

TV VIEWING HABITS AND BODY MASS INDEX AMONG SOUTH CAROLINA HEAD START CHILDREN

The present study tested the hypothesis that TV viewing habits and overweight would be associated among 4-year-old children. A convenience sample of Head Start students was enrolled ($N=148$). Parents were asked to complete a questionnaire on their children's TV viewing habits for a typical weekday, and for Saturday and Sunday. Height and weight of the children were assessed by the authors. As BMI increased, average hours of TV viewing increased slightly. Nearly 97% of children whose BMI was greater than the 95th percentile for age and sex watched more than one hour of TV, compared with less than 80% of children below the 95th percentile ($\chi^2=6.0$, $P=.01$). The present study suggests that TV viewing habits relate to BMI among 4-year old children to approximately the same degree as in older cohorts. (*Ethn Dis.* 2004;14:336-339.)

Key Words: Overweight/Obesity, Sedentary Behavior, Television, Youth

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INTRODUCTION

The rapidly emerging epidemic of childhood obesity among the world's industrialized nations will have profound public health consequences, as overweight children become overweight adults.¹ During the past 2 decades, the percentage of overweight youth has more than doubled.² Sedentary behavior, such as TV viewing, may be a contributing factor, as studies have demonstrated an association between TV viewing and overweight or obesity among children of various ages.³⁻⁶ We know very little, however, about whether this association exists among children younger than 6 years. The present study tested the hypothesis that TV viewing habits and overweight would be associated among 148 4-year-old children in South Carolina, who were enrolled in Head Start.

METHODS

Five Head Start schools in Lancaster, York, and Chester counties, in South Carolina, were recruited for an intervention study during the fall of 2000. A convenience sample of 4-year-old students, whose parents gave informed consent and completed a questionnaire, was enrolled ($N=148$). Approximately 75% of the enrollees were African-American.

Prior to enrollment, parents were asked to complete a questionnaire on their child's TV viewing habits for a typical weekday, and for Saturday and Sunday. For the weekday, items assessed whether the child watched TV before

school, after school, during dinner, and after dinner; for the weekend, the time segments were morning, afternoon, and evening. Parents estimated the duration of their child's TV viewing for each time segment on a typical weekday, and on Saturday and Sunday (eg, 2 hrs of TV viewing after dinner M-F; 3 hours of TV viewing Sunday afternoon). Minutes of TV viewing per week, per weekday, and per weekend were calculated.

The height and weight of the children, without shoes, were assessed by 2 of the authors. Weight was assessed using a Health-O-Meter digital scale. A 25-pound weight was used to calibrate the scale before use at each school. Height was measured with a homemade stadiometer. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. National norms for children aged 4.5 years were used to determine the prevalence of overweight among this sample (at or above 95th percentile for age and sex, respectively).⁷

Descriptive statistics (means and frequencies) are provided for TV viewing time and BMI. We used quartiles of BMI derived from the sample to plot average TV time among categories of weight status (low = <25th percentile, medium = 25th percentile-75th percentile, and high = >75th percentile). To explore the potential association between TV time and BMI, both were dichotomized at recommended cut points (TV time ≤ 2 hours or > 2 hours; BMI ≥ 95 th percentile or < 95 th percentile), and a chi-square test was performed. To compare with a previously published report, TV time was also categorized as

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≥5 hours or ≤1 hour and used as a predictor variable for overweight.

RESULTS

Nearly all parents reported that their children watched TV during the week (90%) and on the weekend days (96%); 18% reported TV viewing during dinner. Total viewing time ranged from none to 61 hours per week, with a mean of 21.5 (±13.5) hours. Viewing habits are summarized in Table 1.

The mean BMI was 16.9 (±2.5); with a range from 13.2 to 28.0. According to the national norms, 25.6% of the children were obese (ie, ≥95th percentile).

For each increase in BMI categorization (low, medium, high), an increase in TV time was observed, though the results were not statistically significant

Table 1. TV viewing habits of 4-year-old South Carolina children enrolled in Head Start (N=148)

	TV Viewers (%)	Mean Minutes (SD)/Day
Weekday	90	181 (114)
Before school	43	34 (32)
After school	82	91 (66)
During dinner	18	30 (25)
After dinner	79	91 (59)
Weekend	96	229 (149)
Saturday	95	265 (170)
Morning		95 (73)
Afternoon		72 (75)
Evening		99 (71)
Sunday	89	203 (147)
Morning		49 (56)
Afternoon		69 (76)
Evening		86 (70)

(see Figure 1). When TV time and BMI were dichotomized, only 19.4% of overweight children watched ≤2 hours/day, compared with 43.9% of children who were not overweight ($\chi^2=6.0$; $P=.01$). Categorized another way, children who watched more than 5 hours of TV per day were 5 times as likely to be obese as those who watched less than one hour (OR=5.0; 95% CI=0.5–49.3).

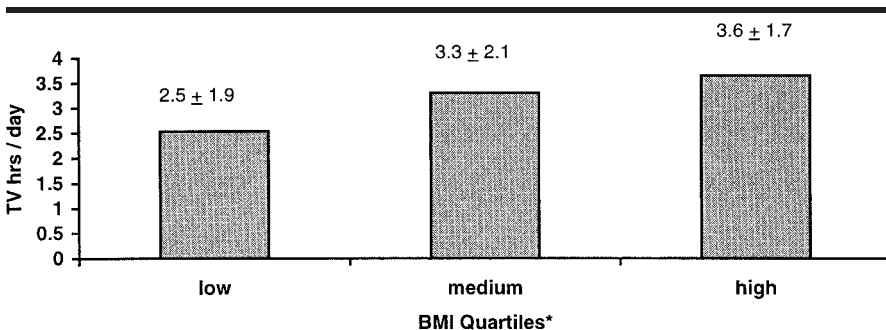
DISCUSSION

The fact that a little more than 25% of the children in our study were overweight is discouraging, but not surpris-

We found that children above the 95th percentile for BMI were more likely to watch more than two hours of TV per day, compared to children with lower BMIs.

ing, given current trends. The finding that the children watched a lot of TV (average 21.5 hours weekly) is also not a surprise, in light of what we know of the viewing habits of slightly older children. The cross-sectional nature of the study rules out the establishment of causality, but given the strength of the emerging epidemic of obesity among young children, establishing its risk factors is of ongoing importance, especially if they are preventable. We found that children above the 95th percentile for BMI were more likely to watch more than two hours of TV per day, compared to children with lower BMI.

TV viewing behavior and BMI have been shown to be strongly related in studies of slightly older children. Using a nationally representative sample of youth aged 10 to 15 years, Gortmaker et al found that the odds of being overweight were 4.6 times as great among those who watched ≥5 hours of TV per day as in those who watched 0–2 hours.⁴ In the third National Health and Nutrition Examination Study (NHANES III), children aged 8–16 years who watched ≥5 hours of TV per day were more than 2.5 times as likely to be obese as children who watched ≤1 hour, even after controlling for age, race/ethnicity, family income, energy intake, and weekly bouts of physical activity.³ For comparison, our study showed that children who watched more than five hours of TV per day were 5 times as likely to be obese as those who watched less than one hour,



*low ≤ 25th percentile of the sample; medium = 25th to 75th percentile; high ≥ 75th percentile

Fig 1. Average TV hrs/day of 4-year-old children by category of BMI

though the confidence interval was quite wide.

Hours spent watching TV may represent a lack of physical activity and exposure to food advertising that may promote increased energy consumption. A review of the literature suggested that greater TV use is associated with higher intake of fats and sweets⁸; though data are less conclusive with regard to TV viewing time and physical activity levels. Taras et al found the variables to be unrelated among 3- to 8-year-old children,⁹ while DuRant and colleagues found that children aged 3 to 4 years old who watched more TV were less likely to engage in physical activity.¹⁰

Both physical activity and overweight or obesity are among the nation's major health concerns at present, as indicated by their selection as 2 of the 10 Leading Health Indicators for Healthy People 2010.¹¹ Two of the objectives within that document speak to the concerns that the present study raises: Objective 19-3 states: "Reduce the proportion of children and adolescents who are overweight or obese," and Objective 22-11 reads: "Increase the proportion of adolescents who view television 2 or fewer hours on a school day." Judging by NHANES III (1988 to 1994), the record as we begin the 21st century is not very good. Using the national representative data from NHANES III, Crespo and colleagues recently reported that only 29% of children aged 8 to 16 years are watching 2 or fewer hours per day.³

The American Academy of Pediatrics¹² has encouraged active play in preschool children, and the literature indicates that the physical activity habits of very young children should engage the interest of parents, pediatricians, and, as appropriate, teachers and day care staff (eg, Head Start staff). In 2 studies of preschoolers, physical activity was inversely related to body fat.^{13,14} DuRant and colleagues found that excess body fat in children as young as 4 or 5 years was associated with unfavorable lipid

values, and that aerobic fitness was associated with a more positive profile.¹⁵ Further emphasizing the importance of this issue, evidence suggests that physical activity and inactivity track from a very young age.^{16,17} From findings such as these, and from our own results, we recommend interventions designed to decrease TV viewing hours of preschoolers, replacing them with moderate to vigorous activities to reduce the prevalence and incidence of obesity. Such interventions may be even more important among young, low-income, African-American populations, such as the one represented in this study. National studies have shown that African-American and low-income children are at greater risk for obesity,¹⁸ and watch more TV than their peers from other ethnic groups.^{19,20}

Some success has been documented for performing these types of interventions among older children. One example was an interdisciplinary intervention, taking place over the course of 2 years, in which each hour of reduction in TV viewing predicted reduced obesity prevalence among girls in grades 6–8.⁵ In another example, decreased TV viewing time was associated among 3rd and 4th graders with a relative decrease in BMI for both boys and girls, in a comparison with controls.⁶

The present study suggests that TV viewing habits relate to BMI among 4-year-old children to approximately the same degree found with older cohorts. While our results add to the literature supporting an association between TV time and BMI among children, these findings are not without limitations. The reliability and validity of the instrument to assess TV viewing time was not established, and the analyses were performed without control for other factors known to affect BMI (eg, energy intake, parental weight status). In addition, BMI as a measure of adiposity has its own limitations; however, the International Obesity Task Force has declared it to be a reasonable measure,²¹ and

more recently BMI has performed well against other measures for detecting overweight in children aged 3–19 years.²² Despite this study's limitations, we examined a very timely issue and identified an important association between TV viewing and BMI among a population greatly in need of public health attention, if we are to ever reach the national goal of eliminating health disparities between ethnic groups.

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Data analysis and interpretation: Levin, Riner
Manuscript draft: Levin, Martin, Riner
Statistical expertise: Levin
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