| **Section and Topic** | **Item #** | **Checklist item** | **Location where item is reported** |
| --- | --- | --- | --- |
| **TITLE** | | |  |
| Title | 1 | Maternal depression increases the risk of early childhood caries (ECC): a systematic review and meta-analysis. | Page 1 |
| **ABSTRACT** | | |  |
| Abstract | 2 | Maternal depressive symptoms may negatively affect children's oral health (COH). This study aimed to systematically review the literature to investigate whether maternal depression is associated with early childhood dental caries. We systematically retrieved literature from the earliest available date to June 1, 2024, from the PubMed, Embase, Web of Science, and Cochrane Library databases, to identify relevant studies on maternal depression and early childhood caries (ECC) status. After literature screening, data were independently extracted and summarized via random effects or fixed effects models, depending on the magnitude of heterogeneity. The GRADE methodology was used to rate the certainty of the evidence. A total of 7 studies (22,764 patients) were included. The results of the random effects model revealed that maternal depressive symptoms could significantly lead to early childhood caries (OR, 1.40; 95% CI, 1.09–1.80; I2=71.9%). Considering our findings, the need for better mental health education for parents must be emphasized. | Page 1 |
| **INTRODUCTION** | | |  |
| Rationale | 3 | Early childhood caries (ECC) is defined as the development of at least one caries lesion on primary teeth within 72 months of birth. It can lead to the destruction of primary teeth and damage to permanent teeth and is one of the most common chronic diseases in children. Early childhood caries (ECC) can have serious adverse physical and behavioral effects, which seriously affect learning and quality of life | Page 1 |
| Objectives | 4 | we explored the potential impact of maternal depression on early childhood caries (ECC) status. | Page 1 |
| **METHODS** | | |  |
| Eligibility criteria | 5 | The question studied in this paper is whether maternal depression leads to an increased risk of early childhood dental caries. The subjects of the study are mothers, the exposure factor is maternal depression, and the result is the risk of early childhood dental caries. The following inclusion criteria were used in this study: (1) randomized controlled trials, cohort studies, case‒control studies, and cross-sectional studies; (2) The mothers of the children had depressive symptoms and the relevant depression scales met the diagnostic criteria for depression; (3) The dental health of the offspring was investigated, and children who met the WHO definition of early childhood caries (ECC) were included in the analysis. ECC is defined as the presence of one or more decayed (regardless of whether caries have formed), missing (due to caries), or filled surfaces in any deciduous tooth of a child aged 6 years or younger. The exclusion criteria were as follows: (1) studies in which the children’s mothers had no depression and only anxiety symptoms; and (2) studies focusing on children’s dental anxiety, dental care, and dental habits. We did not review the gray literature, nor did we review congressional papers, editorials, abstracts, etc. We reviewed only the English literature and there were no restrictions about year. | Page 2 |
| Information sources | 6 | We conducted a systematic literature search of PubMed, Embase, Cochrane Library, and Web of Science databases. | Page 2 |
| Search strategy | 7 | Combining MeSH/Emtree and title/abstract keywords. The keywords used were "maternal", “depression” and “early dental caries (ECC) status”. | Page 2 |
| Selection process | 8 | Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process. | Page 3 |
| Data collection process | 9 | To minimize data entry errors, all data were entered by the two independent researchers via predetermined forms, with any discrepancies resolved through discussion. | Page 3 |
| Data items | 10a | The collected information included the author, year of publication, country or region, age, study design, prevalence of early childhood caries, total number of people, prevalence of depression among mothers, prevalence of dental caries among children, period of data collection, tools for diagnosing major depression in mothers, criteria for assessing dental caries in children, covariables and findings. | Page 3 |
| 10b | Any discrepancies resolved through discussion. | Page 3 |
| Study risk of bias assessment | 11 | The quality of the eligible studies was assessed via the Newcastle‒Ottawa Quality Assessment Scale[17]. Studies were assessed considering three categories, namely, the selection of study groups (0–4 points), comparability (0–2 points), and exposure (0–3 points), and a total score of 7 points or more was considered to indicate high-quality research. | Page 4 |
| Effect measures | 12 | Odds Ratio used in the synthesis or presentation of results. | Page 4 |
| Synthesis methods | 13a | whether maternal depression leads to an increased risk of early childhood dental caries. The subjects of the study are mothers, the exposure factor is maternal depression, and the result is the risk of early childhood dental caries. | Page 4 |
| 13b | We used R software for analysis and excluded studies if important data were missing. | Page 4 |
| 13c | We used Stata software to perform correlation analysis. | Page 4 |
| 13d | we selectively interpreted the results of the random effects model or the fixed effects model. When I2=0, we interpreted the results of the fixed effects model; otherwise, we interpreted the results of the random effects model. | Page 4 |
| 13e | We did not perform subgroup analyses. | Page 4 |
| 13f | Sensitivity analysis revealed no significant differences between the pooled results for calculations that did not exceed the 95% confidence limit. | Page 4 |
| Reporting bias assessment | 14 | We drew funnel plots to assess risk of bias. | Page 5 |
| Certainty assessment | 15 | We used either random-effects or fixed-effects models based on the size of the differences in the included studies. | Page 5 |
| **RESULTS** | | |  |
| Study selection | 16a | Identified a total of 1323 articles on maternal depression and early childhood dental caries. After removing duplicates and screening applicable titles, abstracts, and full texts, we retained 7 trial reports for detailed analysis | Page 5 |
| 16b | The relevant excluded studies are shown in Supplementary Table 1. | Page 5 |
| Study characteristics | 17 | Table 1 shows the relevant specific characteristics of the included studies. | Page 6 |
| Risk of bias in studies | 18 | The specific scoring scale can be found in Supplementary Table 2. | Page 6 |
| Results of individual studies | 19 | Table 1. Methodological characteristics of the included studies. | Page 6 |
| Results of syntheses | 20a | See Table 1 for details. | Page 6 |
| 20b | The results of the random effects model revealed that maternal depression significantly increased the risk of early childhood dental caries (ECC) (OR, 1.40; 95% CI, 1.09–1.80; I2=71.9%). | Page 6 |
| 20c | Moderate depression in mothers; Severe depression in mothers. | Page 8 |
| 20d | Sensitivity analysis revealed no significant differences between the pooled results for calculations that did not exceed the 95% confidence limit (Figure 3). | Page 8 |
| Reporting biases | 21 | Since the number of studies included in this study was less than 10, we did not draw a funnel plot. | Page 8 |
| Certainty of evidence | 22 | Table 2. GRADE summary of findings. | Page 8 |
| **DISCUSSION** | | |  |
| Discussion | 23a | The results of this study showed that maternal depression can increase the risk of early childhood caries (ECC), suggesting that we need to pay attention to maternal mental health in the future. | Page 9 |
| 23b | A limited number of studies were included in our review. Although most of the studies we included are of high quality, there may still be a discrepancy between reality and the reported results due to the interference of confounding factors. Therefore, the conclusions should be interpreted with caution. | Page 10 |
| 23c | In addition, the GRADE system shows that the level of evidence for the results is low (Table 2). In the future, confounding factors need to be controlled, and cohort studies should be conducted to verify the results of this article. | Page 10 |
| 23d | First, we can explore how maternal depression affects children's oral health through biological pathways. Second, we need to analyze the impact of maternal depression on children's oral hygiene habits, eating habits, and other behavioral patterns in detail. Finally, we need to conduct long-term follow-up studies with depressed mothers and perform large cohort studies to further verify and determine the association between maternal depression and the risk of dental caries in children. | Page 10 |
| **OTHER INFORMATION** | | |  |
| Registration and protocol | 24a | ID: CRD42024556728. | Page 2 |
| 24b | https://www.crd.york.ac.uk/prospero/. | Page 2 |
| 24c | We subsequently conducted a GRADE summary of findings. | Page 8 |
| Support | 25 | We do not accept any financial assistance. | Page 6 |
| Competing interests | 26 | We declare no conflicts of interest. | Page 11 |
| Availability of data, code and other materials | 27 | We declare that if readers need it, they can contact my email at any time and I will provide relevant data. | Page 11 |

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