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Childhood Obesity and Parental Perceptions of Healthcare Quality

By

Keji Akin-Olugbemi, M.D.

Degree to be awarded: M.P.H.
Career MPH

_____
Michael Kramer, phD
Committee Chair

_____
Inyang Isong, M.D., MPH
Committee Member

_____
Melissa Alperin, MPH, CHES
Chair, Career MPH Program

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M.P.H., Emory University, 2011

MB:BS, University of Lagos, 1991

Thesis Committee Chair: Michael Kramer, PhD, MS, MMSc, BA

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Abstract

Childhood Obesity and Parental Perceptions of Healthcare Quality

By

Keji Akin-Olugbemi, M.D.

Objectives: The objective of this study was to determine the association between parental perceptions of healthcare quality and overweight/obese status of children using a nationally representative survey.

Research methods and Procedures: This study analyzed the National Survey of Children's Health, 2007 and included 41,915 children who had BMI percentiles reported. The outcome variable was dichotomized into overweight/obese and healthy weight children. The exposure variables were four questions pertaining to healthcare quality derived from the NSCH survey: These inquired whether parents felt that healthcare providers spent enough time with their children, provided specific information needed, listened carefully to parents or made parents feel like a partner in child's healthcare. Possible confounders of this relationship were age, sex, race, poverty level, whether child has a usual source of healthcare, health insurance status and mother's education level. Multivariate logistic regression analysis was used to investigate the relationship between weight categories and each these healthcare quality indices.

Results: Of the 41,915 children analyzed, 31% were overweight or obese. Crude estimates revealed that parents of overweight or obese children reported lower levels of satisfaction than parents of healthy weight children with regards to time spent ($p<0.01$), providing specific information needed ($p=0.016$), listening carefully to parent ($p<0.01$) and feeling like a partner in child's healthcare ($p=0.024$). However these results are attenuated and no longer significant when adjusted for other variables.

Discussion: This study finds no significant association between parental perceptions of quality of healthcare delivered to children based on their weight status. This may be represent an opportunity to reduce childhood obesity rates by harnessing provider parent relationships.

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Introduction

The prevalence of obesity among children and adolescents in the United States has tripled since 1980 and has now reached epidemic proportions[1].As of 2008 the estimated prevalence rate of obesity in children ages 2-19 years is 17%. Obese children, who are twice as likely to become obese adults also have increased risks for developing chronic diseases such as diabetes and hypertension.[2] The severity of this epidemic is emphasized by the Presidential Task Force on childhood obesity and the First lady's initiative in forming *let's move*, all seeking strategies to reduce the incidence and prevalence of childhood obesity.[3,4] The estimated healthcare costs associated with childhood obesity are $14.1 billion annually.[5]

The Children's Health Insurance Program Reauthorization Act (CHIPRA) and the Institute of Medicine (IOM) have provided guidelines to improve the health of overweight and obese children by monitoring indices of the quality of care received by this population of children[6]. These include indicators of perceived healthcare quality by parents of overweight and obese children. Since the treatment and prevention of obesity relies heavily on the patient being motivated, and a primary source of motivation and counseling is the healthcare system, parental satisfaction with quality of care received will influence their willingness to use these services and adopt treatment guidelines. The impact of parental satisfaction with the quality of healthcare provided to their children is one of the key measures which can provide more insight into the ways that healthcare providers can reverse the trend of childhood obesity.

If a problem is within the realm of a specific specialty, it is presumed that the sector which is responsible for preventing or fixing that problem will be held accountable. If parents regard overweight/obesity as poorly-controlled medical problem (such as poorly controlled asthma or diabetes), they would seek help from their healthcare providers. With such high prevalence rates, it is expected that parents of overweight and obese children will be dissatisfied with the quality of healthcare provided.

Research Question:

Hypothesis 1: Parental perception of time spent with physician in overweight/obese children is lower than that of healthy weight children after controlling for age, sex, race, has PCP, poverty level, mom's education level, health insurance status.

Hypothesis 2: Perception of whether specific information needed by parent was provided by physician in overweight/obese children is lower than that of parents of healthy weight children after controlling for age, sex, race, has PCP, poverty level, mom's education level, health insurance status.

Hypothesis 3: Perception of whether parent feels like a partner in child's health care in overweight/obese children is lower than that of parents of healthy weight children after controlling for age, sex, race, has PCP, poverty level, mom's education level, health insurance status.

Hypothesis 4: Parental perception of whether physician listens to patient in overweight/obese children is lower than that of healthy weight children after controlling for age, sex, race, has PCP, poverty level, mom's education level, health insurance status.

Review of the Literature

The epidemic of childhood obesity has been growing at alarming rates, with three times the estimated number of children being obese in 2008 compared to the 1980s. In 2008, an estimated 16.9% of children ages 2-19 years were obese. From the end of 1970s decade to the late 2000s, this rate increased from 5% to 10.7% in children ages 2-5, and from 6.5% to 19.6% in children ages 6-11 years. The rate also increased from 5% to 18.1% in children ages 12-19 years.[1] There are also significant disparities in childhood obesity prevalence based on race and sex. Among males ages 12-19, 19.3% were estimated to be obese, however, Mexican American males had a prevalence rate of 26.8%, Black males had a rate of 19.8% and white males had a rate of 16.7%. Among females ages 12-19 years, the obesity rate was 16.8%, with a rate of 29.2% in black females, 17.4% in Mexican American females, and 14.5% in white females.

Children and adolescents from families below the FPL were more likely to be overweight/obese compared with children from families at >400% of the FPL.[7] The 2001 MMWR report also shows an inverse relationship between family income and obesity in white males and females children. However, this relationship was not reproduced in blacks or Hispanics. Interestingly it further shows a positive correlation between income and obesity in black males. Whereas black women show an increase in obesity prevalence over a 40 year period, from the 1960s to 2005, none of the studies reviewed report a correlation between maternal educational status and obesity in children[8].

Childhood obesity is defined as a Body Mass Index (BMI) at or above the 95th percentile for age, while overweight is defined as a BMI of 85th percentile to the 94th percentile. A BMI between the 5th and 84th percentile are classified in the healthy weight category, while a BMI below the 5th percentile is classified as underweight.[8,] BMI is an indirect indicator of body fat , and is measured using the height and weight. Children in the overweight category are at increased medical and behavioral risks, including obesity and obesity-related disorders. Children who are overweight have increased risks of sleep disorders, such as obstructive sleep apnea, respiratory problems such as asthma, endocrinological problems such as diabetes, cardiovascular problems such as elevated blood pressure and lipid abnormalities and orthopedic problems such as slipped capital femoral epiphyses. They also are at increased risk of behavioral problems such as depression.

The 1997 Children's Health Insurance Program (CHIP) legislation was the first effort at developing quality of care performance measures for children under CHIP. The Children's Health Insurance Program Reauthorization Act (CHIPRA) law passed in 2010 called for identification of measures that can be used to determine treatment and management for acute and chronic conditions in children and family experiences of care amongst other services. CHIPPRA also authorized these measures which would use evidence-based guidelines and outcomes that could identify disparities in health care quality by race and

ethnicity, socioeconomic status, and special health care need[9].One of the quality measures pertains to obesity while two of these measures focus on family experiences with care.

In addition, the 2009 Patient Protection and Affordable Care Act (Affordable Care Act) requires the Centers for Medicare and Medicaid Services (CMS) to improve quality of healthcare provided for children. The properties of healthcare quality as identified by the institute of Medicine (IOM) are: Effectiveness, efficiency, equity, patient-centeredness, safety and timeliness. A Quality measure is defined as a mechanism to assign a quantity to quality of care by comparison to a criterion.[10] The 3 types of quality measures are measures of structure, which examine resources which are in place to deliver care, such as computerized prescription order entry; process measures which investigate whether appropriate physician activities were carried out to deliver care (e.g. the number of times adolescents were provided guidance on smoking avoidance) and outcome measures, which measure the results of physician and provider activities. Outcome measures seek to determine patient morbidity and mortality, including experience with health care and/or the level of satisfaction with care.[6,11]

This paper seeks to determine how perceived healthcare quality outcome measures as determined by satisfaction of care is related to a child's BMI status.

Trasande et al studied the impact of obesity on health service utilization and associated costs, analyzing the 2002-2005 Medical Expenditure Panel. The authors focused on out-patient costs and reported significant increases in utilization by obese children, with estimated $14.1 billion nation-wide costs annually. With such huge estimates of healthcare expenditure by overweight and obese children, it is necessary to determine that they quality of healthcare provided is at least adequate[5].

The management of childhood obesity is multifaceted, requiring several strategies. These strategies include change in eating habits, reduction in television viewing time and increased duration and intensity of physical activity (within certain limits) and to involve the whole family as a unit of change. The 2007 Expert committee recommendations for the prevention and treatment of obesity utilize the chronic are model, with the primary care provider functioning as the counselor.[12] various counseling techniques are encouraged. A mixed method model, which includes stages of behavior change, and agenda setting are encouraged. The provider is encouraged to be a partner in the patient's care, inquiring about concerns about obesity, and the stage of behavioral change at which the patient is. The provider is also encouraged to listen reflectively to the parent's comments in a non-judgmental manner. The provider is subsequently expected to provide specific information regarding achieving or maintaining healthy weight, including caloric consumption and exercise and physical activity. However due to the complexity of implementing obesity management, this process is not commonly undertaken. Interestingly, providers report lack of re-imbursement as a major obstacle in providing ideal obesity care. Counseling is a time-intensive process, and if re-imbursement is not provided, time commitment to this process will be inadequate. Access to and adequacy of health insurance also impact the quality of these services.

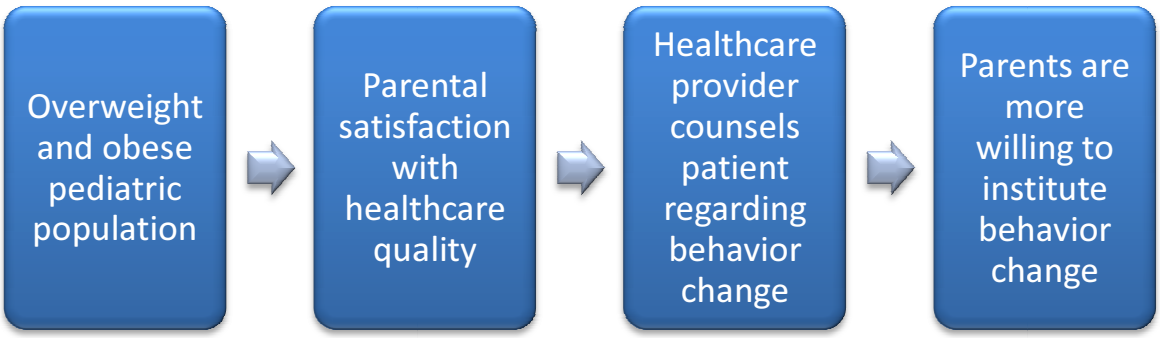
Bethel et al examined the relationship between health insurance status and quality of care provided using the 2007 NSCH data. They found out that publicly-insured children have higher prevalence and severity of health problems than privately insured children.[13] The authors concluded that publicly insured children had a lower healthcare quality based on gaps in healthcare coverage and problems

accessing specialist healthcare. Though insurance status plays an important role in healthcare quality, having a usual source of healthcare also plays a significant role in determining whether a parent will actually use the healthcare service as needed.

The medical home model encourages a usual source of primary care for pediatric patients. This would require parental knowledge of a primary care provider. It would also require that the parent have a certain level of comfort with the primary care provider. This level of comfort can be translated into the quality of care questions that this paper seeks to investigate. It can therefore be extrapolated that parents who show satisfaction in the quality of care their children received would be more willing to implement the behavior changes that are recommended by their healthcare providers.

This study attempts to build on the framework set forth by CHIP, CHIPPRA and the IOM to conduct further studies investigating the association of 4 relevant quality measures and the BMI categories of children.

Figure 1 showing how the progression of parental healthcare quality will lead to reduced obesity rates



Methodology

IRB approval was obtained, and analysis of this dataset was exempted by the IRB of Emory University.

A cross-sectional analysis of the 2007 National Survey of Children's Health (NSCH) was performed.[14] Data were collected between April 2007 and July 2008, using household landline telephones. A random-digit-dialed sample of households with children less than 18 years of age was selected from each of the 50 states and the District of Columbia. One child was randomly selected from all children in each identified household to be the subject of the survey. The respondent was a parent or guardian who knew about the child's health and health care. Questions were divided into 11 sections; the healthcare quality questions analyzed in this paper were drawn from section5, the medical home section.[15,16] Additional information regarding the survey can be obtained from the NSCH website at http://www.cdc.gov/nchs/slaits/nsch.htm.

The sampling frame consisted of children ages 10-17 years old. Children with missing values in any of the variables of interest were excluded from analysis.

Data were cleaned, analyzed and variables recoded. Age was reported yearly from 0-17 years, this was recoded as 0-9 years and 10-17 years for domain analysis. An additional variable for age was coded as 10-14 years and 15-17 years for age-adjustment.

BMI was recorded only for children ages 10-17 years and reported in 3 categories: less than the 5^{th} percentile, 5^{th}-less than 85^{th} percentile, 85^{th} to 95^{th} percentile, and 95^{th} percentile and greater.BMI was then dichotomized into the healthy weight group which comprised 5^{th} to 85^{th} percentile; and overweight/obese group which comprised 85^{th} percentile and greater.

Respondents with missing data for sex were excluded from analyses.

Two health insurance questions were recoded, the first inquiring if the child had health insurance. There were 4 responses, yes, no, I don't know and refused. A "no" response was recoded as the child having no health insurance. The second question asked if the child had public health insurance, with the same response categories. A yes response was coded as public health insurance; if the response to the first question was yes, but the second question no, it was coded as private health insurance.

The question inquiring about a regular source of healthcare had 4 possible responses: yes, no, more than 1 place and refused. The yes and more than 1 place categories were recoded as yes, and no remained the same. The respondents who refused to answer were excluded from analysis.

The question asking if healthcare providers spent enough time with the child had 7 response levels: Never, sometimes, usually, always, don't know, refused and legitimate skip. This was dichotomized into always/usually and never/sometimes. The additional categories were set to missing. The same method of coding was applied to the other 3 quality related questions, how often provider listened, was provided specific information needed, and treated parent as a partner.

Hispanic race was reported in 5 categories, and recoded as Hispanic. Race was further reported in 5 categories: white, black, multiracial and other. White and black were recoded as is, and all other respondents who were not previously recoded as Hispanic were coded as other.

Mother's education level was reported as: less than high school, high school graduate, more than high school, don't know, refused, missing in error, partial interview and legitimate skip. This category was recoded as less than high school, high school and more than high school. Other responses were not included in analysis.

Poverty level had 9 responses based on the federal poverty level: At or below 100% of FPL, above 100% to at or below 133% FPL, above 133% to at or below 150% FPL, above 150% to at or below 185% FPL, above 185% to at or below 200% FPL, above 200% to at or below 300% FPL, above 300% to at or below 400% FPL, and above 400% FPL. These were recoded into 2 categories: below 133% of the FPL and 133% and above of the FPL. 133% of the federal poverty level is the level at which federal assistance including medical insurance is determined by the department of Health and Human Services (DHHS) and so was chosen as a cut-off point for our analysis[17]. Missing values for poverty level were not included in the analysis.

SAS version 9.2 was used for data analysis. The study sample consisted of all children 10-17 years of age with BMI values calculated. The study group was children in the overweight/obese category while the control group was children in the healthy weight category. The unit of analysis was the child. Estimates were generated using proc surveyfreq to determine the numbers, percentages and difference in characteristics between study and control groups accounting for complex sample weights and design. Multivariate logistic regression using Proc surveylogistic was conducted, with domain analysis of the study age group. Crude and age-adjusted associations between the outcome variable and the individual explanatory variables were conducted. Full models including interaction terms were then created and backward elimination procedure conducted also using proc surveylogistic. Interaction terms were removed above the 0.05 level of significance. The other exploratory variables were removed to check for confounding. A 10% change in the calculated odds ratio was used to investigate the effect of confounding . Adjusted odds ratios and chi-square statistics were calculated and recorded.

Table 1: Explanation of Variables

Variable name	Variable text	Variable type	Potential outcome
BMIREC	BMI 5th -94th percentile	Outcome	1=Overweight/obese
	BMI 95th percentile and greater		2=Healthy weight
Timerec	During the past 12 months or since child's birth, how often did your child's doctors and other health care providers spend enough time with him or her?	Exposure	1= Never/sometimes 2= Usually/always (reference group)
Specrec	During the past 12 months or since child's birth, how often did you get	Exposure	1= Never/sometimes 2= Usually/always

	the specific information you needed from your child's doctors and other health care providers?		(reference group)
Partnerrec	During the past 12 months or since child's birth, how often did your child's doctors or other health care providers help you feel like a partner in his or her care?	Exposure	1= Never/sometimes 2= Usually/always (reference group)
Listenrec	Listenrec	Exposure	1= Never/sometimes 2= Usually/always (reference group)
Sexrec	Gender	Possible Confounder	1= Male (reference group) 2=female
Race	Race	Possible Confounder	1=white (reference group) 2=black 3=hispanic 4=others
Poverty	Poverty level	Possible Confounder	1= Less than 133% of federal poverty level in year survey was conducted 2=At or above 133% of federal poverty level in year survey was conducted (reference group)
PCP	Has usual source of healthcare	Possible Confounder	1= Does not have usual source of healthcare 2= Has usual source of healthcare (reference group).
Healthins	Health insurance status	Possible Confounder	1=No health insurance. 2=Public Health insurance 3= Private Health Insurance (reference group)
momeduc	Mother's education level	Possible Confounder	1= less than high school. 2= High school. 3= More than high school (reference group)

Results

Figure 2: showing how study population was generated

Of the 91,642 children in the main survey, 41,915 children met the inclusion criteria and had non-missing values of BMI. Table 2 shows that 31% of the study population were overweight or obese, while 69% were healthy weight children. The overweight and obese groups were different in most of the variables analyzed. Of the children aged 10-14 years, 37% were overweight/obese while 63% were of healthy weight ($p<0.001$). However, of those aged 15-17 years, only 25% were overweight/obese. Of the white children, 37% were overweight/obese compared to 43% of black, and 39% of Hispanic, children. 33% of children of multiracial children were overweight/obese. 35% males were overweight/obese children compared to 26% of females ($p<0.001$). 36% of children without health insurance were overweight/obese compared with 43% of publicly insured children and 27% of children with private health insurance ($p<0.001$). Almost twice as many children below 133% of the Federal poverty level were (20%) overweight/obese compared to the children at or above 133% of the federal poverty level (11%). Similarly, almost twice as many children without a usual source of health care were overweight/obese as compared with children who had a usual source of healthcare ($p=0.007$). Children of mothers who did not complete high school had the highest proportion of obese children (45%), compared with 36% in children whose mothers completed high school, and 27% in children whose mothers had more than high school education.

Table 2: Characteristics of overweight/obese and healthy weight children, ages 10-17, and their parental responses, 2007 National Survey of Child Health (NSCH)

	Overweight/obese (n=12,794 or 31%)		**Healthy weight** (n=29,121 or 69%)		**Chisq (d.f)**	**p-value**
Characteristic	**Number**	**%**	**number**	**%**		
Age						
10-14 years	8,186	37%	15,292	63%	382.55 (1)	<.001
15-17 years	4,608	25%	13,829	75%		
Race						
White	8,000	37%	21,527	63%	854.06(3)	<.001
Black	1,877	43%	2,438	57%		
Hispanic	1,620	39%	2,499	61%		
Other	1,297	33%	2,657	67%		
Sex						
Male	7,638	35%	14,179	65%	202.32(1)	<.001
Female	5,156	26%	14,942	74%		
Health Insurance status						
None	1,110	36%	2,015	64%	938.69	<.001
Medicaid	3,236	43%	4,358	57%		
Private	8,326	27%	22,546	73%		
Poverty level below 133%						
Yes	2,410	20%	9,393	80%	102.66(1)	<.001
No	3,022	11%	23,755	89%		
Child has a usual source of healthcare						
Yes	12,201	30%	28,151	70%	54.60 (1)	0.007
No	558	62%	901	38%		
Mom's education level						
Less than high school	1,217	45%	1,505	55%	755.52 (2)	<.001
High school	3,018	36%	5,444	64%		
More than high school	7,262	27%	19,953	73%		
How often providers spent enough time with patient						
Never/sometimes	2,608	21%	9,658	79%	92.62 (1)	<0.001
Always/usually	4,624	16%	23,584	84%		
How often providers listened carefully to parent						
Never/sometimes	1,430	11%	10,859	89%	67.57(1)	0.005
Always/usually	2,574	9%	25,691	91%		
How often parent obtained specific information needed from provider						
Never/sometimes	2,065	34%	3,965	66%	48.51	0.018
Always/usually	10,240	30%	24,257	70%		
How often providers helped parent feel like partner in child's care						
Never/sometimes	1,663	44%	3,253	63%	37.19	0.034
Always/usually	10,653	30%	25,019	70%		

With regards to the healthcare quality questions of interest, 21% of the parents who felt that their healthcare providers did not spend enough time with them were in the overweight/obese group as compared with 16% of the parents who felt that their providers spent sufficient time with them ($p<0.001$). Similarly, a higher proportion of parents of overweight/obese children felt that their healthcare providers did not listen carefully to them, 11% when compared to those parents who felt that their providers listened to them(9%, $p=0.005$). 34% of parents who felt that their healthcare providers provided specific information needed belonged to the overweight/obese group, compared to 30% of parents who did not feel that their providers provided specific information needed. 44% of parents who felt like their provider made them feel like a partner in their child's healthcare were in the overweight/obese group as compared to only 30% of parents who felt that their provider did make them feel like a partner in their child's healthcare ($p=0.034$).

Table 3 shows that children 15-17 years old were about two-thirds as likely to be overweight or obese as children 10-14 years old; and females were less likely to be overweight/obese when compared to males. Blacks (OR 1.92) and Hispanics (OR 1.91) were more likely to be as overweight/obese when compared with whites. Children without health insurance were 20% more likely to be overweight or obese while children with Public health insurance were almost two and a half times as likely to be overweight/obese as children with private health insurance. Children whose families incomes were below 133% of the federal poverty level were twice as likely to be overweight or obese as compared with children whose families were at or above the 133% federal poverty level. Children with a usual source of healthcare were 40% more likely to be overweight/obese than those without a usual source of healthcare. Children whose mothers had high school education were almost 50% more likely to be overweight or obese; while children of mothers who did not complete high school were more than two times as likely to be overweight/obese when compared with children whose mothers had more than high school education. The test for trend shows an incremental increased risk for overweight/obesity as education level decreases.

Parents of overweight/obese children were almost 30% more likely to feel that providers did not listen to them carefully or spend enough time with their child, than parents of healthy weight children. Parents of overweight/obese children were also about 20% more likely to feel that they were provided with specific information needed for their child's care, or that they were a partner in their child's health care, compared with the healthy weight group. Age-adjusted odds ratios showed no significant difference in reported odds ratios. Crude and age-adjusted estimates showed statistically significant differences between parental perceptions of quality of healthcare and their children's overweight/obese status.

Table 3: Crude and age-adjusted associations of characteristics of overweight/obese children and healthy weight children, ages 10-17, and their parental responses, 2007 National Survey of Child Health (NSCH)

	Crude		**Age-adjusted**		
Characteristic	**Odds ratio**	**95% C.I**	**Odds ratio**	**95% C.I.**	**Heterog. p-value**
Age					
10-14 years	1				
15-17 years (reference group)	0.65	0.58- 0.73			
Race					
White (reference group)	1		1		**<.001**
Black	1.92	1.68- 2.12	1.94	1.70- 2.22	
Hispanic	1.91	1.58- 2.30	1.90	1.58- 2.29	
Other	1.12	1.00- 1.50	1.18	0.98- 1.43	
Sex					
Male	1		1		**<.001**
Female	0.74	0.67- 0.83	0.74	0.66- 0.82	
Health Insurance status					
None	1.26	1.05- 1.52	1.29	1.07- 1.55	**<.001**
Medicaid	2.07	1.82- 2.35	2.06	1.82- 2.34	
Private (reference group)	1		1		
Poverty level below 133%					
No	1		1		**<.001**
Yes	2.00	1.75- 2.29	2.01	1.75- 2.30	
Child has a usual source of healthcare					
Yes	1		1		**<.001**
No	1.43	1.10- 1.86	1.48	1.13- 1.92	
Mom's education level*					
Less than high school	2.38	1.93- 2.94	2.42	1.96- 2.98	**<.001**
High school	1.48	1.30- 1.68	1.51	1.33- 1.72	
More than high school	1		1		
How often providers spent enough *time* with patient					
Never/ sometimes	1.27	1.12- 1.45	1.29	1.13- 1.47	**<.001**
Always/usually	1		1		
How often providers *listened* carefully to parent					
Never/sometimes	1.3	1.08- 1.56	1.34	1.11-1.61	**<0.001**
Always/usually	1		1		
How often parent obtained *specific information* needed from provider					
Never/sometimes	1.21	1.03- 1.42	1.22	1.04- 1.42	**0.016**
Always/usually	1		1		
How often providers helped parent feel like *partner* in child's care					

Never/sometimes	1.20	1.01 1.42	1.22	1.03-1.44	**0.024**
Always/usually	1				

*Trend p-values less than 0.001

Four individual models were built using the quality indicators (if provider spends enough time with patient, listens carefully to patient, provides specific information and if parent feels like a partner in child's healthcare) as the exposure variable.

Table 4: Fully adjusted, most parsimonious and preferred models showing odds ratios of the four quality indicators and overweight/obese children ages 10-17 in the 2007 NSCH

	Fully adjusted model: BMI = (quality measure)+ agegp+ SEXREC +RACE +poverty+ PCP +healthins+ momeduc			**Most Parsimonious model** **BMI= timerec + race** **BMI=specrec+ race** **BMI=listenrec+ race** **BMI=partnerrec**			**Preferred Model** **BMI= (quality measure**)+ agegp+ SEXREC +RACE +poverty+ +healthins+momeduc		
Characteristic	**Odds ratio**	**95% C.I.**	**p-value**	**Odds ratio**	**95% C.I.**	**p-value**	**Odds ratio**	**95% C.I.**	**p-value**
How often did doctors spend enough ***time*** with patient									
Never	1.04	0.88-1.23	**0.65**	1.07	0.93- 1.23	**0.37**	0.97	0.82- 1.15	**0.73**
Always/usually	1			1			1		
How often did doctors ***listen*** carefully to you?									
Never/Sometimes	1.07	0.85-1.34	**0.57**	1.12	0.92- 1.37	**0.27**	1.07	0.86-1.34	**0.55**
Always/usually	1			1			1		
How often did you get ***specific information*** you needed from doctor									
Never/Sometimes	1.08	0.89-1.30	**0.45**	1.09	0.93- 1.27	**0.30**	1.07	0.89- 1.29	**0.78**
Always/usually	1			1			1		
How often did doctors help you feel like ***partner*** in child's care									
Never/Sometimes	1.05	0.86-1.30	**0.62**	1.198	1.01- 1.42	**0.03**	1.060	0.87- 1.30	**0.57**
Always/usually	1			1			1		

There were no significant interaction terms at 0.05 level of significance. Fully adjusted models comprised of the exposure and outcome variables in addition to all the possible confounders. None of these fully adjusted models had odds ratios that were statistically significant for any of the quality indicators. Race confounded the association of each individual the quality indicator and BMI, except the indicator which determined if the parent felt like a partner in their child's health care. The most parsimonious model included the minimal set of variables that would describe the association between exposure and outcome, and also include variables that confound that association. Hence the most parsimonious models comprised race and the quality indicator, except for the partner indicator as

mentioned above, which had the crude model as the most parsimonious. My preferred model had the exposure and outcome variables including all the covariates excluding whether the child had a source of regular healthcare. This variable was not significant at p=0.05, and did not confound the relationship in any way. The other variables are important influences on either BMI or healthcare quality, and were thus kept in the model.

Discussion

This study set out to investigate the association between parental perceptions of healthcare quality in overweight and obese children, compared with healthy weight children. Though the crude and age-adjusted estimates showed statistically significant differences, however, after controlling for socio-economic factors, this association is attenuated and no longer significant. This would support a similar study in adults conducted by Fong et al, where they investigated the association between obesity and patient satisfaction. A patient satisfaction scale was based on 5 questions pertaining to patient satisfaction from the 2000 Medical Expenditure Panel survey. The authors found that obese adult patients actually have a significantly greater patient satisfaction with their healthcare providers than did normal weight patients. They postulated that this finding was due to poor self esteem and lowered expectations in obese patients.[18]One reason why we do not see a difference in patient satisfaction between our population of overweight/obese and healthy weight children may be that parents indeed are quite satisfied with their healthcare providers. They do not recognize that their children are obese, and if this is not perceived as a problem, then they do not feel that the healthcare provider is a good source for a solution. The lesson that can be gleaned from this study is that since parents have relatively high satisfaction levels with healthcare providers, these providers would be a great source for obesity counseling.

While our findings regarding obesity and healthcare quality using the 4 chosen quality indicators may not be statistically significant, some interesting results did emerge from this analysis. About one-third of the pediatric population in this nationally representative study is overweight or obese, as has been shown in similar studies. The significant difference in sex and age distribution is also to be noted, with males and the younger age group being more at risk for overweight/obesity. This supports the current trend, with increasing rates of obesity, the younger population is being affected, and the rates of the older age group is expected to catch up as the younger children grow up. The striking difference in race and poverty level distribution with regards to obesity supports previous studies showing disparities by race. Berry et al, showed significant racial and ethnic healthcare disparities in children with chronic diseases.[19] A study analyzing the 2008 NHANES data also shows racial and socio-economic disparities in obese children[8]. The finding that publicly insured children are more than twice as likely to be overweight/obese is also supported by previous studies. This would emphasize the importance of the re-authorization of CHIPPRA and the need for continued support continued funding for studies to improve

the quality of publicly insured programs. Considering that mothers with less than high school education are more than twice as likely to have obese or overweight children, educational programs starting in elementary school would be beneficial.

Study limitations: This analysis was conducted on a national dataset obtained from a self-reported survey. Hence all information obtained was self-reported without independent confirmation. Secondly, BMI was calculated from parental reports of weight and height, which may be inaccurate. BMI was also only calculated in children ages 10-17, hence analysis was limited to this age group. Some variables had significant numbers of missing values, such as poverty level and mother's education. Poverty level was a derived variable based on household income and total household members using the DHHS Federal Poverty level guidelines. Values were imputed, and many responses remained missing. The other significant limitation that must be mentioned is the assumption that healthcare providers are actually calculating and recording children's BMIs. If providers do not recognize that a patient is obese or overweight, they may not view it as a problem which needs to be addressed.

Conclusions

We must reject our study hypothesis and conclude that parental perceptions of the quality of healthcare received by overweight and obese children does not differ from the perceptions of healthy weight children. With similar satisfaction ratings by parents, healthcare providers are encouraged to take the time to implement obesity counseling sessions in the out-patient setting. Health insurance companies are also encouraged to reimburse healthcare providers adequately for time spent during these counseling sessions.

In addition to this, our study revealed that children who have public health insurance, are black or Hispanic or whose mothers who did not complete high school are at increased risk for being overweight/obese. Specific public health programs can be implemented to reduce the incidence of obesity in this population.

Further studies would need to be conducted to determine the impact of healthcare quality in overweight and obese children, and methods to improve quality with a goal of improving compliance to treatment regimen, and ultimately to reduce the incidence and prevalence of childhood obesity.

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Appendix

June 30, 2011

RE: Determination: No IRB Review Required

Title: Childhood Obesity and Parental Perception of Healthcare Quality

PI: Keji Akin-Olugbemi

Dear Dr. Akin-Olugbemi:

Thank you for requesting a determination from our office about the above-referenced project. Based on our review of the materials you provided, we have determined that it does not require IRB review because it does not meet the definition(s) of "research" involving "human subjects" or the definition of "clinical investigation" as set forth in Emory policies and procedures and federal rules, if applicable. Specifically, in this project, you will be conducting a secondary data analysis of de identified data sets.

This determination could be affected by substantive changes in the study design, subject populations, or identifiability of data. If the project changes in any substantive way, please contact our office for clarification.

Thank you for consulting the IRB.

Sincerely,

Andrea Goosen, MPH

Research Protocol Analyst

This letter has been digitally signed