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Is It Time to Do More Homework on the Impact of Childhood Obesity on Academic Achievement?

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Despite continued efforts, the childhood obesity epidemic persists. Recent reports from the U.S. National Health and Nutrition Examination Survey (NHANES) shows that 16.9% of 2 to 19 year old children are obese with no significant changes in the overall prevalence of obesity over the last decade, especially among children ages 6 to 11 years.¹ The current paper by Johnston and colleagues assessed the relationship between weight status and grades among 2nd grade children attending seven schools in southeast Texas. It is important to recognize here that Texas is a state in crisis with respect to the childhood obesity issue. Texas is the second largest state in the U.S. with an ethnically diverse population (37% Hispanic, 12% African American), and among children attending schools the population distribution is 49% Hispanic and 13% African American.² Recent data from the 2009-2011 School Physical Activity and Nutrition (SPAN) survey, which monitors obesity prevalence among 4th, 8th, and 11th grade children in Texas, indicates that 42.8% of 4th grade children in Texas are overweight or obese, of which 23.8% are obese.³ An overwhelming 16.5% of Texas children under the age of 18 have no insurance, and the healthcare costs related to obesity in the state are estimated to be \$39 billion by 2030.⁴

The current paper by Johnston and colleagues sheds light on the important issue of the relationship between childhood obesity and

academic performance. The results of the study indicate that children who are overweight or obese have lower math, science and reading scores as compared to children of normal weight. As the authors rightfully point out, there is a paucity of data that have assessed the relationship between obesity and academic performance and this study helps fill that existing gap in the literature. The results of this study concur with other studies including that of Crosnoe & Muller,⁵ which used a nationally representative sample of adolescents in grades 7 to 12 and found that the risk of obesity was negatively associated with academic achievement. Moreover, while obese adolescents had lower achievement than normal weight students, change in achievement over the one-year time period was the same for the two groups, thus indicating that academic differences of students by weight status are relatively set prior to entering middle and high school. Another recent longitudinal study by Gable et al⁶ evaluated the relationship between weight status and math performance stratified by gender between kindergarten and fifth grade. They reported that children who were obese from kindergarten through fifth grade, and children who were normal weight at kindergarten, but became obese at third and fifth grades, had poorer performance on math assessment as compared to those who were never obese. The results are similar for reading performance as well in this age group,⁷ thus indicating that the effects of

obesity on academic performance are worse for children who remain obese as they continue through their formal education years.

While the health and physiological consequences of obesity are well defined, the equally important social and psychological factors associated with childhood obesity remain poorly understood. Negative social and psychological ramifications of obesity in children include low-self-esteem, poor relationships with peers, victims of bullying, stigmatization and isolation which can significantly decrease the quality of life for the child.^{8, 9} These social traits could potentially mediate or moderate the relationship between childhood obesity and academic performance. Johnston and colleagues propose in the current article the Golem effect as a potential psychological explanation for their observed negative association between obesity and academic performance, whereby teachers and other providers could view obese children as lazy, lacking will-power and self-discipline, and thus have low expectations from these children as compared to those of normal weight. As the authors state, these attitudes may be latent or self-conscious. However, it may be postulated that teachers could inadvertently influence child academic performance through these low expectations. Gable et al⁶ demonstrated mediating effects of child interpersonal skills and internalizing behaviors as reported by the teachers, on the relationship between obesity and

academic performance. Interpersonal skills included child's skills in getting along with people, maintaining friendships, expressing feelings, and internalizing skills included presence of anxiety, loneliness, low self-esteem and sadness. The authors concluded that there could potentially be teacher bias in the reporting of these child social traits. Similarly, in another study, it was observed that a majority of teachers and school staff viewed obesity as a condition that is under a child's control.¹⁰ This observation raises an important question – What are the teacher and child provider-level factors that need to be considered in future studies to understand the relationship between childhood obesity and academic performance? Methodologies such as social network analysis have been successfully used to understand the biologic and behavioral traits of obesity and establish that obesity 'spreads' through social ties in adults.¹¹ However, it remains to be seen how these social ties and relationships function within the context of obesity in children. We need to understand the mediators and moderators that influence the relationship between obesity and academic performance so that they may be addressed. Finally, where does the responsibility of school systems lie with respect to childhood obesity in a psychosocial context? While there are sensitivity trainings for teaching staff with respect to no tolerance towards discrimination by culture, race, gender, and other factors, childhood

obesity is currently not on the table in these discussions which needs to be considered in the future.

In the current study, Johnston and colleagues conclude no relationship between school socioeconomic status (SES) and academic scores. This needs to be interpreted with caution primarily because the SES data was at the school level and may not necessarily correlate with data at the individual level, potentially resulting in ecological fallacy. It is also important to note that the mean academic scores of the obese and normal weight students differed by less than two points, which, as the authors rightfully point out, may not be clinically meaningful. However, given that this study was done in 2nd grade children who are relatively new to the school system and embarking on their learning of math, science and reading, these results do raise an important question – Does this gap widen as the children grow older and their academic responsibilities of formal education increase? Furthermore, given the ethnic and SES disparities in obesity, an additional question would be – How does the relationship between childhood obesity and academic achievement track over time by ethnicity and SES status?

It is important to recognize that cross-sectional studies such as this current study with a small sample size of seven schools, while useful in generating hypotheses, are limited in establishing causality between

obesity and academic performance, and limited in generalizability to other schools. There could also potentially be reverse causation between obesity and academic achievement whereby children, as a result of lower academic performance, could have low self-esteem, depression, and subsequently indulge in poor lifestyle behaviors (including overeating, thus resulting in weight gain). More appropriately powered longitudinal and experimental studies with academic achievement as the primary outcome are needed. Specifically among intervention studies targeting obesity prevention, the impact of reducing obesity on academic performance in children needs to be evaluated. Moreover, given that attendance and delinquency has a direct impact on academic achievement, another question would be - What is the impact of obesity prevention strategies on academic achievement among academically 'high-risk' students and among schools with low academic ratings?

The children of today are the adults of tomorrow. Obesity rates are stabilizing albeit at high levels among U.S. children. Given that obesity in childhood tracks into adulthood, if childhood obesity is indeed a risk factor for low academic performance, this could lead to a workforce that is not only suffering from the health consequences of obesity, but one that is also low-performing intellectually – leading to an economic impact that could be felt for generations to come.

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