

ARTICLE ANALYSIS & EVALUATION // ETIOLOGY/OTHER



FOUR OR MORE AMALGAM FILLINGS CORRELATE WITH HIGHER BLOOD MERCURY LEVELS IN PREGNANT WOMEN BUT NOT HIGH ENOUGH TO BE OF HEALTH CONCERN

REVIEWER
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What is the extent of the contribution of dental amalgam fillings to blood mercury levels in pregnant women?

ARTICLE TITLE AND BIBLIOGRAPHIC INFORMATION

Dental associations with blood mercury in pregnant women. Golding J, Steer CD, Gregory S, Lowery T, Hibbeln JR, Taylor CM. Community Dent Oral Epidemiol 2016; 44: 216-22.

SORT SCORE			
A	B	C	NA

SORT, Strength of Recommendation Taxonomy.

Level of Evidence		
1	2	3

See page 11A for complete details regarding SORT and Level of Evidence grading system.

SUMMARY

Subjects

Subjects were 2689 pregnant women from a population-based study in the United Kingdom, the Avon Longitudinal Study of Parents and Children, whose expected date of delivery was between April 1, 1991, and December 31 1992. Although women with a total of 14,541 pregnancies were enrolled in the Avon Longitudinal Study of Parents and Children, the women in the present analysis included only those who provided blood samples and had completed a questionnaire that asked questions about dental care related to dental amalgam fillings.

Key Risk/Study Factor

The primary explanatory factor was the presence and number of dental amalgam fillings at the time of pregnancy (categorized as none, one-three, or four or more fillings).

Main Outcome Measure

The primary outcome was the blood mercury level, measured in micrograms per liter (µg/L).

Main Results

The authors found that the R² (the coefficient of determination, which indicates the proportion of the variance in the outcome, ie, predictable from the explanatory factor[s]) estimated the contribution of dental amalgam fillings to blood mercury level was 6.47%. They also found that there was little difference in blood mercury levels between women with no dental amalgam fillings and those women with 1-3 dental amalgam fillings.

SOURCE OF FUNDING

This study was funded by a combination of government (UK Medical Research Council), foundation/nonprofit (the Wellcome Trust) and university (University of Bristol, UK) grants.

TYPE OF STUDY/DESIGN

Cross-sectional.

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Conclusions

The authors found that 6.47% of the variance in blood mercury levels could be explained by dental amalgam fillings. This compares to 8.75% of the variance in blood mercury levels that is explained by dietary factors (eg, fish consumption).

COMMENTARY AND ANALYSIS

Dental amalgam has been used to restore teeth for over 165 years and accounts for most of the restorations placed to treat caries, although its use has been waning recently because of concerns regarding mercury. Over the years, many have debated the toxicity of dental amalgam; however, most professional organizations (including (1) the Food and Drug Administration, (2) the American Dental Association, and (3) the Federation Dentaire Internationale) have issued statements in support of its safety. However, despite this support for its use, its potential toxicity continues to be investigated, and some continue to dispute its safety, especially for certain populations such as children and pregnant women. Two countries, Norway and Sweden, have introduced legislation aimed at limiting the use of amalgam; however, this effort is part of a larger program that seeks to reduce the overall burden of environmental mercury and has not targeted dental amalgam specifically because of its purported effects on the health of those with dental amalgam restorations.¹

This study demonstrates that blood mercury level correlates with the number of dental amalgam fillings, measured categorically, among pregnant women, with those women who have more than 4 dental amalgam fillings having higher concentrations compared with those women with 3 or fewer dental amalgam fillings. The authors are rightly careful in their conclusions not to state that dental amalgam fillings in the mother lead to mercury toxicity in the fetus, nor do they tie a higher blood mercury concentration to any purported ill health effects in the fetus. In fact, they state “there is no evidence to date... that fetal exposures to mercury from maternal [dental amalgams] have adverse effects on the developing child.”²⁻⁴ However, some readers of this article may use these study findings to implicate dental amalgam fillings as causing toxicity in the fetus. One should be careful not to draw such a conclusion from this investigation, as the blood level of mercury was measured in the women, not in the fetus; the blood level of mercury did not reach toxic levels in the women, even in those women with 4 or more dental amalgam fillings (in fact, the level associated with 4+ dental amalgam fillings was only 2.28 µg/L—less than half that level [5 µg/L] that requires reporting to the Department of Health in New York State, eg); and health effects were not assessed in the mother, the fetus or the child after delivery.

The present study was generally well conducted, and there are several advantages to its methodology, including its population-based sample, its relatively large sample size, and the fact that the investigators sought to minimize bias by inserting the questions regarding dental amalgam fillings somewhere in the middle of the questionnaire. In addition, the authors considered several other factors that would be related to blood mercury level, including sociodemographic factors and diet. The authors state that while self-report of the number of dental amalgam fillings might be considered a weakness as a way to measure dental mercury exposure, they do support the validity of self-report of the number of fillings based on another study in which the correlation between a dental examination and self-report was high. A major disadvantage to this study was that the number of fillings during pregnancy was estimated a full 2 years after the end of the pregnancy, whereas blood mercury was measured during pregnancy. It is likely, therefore, that there could be some level of error because of the length of time that had elapsed and because women may not remember how many restorations they had when they were pregnant. However, the authors did take this factor in consideration in the design of their questionnaire and by comparing results for a subgroup of women who answered the question at 2-month postpartum with their responses 31 months later. In addition, the authors fail to consider that the size of amalgam fillings may be as important as the number of fillings; that is, very large amalgam fillings are likely not the same as 5 small amalgam fillings. Assessing the size of amalgam fillings was not possible in this study, however.

Given the limitations of this study (ie, cross-sectional nature, narrow scope, failure to look at health effects, inability to accurately assess “mercury load” due to inability to assess the size, number, and exact placement time of restorations), practitioners should not change the way that they currently practice. Given that, compared with other restorative materials available, primarily composites, dental amalgam fillings remain less expensive, stronger, and less technique sensitive. In addition, it should be noted that the safety of composite materials containing bisphenol A (BPA) has also been questioned, although most investigations support a minimal or negligent health impact of BPA-containing composites.⁵⁻⁷ The authors conclude that given the correlation between the number of dental amalgam fillings and blood mercury levels and the potential for health effects, long-term studies regarding the health effects of dental mercury are warranted, and it might be difficult for anyone to disagree with this statement. However, readers should realize that many studies, conducted over many years, have failed to uncover any health effects related to dental amalgam fillings.

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