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Weighing the Unintended Consequences of Early Dental Care in Indigenous Australian Children

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The study by Smithers et al[1] examined the dietary patterns, anthropometry, and blood pressure of a longitudinal birth cohort of South Australian Indigenous children at 3 years of age. These children and their caregivers were enrolled in the Baby Teeth Talk randomized clinical trial, which aimed to prevent and reduce dental caries.[2] A previous follow-up at 2 years of age had highlighted the benefits of targeted early (immediate) oral care intervention provided within the first 2 years of life compared with delayed oral care intervention that started at age 2 years to prevent and reduce caries,[3] while noting a decrease in energy intake from discretionary foods and increased fruit intake among the immediate intervention group. The present study aimed to build on earlier findings and discern the differences in dietary intake trajectories, with the expectation that the early intervention would continue to favorably influence healthier food choices. Smithers et al[1] hypothesized that these differences in dietary patterns would be more apparent at 3 years of age, with corresponding healthier anthropometry and cardiovascular health as indicated by blood pressure. However, this study did not observe any differences in dietary intake patterns or blood pressure measurements between the 2 groups at 3 years of age. Rather surprisingly, children in the immediate intervention group attained higher-than-expected *z* scores of weight, mid–upper arm circumference, and body mass index at age 3 years compared with children in the delayed intervention group, a pattern that was first noted at 2 years of age and highlights a possible unintended consequence of the primary intervention.

Simply put, the value of this analysis cannot be understated. The authors used a prespecified statistical analysis plan to test their hypothesis with well-defined aims and outcomes. The authors acknowledged the limitations and shortfalls of the food frequency questionnaire used in this study at the follow-up at age 3 years compared with the more accurate but burdensome 24-hour dietary recall method used in the Baby Teeth Talk trial at the follow-up at age 2 years. As Smithers et al[1] surmised, it is possible that the food frequency questionnaire may not be sensitive enough to detect the differences in dietary intake, especially because the sample size estimates were based on a modest difference of 5% of dietary intake across groups. However, specific dietary intake patterns (milk, discretionary beverages, and water) for this cohort of participants also differed from nationally representative dietary intake data for similarly aged Indigenous and non–Indigenous Australian children, suggesting greater social and health disparities in this study cohort.

This study highlights the well-known conundrum of the unintended consequences of public health interventions. On the one hand, childhood dental caries is an entirely preventable disease that can considerably affect the health and quality of a child's life well into adulthood.[2] Indigenous Australian children experience higher rates of dental caries, with the prevalence among children in some areas being up to 5 times higher than among their non-Indigenous counterparts.[2] On the other hand, the seeds of childhood overnutrition and obesity are often sown early in infancy and result in a greater tendency for adult overweight and obesity with correspondingly greater lifetime disease burden. Although children with overweight and obesity are at higher risk for dental caries and poor oral health, whether the converse is also true is not as clear. Several factors, such as socioeconomic deprivation, dietary patterns related to food insecurity, educational levels of parents, and access to health care, are associated with both dental health and nutrition status of Indigenous Australian children.[4]

Should the findings of this study worry us? Although Smithers et al[1] were justifiably concerned enough to suggest that a binary choice (reduced caries or healthier anthropometric outcomes) may need to be made, the solution is likely more complex and requires a nuanced multitier approach to tackle the twin scourges of poor oral health and overnutrition in Indigenous children in Australia and beyond. The findings by Smithers et al[1] bring into sharp focus 2 fundamental issues that are pertinent to Indigenous peoples: the existent health disparities and the growing prevalence of obesity and overweight fueled by food insecurity. Indigenous peoples worldwide experience disparities in health, often with coexistent undernutrition and overnutrition. The 2018 to 2019 National Aboriginal and Torres Strait Islander Health Survey released by the Australian Bureau of Statistics reported that, among children aged 2 to 4 years, as many as 24% had overweight, 13% had obesity, and 9% had underweight.[5] A recent systematic review of the retail food sector that serves Indigenous peoples in high-income countries identified exposure to unhealthy food environments and socioeconomic inequality to be major factors in overnutrition and obesity in this vulnerable population.[6] A more comprehensive approach to addressing both poor oral health and food insecurity may, therefore, be needed to improve the health of Indigenous Australian children.

The important question that remains is, why did the early intervention group experience an increase in anthropometric measures over time compared with the delayed intervention group? There were no reported differences in dietary intake between the 2 groups, although it is possible that the food frequency questionnaire missed the subtle differences in diet. Because of randomization, there were likely no differences in physical activity between the 2 groups that could explain the anthropometric differences. However, a more intriguing possibility may be the improvements in oral health coupled with the fundamental changes in dietary patterns that alter the oral and gut microbiome in Indigenous Australian children, which in turn changes body composition and anthropometry. For millennia, Indigenous peoples in Australia had a hunter-gatherer lifestyle with a diet of wild plants and animal foods and experienced periods of scarcity alternating with abundance. Modern dietary patterns following colonization and industrialization in the past few centuries now consist of a plentiful Western diet that is rich in sugars and carbohydrates, which bring corresponding changes in gut microbiota and body composition. Dental caries associated with high salivary glucose levels from carbohydrates lead to a greater state of inflammation and alterations of the oral microbiome.[7] Measures to improve oral health can alter the gut and oral microbiome and consequently change body composition and anthropometric measures. The scale of the observed changes in anthropometry in the present study may be attributed to the beneficial changes in body composition and fat-free, lean mass. Although height was similar between the 2 groups, participants in the early intervention group also experienced greater improvements in *z* scores for height compared with the delayed intervention group, which could be interpreted as prevention of undernutrition in the early intervention group. Longer-term follow-up of this cohort, as planned by the investigators, will help shed more light on whether these changes in anthropometry are sustained over time and skew toward benefit or harm.

ARTICLE INFORMATION

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