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Salman Salman

Virginia Commonwealth University

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VCU

The Role of Television on Early Onset Puberty

Salman Salman, Professor Mary C. Boyes

Abstract

The trend of early onset puberty has been increasing in recent years. As several studies have shown, a strong link between diet and puberty has been established in animals as well as in humans. However, not much attention has been paid to the cultural influences that have emerged recently such as television, computers, and gaming devices. Several different aspects of this trend were carefully studied and analyzed such as television and diet habits, children with early onset puberty, hormonal changes in children with early onset puberty, as well as the methodology of administering treatment. By connecting television to early onset puberty, pediatricians can reconsider treatment options for children maturing at a faster-than-normal rate and the harmful effects of early puberty (i.e. increased risk for breast/testicular cancer, insulin rejection, etc.) can be better averted. After careful analysis of reports from a wide range of persons all over the world, increased television viewing time was shown to be associated with a higher intake of fatty foods, a higher BMI, and in turn higher leptin levels. These high leptin levels predisposed the child to early puberty and the most effective way to treat this proved to be providing a detailed prescription outlining how to cut down on television and poor food habits in order to maintain healthy growth.

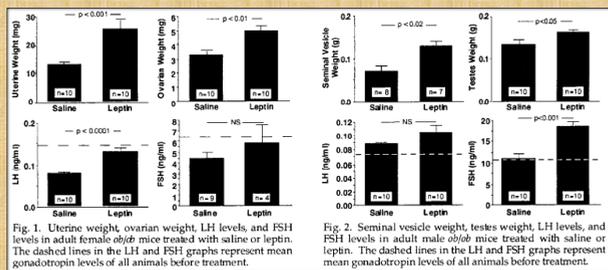


Fig. 1. Uterine weight, ovarian weight, LH levels, and FSH levels in adult female mice treated with saline or leptin. The dashed lines in the LH and FSH graphs represent mean gonadotropin levels of all animals before treatment.

Introduction

The recent trend of earlier onset puberty has been causing much stir in the fields of pediatrics and biology. No one has been able to conclusively give a reason why children are maturing at a faster rate than normal. A few studies showed that diet played a role in the development of the child as higher BMI children were shown to enter puberty at a significantly earlier age. I am studying the consequence that television viewing has on children in relation to diet preferences and early puberty because I want to find out if television may be related to the recent worldwide trend of early onset puberty in order for the reader to understand what may be playing a role in a child's delayed or early puberty and what measures to take to avoid negative repercussions (i.e. increased risk for cancer, insulin rejection, etc.) and how to properly administer treatment.

Results/Discussion

After careful analysis of several studies and reports, the correlation of television on diet preferences proved to be positive towards poor diet choices. Children were shown to prefer poor food high in fat as well as prefer fast food. This type of food was shown to be positively related to increased leptin levels and increased BMI. Both of those were shown to offset the child to earlier onset puberty. Treatment should shift towards limiting television as well as providing a strict, detailed prescription on what foods to avoid and a schedule to follow for television viewing to best guarantee that the patient will adhere to the prescriptions.

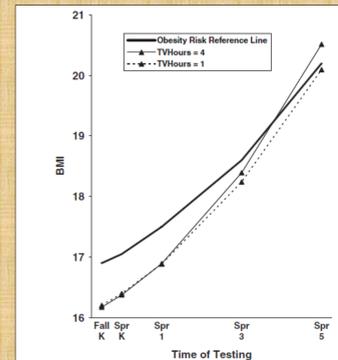


Figure 1. Trajectory of BMI growth among males from Kindergarten through fifth grade as a function of 1 or 4 hr of TV/day. SES, birth weight, and initial age all set at their means. Obesity risk reference line represents the age- and gender-adjusted 85th percentile for BMI.

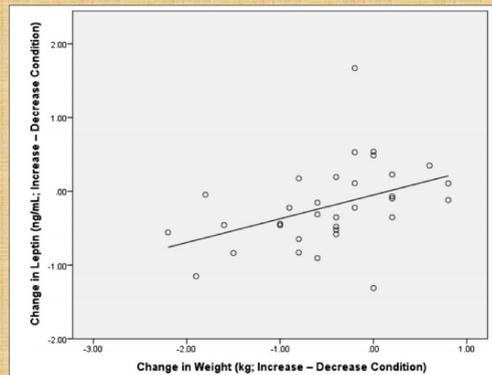


FIGURE 3. Scatterplot and associated regression line for the association between difference in child weight and difference in fasting leptin between the increase and decrease sleep conditions. The x-axis represents difference in weight as: Increase Condition weight - Decrease Condition weight. The y-axis represents the difference in leptin as Increase condition Leptin - Decrease Condition Leptin.

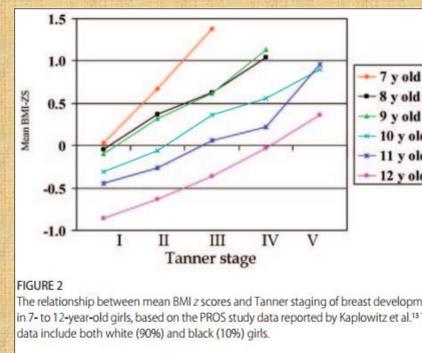


FIGURE 2. The relationship between mean BMI z scores and Tanner staging of breast development in 7- to 12-year-old girls, based on the PROS study data reported by Kaplowitz et al.¹⁹ The data include both white (90%) and black (10%) girls.

Conclusion

Television demonstrated an increased intake of fatty foods, higher levels of BMI, and higher levels of leptin. The higher levels of leptin and higher BMI levels were positively correlated to earlier puberty. Though television viewing increased food intake, and specifically poor food intake, leptin levels were shown to be increased in general. Children with higher BMIs were shown to have higher leptin levels, however children with regular weights also had increased leptin levels hinting at a possible other role. Further studies should take into account genetic factors and environmental factors as well. Also, rather than just television, the focus should include different entertainment devices such as gaming systems, smart phones, etc.

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	Negative binomial regression: incidence-rate ratios (95% CI)		OLS regression: proportion of fast-food restaurants out of total restaurants (SE)	
	Full-service restaurants	Fast-food restaurants	All ZIP codes	Urban area ZIP codes
Income				
Low	1.1203** (1.076, 1.167)	1.235** (1.175, 1.297)	0.006 (0.004)	0.010 (0.006)
Near low	1.236** (1.189, 1.284)	1.336** (1.275, 1.399)	0.004 (0.004)	0.023** (0.006)
Middle	1.223** (1.178, 1.269)	1.278** (1.224, 1.335)	0.002 (0.004)	0.020** (0.006)
Near high	1.145** (1.105, 1.186)	1.194** (1.147, 1.243)	0.005 (0.004)	0.012* (0.006)
Race				
Predominantly black	0.582** (0.535, 0.632)	0.593** (0.541, 0.650)	0.010 (0.009)	0.028** (0.008)
Mixed races	0.899** (0.870, 0.929)	0.891** (0.859, 0.925)	0.005 (0.004)	-0.004 (0.004)
Ethnicity (predominantly Hispanic)	0.609** (0.553, 0.671)	0.558** (0.501, 0.622)	-0.015 (0.010)	0.001 (0.011)
Population (in 1000s)	1.049** (1.047, 1.050)	1.047** (1.046, 1.048)	0.001** (0.0001)	0.0001 (0.0001)
Urbanization				
Suburban	1.344** (1.282, 1.409)	1.768** (1.679, 1.862)	0.040** (0.005)	—
Rural	0.215** (0.207, 0.224)	0.142** (0.135, 0.150)	-0.074** (0.004)	—
Farm	0.004** (0.003, 0.005)	0.0003** (0.0002, 0.0006)	-0.318** (0.025)	—
Region				
Midwest	0.979 (0.945, 1.014)	1.284** (1.230, 1.341)	0.036** (0.004)	0.066** (0.005)
South	0.986 (0.955, 1.019)	1.434** (1.378, 1.492)	0.042** (0.004)	0.060** (0.005)
West	1.052 (1.013, 1.093)	1.069** (1.021, 1.119)	0.007 (0.004)	0.020** (0.005)
Constant	—	—	0.155** (0.004)	0.143** (0.005)
Number of observations	28,050	28,050	21,976	4,272

Note: For the negative binomial regressions, this table reports estimated coefficients (β) transformed to incidence-rate ratios (e^{β}). *statistical significance at the 5% level; **statistical significance at the 1% level. CI, confidence interval; OLS, ordinary least squares; SE, significant error.

Acknowledgements

I'd like to acknowledge Professor Boyes for guiding me through this research and for her continuous help.