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Disparities in Childhood Obesity in Low Socioeconomic Status and Racial/Ethnic Populations: An analytical literature review

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ABSTRACT

Since childhood obesity is linked with an increased risk of obesity in adulthood, obesity in children and adolescence brings a multitude of adverse health outcomes including, but not limited to cardiovascular disease, sleep apnea, diabetes, some forms of cancer, hypertension, and death. This study focuses on analytical evaluation of disparities of childhood obesity in low socioeconomic status and racial/ethnic populations. The analytical review was conducted on the literature available online focusing five dimensions for the analysis is expressed in the following points: (1) What is evel of incidence of childhood obesity in the United States, (2) What is definition of childhood obesity? (3) What are the factors that impact obesity? (4) What is the appropriate theoretical framework for research on childhood obesity? (5) What are the knowledge gaps and the recommended future research? The prevalence of obesity in children and adolescents is very alarming and needs to be addressed because this health status, being overweight/obese, has a significant and unfavorable impact on not only the health of young Americans today but also the future health of young Americans. Using the percentile categories to determine childhood obesity, there are noteworthy differences when comparing obesity rates by race/ethnicity, gender, and socioeconomic status. There was no significant correlation between race/ethnicity and overweight/obese when controlling the income. When addressing disparities in childhood obesity it is important to understand not only the causes of obesity, but also other factors which may amplify the causes of obesity. Socioeconomic status during childhood, being male, white, has a high possibility of adiposity in adolescence. Exposure to media and marketing, the reduced access and availability of quality and affordable food products is an example of a factor that may amplify the cause of obesity.

Keywords: Childhood Obesity, Socioeconomic Status, Ethnic Population.

INTRODUCTION

Incidence of Childhood Obesity in the United States

Among the many public health concerns in the United States, childhood obesity is one of the most important. In the past three decades, the rate of obesity in children and adolescents living in the United States has increased exponentially – almost tripled since the 1970s. The prevalence of obesity is approximately 33% of school-aged children (Ogden, Caroll, Kit, &

Flegal, 2014). According to Hales, Caroll, Fryar, & Ogden (2017), in the United States, almost 1 in 5 school-age children and young people (age 6-19) are obese. The prevalence of obesity in children and adolescents is very alarming. A major reason why this public health concern needs to be addressed is the health risks associated with obesity.

Research has shown that childhood obesity is linked with an increased risk of obesity in adulthood. There is a 70% chance an individual will remain overweight or obese in adulthood if this individual was overweight as an adolescent (Freedman et al., 2005). Obesity in children and adolescence brings a multitude of adverse health outcomes including, but not limited to cardiovascular disease, sleep apnea, diabetes, some forms of cancer, hypertension, and death (Rogers et. al, 2015). Being overweight has a significant and unfavorable impact on not only the health of young Americans today, but also their future health. Hence, the importance of addressing the causes of obesity and finding solutions that will strengthen the fight against childhood obesity.

The ever-changing demographic of diversity in racial and ethnic groups in the United States is a factor to consider when studying public health concerns such as childhood obesity. The Federal Interagency Forum on Child and Family Statistics (2013) explains the changes that are occurring in the demographics of children in the United States:

There were 73.7 million children ages 0–17 in the United States in 2012, accounting for almost 24 percent of the population. Racial and ethnic diversity among America's children ages 0–17 continues to grow. By 2050, about half of the American population ages 0–17 is projected to be composed of children who are Hispanic, Asian, or of two or more races. Specifically, it is projected that 36 percent of the American population ages 0–17 will be Hispanic (up from 24 percent in 2012); 6 percent will be Asian (up from 5 percent in 2012); and 7 percent will be of two or more races (up from 4 percent in 2012) (p. vii).

In 2010, 18% of children were categorized under the weight status of obese, with higher rates found in Mexican Americans (23 %) and black (26%) children. In 2011, 22% of all children lived in poverty and more than half of the childhood population lived in substandard housing, which brings an increased risk of disease (Barr, 2014). The data mentioned above shines light to the fact that health disparities found in children are different based on the socioeconomic and racial/ethnic groups they belong to.

According to De Chesnay (2020), vulnerable populations "… are those with greater-than-average risk of developing health problems by virtue of their marginalized sociocultural status, their limited access to economic resources, or their personal characteristics, such as age and

gender…" (p.5). Based on the data discussed above and the definition of vulnerable population, the author is led to the conclusion that children in the United States belonging to minority/ethnic groups and low socioeconomic status are considered a vulnerable population. The author's first goal is to focus on the disparities and prevalence of childhood obesity among racial/ethnic minority and low socioeconomic populations. Second is to address the possible contributing factors that amplify the causes of obesity found in ethnic minority and low socioeconomic populations. The author will also discuss relevant studies and findings to address the objectives mentioned above. Lastly, to discuss knowledge gaps and future nursing research focusing on childhood obesity.

METHODS

The method of this research is an analytical review of pertinent literature in the Google Scholar and other databases available on the internet

RESULTS

Definition of obesity

It is important to first understand the definition and criteria used to determine childhood obesity. Obesity is described using the "…ratio of one's weight (measured in kilogram) to the square of one's height (measured in meters) …" (Barr, 2014, p. 162) which results in one's Body Mass Index (BMI). Unlike the division of BMI categories used for adults, children are categorized using a percentile ranking based on a BMI-for age growth chart separated by gender. (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2013). According to the CDC (2018), the child weight categories are divided based on the percentile categories listed below:

Weight Status	**Percentile Range**
Underweight	Less than the 5th percentile
Normal or Healthy Weight	5^{th} percentile to less than the 85th percentile
Overweight	85^{th} to less than the 95th percentile
Obese	95^{th} percentile or greater

Related studies and findings

Using the percentile categories above to determine childhood obesity, there are noteworthy differences when comparing obesity rates by race/ethnicity, gender, and socioeconomic status. According to the U.S. Department of Health and Human Services (2013), the population of children at highest risk to develop obesity are children ages 2-4 (pre-school) in low-income families. When looking at this vulnerable population nationally, rates of obesity is 11.9% in black and Asian children; 12.3% in white children; 17.9% in Hispanic children, and the highest rate of obesity was found among American Indian/Alaskan Native children – 20.7% (U.S. Department of Health and Human Services, 2013).

In a study conducted by Ogden, Caroll, Kit, & Flegal (2012), when comparing females ages 6-11, the rate of obesity for black girls is 1.7-2.8 times greater compared to the rate of obesity in white females. In the male population (ages 6-11), the rate of obesity in black males is 1.3 – 1.8 times more than the rate in white males. The sample used for this study were 4111 participants which was a representative sample of the United States child and adolescent population at the time of the study. According to the authors, the main limitation of this study is the rather small sample size that was based on two years of data collected by the National Health and Nutrition Examination (NHANES) survey which may not be adequate to detect alterations in the prevalence of obesity.

In 2015, Rogers et al. conducted a study on students in 68 Massachusetts school districts comparing the relationship between overweight/obese students with race/ethnicity and low-income rate. BMI data was collected from 111, 799 students in grades 1, 4, 7 and 10. The low-income status within this group of students ranged from 2.4% - 69.5% with an average of 32%. The findings of this study revealed a significant association between low-income status and obesity/overweight. When controlling for race/ethnicity (African American/Hispanic), Rogers et al. (2015) discovered that "For every 1 percentage point increase in low-income designation… there was a corresponding 1.17 percentage point increase in overweight/obese prevalence across the 68 districts…" (p. 692). There was no significant correlation between race/ethnicity and overweight/obese, when controlling the income. This finding led the authors of this study to suggest that low socioeconomic status has a more consequential impact in the childhood obesity epidemic when compared to the role of race/ethnicity. It is important to keep in mind that a limitation to this study is using data from a specific geographic location. A subsequent study that would include a more nationally representative sample is worthy of further pursuit.

In another study, Kendzor, O Caughy, and Owen (2012) used data from 1991-2007 from 10 sites across the United States and conducted a latent class growth analysis (LCGA) to identify family income from birth up to the age of 15 in 1356 participants. Anthropometric measures were taken (BMI, waist circumference, skinfold thickness) to determine if the measures differed by income trajectory. Other independent variables such as race/ ethnicity and gender were included. The income trajectory for body mass index (BMI) indicated that individuals with either stable or unstable low income had significantly higher BMI percentile compared to individuals with either stable or unstable adequate income. The income trajectory and waist circumference also indicated that individuals with either stable or unstable low income had significantly higher BMI percentile compared to individuals with either stable or unstable adequate income.

Lastly, the income trajectory and skinfold thickness indicated that skinfold thickness values for stable low income were significantly greater than individuals with stable adequate income.

Income trajectory and BMI, waist circumference, and skinfold thickness, gender or race/ethnicity did not significantly interact with income trajectory. The results indicate that stable low income and unstable to low income were associated with significantly greater anthropometric measures (BMI percentile, waist circumference, skinfold thickness) than the more advantaged trajectories. Results also showed that "…trajectories that ended with a higher proportion of children in low-income families showed greater adiposity at age 15." (Kendzor, O Caughy, and Owen, 2012, p.8). These findings suggest that socioeconomic status during childhood has a high possibility of adiposity in adolescence and promoting increasing socioeconomic growth within disadvantaged families may have a positive impact on obesity-related outcomes in adolescence.

Kendzor, O Caughy, and Owen's (2012) study added to the existing knowledge of how socioeconomic status is interrelated with obesity in adolescents. The results of this study may have influential policy implications such as providing funding to increase the opportunities of economically disadvantaged parents to participate in job training to compete for higher paying jobs. Thus, improving their socioeconomic status. Limitations to this particular study is excluding the psychological, environmental, and behavioral factors linked to economic disadvantages that may have an effect on obesity in the population studied.

A study conducted by Moss & Yeaton (2011) was to examine relationships between weight status changes and demographic variables (weight, sex, race/ethnicity, socioeconomic status, and demographic location) in children 9 months and 2 years of age. The subjects of this test

were a national representative estimate of at-risk and obese children born in 2011. Out of the five demographic variables measure only three were significant predictors of changes in weight status: sex, race/ethnicity, and socioeconomic status. Results of the study indicated males were more likely than females to have weight status change, whites were more likely than Asian Pacific Islanders to have weight status gain, and children with low socioeconomic status were more likely to have weight status gain.

This longitudinal study (Moss & Yeaton, 2011) is among the first to measure changes in weight status from infancy to toddlerhood using a rigorous sampling design that was a representative sample of children in the United States. Although the findings of this study contributed to the knowledge of risk factors that are associated with obesity in the infant and toddler population, there were several limitations to this study. Moss and Yeaton (2011) did not include other variables that may potentially have an effect on children's weight such as: social relationships, public policies, activity levels, maternal characteristics, etc. The findings of the study were also limited to a short snapshot of the fifteen months during the children's early development.

Social, cultural, and economic environmental factors that impact obesity

When addressing disparities in childhood obesity it is important to understand not only the causes of obesity, but also social, cultural, and environmental factors that are especially extensive in ethnic minority and low-income populations which may amplify the causes of obesity. Research has shown that exposure to media and marketing is an example of a factor that may amplify the cause of obesity. Children between the ages of 8-18 years old in ethnic minorities have been found to have more entertainment media use than the majority of children. Hispanic and black youth spend more time watching TV or movies and playing video games compared to white youth Low-income children have also been found to watch more TV and have higher exposure to media compared to higher-income children (Kumanyika & Grier, 2006). This extensive media consumption exposes ethnic minority and low-income youth to a variety of food advertising that may have a strong impact on a child's food preference (Borzekowski & Robinson, 2001).

A recent study conducted by Powell, Wada, & Kumanyika (2014) studied the racial/ethnic and income disparities in children's exposure to televised food and beverages in the United States. One of the findings from this study indicate that "… higher proportions of black population were associated with greater exposure to ads in all food categories.." and "… larger than average associations between the prevalence of child/adolescent black population… were

found for sweets, beverage, snack and fast-food restaurant product categories for children … and beverages and sweets for adolescents…" (p.126). According to Powell, Wada, & Kumanyika (2014), "The associations with exposure for both children and adolescents were significantly higher… for regular soda versus diet soda advertisements with higher proportions of black children/adolescents and lower median household income." (p.128). These finding bring to light the challenge of highlighting the importance of lowering the consumption of fast-food and other high-calorie food and beverages in this vulnerable population that has a high exposure to food and beverage TV ads. It highlights the need for heightened effort to promote healthier food alternatives to unhealthy products.

Other factors that is found in the ethnic/minority and low-income population that may amplify the cause of obesity is the reduced access and availability of quality and affordable food products. African-American neighborhoods have many fast-food restaurants compared to white neighborhoods (Block, Scribner, & DeSalvo, 2004). Low-income neighborhoods have also been found to have fewer supermarkets than higher-income neighborhoods, this may limit the citizens of these neighborhoods access to healthier food products (Morland, Wing, & Diez Roux, 2002). Minority families live in neighborhoods with a higher concentration of fast food options and lower healthy food outlets, also known as "food deserts" (Barr, 2014).

Theoretical Framework

After review of the research studies and findings, it is apparent that there are still gaps in knowledge that must be filled to effectively fight the battle against childhood obesity. As nurse researchers it is important to highlight the importance of using nursing theory to guide one's research. Nursing theory not only serves to guide research but also provide insights regarding nursing practice. According to Meleis (2018), "Nursing theories have provided nurse researchers with new propositions for nursing research that could not have been as well articulated if theories from other disciplines were used…" (p.3 6). Meleis (2018) also points out that theory guides research and practice because nursing theory provides nurses with the framework for the nursing process.

The author has chosen the Health promotion model as the theoretical framework that may be used to guide nursing research focusing on finding solutions to weaken the increase of childhood obesity in the United States today. According to Whittemore, Chao, Popick, & Grey (2013), "The Health Promotion Model classifies health behavior determinants into individual characteristics and experiences (i.e., prior related behaviors and personal factors) and behavior-

specific cognitions and effect (i.e., perceived benefits and barriers, interpersonal influences, and situational influences." (p. 55).

The Health Promotion Model not only addresses personal factors but also the behavior-specific effects such as interpersonal and situation influences. This is the reason that the author deemed this theoretical framework as the appropriate choice to guide nursing research addressing the prevalence of childhood obesity. This nursing theory helps address the limitations several of the studies discussed earlier had which was to investigate any life circumstances, attitudes, and behaviors that may contribute to the prevalence of childhood obesity

DISCUSSION

Conclusion

Knowledge gaps and future research

The prevalence of obesity in children and adolescents is very alarming and needs to be addressed because this health status, being overweight/obese, has a significant and unfavorable impact on not only the health of young Americans today, but also the future health of young Americans. The research studies discussed revealed that gender, race/ethnicity, and socioeconomic status plays a significant role in the prevalence of childhood obesity (Kendzor, O Caughy, and Owen, 2012; Moss & Yeaton, 2011; Ogden, Caroll, Kit, & Flegal, 2012; Rogers et al., 2015). As evident by the findings and limitations of the research studies discussed above, there are still gaps in current knowledge of the prevalence of childhood obesity in racial/ethnic and low socioeconomic populations. Future research should examine the relationship between other demographic such as social relationships, public policies, activity levels, birth and maternal characteristics with weight status variables. Future research should also focus more critically on actionable targets for change,that include factors specific to each household, neighborhood, community, and region.

When conducting future research studying this vulnerable population, it is important for the researcher to avoid bias. According to the Oxford Dictionary, bias is "an inclination or prejudice for or against one person or group, especially in a way considered to be unfair" (Lexicon Dictionaries, n.d.). It is important to first understand that bias exists in all research, regardless of the research design or stage of the research process. Although bias is difficult to eliminate, it is important to understand because "…bias impacts on the validity and reliability

of study findings and misinterpretation of data can have important consequences for practice." (Smith & Noble, 2014, p.100).

Researchers must also be aware to avoid broadly categorizing race and ethnicity by not including racial and ethnic subpopulations. According to Barr (2014, p.88), "In studying the health disparities that exist in our society and the potential means to reduce them, it is important to understand how the categories of race and ethnicity are used and what they mean."

It is also critical that researchers strive to obtain the skills to be culturally competent. Betancourt and colleagues (2005, p. 499) puts it beautifully, "the goal of cultural competence is to create a health care system and workforce that are capable of delivering the highest-quality care to every patient regardless of race, ethnicity, culture, or language proficiency.

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