Prenatal alcohol exposure is associated with later excess weight/obesity during adolescence

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Fetal Alcohol Spectrum Disorders (FASD) refer to a range of disabilities, and include individuals with neurocognitive impairments as well as growth irregularities ranging from deficient to normal. However, very little is known about the prevalence of excessive weight and obesity as components of FASD in the long-term. A study examining body mass index (BMI) in a large clinical sample of children with FASD has found that rates of excess weight/obesity are elevated in children with partial fetal alcohol syndrome (pFAS).

Results will be published in the September 2014 online-only issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"Growth deficiency is a defining feature of FASD and typically babies and children with FASD have short stature and low weight," explained Jeffrey R. Wozniak, associate professor of psychiatry at the University of Minnesota, as well as corresponding author for the study. "Individuals with FAS, the most severe form of the condition, typically continue to show growth deficiency into adulthood. However, a number of FASD investigators have consistently heard from families that weight gain is a problem in adolescence and adulthood in some patients, and we thought it was important to examine this further."

"Because being underweight is part of the diagnostic criteria for FAS,

and because the neurological consequences can be so profound, little attention has been given to the possibility that prenatal alcohol exposure (PAE) might also affect body weight in later life," added Susan Smith, a professor of nutritional sciences at the University of Wisconsin-Madison. "There have been anecdotal observations and several hints and clues that this may be a problem, but no real data."

Wozniak and his colleagues examined 617 children (257 males, 360 females), ages 2 to 19, who had been clinically evaluated for FASD between April 2005 and April 2013: 446 with an FASD diagnosis – FAS (n=64), pFAS (n=166), and Alcohol-Related Neurodevelopmental Disorder (n=216) – as well as 171 with no FASD diagnosis. Prevalence of being overweight/obese using the measure of BMI was compared to national and state prevalence, and also examined in relation to FASD diagnosis, gender, and age. Dietary intake data were additionally examined for a young sub-sample (n=42).

"We found that overweight and obesity were not necessarily a universal problem for those exposed prenatally to alcohol," said Wozniak, "but that there were specific patient characteristics that were associated with increased rates. Specifically, we found that those with pFAS were at particularly high risk for obesity and overweight during the adolescent years. We also found that females were at greater risk for obesity/overweight than males during adolescence."

"This study adds to suggestions that PAE might increase the risk for obesity/overweight as girls reach adolescence," concurred Smith. "However, there's a big caveat because the obesity rates were no different from U.S. norms, and were greater only when compared with girls in the geographic region of Minnesota. So there is not enough evidence to say that 'PAE causes obesity' and it is critical that we do not take this interpretation."

Wozniak agreed: "At this point, all we really know is that there is an association between a diagnosis of FASD – especially partial FAS – and obesity/overweight. The link could be a biological one (metabolic/endocrine), a behavioral one (related to eating or exercise patterns), or a combination of the two. On the biological side, a 2012 study showed increased adiposity (fat storage) and pancreatic abnormalities in guinea pigs exposed prenatally to alcohol. On the behavioral side, our group has shown that children with FASD have diets that are insufficient in multiple nutrients, a finding that is consistent with the clinical understanding that many of these children have abnormal eating patterns."

Smith believes that the metabolic/endocrine link is currently tenuous. "We do have animal studies that suggest PAE may cause problems in glucose handling," she said. "However, obesity experts know that its causes are complex. Children with PAE face a lot of challenges that can increase obesity risk. For example, some of the most commonly used medications these children need to take will increase their appetite. Many children with FASD find it hard to participate in organized sports, so maybe they get less exercise. Maybe their neurodevelopmental problems mean that these girls worry less about their body image, as compared with typically developing teen-age girls. To that end, my lab has started an animal study to tease out the myriad potential causes of overweight in PAE, and we're looking at everything from endocrine disruption to eating behavior to medication effects."

"Parents raising children with FASD should seek help with early eating difficulties such as pickiness or strong preferences for high calorie, nutritionally-deficient foods," said Wozniak. "Much of the usual advice applies, even though there may be additional challenges because of behavioral problems associated with FASD: young children need many small exposures to new foods before they will incorporate them into their diets; rejected foods should be re-visited repeatedly over time in a

non-threatening, non-coercive manner; consistently timed family meals encourage healthy eating; snacking should be minimal and include primarily healthy options; soft drinks should be avoided. Children with FASD have inhibitory difficulties, therefore, portion sizes should be determined by the parent(s). Regular physical activity is essential, especially during adolescence, and children with FASD may not be as inclined toward organized team sports, thus, individual sports may be a good alternative."

"Obesity/overweight is a significant health problem in children, with or without PAE," added Smith. "It's good that this study will remind parents to be alert to this potential problem. If their child does struggle with unhealthy weight, they can work with their treatment providers to identify possible influences. As Jeff mentioned, individualized solutions won't differ much from best practices."