Sibling composition impacts childhood obesity risk

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

It is well documented that children with obese parents are at greater risk for obesity. In a new study, researchers from Massachusetts General Hospital, Cornell University, and Duke University looked at how different kinds of family associations affect obesity, specifically how sibling relationships affect a child's weight. They not only found a correlation between parents and child, but also discovered a link between having an obese sibling and a child's obesity risk, after adjusting for the

parent-child relationship. Their findings are published in the October issue of the *American Journal of Preventive Medicine*.

By surveying adults in 10,244 American households, investigators found that the likelihood of childhood obesity varies with the number of children in a household, as well as their gender. According to the study, in a single child household, a child is 2.2 times more likely to be obese if a parent is also obese.

However, in families with two children, the data showed a stronger relationship with sibling obesity than with parental obesity. Older children in a two-child household with an obese parent are 2.3 times more likely to be obese, but that number jumps to 5.4 times for those with overweight younger siblings. If the child is the younger sibling in a two-child household, parental obesity is not relevant to risk, but having an obese older sibling is associated with a 5.6-fold higher risk.

"The family environment is known to exert a strong influence on the trajectory of children's health, and prior research has done a great deal to illuminate connections between parent and offspring obesity. Others have also found that obesity is also often correlated between siblings. Our study extends these findings by integrating data on both parent-child, and sibling relationships. We found that obesity status of a younger child's older sibling is more strongly associated with a child's obesity than is the parent's obesity status," notes lead investigator Mark C. Pachucki, PhD, Mongan Institute for Health Policy, Massachusetts General Hospital, Boston, MA. "This association is independent of a host of socioeconomic and demographic attributes, health behaviors, and overall health status." Dr. Pachucki began this research collaboration when he was a Robert Wood Johnson Foundation Health and Society Scholar at the University of California, Berkeley, and University of California, San Francisco.

The data also uncovered a link between gender and obesity risk. In homes with only one child, girls were less likely to be obese than their male counterparts. Gender was also an important factor for siblings in two-child households. The study suggests that younger children may be particularly susceptible to the influence of an older sibling, especially if that sibling is of the same sex.

"For youngest boys in two-child families, obesity is 11.4 times more likely with a male older sibling," write the authors. "If that younger boy's elder sibling is a girl, the boy is 6.6 times more likely to be obese. In two-child families, youngest-girl obesity is 8.6 times more likely with a female older sibling and is not significantly more likely if the older sibling is male. Thus, for younger children, there is a discernible gender correlation in sibling obesity status: having an obese elder same-gender sibling is associated with an increased likelihood of the younger child being obese."

Of course, exercise and food consumption play key roles in the prevention of obesity, and investigators found that only children were less likely to engage in physical activity and more likely to eat fast food than their counterparts with brothers and sisters. Curiously, however, the data also showed that having a highly active older sibling raised the obesity risk for the younger sibling. "Younger siblings with more vigorous physical activity are significantly less likely to be obese, though having an elder sibling who is extremely active is associated with a higher risk of younger-sibling obesity," clarifies Dr. Pachucki.

While the authors stress that more within-family obesity research is needed, this new study offers key data that will be beneficial in the fight against childhood obesity. "Because this study is cross-sectional, a snapshot of one point in time, we cannot claim that these particular siblings are causing one another's weight status. And we were only able to look at one-child and two-child families. Still, our findings are

consistent with research showing that siblings tend to eat alike and have similar levels of physical activity," concludes Dr. Pachucki. "In seeking to reduce the prevalence of childhood obesity, it may be productive to consider prevention and treatment models that meaningfully recognize siblings as interconnected."

More information: "Within-family obesity associations: Evaluation of parent, child, and sibling relationships," by Mark C. Pachucki, PhD, Michael F. Lovenheim, PhD, Matthew Harding, PhD, is published in the *American Journal of Preventive Medicine*, online ahead of Volume 47, Issue 4 (October 2014), dx.doi.org/10.1016/j.amepre.2014.05.018

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