

Review articles examine early-life risk factors, interventions for childhood obesity

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Juan Carreño de Miranda's "La monstrua desnuda" (The Nude Monster) painting.

As the rate of obesity in the U.S. population has risen dramatically, more and more children are becoming overweight at younger and younger ages. Understanding the factors that contribute to childhood obesity and identifying ways to prevent its development are critical to stemming the historically high prevalence of childhood obesity and of associated health problems like type 2 diabetes. Two articles receiving online publication in the *American Journal of Preventive Medicine* describe

systematic reviews of the results of studies investigating either risk factors that contribute to childhood obesity or interventions that could prevent it during the first 1,000 days of life - from conception to age 2.

"We know that [obesity](#) is notoriously difficult to treat, and evidence suggests that reducing [risk factors](#) for [childhood obesity](#) during pregnancy, infancy, and early childhood could prevent children from becoming overweight in the first place," says Elsie Taveras, MD, MPH, chief of General Academic Pediatrics at MassGeneral Hospital for Children (MGHfC) and senior author of both papers. "While our reviews were able to identify a few early-lifetime risk factors and interventions that appear to have some effectiveness, the studies we found were quite limited in both the factors that were examined and the interventions that were tested."

The childhood obesity risk-factors review led by Jennifer Woo Baidal who is an assistant professor of Pediatrics at Columbia, MD, MPH - previously an MGHfC General Academic Pediatrics research fellow and now with the division of Pediatric Gastroenterology at Columbia University Medical Center - analyzed the results of 282 studies published from 1980 through 2014. Across all of the studies, only a few factors were consistently associated with an increased risk of a child being overweight or obese at the end of the study periods, which ranged from age 6 months to 18 years. Maternal factors were smoking, elevated prepregnancy weight and excess weight gain during pregnancy; factors applying to children were high birth weight and rapid weight gain during the first months after birth. While the largest number of studies focused on breastfeeding, evidence for any impact on obesity risk was inconsistent.

The review of intervention studies was led by Tiffany Blake-Lamb, MD, MSc, an obstetrician in the Massachusetts General Hospital Vincent Memorial Department of Obstetrics and Gynecology, and examined 34

articles published during the same time period that reported on the outcomes of 26 unique interventions. Neither of two prenatal interventions - one that included dietary advice, coaching, and exercise during pregnancy, and one focused on treating women with mild gestational diabetes - appeared to alter the incidence of obesity among offspring.

Two of six interventions that began during pregnancy and continued into infancy, both of which involved home visits focusing on the mother's diet and infant feeding, reduced the risk of overweight in later years. Other interventions that had some success focused on the mother's physical activity and diet, parenting practices related to the feeding of children, and behavioral counseling. Interventions featuring the use of high-protein and enriched formulas actually increased the risk of obesity, while the use of formulas with hydrolyzed protein, which is believed to promote infant satiety, stemmed infants' rate of growth during the first year of life.

The authors were surprised that none of the studied interventions targeted helping mothers achieve a healthy weight before the start of their pregnancy, preventing prenatal and early-life tobacco exposure, or reducing the introduction of sugary beverages. Many interventions related to infant feeding focused solely on breastfeeding and did not include strategies to prevent obesity in formula-fed infants. Although the effective interventions were applied in settings ranging from the home to the community, the complexity of factors contributing to obesity risk suggests that interventions need to extend beyond simply the diet and activity levels of individual children and mothers.

"While most interventions that have been completed to date focus on individual behavioral change, it is clear that multiple and overlapping factors contribute to obesity risk," says Blake-Lamb, who is also a fellow with the Kraft Center for Community Health Leadership at Partners

HealthCare. "The limited success of these interventions suggests that many, and possibly more influential, factors related to social influences and the community environment - including food subsidies and fast-food marketing - may have a powerful impact on the risk of childhood obesity. Future interventions should address multiple obesity risk factors and be based on conceptual frameworks that recognize the multi-layered and inter-generational complexity of factors contributing to obesity risk."

Taveras adds, "Future research focused on risk factors during pregnancy should examine the mechanisms through which those factors lead to obesity risk and how successful interventions alter those mechanisms. A broader investigation of the impact of diet and feeding practices, and perhaps their effects on the infant microbiome, could identify new targets for intervention, and while maternal risk factors are clearly important, future studies also should examine the role of fathers and other caretakers in [obesity risk](#). Studies also need to include populations that are more diverse in terms of both racial/ethnic backgrounds and socioeconomic status."

To address these needs, Taveras, Blake-Lamb and their team are leading a new intervention study, "The First 1,000 Days," to be conducted at the MGH Health Centers in Chelsea and Revere, Mass and funded by [The Boston Foundation](#).

Provided by Massachusetts General Hospital

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