA et al; 2003	Brazil	Randomized control trial	Control group - 38 Intervention group - 43	Pregnant women	Printed educational, aterial, diet counselling, oral hygiene kit	By professionals & study material	Reduction in ECC, maternal and child oral health	Caries increment cavities and white spot lesions - (intervention group 5.2% vs control groups 6.2%); *p=0.5 Caries free infant - (29%vs 20%) *p=0.8	none
Ali Khani Jeihooni et al; 2017	Iran	Randomized control trial	Control group - 55 Intervention group - 55	Pregnant women	Teaching intervention - health bilief model; oral health care	By professionals & study material	health belief model in oral health care for pregnant women	Not applicable	none
Rena Takahashi et al; 2017	Tokyo	Randomized control trial	Control group - Intervention group- 1400	Pregnant women and their children	Fluoride supplements	By professionals	No evidence of reduction in ECC after intake of fl supplements by mothers.	Not applicable	none
Plutzer & spencer; 2008	Australia	Randomized control trial	Control group - 322 Intervention group - 327	Pregnant women	Oral health promotion in form of anticipatory guidance	Printed information	S - ECC assessed when child was 12 months old	(intervention group 1.7% vs control groups 9.6%); *p<0.001	none

4. Discussion

From all the studies reviewed regarding the role of educating pregnant woman on reduction of early childhood caries, significant reduction was seen in the incidence of ECC and these intervention methods were found to be very effective.
The findings of the study with Health Belief Model (HBM) showed that 4 months after the teaching intervention and following training sessions related to oral health promotion program based on HBM, there was rather a significant increase in the constructs of HBM and oral and dental hygiene practices in the experimental group than the control group and also significant decrease in the ECC.

Most effective of all were health education material, health belief model, oral hygiene kits and also visual health promotions as described in studies by Régia Luzia ZANATA et al; 2003, Ali Khani Jeihooni et al; 2017 &Plutzer & spencer; 2008.

As pregnant women are more prone to gum diseases and dental caries during pregnancy, it is vital that mothers are more sensitive to the consequences. In this study, the presence of such a significant difference between experimental group following the teaching intervention and control group can be a successful evidence of the impact of teaching intervention on promoting perceived susceptibility and seriousness in the control group so that after the teaching intervention, the majority of mothers in the experimental group believed that they would probably be exposed to the risk of tooth decay. An increase in their knowledge provided an opportunity to adopt oral health behaviors. The findings of this study are consistent with that of Peyman and Pourhaji.

5. Strength & Limitations

The strengthen of the study is the significant differences observed in caries reduction in the test group. In association with selection bias, a possible limitation of this study was that a thorough hand search of full series of consecutive issues of all dental journals was not performed. In addition, only studies in English were included. Hence, as we did not analyse studies from other languages that could have contributed to the data, the possibility of publication bias exists.

6. Conclusion

Based on this review, there is some evidence to suggest that oral health education intervention in expectant mothers may have positive impact in preventing ECC in their children. However as there were disparities among the interventions, a definitive conclusion concerning the best intervention to prevent ECC could not be obtained.

This evidence indicated that for high risk patients, there is a need for re - evaluation every three months, with additional counselling and delivery of preventive services to the mother on a regular basis, so that their effects can be sustained for a longer period of time.

Conflict of Interest: None

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