

The Effect of Motivational Interviewing on Reduction of New Carious Lesions in Children with Early Childhood Caries: A Systematic Review and Meta-analysis

Shivangi Manek¹, Ashwin M Jawdekar², Amar N Katre³

ABSTRACT

Background: Preventive therapies rely on effective behavior change. Motivational interviewing (MI), has been the most recent advancement in behavior therapies that have been successful in tobacco cessation. The effectiveness of MI needs to be evaluated in caries prevention.

Objectives: To evaluate the effectiveness of MI on the reduction of new carious lesions in children with early childhood caries (ECC).

Materials and methods: The two authors independently searched data from Cochrane Library, PubMed, Google Scholar, J gate, and Quintpub. Selection criteria—interventional studies written in the English language with MI as an intervention, a mean follow-up period of at least 2 years, ECC with decayed, missing, and filled primary teeth/decayed, missing, and filled primary surfaces (dmft/dmfs) as the outcome measures, in the age group of 0–6 years. We excluded cross-sectional studies. Information regarding methods, participants, interventions, outcome measures, and results were extracted. A risk of bias assessment within and across studies was conducted. Grading of Recommendations Assessment, Development, and Evaluation (GRADE) criteria were applied to generate quality evidence.

Results: Six studies with a total of 2,663 participants were included in the review, and meta-analysis was conducted on 4; 3 studies had a high risk of bias. A mean reduction of 2.16 (–5.06, 0.75) was observed with MI as an intervention. A sensitivity analysis revealed a mean reduction of 3.64 (–5.77, –1.51) in favor of MI.

Conclusion: There is some evidence with moderate certainty that MI is beneficial in the reduction of new carious lesions in children with ECC.

Keywords: Behavior change, Early childhood caries, Motivation interviewing, Oral health behavior.

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BACKGROUND

Dental caries is a public health concern¹ as it is ubiquitous, severe, transmissible, and has an impact on quality of life but is preventable.^{2,3} The prevalence of ECC in India was 49.6%.⁴

Early childhood caries (ECC) leads to eating disabilities, unexplained episodes of fever, lymphadenopathies, missed school days, and other psychological and behavioral problems.⁵ ECC can be prevented by implementing preventive therapies and targeting dietary behavior change.⁶ The American Academy of Pediatric Dentistry recommends the first visit of the child to the dentist by 1 year of age or within 6 months of the eruption of the first primary tooth,⁷ thus facilitating the implementation of preventive strategies like topical fluoride application at an early age and reinforcing a desirable behavior in the parents. As preventive therapies rely on effective behavior change, newer methods for the same should be tested.

Motivational interviewing (MI) is a patient-focused technique of behavior management. The patient has an active role in planning his treatment when MI is applied. It comprises of following stages—precontemplation, contemplation, preparation, action, and maintenance. It consists of different communication styles like instructing, guiding, and directing through different methods such as elicit-provide-elicited and chunk-check-chunk implied for imparting information.⁸

The effect of MI on oral health behaviors in terms of obesity, periodontal diseases, tobacco and smoking cessation, and

^{1,3}Department of Pediatric and Preventive Dentistry, Dr G.D. Pol Foundation's Y.M.T. Dental College and Hospital, Navi Mumbai, Maharashtra, India

²Vice Principal, Bharati Vidyapeeth Deemed to be University Dental College & Hospital, Belpada, Navi Mumbai 400614 (India)

Corresponding Author: Shivangi Manek, Department of Pediatric and Preventive Dentistry, Dr G.D. Pol Foundation's Y.M.T. Dental College and Hospital, Navi Mumbai, Maharashtra, India, Phone: +91 9619778277, e-mail: manekshivangi@gmail.com

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consumption of sugar-containing beverages has been studied in the recent past, wherein the participants could reflect on their dietary behaviors and were an active part of the discussion. They were also given practical suggestions which were more acceptable to cause a change in the routine.^{9,10} Hence, there is a scope to review literature pertaining to the effect of MI on ECC. We hypothesize that MI would lead to the reduction of new carious lesions in children with ECC.

OBJECTIVES

To evaluate the effectiveness of MI on the occurrence of new carious lesions in children with ECC.

MATERIALS AND METHODS

This systematic review was conducted in compliance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses. This review protocol was registered in PROSPERO (CRD42020151060). The review was carried out using RevMan Manager 5.3 version software.

Criteria for Considering Studies for this Review

Types of Studies

Interventional studies and analytical observational studies with MI as an intervention in children below the age of 6 years were included. We included randomized controlled trials (RCTs), non-randomized trials, clinical trials, case-control studies, and cohort studies for the review.

Selection Criteria

- Full-text articles published in the English language.
- Minimum follow-up of 2 years.
- Children in the age range of 0–6 years having ECC with dmft/dmfs being the outcome measures.
- Studies in press.

All cross-sectional studies, letters to editors, and personal communication were excluded.

Types of Interventions

- Test group: Mothers who were in the last trimester of pregnancy had just given birth or had children from 0–6 years of age in whom MI was administered.
- Control group: Mothers who were in the last trimester of pregnancy had just given birth or had children from 0–6 years of age in whom dental education in the form of simple instructions or videos or through pamphlets was administered.

Types of Outcome Measures

- Primary outcomes: Reduction in occurrence of new carious lesions—this was measured using the dmft index. The occurrence of new carious lesions was assessed by analyzing the baseline dmft/dmfs scores with the postintervention scores.
- Secondary outcomes: No secondary outcomes were assessed

Search Methods for Identification of Studies

Electronic Searches

Two authors of this review (SM and AJ) conducted systematic searches in the following databases for studies published till August 2019 according to mentioned selection criteria:

- Cochrane Library.
- PubMed.
- Google Scholar.
- J gate.
- Quintpub.

Searching other Resources

Articles that were not accessible as full texts online were retrieved by contacting the journal offices/authors.

Data Collection and Analysis

Selection of Studies

Following the search, two authors (SM and AJ) independently reviewed the articles on the basis of title, abstract, and full texts, the agreement between the two authors. In case of any disagreement, it was resolved by a third independent author (AK).

Data Extraction and Management

Data extraction was carried out by the two authors independently, and the data extraction sheets were compared.

The data were collected was under the following headings:

- Study design.
- Year when the study was completed.
- Demographic data of the participants, wherever available.
- Independent variable.
- Dependent variable assessed.
- Outcome.

The characteristics of trial participants, interventions, and outcomes are presented in the characteristics of included studies table (Table 1).

Assessment of Risk of Bias in Included Studies

We assessed the risk of bias for trials according to the Cochrane Risk of Bias Tool for RCTs and the New Castle Ottawa scale for cross-sectional studies.^{11,12} The risk of bias table was completed by assessing the studies in the following categories for RCTs:

- Random sequence generation for selection bias.
- Allocation concealment to assess selection bias.
- Selective reporting to assess reporting bias.
- Blinding of participants and personnel to assess performance bias.
- Blinding of outcome assessment to assess detection bias.
- Incomplete outcome data to assess for attrition bias.
- Other bias to assess any other bias which has not been covered elsewhere.

The risk of bias table was completed by assessing the studies in the following categories for cross-sectional studies:

- Selection.
- Comparability.
- Outcome.

The graphical representation of the same is depicted in Figure 1. For each category, the risk of bias was termed as low, unclear, or high. Low risk was judged when the provided data did not influence the outcome in any form, the unclear risk was judged when there was insufficient information provided about the particular category, and a high risk of bias was judged when there was a source of bias that influenced the outcomes and results.

Overall, the risk of bias for a particular study was graded as the study being of good, fair, or poor quality according to the Cochrane Risk of Bias Tool for RCTs. GRADE guidelines was used to summarize the overall quality of evidence of each outcome included in the systematic review and meta-analyses.

Measures of Treatment Effect

New carious lesions, either treated or untreated, are usually reported as dmft and dmfs in mean and standard deviation and as percentages. Our data synthesis was based on this continuous and exploratory outcome only. The confidence interval (CI) and *p*-value were scrutinized for further analysis.

Table 1: Characteristics of included studies

<i>Colvara 2018</i>		
Methods	The mothers/child's pair and external examiners from 12 health care units in southern Brazil were blinded to the intervention. The data were collected by calibrated examiners using questionnaires, and a clinical examination for caries was based on modified International Caries Detection and Assessment System criteria.	
Participants	Out of 674 children born in 2013, 469 received the intervention (224 in the conventional oral health education group, 245 in the MI group), and 320 were examined by the end of the study (145 in the conventional oral health education group, 175 in the MI group), with a mean age of 30 months.	
Interventions	MI	
Outcomes	dmft in percentage	
Notes	Final follow-up was 68% after 3 years, the caries rate per 100 surface-year in the conventional oral health education group was 1.74 (95% CI, 1.14–2.34), and in the MI group, it was 0.92 (95% CI 0.63–1.20)	
<i>Risk of bias table</i>		
Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Low risk	Since the sequence was generated by the computer for randomization, the bias is low
Allocation concealment (selection bias)	High risk	Not mentioned
Blinding of participants and personnel (performance bias)	Unclear risk	The examiners were blinded for the intervention but blinding for the participants has not been mentioned
Blinding of outcome assessment (detection bias)	Low risk	The examiners were blinded, and they were also calibrated
Incomplete outcome data (attrition bias)	Low risk	There was attrition in the sample due to the children refusing to report for follow-up; they migrated to another area which led to the loss of contact and those who could not be contacted at home when they were visited.
Selective reporting (reporting bias)	Low risk	The dmft scores were used by calibrated external examiners, and inter and intraexaminer reliability was also done
Other bias	Unclear risk	Sociodemographic data was compromised
<i>Harrison 2007</i>		
Methods	South Asian children and mothers were recruited from the PICS community center, Sikh temple, community events, and radio advertisements, and they have explained the risks and benefits of the intervention	
Participants	240 6–18-month-old children were recruited	
Interventions	MI	
Outcomes	dmfs with 3.35 + 7.8 for the intervention group, 7.59 + 14.2 for the control group, and p -value = 0.01 was significant with decayed 2.91 + 5.6 for the control and 2.03 + 4.9 for the intervention group, missing 1.25 + 5.8 for the control group and 0.33 + 2.5 for the intervention group, filled surface 3.43 + 9.7 for control and 0.99 + 5.1 for intervention group with p -value significant for filled surface	
Notes	Followed up for 2 years	
<i>Risk of bias table</i>		
Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Low risk	A table of random numbers was used
Allocation concealment (selection bias)	Low risk	To keep allocation concealed, the assignments were sealed in a block of 10 envelopes made by statistician and PICS staff
Blinding of participants and personnel (performance bias)	Unclear risk	Blinding of personnel was done by concealed envelopes, but blinding of participants has not been mentioned

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Blinding of outcome assessment (detection bias)	Low risk	The examiners were blinded to which group they were examining
Incomplete outcome data (attrition bias)	Low risk	To take care of attrition bias, they recruited 11.42% of the extra population so that the results would not get affected
Selective reporting (reporting bias)	Low risk	Outcomes were prespecified, and inter and intraexaminer reliability was also checked
Other bias	High risk	The population in the experimental group had higher fluoride varnish visits as a result of MI than the control group, and the home conditions for the prevention of caries also varied in both groups

Harrison 2012

Methods	Mothers were given scripts of MI and were followed up postnatally for up to 2 years; they were assigned to two groups—intervention and control being traditional health programs through pamphlets
Participants	A total of 309 mother-child pairs (Cree women who had recently given birth or were between 12 and 34 weeks of pregnancy and were followed up until their child was 2 years of age)
Interventions	MI in the form of scripts based on prior trials
Outcomes	dmfs for the control group was 11.1+12.9, 73%, and for the test, the group was 8.0 + 11.2, 64%
Notes	Followed up for 2 years

Risk of bias table

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Low risk	Done over community radio to select one person from a large community and one from a small community
Allocation concealment (selection bias)	Low risk	Allocation concealment was done using sealed envelopes
Blinding of participants and personnel (performance bias)	Low risk	Both the participant and examiner were initially unaware of the group they belonged to until the envelope was opened. Interveners and mothers of children were not blinded.
Blinding of outcome assessment (detection bias)	Low risk	The examiners were not familiar with the intervention
Incomplete outcome data (attrition bias)	Low risk	To account for attrition bias, they recruited 5% of the extra population for each year for the 3-year study
Selective reporting (reporting bias)	Low risk	Outcomes were reported as per the predefined scale
Other bias	Low risk	Socioeconomic status was not recorded

Henshaw 2018

Methods	Residents of public housing developments participated and were divided into two groups - control and intervention group, with the intervention being the MI
Participants	A total of 1,065 children (49% female, 55% non-White, 61% Hispanic, 89% below poverty level, n = 686 control) and their caregivers were included in this study
Interventions	MI
Outcomes	dmfs with mean dmfs showed a rise in both groups over the 2-year period: from 1.3 + 4.6 to 3.1+ 8.0 in intervention and from 1.6 + 5.6 to 3.1 + 8.1 in control.
Notes	Followed up for 2 years

Risk of bias table

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Low risk	Statisticians divided the population into six strata, and a computer-generated random number was used
Allocation concealment (selection bias)	Unclear risk	Not mentioned

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Blinding of participants and personnel (performance bias)	Unclear risk	Examiners were blinded, but not the participants
Blinding of outcome assessment (detection bias)	Low risk	The examiners were blinded to the group they were examining
Incomplete outcome data (attrition bias)	Low risk	24.77% of the population was recruited extra to account for attrition bias
Selective reporting (reporting bias)	Low risk	The outcome measures were pre-specified and were recorded by calibrated dental examiners
Other bias	Low risk	Appears to be free of other biases

Jamieson 2018

Methods	Randomized control trial was conducted with participants recruited by health service providers
Participants	Pregnant mothers and mothers of children of age groups 6, 12, and 18 months—280 children being sample size
Interventions	MI with anticipatory guidance, application of fluoride varnish, and provision of dental care for pregnant mothers
Outcomes	dmft mean number for the intervention group was 0.62, and for the control group was 0.89
Notes	Followed up for 2 years

Risk of bias table

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Low risk	Statisticians made this sequence through computer generation and random block sizes
Allocation concealment (selection bias)	Low risk	Occurred through computer generation sequence
Blinding of participants and personnel (performance bias)	High risk	Both were not blinded
Blinding of outcome assessment (detection bias)	Low risk	Separate examiners recorded the data after 2 years; thus, they were blinded
Incomplete outcome data (attrition bias)	Low risk	35% of the population was over-recruited to account for attrition bias
Selective reporting (reporting bias)	Low risk	The examination was standardized using prespecified scales for calculating dmft by calibrated examiners
Other bias	Low risk	The study is free from other biases

Wagner 2013

Methods	Mothers were educated after birth, and the caries status of their children was assessed after 5 years
Participants	Mothers from regional hospitals in Vorarlberg were counseled after birth
Interventions	Toothbrush training, MI, dietary counseling, and anticipatory guidance
Outcomes	dmfs with 3.2 + 7.4 in intervention group and 5.2 + 6.4 in control group and dmft being 1.5 + 2.5 in intervention group and 2.4 + 4.1 in control group
Notes	5-year follow-up reported this study was not subjected to risk of bias evaluation as it was a case-cohort study and not an RCT

Risk of bias table

Bias	Stars	Support for judgment
Selection: Representativeness of the exposed cohort	*	The sample was truly representative
Selection of the nonexposed cohort	*	Drawn from the same community as the exposed cohort

Contd...



Contd...

Ascertainment of exposure	*	The counseling was conducted in a structured format
Demonstration that outcome of interest was not present at the start of the study	*	Both intervention and control groups had similar dmft and were matched to avoid a biased result
Comparability: Comparability of cohorts on the basis of the design or analysis controlled for confounders	*	The study controls for age, sex, ethnicity, and socioeconomic status
Outcome: Assessment of outcome	*	Independent blind assessment
Was follow-up long enough for outcomes to occur?	*	It was a follow-up after 5 years, giving enough time for a change in dmft to occur
Adequacy of follow-up of cohorts	*	There was a loss in follow-up due to the missing written consent of their parents ($n = 42$), not completed survey ($n = 27$), disease on dental examination day ($n = 57$), and children with special healthcare needs ($n = 3$) account for successful 78.5% of response rate

Unit of Analysis Issues

The caries status of the participants was the unit of analysis. The baseline and the postintervention caries status were recorded in both groups to assess the effectiveness of the intervention. Because of heterogeneity and differences in the sample sizes in the study, we used both fixed effects and random effects models.

Dealing with Missing Data

Only available data was analyzed.

Assessment of Heterogeneity

Heterogeneity in the results of the trials was assessed by inspection of a graphical display of the results and by formal tests of heterogeneity.

Assessment of Reporting Biases

A funnel plot was used to assess publication bias.

Data Synthesis

For this review, the continuous variable (dmft) was recorded as mean and standard deviation and percentages at baseline and at the end of 2 years. MI was the explanatory variable for it. Meta-analysis was carried out with studies having dmft reported as mean and standard deviation. Data analysis was carried out using the software RevMan 5.3.

Subgroup Analysis and Investigation of Heterogeneity

No subgroup analysis was carried out.

Sensitivity Analysis

The influence of Henshaw's¹³ study was seen in the meta-analysis with both fixed and random effects models (Figs 2 and 3). Therefore, a sensitivity analysis was carried out by excluding Henshaw (Fig. 4).¹³ Wagner¹⁴ though being a case-cohort study, had the same variables and hence was considered in an additional analysis (Fig. 5).

RESULTS

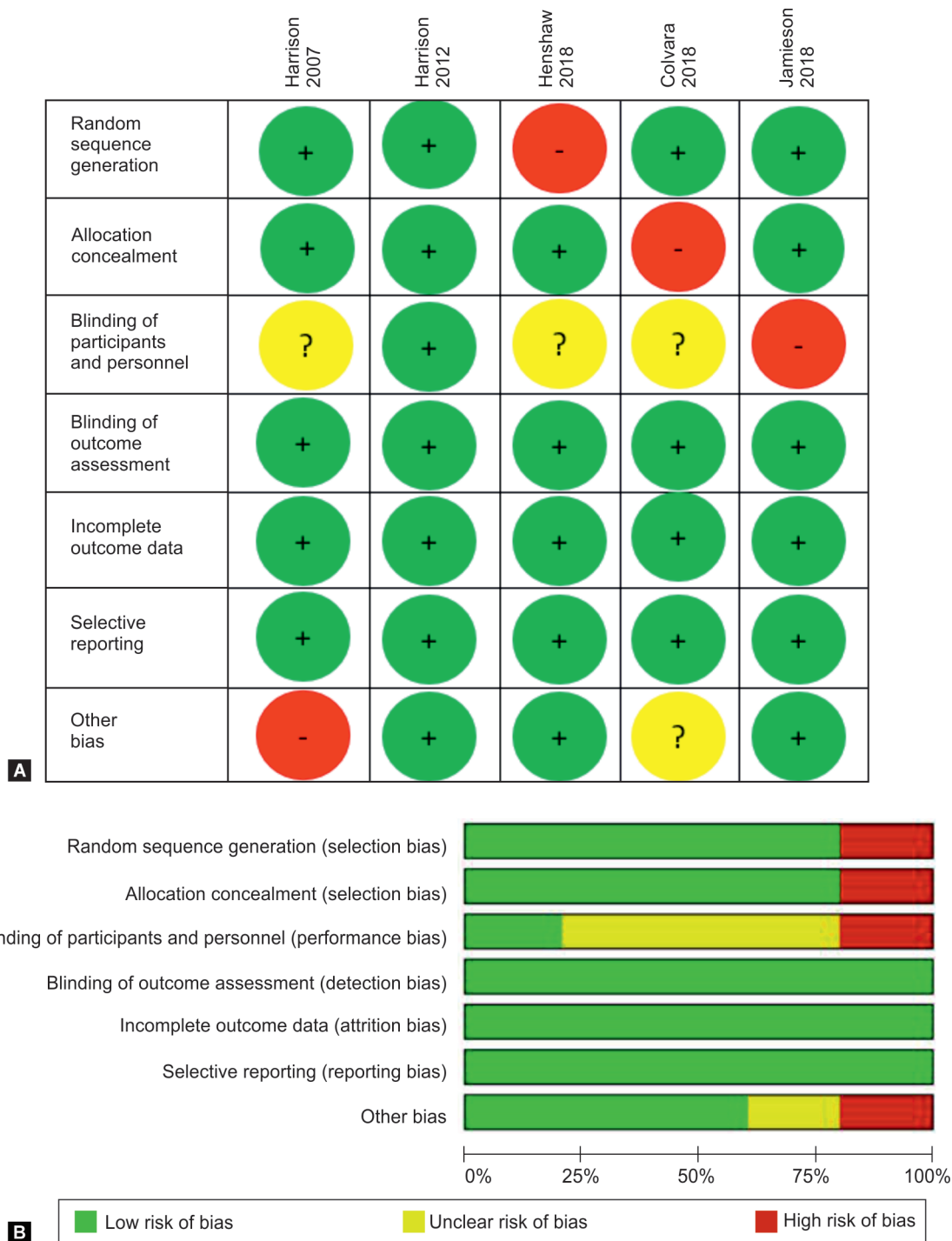
Description of Studies

A total of 626 articles were found. After the elimination of duplicates, a further 594 articles were excluded as they did not meet the selection criteria. A total of 23 articles were identified with children having ECC as an inclusion criterion. A total of 17 articles were excluded as they did not have a mean follow-up of 2 years and were not interventional studies. Six articles were included in this review which was interventional studies that reported dmft and dmfs as outcome measure. Three articles reporting dmft (mean and standard deviation) were included in the meta-analysis (Flowchart 1).

Results of the Search

Included Studies:

- Characteristics of the studies.
- Dates of publication ranged from 2007 to 2019.
- Studies were undertaken in different countries, with two out of six studies being undertaken in Canada, one in Brazil, one in Australia, one in Boston, and one in South Asia.
- The sample size calculation was not reported in the following studies: Harrison,¹⁵ Henshaw,¹³ and Wagner.¹⁴
- Characteristics of the participants.
- The mean number of participants was 449, with a total of 2,694 participants across six trials. The age of the participants included in the trials was 0–5 years. The mean age for all the studies was 2 years and 3 months \pm 17.28.
- Characteristics of the intervention.
- Motivational interviewing (MI) was the common intervention for the participants in the test groups. In the study reported by Wagner,¹⁴ mothers were educated on the 2nd and 3rd day after delivery on the maintenance of oral hygiene, methods of toothbrushing, and the importance of fluoride in the reduction of caries. Jamieson¹⁶ called mothers for a follow-up during pregnancy and at 6, 12, and 18 months postdelivery



Figs 1A and B: (A) Risk of bias assessment of individual studies and (B) Risk of bias assessment across studies

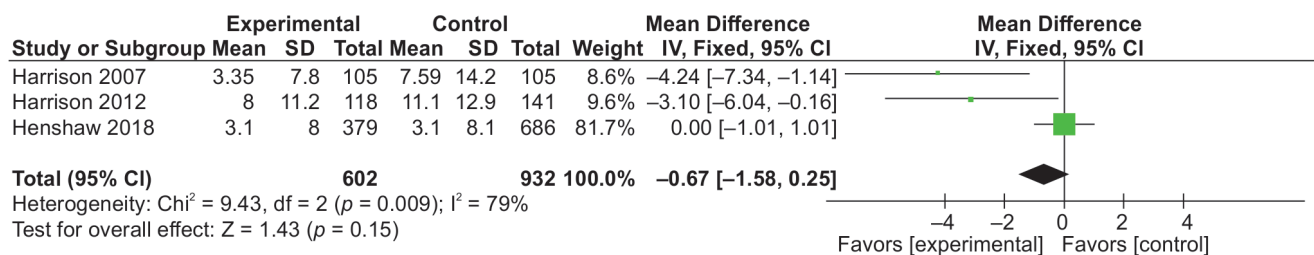


Fig. 2: Fixed effects model

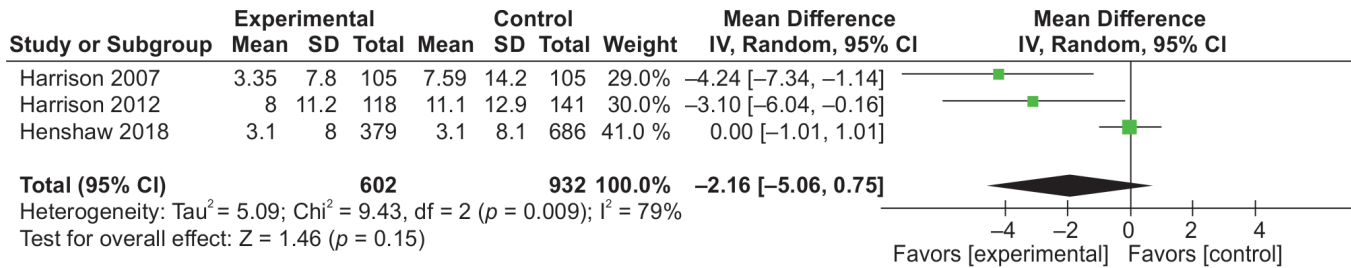


Fig. 3: Random effects model

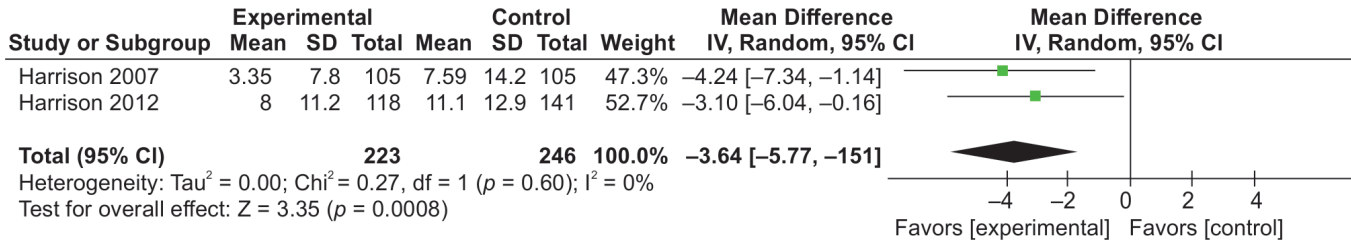


Fig. 4: Sensitivity analysis

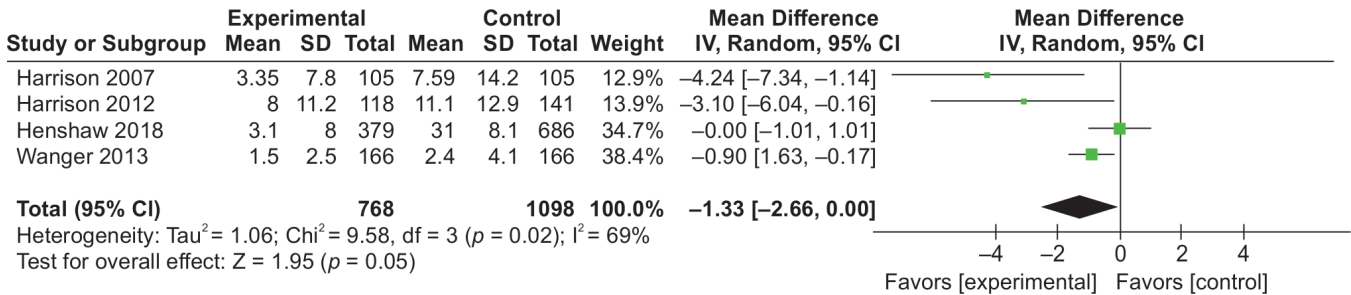
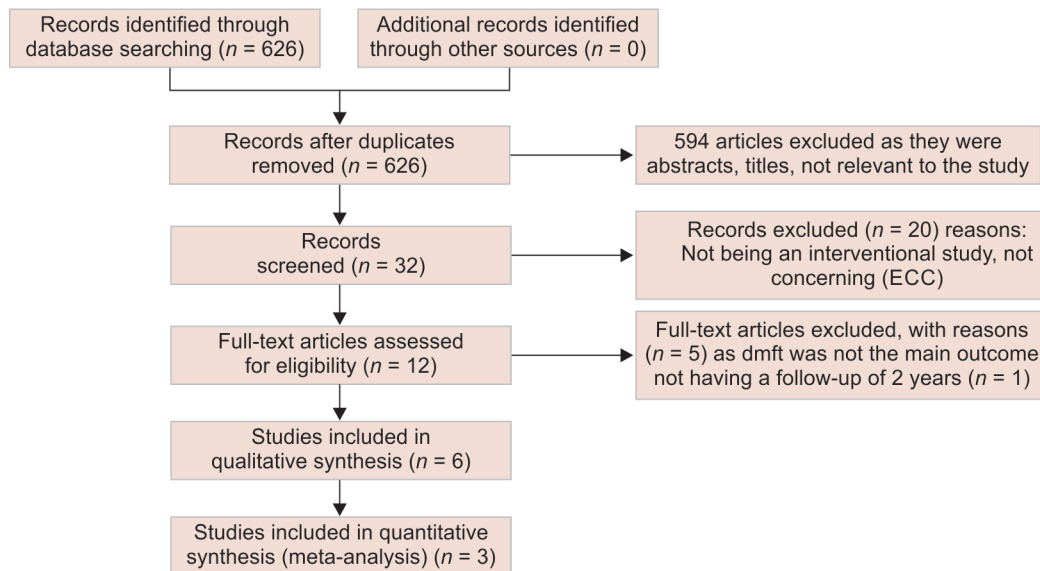


Fig. 5: Additional analysis

Flowchart 1: Study flow diagram



for follow-up and reinforcement of MI. Henshaw¹³ carried out a 30-minute MI for the participants at their houses falling in the test group. Harrison¹⁷ conducted MI sessions for mothers during pregnancy and 6 months postnatally, whereas

Harrison¹⁵ had four telephonic follow-ups up to 6 months after their initial contact; annual reinforcement was done by Colvara.¹⁸

- Characteristics of outcome measures.

The outcome measures, dmft, and dmfs were reported as means with standard deviations except in the study by Colvara,¹⁸ which recorded a caries reduction in percentage.

Excluded Studies

The studies that did not fit the selection criteria were excluded from this review. Reasons for exclusion are mentioned in Table 2—table of characteristics of excluded studies.

Results of Review and Meta-analysis

Motivational interview (MI) of parents was found to be beneficial in the review for reducing the occurrence of new carious lesions in children. Additionally, it led to an increase in knowledge pertaining to oral health behaviors. Three studies had a high risk of bias; one study with unclear risk of bias, and one with low risk of bias. Overall a low risk of bias was observed in random sequence generation, allocation concealment, blinding of outcome assessment, incomplete data, and selective reporting categories. Overall unclear risk of bias was seen in the blinding of personnel and participant performance and other bias categories (Fig 1). The meta-analysis of three studies reported a mean difference of -0.67 (-1.58 to 0.25, $p = 0.15$) using the fixed effects model. A mean difference of -2.16 (-5.06 to 0.75, $p = 0.15$) was found using the random effects model. Both models were applied to account for heterogeneity. A significant reduction in new caries with a mean difference of -3.64 (-5.77 to -1.51, $p = 0.0008$) was seen on the application of sensitivity analysis. Additional analysis revealed a mean difference of -1.33 (-2.66 to 0.00, $p = 0.05$). A moderate grade of evidence was achieved using the GRADE criteria for the review (Figs 2 to 5).

Table 2: Characteristics of excluded studies

Edelstein 2015	
Reason for exclusion	The study was not a RCT and did not have caries reduction measured in mean and standard deviation
Joanna 2015	
Reason for exclusion	It was a narrative review and not a RCT
Kavita 2014	
Reason for exclusion	The follow-up period was of 8 months

We had <10 studies in our funnel plot; hence the same could not be included (Fig. 6).

DISCUSSION

Behavior change is difficult to achieve.¹⁹ There have been various models put forth to explain behavior change, like the K-A-B model, transtheoretical model (TTM), and rational emotive behavior therapy model. All these models may not involve the active participation of the patient. MI is one of the most recent advancements in behavior management wherein the patient has an active role in the counseling. Its effect on obesity reduction, and cessation of smoking has been studied and found to be effective.^{9,10} The effect of MI has not yet been tested adequately on ECC, hence this review.

Summary of Main Results and Other Results

A summary of the main findings is reported in Table 3. This confirms our hypothesis that MI proves to be beneficial for the reduction of dental caries and is in agreement with the results of the systematic reviews assessing the effect of MI on changing dietary behaviors.^{9,10}

Overall Completeness and Applicability of Evidence

Although six studies have been included in this review, there are only a small number of participants available for each intervention group.

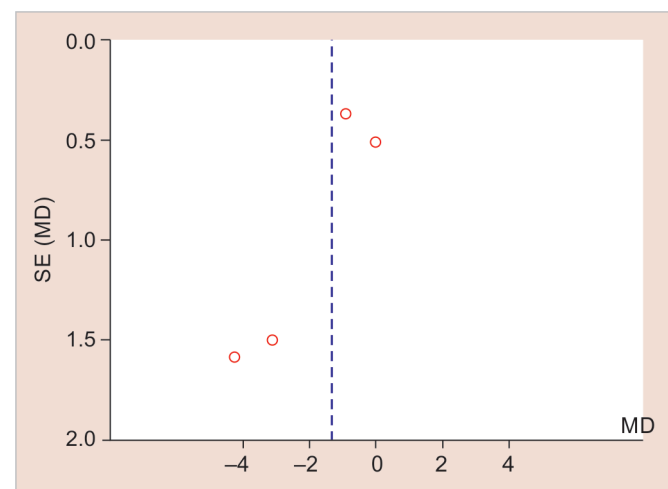


Fig. 6: Funnel plot

Table 3: Summary of findings

<i>MI compared with traditional health education for a reduction in the occurrence of carious lesions</i>			
Patient or population: mothers of children with ECC			
Settings: public health centers and hospitals			
Intervention: MI			
Comparison: traditional health education			
Outcomes	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
dmft—an effective chair side tool to record caries status (2-year follow-up)	2663(6)	⊕⊕⊕⊖ moderate	There is sufficient evidence to identify the role of MI in the reduction of new carious lesions in children with ECC

GRADE Working Group grades of evidence: High quality—further research is very unlikely to change our confidence in the estimate of effect. Moderate quality—further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. Low quality—further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. Very low quality—we are very uncertain about the estimate.



All the studies in this review have been conducted in public health settings. This poses a question of its applicability in private practice, the cost-effectiveness of the technique, the time allocated for each appointment, the number of appointments required, and any funding source needed.

Studies in this review have given counseling to pregnant mothers, followed them up individually till 6 months, and with children from 0–6 years. Hence, the results are generalizable to this population.

Early counseling about oral health behaviors will lead to a reduction in the occurrence and prevalence of ECC and thus attempt to reduce the severity of this disease on general health outcomes.

Quality of the Evidence

We chose RCTs for this study as it is regarded as a high grade of evidence as per the evidence pyramid. Thus, a systematic review based on these articles would yield good results. We searched PubMed, Google Scholar, J Gate, Quintpub, and Cochrane Library for our study as these databases were accessible and are recognized the world over. Dental caries can be recorded through many indices. dmft index is an effective and convenient chair-side index to record dental caries. Hence, we chose articles with dmft as an outcome for ECC. ECC had been recorded as dmft in percentage as well as in mean and standard deviation in the articles. The articles Tolvanen,²⁰ Edelstein,²¹ Joanna,²² though recorded dmft as percentages, were not interventional studies; hence, these articles were excluded. We chose the follow-up period of 2 years for our study; hence, cross-sectional studies^{23,24} and studies with a shorter duration of follow-up^{25–28} were excluded. Our results showed the presence of nonsignificant mean reduction on the application of fixed and random effects models, respectively. The influence of the study conducted by Henshaw¹³ was seen in the results. Hence, a sensitivity analysis excluding it was carried out, and it showed a significant mean reduction in dmft after MI. Also, Wagner¹⁴ being a case-cohort study, had similar variables and hence was considered in the additional analysis.

Behavior change is a slow process.²⁹ Hence, a longer follow-up is necessary. There always exists a time lag between the initiation of behavior therapy and its effectiveness in terms of the results of true outcomes. Additionally, the period window of infectivity is from 18–33 months which gives it a mean of 26 months.³⁰ During this period, a change in oral microflora is seen with the eruption of primary molars. Hence, the child is more susceptible to dental caries in this time period, hence the 2-year follow-up.

Potential Biases in the Review Process

One of the possible limitations could be that we are restricted to interventional studies. Hence, the data from other study designs were not taken into consideration. We found only six articles that could meet our inclusion criteria. A larger number of studies could

have yielded more information. The severity of dental caries is different for people belonging to different regions, socioeconomic strata, and cultural backgrounds; these confounders were not analyzed. In the included studies, MI was carried out by different health professionals. This method, being technique sensitive, requires a trained professional to conduct it. Therefore, who will be practicing MI could decide how effective its result could be. Articles published in any other language other than English could not be assessed. Moreover, only available data from the articles were taken for this study. The application of this technique to the real-life setting is challenging and requires the health professional to spend considerable time with each patient, increasing the cost of each session and the number of visits, which was not analyzed in our review. RCTs with long-term follow-ups and “pragmatic trials” are required to substantiate the claims made by us.

Agreements and Disagreements with Other Studies or Reviews

Our results are in agreement with previous reviews like Dooley,¹⁰ Mallonee,⁹ Gomez,²³ and other studies Colvara,¹⁸ Tolvanen,²⁰ Edelstein,²¹ and Joanna,²² that MI is beneficial for the health of the patient.

CONCLUSIONS

Implications for Practice

Pediatric dentists must seek training to practice MI. Along with doctors, the auxiliary staff could also learn and partner with the dentist to save on clinical time and possible costs. Active participation of the health counselors and practice of MI along with a common-risk factor approach³¹ with respect to dietary behavior change could ensure the good general health of the patient together with good oral health.

Implications for Research

The findings of our research imply that the role of health professionals, including dentists as “behavior therapists,” is important in preventing ECC.

Why is this Paper important to Pediatric Dentists?

- Early childhood caries (ECC) is of public health concern and needs to be prevented with the most effective measures possible at the public and individual levels.
- Motivational interviewing (MI) is an effective intervention that reinforces the importance of oral health behaviors in preventing dental diseases.
- Pediatric dentists deal with both parents and children and thus play a vital role in the primary and primordial prevention of oral diseases.

APPENDICES

Appendix 1

PubMed Search Strategy

PubMed search strategy was carried out using the following keywords: MI and children and dentistry, motivational interviewing and children and dentistry and parents, motivational interviewing and children and dentistry and parents and oral health behaviors, counseling and oral health behaviors and children, directive counseling and oral health behavior and children, Francisco Ramoz-Gomez, Tim Newton and behavior, Weinstein and oral health behaviors, TTM and Harrison and MI.

Search	Add to builder	History Query	Download	Clear history
			history Items found	Time
#10	Add	Search Harrison and MI	18	08:49:48
#9	Add	Search TTM	1,484	08:49:36
#8	Add	Search Weinstein and oral health behaviors	49	08:49:23
#7	Add	Search Tim Newton and behavior	38	08:49:11
#6	Add	Search Francisco Ramoz-Gomez	116	08:48:45
#5	Add	Search directive counseling and oral health behavior and children	23	08:48:32
#4	Add	Search counseling and oral health behaviors and children	282	08:48:13
#3	Add	Search MI and children and dentistry and parents and oral health behaviors		08:47:55
#2	Add	Search MI and children and dentistry and parents	17	08:47:32
#1	Add	Search MI and children and dentistry	51	08:46:59

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