Socioeconomic Determinants of Childhood Obesity in the HRSA Region IX

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Abstract

Research Question:
How do socioeconomic determinants of health within the HRSA Region IX in the United States lead to increased rates of childhood obesity within these communities?

Background:
The prevalence of obesity is increasing in recent years, specifically in adolescents (10-17yrs) (13). Being overweight in this critical growth phase has been linked to long-term health complications such as diabetes, cardiovascular diseases, cancers, and increased mortality rates (2). Obesity can further have effects beyond the health of the body, such as in the child's behavior, school performance, and overall mental well-being (3). It is known that increased consumption of highly fatty and sugary foods has been linked to increased risks of obesity in the human population. Obesity is generally attributed to an imbalance between intake and output, where intake exceeds output, which results in excess calories being stored as fat within the body. However, little is known about the relationships of household income level, parental nativity, race/ethnicity, and education of adults in households on the prevalence of obesity in children. This aspect of obesity is critical to its understanding and progression because it provides a holistic perspective on the problem.

Method:
This study will collect data from national children's health public surveys conducted by the National Survey of Children's Health, Health Resources and Services Administration, and Maternal and Child Health Bureau between 2020 and 2021 (20). This research will primarily focus on the HRSA Region IX and will look at the different subgroups within this study population. This organization provides extensive data on the study population within the time frame of 2020- 2021. It will identify relationships between childhood obesity and socioeconomic determinants of health, such as household income level, parental nativity, race/ethnicity, and the highest education of adults in a household. This research will analyze the association between the variables to identify potential factors affecting obesity.

Hypothesis:
Lower income levels reduce the accessibility of nutritious food for children and cause families to resort to cheaper alternatives (19). Such cheaper alternatives are often higher in saturated fats and are more processed than their counterparts (19). For example, fast food often is cheaper but is more processed and contains more saturated fats than healthier alternatives. Further, underserved communities may have difficulty accessing fresh sources of food. The lower education level of the adult in the household may also adversely affect obesity rates among adolescents due to an overall lack of awareness about the consequences of eating habits on one's health. Data on the relationship between income levels, education, parental nativity, and race/ethnicity and obesity rates helps understand the underlying patterns observed in these communities. This study hypothesizes that lower income levels, as well as education levels,

contribute to higher rates of obesity in underserved communities. Further, this study predicts race/ethnicity and parental nativity will also show an association with higher obesity rates.

Results/Conclusion:
Based on the results of this study, an association between income level, education, race/ethnicity, and the number of children in the overweight and obese category was seen. However, no association was seen between parental nativity and obesity rates. This was determined using the data gathered from the National Survey of Children's Health, Health Resources and Services Administration, and Maternal and Child Health Bureau between 2020 and 2021(20). Additionally, statistical analysis was done to analyze the association between socioeconomic factors of childhood obesity and obesity numbers within the subject population.

Introduction

Prevalence of childhood obesity has increased dramatically in recent years with 16% of the children ages 6-19 suffering from obesity in 1999-2000 and just 11 percent in the years of 1988-94 (13). This shows a 45 percent increase in the incidence of childhood obesity (13). Today, 19.7% or 14.7 million of the children suffer from obesity in the United States (14). Obesity is the leading cause of severe long-term health concerns such as heart disease, diabetes, sleep apnea, high blood pressure, and stroke (5). Extensive research exists on the long-term consequences of obesity. However, little is known about the external socioeconomic factors that lead to increased rates of obesity, specifically in the HRSA Region IX of the United States. Recognizing these factors and their influence on childhood obesity is critical in reducing its rates through public programs that direct resources to these communities.

Overweight and obesity are defined as excess fat accumulation within the body that threatens the body's overall health. Within this context, BMI (Body Mass Index) often serves as a critical determinant of the health of a body. BMI is calculated by dividing the body mass by the square of the body height (10). Overweight is defined by a BMI greater than 25, while obesity is above 30 (26). Although BMI does not account for body composition (e.g. muscle, bone mass, fat distribution), it is widely accepted to estimate total body fat. However, BMI is not indicated as a good measure of health by some due to its inability to calculate the fat distribution within the body and account for mass percentage of muscle and bone (22).

As most research in the field of obesity is done on the adult population, it is critical to understand how this research differs in children. Addressing obesity in childhood is critical to a long and healthy life as well as the improved health status of the overall community in the years to come. It is found that around 55% of obese children go on to still be obese in adolescence, and around 80% of obese adolescents will still be obese in adulthood (9). Thus, understanding the factors that contribute to childhood obesity may lessen the overall prevalence of obesity.

Socioeconomic determinants of health are the factors that surround a person and influence their health. Although many socioeconomic factors affect the rate of childhood obesity, this study will specifically look at household income level, highest education of adults in the household, race/ethnicity, and parental nativity. These factors are linked to lower economic stability within

the population and thus will help determine the prevalence of childhood obesity in these communities.

Methods

Data Availability:
This study used the National Survey of Children's Health, Health Resources and Services Administration, and Maternal and Child Health Bureau between 2020 and 2021(20). These surveys are representative of the national health of children (ages 0-17) living in all 50 states and the District of Columbia. However, data for weight is only provided for ages 10-17. The NSCH provides data on the intersecting aspects of a child's life that may impact their wellbeing, including their physical and mental health, access to quality health care, and the child's family, neighborhood, school, and social context. In 2020-2021, surveys were administered both online and by mail, with households randomly selected to receive an online survey link or a physical copy of the survey (20). Surveys were provided in both English and Spanish (27). Two reminder letters were sent to households to complete the online survey before a physical copy was sent out (27). Respondents were initially asked to complete an initial screening form to indicate the age and sex of all children. One child within the household was selected randomly to be the subject, and appropriate surveys were sent out according to the subject's age (27). In 2021, 45.4% of the subjects returned a completed or partially completed survey using the web or paper instrument (27). 90% of the sample received an unconditional $5 incentive for completing the survey at the time of the invitation (27).

Region:
The study examines the HRSA region IX, serving Arizona, California, Hawaii, Nevada, and the Pacific Islands (American Samoa, Federated States of Micronesia, Guam, Marshall Islands, Northern Mariana Islands and Palau) (11). This region was specifically chosen for the diversity in population and the availability of resources. The HRSA Region IX has people from many backgrounds, including Hispanic, Asian, White, and Black communities (19). This allows us to analyze the effect of ethnicity on obesity rates. The diversity index of the HRSA Region IX is greater than other comparable regions which may account for some of the findings relating to obesity rates as they relate to genetic predispositions (19). Further, this region has populations from different income levels spread throughout the landscape. This enables this research to analyze the effect of income level on obesity rates within specific communities (15).

Statistical analyses:
This study examines the different socioeconomic determinants of childhood obesity through an analysis. Associations between obesity rates and socioeconomic factors are investigated through statistical analyses. The chi-square test is done to understand the significance of the finding and establish associations between the variables investigated and obesity rates. Variables are individually assessed for their association to obesity rates within the community. The CHISQ.TEST function was used in the calculator to generate the p-value for the degrees of freedom for each data table. The generated chi-squared value was then compared to the 95 percent confidence interval to determine whether an association between the socioeconomic variable and the overweight/obese category data exists or not. Additionally, graphs were created

from each variable with error bars representing the percent errors presented by the National Children's Health Survey Data (20).

Variables:
The variables investigated in this study are household income level, highest education of adults in the household, race/ethnicity of child, and parental nativity. Data for these parameters is collected from the NSCH. Participants of the survey were categorized as either underweight (less than 5th percentile), average weight (5th to 84th percentile), overweight (85th to 84th percentile), and obese (95th percentile or above) (20). These are the same categories used by the Center for Disease Control to categorize the population (26). Data for this study was collected for the HRSA Region IX for 2020-2021. Parental surveys determined all variables for the subjects of the analysis.

Missing Data:
Some data may need to be more representative as the surveys were conducted during the national CoronaVirus Disease of 2019 (COVID-19). This may mean that the availability of data is limited for this study. Further, this data may misrepresent the reality of obesity and overweight rates present within the community because access to preventive care visits during the pandemic was largely limited. Further, economic stability was also affected by the COVID-19 pandemic, causing the surveys conducted by the NSCH to reflect this change (20).

Results

The data collected from this research is from the NSCH database for children between 10-17 years old. The distribution of weight categories differed based on the variable under investigation for each portion of the research study. The data made available by this database is representative of the approximately 25 million children between the age of 10-17 in the United States in 2020-2021 (20). This study investigates the percentage of obesity in terms of the different variables to establish an association between the variables and the occurrence of obesity in the population. For this study, it is best to rely on the percentage in each category to account for the subjects surveyed.

Household Income Level:
The total number of subjects surveyed for this variable was 4,988,937 (20). Household income data was compared to the weight distribution within the sample population in this survey. The percentage of the population that was obese was the greatest in the 100-199% FPL, or federal poverty level, category and the least in the 400% FPL and greater category (Table 2). For the overweight category, the greatest percentage was in the 100-199% FPL and the least in the 400% FPL and greater category (Table 2). Based on the chi-squared analysis for this variable, the p-value was 0.03250 when analyzing the distribution of overweight and obese categories. This p-value suggests an association between obesity rates and household income level in the subject population.

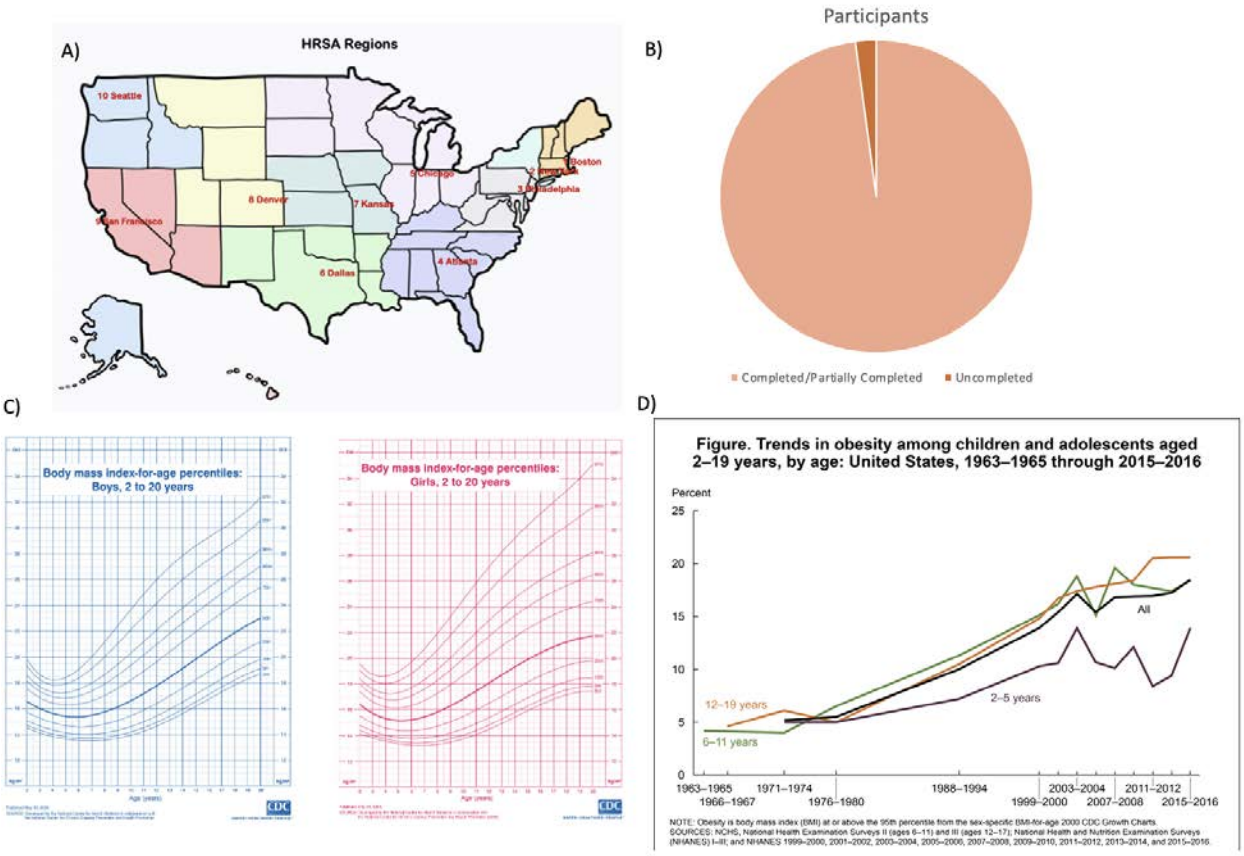
Highest Education of Adult in Household:

The total number of subjects surveyed for this variable was 4,988,934 (20). Highest education of adults in household data was compared to the weight distribution within the sample population in this survey. The percentage of the population that was obese was the greatest in the “less than high school education” category and the least in the “college degree or higher” category (Table 3). For the overweight category, the greatest percentage was in the “High school or GED” category and the least in the college degree or higher category. Based on the chi-squared analysis for this variable, the p-value was 0.00028 when analyzing the distribution of overweight and obese categories. This p-value suggests an association between obesity rates and education level in the subject population.

Race/Ethnicity of Child:
The total number of subjects surveyed for this variable was 4,988,839 (20). Race/Ethnicity of Child was compared to the weight distribution within the sample population in this survey. The percentage of the population that was obese was the greatest for the Hispanic population (18.5%) and the least for the Black, Non-Hispanic population (6.9%) (Table 4). For the overweight category, the greatest percentage was in the Hispanic population (24.3%) and the least in the other Non-Hispanic group (11.7%) (Table 4). Based on the chi-squared analysis for this variable, the p-value was 0.00003 when analyzing the distribution of overweight and obese categories. This p-value suggests an association between obesity rates and race/ethnicity of child in the subject population.

Parental Nativity:
The total number of subjects surveyed for this variable was 5,254,840 (20). Parental nativity was compared to the weight distribution within the sample population in this survey. The percentage of the population that was obese was the Children Born in the US, live with caregiver(s) other than parents category, and the least in the parent(s) born in the US category (Table 5). For the overweight category, the greatest percentage was in any parent born outside of the US category and the least in the children born in the US, living with caregiver(s) other than parents category (Table 5). Based on the chi-squared analysis for this variable, the p-value was 0.76441 when analyzing the distribution of overweight and obese categories. This p-value suggests a lack of association between obesity rates and parental nativity of children in the subject population.

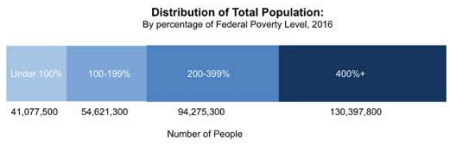
Figure 1



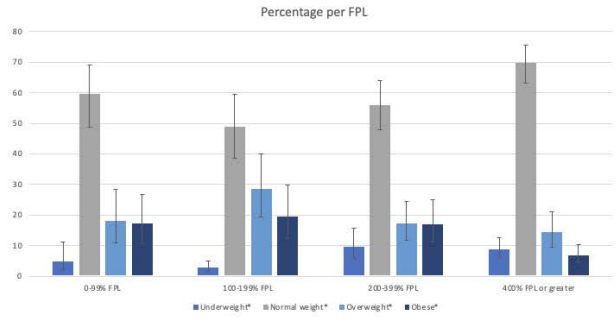
A) Visual representation of the different HRSA regions. This study focuses on HRSA region IX (San Francisco) (11)
B) Percentage of subjects that completed the National Health Survey that was used for this study (20)
C) Normal BMI range as determined by gender and age of child with x axis showing the BMI and y-axis the age of child (12)
D) Growth of obesity among children and adolescents aged 2-19 in the United States in different age groups with x-axis showing the date ranges and y-axis showing the percent obese in population (13)

Figure 2

A)



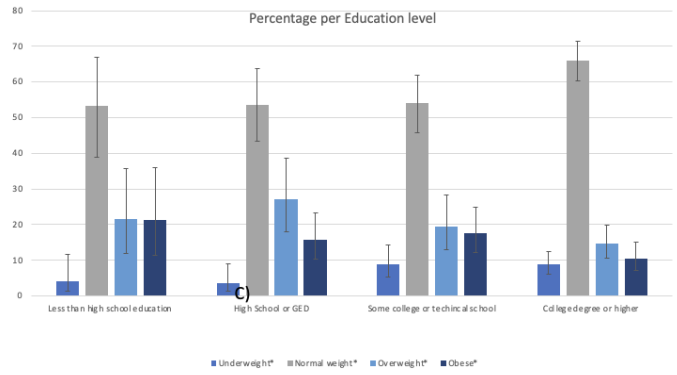
B)



A) The distribution of total population in the United states in 2016 that fall into each category of Federal Poverty Level (FPL), with the number of people in each category labelled (15)
B) Graphical representation of the the (NSCH) Data with error bars representing the possible error in the data collected.
Y-axis is for percentage of subjects that fall in each BMI category in relation to the FPL category as reported in the survey (22)

Figure 3

A)



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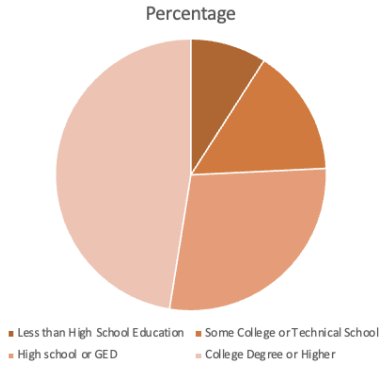
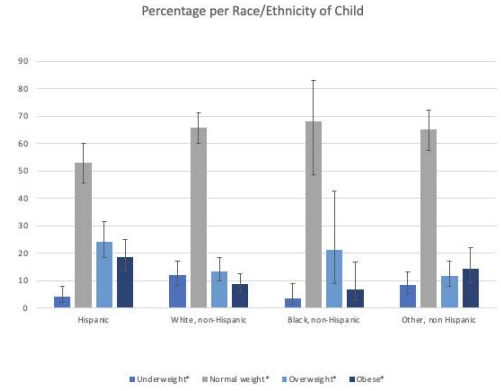


A) Graphical representation of the the (NSCH) Data with error bars representing the possible error in the data collected. Y-axis is for percentage of subjects that fall in each BMI category in relation to education categories as reported in the survey (22).
B) The percentage of the United States population that fall in each category of education level (17).

Figure 4

A)



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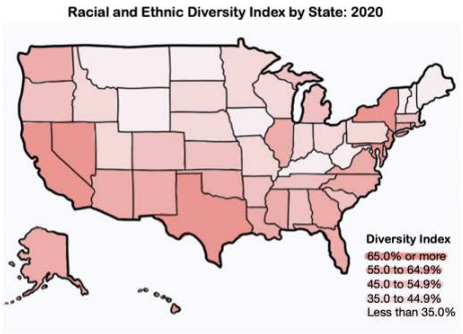
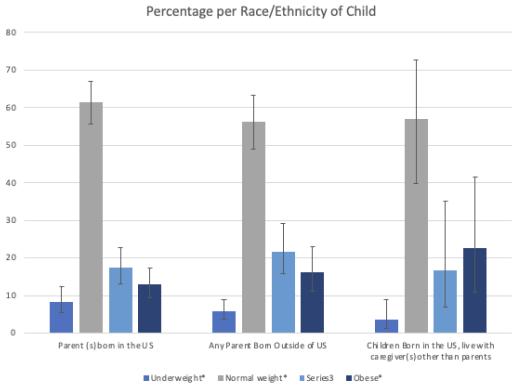


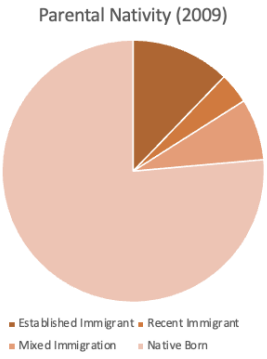
A) Graphical representation of the the (NSCH) Data with error bars representing the possible error in the data collected. Y-axis is for percentage of subjects that fall in each BMI category in relation to race/ethnicity of child as reported in the survey (22)
B) Map of the United States showing the Diversity Index by State. Diversity Index tells us the chance that two people chosen at random will be from different racial and ethnic groups (19).

Figure 5

A)



B)



A) Graphical representation of the the (NSCH) Data with error bars representing the possible error in the data collected. Y-axis is for percentage of subjects that fall in each BMI category in relation to the parental nativity as reported in the survey (22).
B) Parental Nativity of the overall population of the United States in the year 2009 as represented by a percentage of the whole population (24).

Table 1

Federal Poverty Level as based on the territory of residence and the number of people in the household (16).

# of People in Household	Mainland US States & Washington D.C	Alaksa	Hawaii
One	$12,880	$16,000	$14,820
Two	$17,420	$21,770	$20,040
Three	$21,960	$27,450	$25,260
Four	$26,500	$33,130	$30,480
Five	$31,040	$38,810	$35,700
Six	$35,580	$44,490	$40,920
Seven	$40,120	$50,170	$46,140
Eight	$44,660	$55,850	$51,360
For nine or more, add this amount for each additional person	$4,540	$5,680	$5,220

Table 2

National Survey of Children's Health (NSCH) Data that was used in this study, with different categories of FPL and the distribution of BMI in each category in relation to income level. Data for the age range of 10-17 in the HRSA Region IX with the subgroup of income level in the year of 2020-2021 (22).

Survey: 2020-2021 National Survey of Children's Health						
Region: HRSA Region IX						
Question: Obesity, age 10-17 years						
Sub Group: Household income level						
		Underweight*	**Normal weight***	**Overweight***	**Obese***	**Total %**
0-99% FPL	%	**4.9**	**59.7**	**18**	**17.4**	**100**
	C.I.	2.1-11.3	48.7-69.0	10.9-28.3	10.7-26.8	
	Sample Count	27	247	68	78	
	Population Est.	45,409	552,219	166,540	160,602	
100-199% FPL	%	**2.8**	**49**	**28.6**	**19.6**	**100**
	C.I.	1.6-5.0	38.7-59.4	19.3-40.1	12.3-29.7	
	Sample Count	32	316	86	93	
	Population Est.	32,629	565,203	330,225	225,555	
200-399% FPL	%	**9.6**	**56.1**	**17.2**	**17.1**	**100**
	C.I.	5.7-15.6	48.0-63.9	11.8-24.4	11.3-25.0	
	Sample Count	66	575	150	125	
	Population Est.	138,443	811,014	249,264	246,897	
400% FPL or greater	%	**8.8**	**69.8**	**14.5**	**6.9**	**100**
	C.I.	6.0-12.6	63.3-75.6	9.6-21.2	4.6-10.3	
	Sample Count	95	849	145	98	
	Population Est.	128,658	1,022,627	212,078	101,574	
Total		345,139	2,951,063	958,107	734,628	4,988,937

Table 3

National Survey of Children's Health (NSCH) Data that was used in this study, with different categories of education and the distribution of BMI in each category in relation to education level. Data for the age range of 10-17 in the HRSA Region IX with the subgroup of education in the year of 2020-2021 (22).

Survey: 2020-2021 National Survey of Children's Health						
Region: HRSA Region IX						
Question: Obesity, age 10-17 years						
Sub Group: Highest education of adult in household						
		Underweight*	**Normal weight***	**Overweight***	**Obese***	**Total %**
Less than high school education	%	**4**	**53.2**	**21.6**	**21.2**	**100**
	C.I.	1.3-11.6	39.0-66.9	12.0-35.8	11.4-36.0	
	Sample Count	8	74	19	26	
	Population Est.	35,596	470,069	190,904	187,000	
High School or GED	%	**3.6**	**53.6**	**27**	**15.8**	**100**
	C.I.	1.4-9.1	43.3-63.7	17.9-38.6	10.3-23.4	
	Sample Count	23	251	76	88	
	Population Est.	35,705	534,749	269,213	157,177	
Some college or techincal school	%	**8.8**	**54**	**19.5**	**17.7**	**100**
	C.I.	5.3-14.4	45.8-61.9	12.9-28.3	12.2-25.0	
	Sample Count	57	458	136	123	
	Population Est.	77,672	475,793	171,477	155,794	
College degree or higher	%	**8.8**	**66**	**14.7**	**10.5**	**100**
	C.I.	6.1-12.5	60.2-71.3	10.7-19.8	7.2-15.2	
	Sample Count	132	1,204	218	157	
	Population Est.	196,165	1,470,452	326,512	234,656	
Total		345,138	2,951,063	958,106	734,627	4,988,934

Table 4

National Survey of Children's Health (NSCH) Data that was used in this study, with different categories of race/ethnicity of child and the distribution of BMI in each category in relation to race/ethnicity of child. Data for the age range of 10-17 in the HRSA Region IX with the subgroup of race/ethnicity of child in the year of 2020-2021 (22).

Survey: 2020-2021 National Survey of Children's Health						
Region: HRSA Region IX						
Question: NOM 20: Obesity, age 10-17 years						
Sub Group: Race/Ethnicity of Child						
		Underweight*	**Normal weight***	**Overweight***	**Obese***	**Total %**
Hispanic	%	**4.2**	**53**	**24.3**	**18.5**	**100**
	C.I.	2.2-7.8	45.8-60.0	18.3-31.6	13.4-24.9	
	Sample Count	49	508	164	137	
	Population Est.	109,847	1,378,658	632,674	481,657	
White, non-Hispanic	%	**11.9**	**65.8**	**13.5**	**8.8**	**100**
	C.I.	8.2-17.0	60.0-71.3	9.9-18.1	6.1-12.4	
	Sample Count	84	674	121	96	
	Population Est.	154,849	858,901	175,860	114,649	
Black, non-Hispanic	%	**3.7**	**68.3**	**21.1**	**6.9**	**100**
	C.I.	1.4-9.1	48.7-83.0	8.8-42.7	2.7-16.7	
	Sample Count	7	62	16	14	
	Population Est.	9,019	167,726	51,960	17,003	
Other, non Hispanic	%	**8.5**	**65.3**	**11.7**	**14.5**	**100**
	C.I.	5.4-13.3	57.6-72.3	7.8-17.1	9.2-22.2	
	Sample Count	80	743	148	147	
	Population Est.	71,424	545,778	97,514	121,320	
Total		345,139	2,951,063	958,008	734,629	4,988,839

Table 5

National Survey of Children's Health (NSCH) Data that was used in this study, with different categories of race/ethnicity of child and the distribution of BMI in each category in relation to race/ethnicity of child. Data for the age range of 10-17 in the HRSA Region IX with the subgroup of race/ethnicity of child in the year of 2020-2021 (22).

Survey: 2020-2021 National Survey of Children's Health						
Region: HRSA Region IX						
Question: NOM 20: Obesity, age 10-17 years						
Sub Group: Parental Nativity						
		Underweight*	**Normal weight***	**Overweight***	**Obese***	**Total %**
Parent (s) born in the US	%	**8.3**	**61.4**	**17.4**	**12.9**	**100**
	C.I.	5.5-12.3	55.7-66.9	13.1-22.7	9.5-17.2	
	Sample Count	120	1,174	261	229	
	Population Est.	194,308	1,439,810	407,404	301,551	
Any Parent Born Outside of US	%	**5.8**	**56.3**	**21.7**	**16.2**	**100**
	C.I.	3.8-8.8	48.8-63.4	15.7-29.2	11.1-22.9	
	Sample Count	85	673	147	124	
	Population Est.	129,063	1,244,615	480,597	357,939	
Children Born in the US, live	%	**3.5**	**57.1**	**16.7**	**22.7**	**100**
with caregiver(s) other than	C.I.	1.3-9.0	39.8-72.8	6.9-35.1	10.8-41.5	
parents	Sample Count	11	89	33	34	
	Population Est.	10,954	176,681	441,744	70,174	
Total		334,325	2,861,106	1,329,745	729,664	5,254,840

Discussion:

Childhood Obesity is a prominent issue in the modern health system because of its effects on severe long-term health issues. Further, childhood obesity has recently risen in the United States, as shown in Figure 1.D. This study investigated the effect of socioeconomic determinants of childhood obesity within the HRSA Region IX (Figure 1. A) during 2020-2021. In this investigation, the variables of parental nativity, income level, education level of parents, and race/ethnicity of a child were investigated. This study specifically investigates these variables as they address the different socioeconomic aspects that affect children's development. Parental Nativity, education level, income level, and race/ethnicity may affect the rate of childhood obesity as they indirectly influence factors associated with childhood obesity.

By analyzing Table 2, it is seen that there is an association between the income level of subjects and the obesity rate. Qualification of Medi-cal is at 138%FPL, which means that people under this income level qualify for federal/state-funded insurance. The number of dependents and total household income determines the FPL category. The percentage of overweight subjects was the greatest in the 100-199% FPL category, and the rate of obesity was the greatest in the 100-199% FPL category—a chi-square analysis of the associations between income level and

obesity rates. A p-value of 0.03250 for the obese and overweight category was calculated for this socioeconomic factor. This p-value supports the hypothesis that there was an association between income level and obesity rates in the population understudy in the years 2020-2021.

Another socioeconomic variable that this study investigated was the highest education of adults in households and its relation to childhood obesity rates. As Table 3 shows, the rate of childhood obesity was the greatest in the college degree or higher category. For the overweight category, the most significant percentage of subjects were in the subgroup of the college degree or higher category as well. The chi-squared p-value was calculated as 0.00003 for the overweight and obese categories. This p-value supports the hypothesis that an association existed between the education level of adults in households and obesity rates in the population under study.

The following socioeconomic variable that this study investigated was the race/ethnicity of the child. Table 4 shows the most significant percentage of childhood obesity and overweight from the Hispanic category. A chi-square analysis was performed to see the association between obesity rates and the race/ethnicity of the child based on the data used in this study. The chi-squared p-value for the overweight and obese category was 0.00016. These p-values support the hypothesis that an association existed between the race/ethnicity of subjects and the rate of obesity.

This study also investigated the variable of parental nativity and its relation to childhood obesity rates. Table 5 shows the highest rate of obesity in the children born in the US who live with caregiver(s) other than the parents category. The highest percentage in the overweight category was in the subgroup of any parent born outside of the US. The p-value in the chi-square analysis for the obese and overweight category was 0.76441. This means that the hypothesis that there is an association between parental nativity and obesity rates is not supported by this analysis.

Thus, this study determined the strongest association between obesity rates and the socioeconomic variables of income level, race/ethnicity, and education level. Out of the socioeconomic determinants of childhood obesity investigated in this study, an association between obesity rates and education level, income level, and race/ethnicity was seen using the chi-squared analysis. Thus, these socioeconomic determinants influenced the rate of obesity and overweight in this study, as determined by the chi-squared analysis. This may be the case because these socioeconomic variables influence indirect factors that ultimately influence rates of childhood obesity. Income level affects the ability to afford nutritional foods, ultimately affecting obesity rates. Race/ethnicity may be linked to genetic predispositions for childhood obesity, and education level may be linked to the ability to make nutritional choices by this study's subjects.

Missing data/Shortcomings:
The data collected for this study may need to include some data as the years covered in this study is from 2020-2021. During this period, an international pandemic, COVID-19, was present. This made some of the data collected limited in scope. Response to the variable may also be limited due to a lack of resources during the national crisis, which delayed mailing and transportation services. Further, the National Health Survey used in this study does not consider

undocumented people who live in the HRSA Region IX. This means that some of the data gathered may be unrepresentative of the reality of obesity/overweight rates in the region. Additionally, other comparisons could be made with the data collected that may lead to other conclusions between these socioeconomic factors and obesity rates. For example, income level categories could be grouped together, leading to different associations between the variables.

Conclusion:

This study can be furthered by investigating other variables within the realm of socioeconomic determinants of childhood obesity and further grouping them into categories. This would be beneficial in establishing stronger associations between socioeconomic determinants and the rate of obesity within the population. Further, performing additional statistical analyses on the data gathered would also prove effective at establishing associations between these variables.

In this study, we sought to analyze the association between obesity rates and socioeconomic variables, particularly income level, parental nativity, race/ethnicity, and education level, in the HRSA Region IX. Data from the National Survey of Children's Survey was used for this study in 2020-2021. Understanding associations between socioeconomic variables and rates of childhood obesity is the first step in addressing the increasing rates of childhood obesity in the United States population. Understanding factors that affect obesity rates is an essential step in directing resources to address the issue of childhood obesity. Increasing access to nutritional foods is essential in this process, such as with state funded food banks, food stamps, and the CalFresh program, which provide low to no-cost nutritional food to families that qualify. Lower childhood obesity is essential in lowering the incidence rates of severe medical conditions in the future, such as heart disease, diabetes, and hypertension. Thus, understanding socioeconomic factors associated with childhood obesity is the first step in the call for a healthier population in the future and limiting costs associated with chronic diseases.

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