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Research Article

The Correlation of Neighborhood Safety and Behaviors upon Pediatric Obesity in an Urban Population

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Abstract

Background: Neighborhood safety and certain behaviors – namely doing homework and reading – have not been widely correlated with obesity.

Methods: Convenience sample of 124 patients between 7-18 years old from an urban, impoverished community

Results: Forty seven patients (38%) met criteria for obesity. The children spend much of their time watching television (86 (69%) spend 1-7 hours per week), playing video games (84 (68%) spend 1-7 hours per week), and homework (80 (65%) spend 1-7 hours per week). Most children are not involved in extracurricular activities: Sixty eight (55%) do not play organized sports, 109 (89%) do not participate in social clubs. Only lack of reading (LR=7.2, p=0.01) and lack of doing homework (LR= 3.5, p=0.05) were associated with increased obesity. Perception of neighborhood safety was not associated with increased obesity.

Conclusions: In this population where prevalence of obesity was high, lack of reading and doing homework was correlated with increased prevalence of obesity.

INTRODUCTION

Obesity is the most common health problem facing the current

generation of American children [1]. Results from the 2007-2008 National Health and Nutrition Examination Survey (NHANES) demonstrated that nearly 17% of children and adolescents have

a Body Mass Index (BMI) greater than the 95th percentile [1]. The prevalence is disproportionately higher among inner-city poor and minority ethnic groups [2].

While morbidities such as diabetes, coronary artery disease, and premature death associated with increased BMI occur most frequently in adults, there are also consequences for children and adolescents [3]. Overweight adolescents have a 70% chance of becoming overweight or obese adults, and likelihood increases to 80% if one or both parents are overweight or obese [4]. Additionally, Type 2 diabetes, high blood lipids, hypertension, early maturation and orthopedic problems occur with increased frequency in overweight youth [5]. Furthermore, an all too frequent consequence of being overweight in childhood is psychosocial—specifically discrimination and harassment [5].

While several studies have associated obesity with genetic factors, socio-economic status, diet, and sedentary behaviors, the impact of neighborhood safety is beginning to attract attention as an important variable in the obesity epidemic [2,6-11]. However, the data about the impact of neighborhood safety on pediatric obesity is equivocal. While some studies reveal an association between higher crime and greater inactivity, there was no correlation with obesity prevalence [12-17]. These data suggest that other factors, besides neighborhood safety, could impact the prevalence of obesity among the urban poor.

There are other behaviors - such as participation in social clubs, reading, homework, and outdoor play - that may foster a more structured, active life-style and less snacking, defined as “food or drink eaten between main meals.” [18]. Only one study has evaluated the direct impact of reading and homework, and found a correlation with a lower BMI [19].

Given the conflicting data about neighborhood safety, and the lack of data about other behaviors, this pilot study seeks to evaluate the impact of common childhood behaviors and the perception of neighborhood safety with the prevalence of obesity among an inner-city population.

METHODS

A convenience sample of parents with children between the ages of 7-18 in an urban primary care clinic were asked to fill out a questionnaire that included demographic data, behaviors, and a neighborhood safety questionnaire. A body-mass index (BMI) was calculated for all children. Obesity was defined as a BMI of greater than 95% for age. Neighborhood safety was assessed using the Community Safety Scale - a validated instrument devised to assess the impact of urban blight, street crime, joblessness, drug activity, and vandalism [20].

The survey was anonymous, confidential, and voluntary. A Spanish version of the survey was offered to patients. The survey was “back translated” to ensure accuracy. The study was approved by both the Yale Human Investigation Committee and the St. Mary’s Institutional Review Board. The Chi squared test, Pearson correlation coefficient, and Student t-tests were used for appropriate variables. Statistical analysis was performed using the JMP statistical software [21].

RESULTS

One hundred twenty four patients filled out the survey.

Table 1 shows demographic information. Forty seven (38%) of children met criteria for obesity. Of note, the population is multi-ethnic and almost exclusively poor: 81 (65 %) of families earn less than \$20,000/year. There was no statistical difference between ethnic group, income, asthma, use of the women-infant-children nutrition program, being able to walk to a park, or the Community Safety Scale.

Table 2 shows how our patients spent their extracurricular activities. Of note, 68 (55%) do not play organized sports, 109 (89%) do not participate in social clubs. Their time is instead invested in watching television (86 (69%) of patients spend 1-7 hours per week), playing video games (84 (68%) spend 1-7 hours per week), and homework (80 (65%) spend 1-7 hours per week). Further analysis reveals that obese children are 7.2 times likely to spend zero hours per week reading ($p=0.01$), and 3.5 times as likely to spend zero hours doing homework ($p=0.05$). All other behaviors revealed no statistical significance between obese and non-obese patients.

DISCUSSION

This pilot study reveals several important findings. First, in an inner-city, mostly poor population where prevalence of obesity is high, perception of neighborhood safety is not an independent predictor of pediatric obesity. This is likely due to several issues. Neighborhood safety is one variable among several that constitute an “urban obesity syndrome.” Lack of safe areas

Table 1: Demographics of Respondents.

	Non-obese	Obese	P value
Total - 124	77 (62%)	47 (38%)	
Age n (+/- sd)	11.6 (+/- 3.4)	12.7 (+/- 4.3)	.21
Ethnic Identity n (%)			
African-American	15 (19%)	13 (28%)	0.35
Latino	44 (58%)	25 (53%)	
Caucasian	9 (12%)	5 (11%)	
Other	12 (16%)	4 (9%)	
Women-Infants-Children? Yes? n (%)	35 (45%)	20 (43%)	0.61
Asthma? Yes? n (%)	16 (22%)	9 (19%)	0.84
Family Income n (%)			0.39
<10,000	23 (30%)	22 (47%)	
10-20,000	25 (32%)	11 (23%)	
20-30,000	7 (9%)	2 (4%)	
30-40,000	17 (22%)	9 (19%)	
40-50,000	3 (4%)	0 (0%)	
>50,000	2 (3%)	3 (6%)	
Can you walk to a park? Yes? n (%)	54 (70%)	34 (72%)	0.93
How safe to you feel in your neighborhood? 1 (unsafe)-10(safe) mean (+/- sd)	7.13 (+/- 2.6)	6.81 (+/- 2.99)	0.58
Do you ever stay indoors because of safety? Yes? n (%)	45 (58%)	31 (66%)	0.41
Neighborhood Safety Scale mean (+/- sd)	38.7(+/- 11.8)	39.7(+/- 14.8)	0.72

Table 2: Activities of Respondents.

	Hours per week								P value
	None		1-7		8-14		>14		
	Non-Obese	Obese	Non-obese	Obese	Non-obese	Obese	Non-obese	Obese	
Playing Video Games	16 (13%)	9 (8%)	53 (43%)	31 (25%)	1 (1%)	4 (3%)	4 (3%)	5 (4%)	.33
Watching TV, Videos, or Movies	1 (1%)	0 (0%)	52 (42%)	34 (27%)	13 (10%)	8 (6%)	10 (8%)	6 (5%)	.80
Working / Playing on the Computer	33 (26%)	17 (14%)	34 (27%)	21 (17%)	5 (4%)	8 (6%)	5 (4%)	1 (1%)	.40
Playing sports in organized leagues	41 (33%)	27 (22%)	27 (22%)	16 (13%)	4 (3%)	1 (1%)	4 (3%)	3 (2%)	.94
Playing outside	17 (14%)	11 (9%)	46 (37%)	30 (24%)	7(5%)	4 (3%)	7 (5%)	3 (2%)	.95
Biking, Rollerblading, Skateboarding	35 (28%)	22 (18%)	35 (28%)	21 (17%)	3 (2%)	4 (3%)	3 (2%)	1 (1%)	.80
Reading	4 (3%)	12 (10%)	57 (46%)	30 (24%)	8 (6%)	3 (2%)	7 (5%)	4 (3%)	.01
Visiting Friends	13 (11%)	12 (12%)	45 (36%)	24 (19%)	15 (12%)	12 (10%)	3 (2%)	1 (1%)	.73
Schoolwork / Homework	4 (3%)	8 (6%)	55 (45%)	25 (20%)	9 (7%)	5 (4%)	9 (7%)	8 (6%)	.05
Chores around the home	12 (10%)	9 (7%)	50 (40%)	29 (23%)	8 (6%)	5 (4%)	8 (6%)	3 (2%)	.83
Social Clubs (ie. boyscouts, girlscouts, clubs)	70 (57%)	39 (32%)	8 (7%)	3 (2%)	0 (0%)	3 (2%)	0 (0%)	0 (0%)	.32
Religious Activities (ie. worship, youth group)	34 (28%)	26 (21%)	40 (32%)	18 (15%)	3 (2%)	3 (2%)	0 (0%)	0 (0%)	.68

* p values are based on comparing "None" with the other hour categories grouped together.

to play, increased television watching, poor nutrition, and poor access to grocery stores all contribute to the higher prevalence of obesity in the urban poor.

Second, the children in this study spend a considerable amount of time in sedentary activities. The reasons behind this are likely multifactorial. Children may have a lack of access to after school programs. There may be poor family support or low expectations for extra-curricular activities. Neighborhood safety may contribute to this sentiment, but the result is a population of children that tends to stay home, is not involved in extra-curricular activities, and spends inordinate amount of time watching television and playing video games. This finding reflects similar data in larger studies [1-10]. Taken together, these data suggest that children spend most of their time at home, indoors, with individualized activities. Many studies address only the sedentary lifestyle. However, these data point to a more worrisome issue: A lack of socialization, team-building, and skill-development.

Third, one very provocative finding is the association between obesity and lack of reading (LR 7.2, $p=0.01$) or lack of doing homework (LR 3.5, $p=0.05$). While this author could not find a similar association reported in the literature, there are many possibilities. While reading and homework are sedentary activities, they are perhaps different from the more passive activities of television watching and computer games. Further, reading and homework may not be correlated with snacking the way viewing television is. Intentional reading and doing homework may also suggest that a more disciplined and structured home environment. More structure at home may correlate with less idle snacking. Since there was no significant difference in other demographics – income, ethnic group, etc.

– this finding of home structure merits further investigation. Is reading and doing homework simply a marker for a more disciplined home environment, perhaps reflecting the values of the caregivers? Would mandatory study hall decrease the prevalence of obesity?

There are a few weaknesses to this study. First, this is a pilot project that draws important conclusions that merit further evaluation. Although the statistical conclusions are adequately powered, the overall numbers are small. Second, this cohort studies only the urban poor, where time spent on extracurricular activities is relatively the same: Watching television, playing video games, and doing very little homework. A larger study incorporating children from a wider socio-demographic spectrum may help discern the impact of schoolwork and reading. Further, studies that address home structure and discipline – especially among the urban poor – would discern this interesting variable of time spent doing homework and reading.

At present, the treatment for obesity – especially among the urban poor – is challenging. McGovern et al performed an important meta-analysis that evaluated all 76 eligible intervention trials through 2006. They concluded that, "long term efficacy and safety of pediatric obesity treatments remain unclear" [22]. Physical activity interventions had a modest effect on fat mass, but no effect on BMI. Intensive lifestyle interventions targeting children had no effect on BMI Intensive; combined interventions targeting the family had a short-term effect [22]. They concluded that the evidence is unclear how best to treat pediatric obesity. One intervention that showed promise, published after McGovern's meta-analysis, specifically targeted television viewing. Children's television viewing was gradually reduced 50% over six months using an automatic

television locking device. This intervention reduced childrens' BMI ($p < 0.05$) and time spent in sedentary activities ($p < 0.01$) [23]. Of note, this intervention worked better among children of lower socio-economic status [23].

And yet, the urban poor contend with a unique constellation of stressors. The intriguing finding of schoolwork and reading correlated with lower obesity suggests a new variable among this vulnerable population that merits further study. While many studies have revealed the importance of sedentary activities in contributing to obesity, [6,11,19, 22,23] this pilot study suggests that some sedentary activities – namely reading and homework – may mitigate childhood obesity.

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