

January 2014

The Impact Of Education On Obesity Among Blacks And Whites Living In New York City

Chelsea Andrea Doub
Yale University, chelsea.doub@yale.edu

Follow this and additional works at: <http://elischolar.library.yale.edu/ysphtdl>

Recommended Citation

Doub, Chelsea Andrea, "The Impact Of Education On Obesity Among Blacks And Whites Living In New York City" (2014). *Public Health Theses*. 1068.
<http://elischolar.library.yale.edu/ysphtdl/1068>

This Open Access Thesis is brought to you for free and open access by the School of Public Health at EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Public Health Theses by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.

The Impact of Education on Obesity among Blacks and Whites living in New York City

By: Chelsea Andréa Doub

Yale School of Public Health

Department : Social and Behavioral Sciences

A thesis submitted in partial fulfillment of the

requirements for the degree of

MASTER OF PUBLIC HEALTH

Abstract

This analysis examines the role of both race and ethnicity in obesity among residents of New York City. An increase in educational attainment is typically associated with lower Body Mass Index (BMI). The primary research question looks at whether the protective effect of education on obesity is equivalent among Blacks and Whites living in New York City. Predicted probabilities of the rate changes across educational gradients and race/ethnic groups were calculated using data from the 2012 Community Health Survey, a telephone survey conducted annually by the New York City Department of Health and Mental Hygiene (DOHMH). Logistic regression and predicted probabilities confirmed the primary and secondary hypotheses that increased education leads to lower rates of obesity among both Blacks and Whites, but the effect differs between the two.

Introduction

Obesity is strongly associated in the United States with Cardiovascular Disease, Type 2 Diabetes Mellitus, various forms of cancer, and an overall increased risk of mortalityⁱ. Within the United States, the prevalence of obesity also has been strongly associated with increased healthcare costs, reduced quality of life, and increased risk for premature death, and is, thus, a primary public health challenge. *Healthy People 2010* proposed the goal of reducing obesity among adults by 15%; as of 2007, no state had met the objectiveⁱⁱ. Additionally, The Kaiser Family Foundation found in 2012, the prevalence of overweight and obese adults was 62.5% for non-Hispanic Whites, and 71.7% for non-Hispanic Blacksⁱⁱⁱ.

These startling statistics leave room for what important factors may play into combatting the prevalence of obesity in the United States, and what the United States is able to do for persons falling victim to these disparate outcomes. Obesity continues to be a very large problem for Americans, and the need to break down where the gaps may lie in addressing this difficulty is more apparent than ever.

Health by gradients of education have frequently been a topic of research, with outcomes varying at different age levels and across race/ethnic groups. Overall, the differences between persons of higher levels of education as compared to those with lesser education staunchly favor persons of increased education, and there is a significant amount of data that supports this claim. For example the Robert Wood Johnson Foundation conducted a snapshot of health policy in December of 2012 and released their findings in their March 2013 issue brief^v. Figure 1 shows the comparison in life expectancy between college graduates versus high school graduates for both men and women. On average, college graduates live five years longer than persons who never finished high school. Figure 2 is an infographic from their findings that shows the impact of an additional four years of education on various health outcomes of which there is a 5% decrease in the risk of being overweight.

Figure 1. Expected lifespan in men and women with respect to race

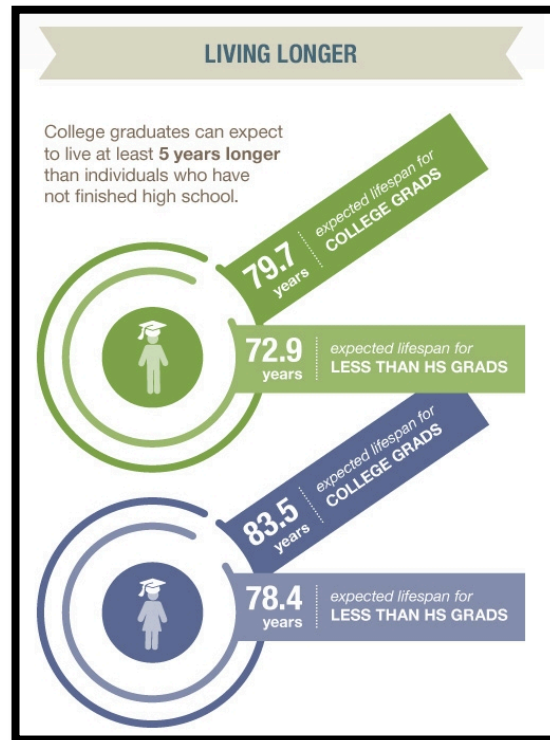
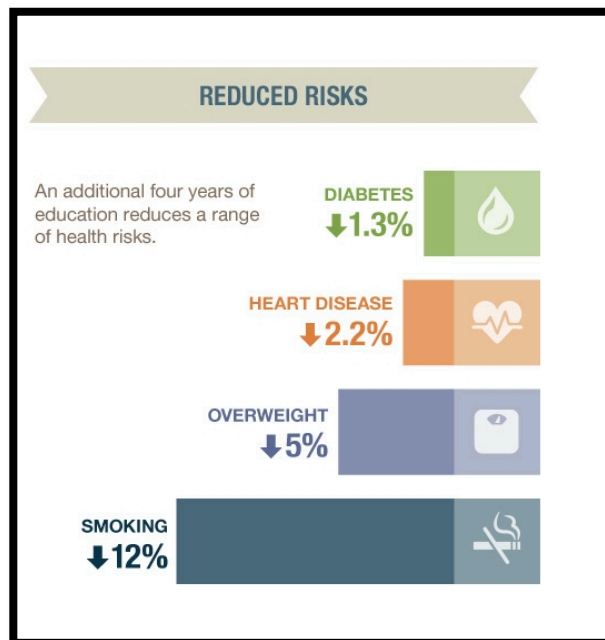


Figure 2. Health risk reduction with respect to education



Those statistics are vital in this conversation and in comprehending the *what* in the physical outcomes question of education on health. The bigger question is *why* education impacts health, and this is where the complexity begins.

Cutler et al. dig deeply into this narrative by investigating the facts and the theories linking health and education to better understand the relativity. More specifically, the authors provide different mechanisms linking education to health, of which are: income and access to health care, goal-setting, and cognitive skill development^v. Similarly, Ross and Wu examined reasoning for health and education association based on three categories: (1) work and economic conditions, (2) social-psychological resources, and (3) health lifestyle. They found that education is highly and positively correlated with two measures cross-sectionally over time: self-reported health and physical functioning. In addition, they found that after adjusting for economic conditions, social-psychological resources, and health lifestyle, education persisted as being significantly associated with better health^{xi}.

While we know education is vital to health and longevity in the United States, there is some research that suggests not every group benefits from education equally. In particular, the Coronary Artery Risk Development in Young Adults Study (CARDIA) looked specifically at longitudinal trends in body size across age, race, gender and education groups among their study subjects. It found that weight gain was considerably greater among participants with a high school education or less at baseline, except for Black males. That pattern continued after adjustment for

baseline age and height differences, and provided evidence suggesting that education is less significant among Blacks males.^{vi}

Notably, the impact of education on health, by race in the United States is not solely evident in studies involving weight gain or obesity. Gage et al. found the racial disparity in infant mortality rates actually increased by maternal education, which has been found in a number of different studies^{vii}. Therefore, the increase in education levels among mothers widens the disparity gap of birth outcomes between Blacks and Whites, and Blacks women are not benefitting from educational levels in the same way that White women are. A plausible explanation for this may be the underlying effects of racial discrimination that negatively affect outcomes persist among Black women with higher levels of education. Collins et al. dug deeper into this finding and looked specifically at how African American women's experiences with interpersonal racial discrimination across the lifespan may negatively affect pregnancy outcomes. Their findings among the 104 African American women in Chicago adds to the growing evidence that women who delivered very-low birthweight, preterm infants were more likely to report more interpersonal racial discrimination throughout their life than women who delivered normal birthweight infants at term, and maternal reported lifetime exposure to interpersonal racism was strongest among college-educated women.^{viii}

Similarly as race and discrimination may negatively affect birth outcomes, a comparable effect may occur with obesity. Burke et al. stated "Prior work by other

investigators suggest that behavioral and attitudinal differences may exist between White and Black women. Black women may have less negative social pressure pertaining to obesity than White women. Environmental factors, such as barriers to dieting and physical activity, may also play a role in mediating this effect.”

In relation to Collins’ findings on discrimination, we suggest that the overall experience of being Black in the United States may have influences on health that can be countered through educational attainment. Within this claim, we take the perspective that race itself is a measure of an individual’s experiences. Elaborating on that concept, Arline Geronimus (2000) says race is, “A set of social relationships between majority and minority populations that have been institutionalized over time, that privilege the majority population, and that are prior to the poverty that is associated with race.” This conception of race raises awareness of that fact that we need to be mindful of how measures of class such as education are experienced among different groups of people.

One example of how race may affect experiential differences lies within the knowledge and concepts of discrimination and shared individual experiences that transfer across race/ethnic groups. Jay Pearson looks broadly at this topic in his article “Can’t Buy Me Whiteness”. He elaborates on how the restriction of study conclusions to that of solely White populations can negatively affect how researchers and the broader community understand the relationship between socioeconomic status and health. He further states, “frameworks and models based

on traditional socioeconomic measures may mask heterogeneity, overestimate the benefits of material resources, underestimate psychosocial and physical health costs of resource acquisition for some groups, and overlook the value of alternative sociocultural orientations.^{ix}”

He further explains how race is truly a set of social relationships that privilege one group over the other. Minority communities plagued with low wages ultimately result in limited access to social services like public education, health care, and recreational facilities, all of which directly impact health and wellness^x. These forms of discrimination that are often experienced by Blacks in the United States are multi-dimensional, and include elements that can impact a race psychologically, contributing to psychiatric illnesses, drug addiction, violence, and hypertension; all of these elements can be experienced even by collegiate educated Blacks and Whites, and thus, negatively impacting their health.

As one of the nation’s most extraordinary metropolitan areas, New York City is a prime example of how health disparities can potentially take a toll on the lives of some of the nation’s most impoverished communities. This analysis explores data collected via the New York City Department of Health’s 2012 Community Health Survey to examine obesity as it relates to education among Blacks and Whites in New York City, and how racial categorization potentially undermines the unspoken effects of discrimination on a person’s health.

In cities such as these, access to quality education, or even higher levels of education by themselves, have proven to be beneficial among minority groups and their overall health, but may not fully solve the riddle in health equity. Over the past decade, the New York City Department of Health has placed a significant emphasis on improving the health of New Yorkers with many campaigns and policies surrounding obesity. However, one gap in the conversation that is widely known to directly impact the health of persons across the globe is education. As related to socio-economic status, education is vital to a person's position within the stratification system, molds the likelihood of being unemployed, the type of job a person can get, as well as income.^{xi} All of these are particularly important to minority communities in New York City that have found themselves stuck in a cycle of poverty and adverse health outcomes for generations.

Although there is a significant amount of research that examines health and obesity among race/ethnic groups across the nation and within different data sources, there are few that address education as related to obesity within large, metropolitan areas. With that said, the primary research question looks at whether the protective effect of education on obesity is equivalent among Blacks and Whites living in New York City.

Methods

The prevalence of obese persons in New York City was calculated using data from the 2012 Community Health Survey^{xii}, a telephone survey conducted annually by the DOHMH, Bureau of Epidemiology Services. The two main variables of interest, race/ethnicity and education, were self-reported by participants of the 2012 survey. The Community Health Survey is a cross-sectional, telephone survey with an annual sample of roughly 8,400 randomly selected adults ages 18 and older from each of the five New York City boroughs (Bronx, Brooklyn, Manhattan, Queens, and Staten Island). A computer-assisted telephone interviewing system was utilized to gather survey data from landline and cellular telephones. The interviews for this self-reported survey were conducted in English, Spanish, Russian, and Chinese (Mandarin and Cantonese).

Data Analysis

Statistical analyses were performed using SAS 9.4 Software (version 9.4, SAS Institute, Cary, NC) and Microsoft Excel. In this retrospective analysis, seven main variables were used from the Community Health survey. The variable for BMI was divided into three categories: underweight/normal weight (BMI <25), overweight (25</= BMI <30), and obese (30 </= BMI </= 100). The four categories for education were 'Less than high school', 'High school graduate', 'Some College', and 'College graduate'. All five boroughs were used in the analysis, as well as the following age groups: 18-24 , 25-44, 45-64, and 65+. Both males and females were

included. The race/ethnic categories were: White/ non-Hispanic; Black/ non-Hispanic; Hispanic; Asian/PI/ non-Hispanic; and Other.

Logistic regression, chi-square and predicted probability analyses were used to assess the primary independent variables' (race and education) relationship with obesity. Each of the variables were transformed into dummy variables and recoded. Under/Normal Weight, Less than High School, Staten Island, White/ Non-Hispanic, Male, and 18-24 years were all used as the references among their respective categories.

Table 1 below shows the survey variables with their means by obesity. In looking at education, an average of nearly 50% of White persons had a college education and were obese, while only an average of 27% of Blacks had at college education and were obese at the time of the survey. An average of 6% of Whites with less than a High School education participated in the survey and were obese, while 16% of Blacks with a less than a High School education participated in the survey and were obese at the time the survey was administered.

Table 1. Survey variables means by obesity

	Whites (n= 3,627)	Blacks (n=2,002)
	Means	Means
Education	3.165	2.653
Less than HS	0.064	0.158
HS Grad	0.206	0.296
Some College	0.232	0.282
College Grad	0.498	0.265
Sex	1.501	1.750
Male	0.499	0.250
Female	0.501	0.750
Borough	3.277	2.508
Staten Island	0.048	0.207
Bronx	0.272	0.359
Brooklyn	0.231	0.191
Manhattan	0.250	0.205
Queens	0.198	0.038
Age	3.166	2.835
18-24	0.014	0.028
25-44	0.157	0.318
45-64	0.478	0.444
65+	0.351	0.209

Results

The first research question relates directly to education and how that variable is associated with obesity across New York City. When examining the rates purely based on percentages through the New York City Department of Health’s EpiQuery tool, there are clear differences in the educational gradients. Figure 3 below demonstrates how education can play a remarkable role in obesity for New Yorkers. In looking specifically at race/ethnicity, Figure 4 below demonstrates the gradual linear decline among obese Whites as education increases. However, in looking at Blacks in Figure 4, there is a slight trend in decreasing rates of obesity, but not to the same apparent degree as Whites.

Figure 3. Obesity and Education in NYC

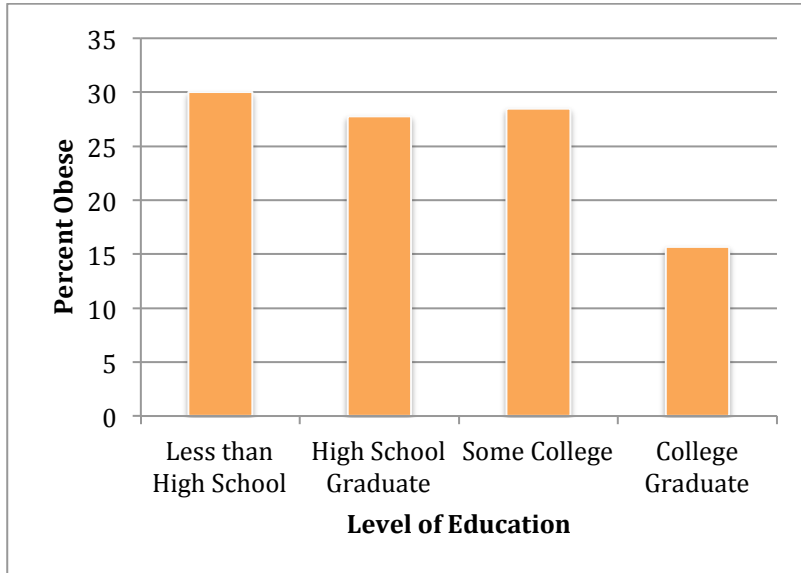
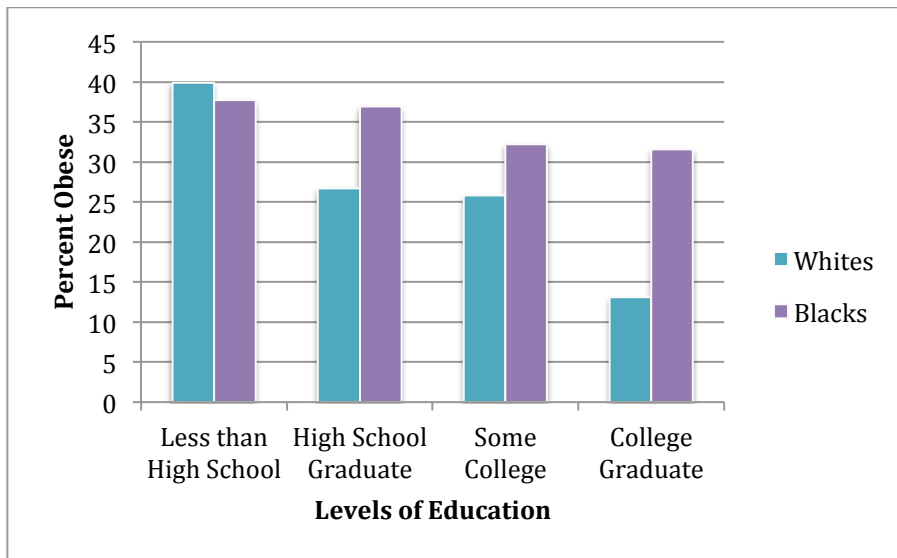


Figure 4. Unadjusted Association of Obesity and Education in NYC by Race/Ethnicity



In looking specifically at the unadjusted associations between the study variables in Table 2 and how they related to obesity, all categories maintained a chi-square p-value of less than <0.0001 , making each of them highly statistically significant. Within the education category, “Less than high school” had the highest

percentage of persons who were obese, and the borough with the highest percentage of obese persons was the Bronx, followed by Brooklyn. Additionally, Blacks had the highest percentage of obese persons among the race/ethnicity variable.

Table 2.
Unadjusted associations between study variables and obesity

Characteristic	N*	% Obese	p [†]
Education			<.0001
Less than HS	1344	34.1	
HS Graduate	1816	29.7	
Some college/technical school	1768	29.9	
College Graduate	3694	17.7	
Sex			<.0001
Male	3562	21.3	
Female	5094	27.9	
Borough			<.0001
Bronx	1284	33.5	
Brooklyn	2179	28.9	
Mahattan	2618	17.8	
Queens	969	23.8	
Staten Island	606	31.0	
Race/ethnicity			<.0001
White, Non-Hispanic	3585	18.4	
Black, Non-Hispanic	1963	36.5	
Hispanic	2155	32.3	
Asian/PI, non-Hispanic	794	8.4	
Age			<.0001
18-24	471	16.4	
25-44	2533	23.9	
45-64	3303	28.5	
65+	2336	23.9	

*Numbers may not sum to total due to missing data

†P-value for x² test

Table 3 and Table 4 below shows the stratified, adjusted odds ratios analyses for Whites and Blacks.

Table 3.
Odds Ratio- Whites

Effect	Point Estimate	95% Confidence Limits
HS Graduate	0.61	0.39 – 0.94
Some College/Technical School	0.60	0.39– 0.93
College Graduate	0.37	0.24– 0.56
25-44	1.67	0.80 – 3.48
45-64	3.26	1.60 – 6.66
65+	2.50	1.22 – 5.13
Brooklyn	0.81	0.61 – 1.06
Bronx	0.59	0.38 – 0.92
Manhattan	0.32	0.24 – 0.42
Queens	0.63	0.48 – 0.83
Female	0.79	0.66 – 0.94

Table 4.
Odds Ratio- Blacks

Effect	Point Estimate	95% Confidence Limits
HS Graduate	0.94	0.69 – 1.27
Some College/Technical School	0.93	0.69 – 1.26
College Graduate	0.66	0.48 – 0.89
25-44	2.87	1.72 – 4.80
45-64	3.63	2.18 – 6.02
65+	2.74	1.61 – 4.65
Brooklyn	0.92	0.55 – 1.55
Bronx	1.05	0.61 – 1.80
Manhattan	0.95	0.55 – 1.63
Queens	0.85	0.50 – 1.45
Female	1.78	1.44 – 2.19

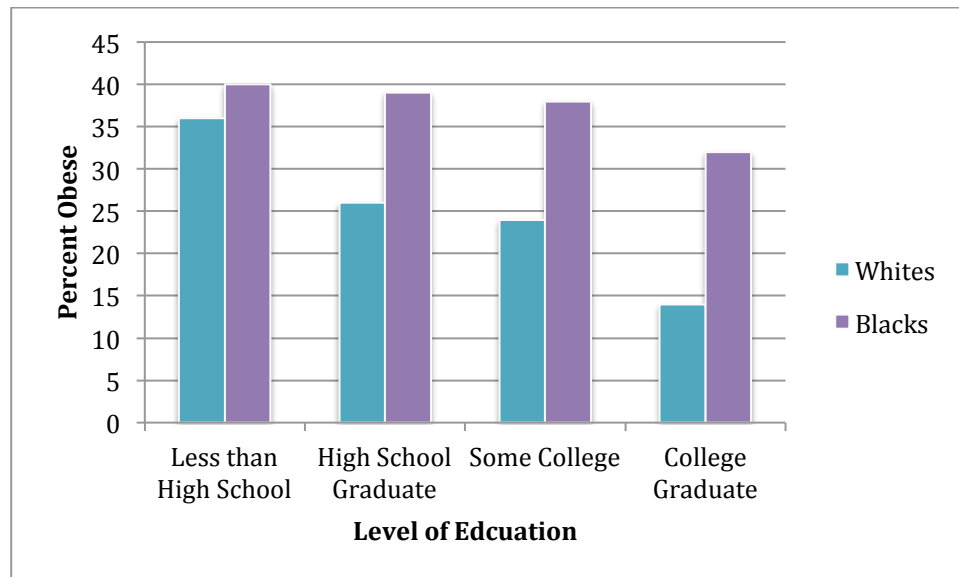
In Table 5 and Figure 5 below are the predicted probabilities of obesity for Blacks and Whites according to education gradients. It is evident, similar to Figure 3, that education plays a major role in decreasing rates of obesity. For Whites, in

comparing “Less than High School” to “College Graduate”, there is a 22% difference in mean predicted probability of obesity, and an 8% mean predicted probability difference in obesity for Blacks.

Table 5. Predicted Probability

	White, Non-Hispanic	Black, Non-Hispanic
Less than HS	0.36	0.40
HS Graduate	0.26	0.39
Some HS/Technical School	0.24	0.38
College Graduate	0.14	0.32

Figure 5. Unadjusted Association of Obesity and Education in NYC by Race/Ethnicity



Discussion

Based on the results of the predicted probability analysis in Figure 4, education is highly correlated with obesity among Blacks and Whites in New York City. Table 5 details the differences in predicted probability for each category. With

“Less than High School Education” as the reference category, Whites demonstrated a 22% difference in probability of being obese between the “High School Graduate” and “College Graduate” categories; for Blacks, there was only an 8% difference. Although Blacks are attaining this higher level of education, there remain unanswered questions of causal influence negatively impacting health. For example, persons living in New York City, in particular, may have difficulty accomplishing social mobility and overcoming racial experiences that can both positively and negatively impact a person’s health. In addition, New York City is known across the world for being extremely diverse, which may be another factor in looking at how racial experiences are different and disparate among the various cultures of the five boroughs.

The overarching takeaway from Figure 5 is the fact that obesity still remains significantly higher among collegiate educated Blacks as compared to Whites. The achievement gap seems to have been narrowed to a degree, but obesity continues to remain an issue among this population. Our argument for this finding rests in the fact that race is more of an experience than a simple pigment of one’s skin. The results have shed light how obesity is numerically related to education, but the gaps in these findings leave room for precisely why education cannot simply address this health disparity by race.

Outside researchers may only attribute this health disparity by race to things such as genetics or historical events; however, we believe there are many plausible

reasons as to why racism plays an impartial role in these differences. In addressing the effects of residential segregation and stress from structural racism, there is strong need to broaden the scope of measuring disparities and applying life-course perspective into the conversation in research. These differences are not only apparent in low-income communities, but even among minority populations of higher income and socioeconomic status, as well^{xiii}.

Education has a multitude of socio-economic outcomes associated with its attainment that influence health disparities. And, because of its importance as a determinant of overall lifestyle, graphs like Figure 5 are evidence as to why it is so vital to study race/ethnic differences within communities in order to effectively mitigate health disparities as whole.

Limitations

There are a few limitations of this research analysis that should be addressed. First, this analysis only looks at race and education, and how they both can predict obesity in a large, metropolitan area. Looking at education is important, but there are many factors that determine obesity, particularly for Blacks, that involve *quality* of education, economic security, residential segregation, and even healthcare^{xiv}. However, even when all of those factors come into play, there are other elements involving historical experiences and perceived racial experiences that can negatively affect a person's health outcomes.

Also, the data do not disaggregate by origin, such that the experience of Black Americans whose ancestry dates back to American slavery are often times not the same as that of Black immigrants.

Lastly, the Community Health Survey is an annual telephone-conducted survey by the New York City Department of Health and Mental Hygiene. The self-reporting of weight in determining BMI may have caused some discrepancies in the data that could have led to reporting bias. Persons who were of higher BMI may not have accurately reported their weight or underestimated their weight at the time that the survey was administered, and this has been a consistent pattern of weight reporting bias in research studies over time^{xv}.

Conclusion

Obesity is highly correlated with education among Blacks and Whites, but there are large differences in how this effect exhibits itself within the two race categories. Addressing overall life experiences and additional structural components may aid in combatting the issue of obesity within the Black community, as opposed to looking at race and education as single factors.

References

- ⁱ Fryer, Jr. G. E. Neighborhoods And Obesity In New York City. *Health & Place*, 16, 489-499.
- ⁱⁱ Differences in Prevalence of Obesity Among Black, White, and Hispanic Adults – United States. *MMWR - Weekly CDC*, 58, 740-744
- ⁱⁱⁱ Overweight and Obesity Rates for Adults by Race/Ethnicity. (2012). *Overweight and Obesity Rates for Adults by Race/Ethnicity*. Retrieved from <http://kff.org/other/state-indicator/adult-overweightobesity-rate-by-re>
- ^{iv} Why does education matter so much to health?. (2013, March 1). *Public Health and Prevention: Health Policy Snapshot* . Retrieved from http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2012/rwjf403347
- ^v Cutler, D., & Lleras-Muney, A. Education and Health: Evaluating Theories and Evidence. *The National Bureau of Economic Research*.
- ^{vi} Sidney, S., Wagenknecht, L., Folsom, A., Hilner, J., Bild, D., & Burke, G. Differences in weight gain in relation to race, gender, age and education in young adults: The CARDIA study. *Ethnicity & Health*, 1, 327-335.
- ^{vii} Gage, T., Fang, F., O'Neill, E., & DiRienzo, G. Maternal Education, Birthweight, and Infant Mortality in the United States. *Population Association of America 2012*, 615-635.
- ^{viii} Andes, S., Wall, S., Handler, A., David, R., & Collins, J. Very Low Birthweight In African American Infants: The Role Of Maternal Exposure To Interpersonal Racial Discrimination. *American Journal of Public Health*, 94, 2132-2138.
- ^{ix} Pearson, J. A. Can't Buy Me Whiteness. *Du Bois Review: Social Science Research on Race*, 5, 27.
- ^x Cooper, R. S. Health and the social status of blacks in the United States. *Annals of Epidemiology*, 3, 137-144.
- ^{xi} Wu, C., & Ross, C. The Links Between Education and Health. *American Sociological Review*, 60, 719-745.
- ^{xii} NYC Department of Health and Mental Hygiene: Division of Epidemiology. *Community Health Survey 2012*.
- ^{xiii} Borrell, L. N., & White, K. Racial/ethnic residential segregation: Framing the context of health risk and health disparities. *Health & Place*, 17, 438-448.
- ^{xiv} Hayward, M., Crimmins, E. Miles, T., & Yang, Y. The Significance of Socioeconomic Status in Explain the Racial Gap in Chronic Health Conditions. *American Sociological Review*, 65, 910-930.
- ^{xv} Sturm, R., & Hattori, A. The obesity epidemic and changes in self-report biases in BMI. *Obesity*, 21, 856-860.