

Childhood Obesity and Overweight: Causes and Implications in Preschool Children

Melissa L. Sittner

Department of Kinesiology

California Polytechnic State University

Abstract

The root causes of childhood obesity and overweight are currently hot topics of research. While many causes have been discovered, researchers are still weighing them against one another while taking the lifestyles of at-risk populations into account. Some of these causes include lack of physical activity, increase in screen time, and the implications of health disparities borne of a child's socioeconomic status. These causes and more are reviewed further and applied to the population of interest: preschool aged children in the United States, and more specifically preschool aged children of San Luis Obispo County in California. The need for multi-level interventions targeting these root causes of preschool childhood obesity and overweight is highlighted.

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REVIEW OF LITERATURE

Introduction

Turn on the television or open any newspaper and one is guaranteed to see some mention of overweight and obesity and its upward trend in the United States. A population of particular interest in this epidemic is children and adolescents. Approximately 17% of school aged children and adolescents in the United States are obese and 10.4% of preschool-aged children (ages 2-5 years old) are obese (NHANES, 2008). The rate of child and adolescent obesity (OB) have increased threefold since 1980 (NHANES, 2008) but have remained somewhat static during the past 10 years (Flegal, et al., 2010). Moreover, obese children today have higher BMIs on average in comparison to the children observed in 1999 (Anderson et al., 2006). Childhood overweight and obesity remains a pressing issue not only because of the growing statistics, but also because it is well established that overweight and obese children are much more likely to become overweight and obese adults than their normal-weight peers (Berenson et al., 2001). Furthermore, being overweight or obese as a child puts one at risk for a variety of health issues more common in adulthood including hypertension, diabetes, and heart disease (ibid). These so-called lifestyle diseases will continue to increase in prevalence over time in the United States unless big changes are made at the family, community, local government, and national government levels.

Childhood obesity (OB) and overweight (OW) are defined as a child being over the 85th percentile or 95th percentile of sex-specific BMI growth charts respectively (Ogden et al., 2010). BMI is calculated by dividing the body weight of the child in kilograms by the child's height in meters², and delineates the distribution of mass of the child's body. From past research on childhood OB and OW, it has been found that a great variety of problems are associated with children having such high BMIs, and these problems provide challenges for successful

development into healthy and productive adulthood. The problems do not only have pathological implications for children: they have psychological and sociological implications as well. Psychosocial issues secondary to OB and OW include lack of self esteem and social discrimination, while secondary pathological issues include asthma, type 2 diabetes, sleep apnea, hypertension, fatty liver disease, and heartburn (CDC, 2012). Additionally, it is predicted that 70% of obese children are living with one risk factor for cardiovascular disease, and 39% of children had two or more (Freedman et al., 2001).

Factors that Influence OW/OB

There is no question that such a pressing public health issue requires effective solutions in the form of multilevel systemic interventions (Gross et al., 2005). The only question that remains on the subject are which factor(s) of OB/OW should interventions focus on in order to be successful. Many factors of OB/OW have already been identified through studies and surveys (NHANES, 2008). These factors and their relative significance are discussed at length below.

Dietary Intake

More recently efforts have been undertaken to address OW/OB in children and adolescents (Maziak et al, 2008) in order to decrease the incidence of childhood and adolescent OB and OW. The root causes of energy imbalance have been conjectured, evaluated, and ranked. Among the most influential factors are dietary intake and the consumption of sugar sweetened beverages (SSB) over water and dairy milk, and consumption of take-out or fast foods over home-cooked, nutrient-rich meals. SSB, fast-foods and packaged foods are consumed because of their convenience, quantity, and calorie density per unit price according to Gross et al. (2005); however these foods do not supply the variety of important nutrients that contribute to healthy growth and the development as they are loaded in salt and sugar, and sparse in

vegetables and whole grains. SSB include fruit juices, sodas, and energy drinks. A positive relationship has been found between the consumption of SSB and overweight in pre-school children (Anderson et al., 2006). In one pivotal study it was found that pre-school aged children who were put in high-fat milk intake group had healthier, micronutrient-rich diets than those in a fruit juice intake group (Larowe et al., 2007). This allows that the consumption of high-fat milk is positively associated with a nutrient-dense diet in children, while fruit juice consumption is negatively associated with a nutrient-dense diet.

The availability and convenience of fast foods has also contributed to the energy imbalance in the American population: according to Paeratakul et al. (2003), individuals who consume fast food meals have higher energy intake with lower nutritional values than those who do not consume fast food meals. Fast-food and convenience food diets are loaded in fat, sodium, and sugars but low in vitamins, minerals and micronutrients (WHO, 2013).

Physical Activity

Dietary intake is only half of the energy equation: it is one thing to take in calorically-dense food and expend those calories via physical activity: energy imbalance is experienced when calories are not adequately expended. Scientists at the University of Sydney have found that pre-school aged children who are overweight are less active during the preschool day than their non-overweight peers, especially boys (Trost et al., 2003). Naturally these researchers also found that the lack of physical activity in overweight children made them more likely to have greater gains in fat mass than their non-overweight peers (Trost et al., 2003). Additionally, if preschool children are not participating in activity, they will see a decline in physical fitness and physical skill, which makes them more likely to lose interest and motivation for physical activity in the future (Parízková et al., 2009). With a decrease in interest at a young age, these children

will not grow into adulthood with an instilled value and enjoyment for physical activity: thus physical activity will not be a priority to these adults, making energy imbalance and obesity that much more likely. Simultaneously, parents influence a child's physical activity level outside of the school setting and through personal example: "because they are often the gatekeepers of their children's activity patterns, parents play a critical role in fostering appropriate levels of physical activity," (Gross et al., 2005, p. 7).

Screen Time

So what are children doing and finding enjoyable in the course of the day if they are not playing and participating in physical activity? The presence and availability of television, computers, and video game consoles for young children has increased the total amount of sedentary screen time engaged in per week since the 1980s (Anderson et al., 2006). Screen time greater than the American Association of Pediatrics (AAP) recommended maximum of two hours per day has a strong positive relationship with overweight and obesity in children (Anderson et al., 2010). According to a 2007 study, preschoolers are also spending time on the computer: preschoolers engaging in screen time greater than the AAP recommendation did not "displace" their television time with computer- they spent at least an additional hour on the computer per day, leading the researchers to conclude that exposure to computer use and television use were positively correlated (Mendoza et al., 2007). This point was delineated further by a study where screen time was broken down further. In a given week, children in the study spent an average of 24 hours per week engaged in screen time, which broke down into 19.3 hours of television watching, 2.3 hours of video game playing, and 2.5 hours of computer browsing (Roberts et al., 1999). Even more recently, it has been elucidated that the engagement of screen time (be it television, computer, video games, phones, etc) has been linked not only to

overweight, but also to poor fitness, a smoking habit, and elevated cholesterol levels in adulthood (Maziak et al., 2008). Children are choosing screen time over physical activity, and is the case with young, preschool aged children, parents are enabling this behavior along with eating behaviors due to factors of their own.

Influence of Parent/Guardian

It has been established that parents influence many aspects of their child's life, such as food selection, and physical activity level, through their example, or the ways in which they go about their lives (Anderson et al., 2006). From this information, it is unsurprising that there is a strong positive correlation between parent and child BMI (although research is still being done to decide whether or not this is more so due to genetics or environmental causes) (ibid). In the context of consumption, maternal external eating, defined as eating due to external stimuli rather than internal drives of hunger and thirst, were associated with both food pickiness and desire to eat in children (Morrison et al., 2012). That is to say that maternal views, interactions with food, and indulgence of external eating directly lead to the development of a child's unhealthy or disordered eating rituals that further contribute to over-consumption and the consumption of a smaller variety of foods. However, the positive aspect of this maternal-child relationship, according to Morrison et al., is that maternal behavior can easily be changed in order to influence the child's eating habits and thus his or her weight status: the act of changing habits in themselves costs virtually no money, and can influence the child at a young, and impressionable age (ibid). However, Morrison et al. fails to mention the financial costs inherent to selecting healthier food choices over more convenient, packaged foods. Other studies have taken into account the roles of parents in today's America. More and more families have one or both parents working, with no stay at home caretaker. This change in family dynamic from times past

is believed to contribute to a child being less likely to walk or ride a bicycle to school (Anderson et al., 2006). More specifically, maternal employment as been associated with early termination or lack of breast-feeding, as well as a lack supervised play and increased screen time- all of which in themselves have been positively linked to childhood OB and OW (ibid). Breast-feeding has been found to have a “protective” effect on children: breast-feeding over months is associated with a lower incidence of obesity in children and adolescents as well as a decreased risk in the acquisition of type 2 diabetes in children, adolescents, and adults (Lobstein et al., 2004), and thus is generally recommended to mothers who have the resources to do so (Gross et al., 2005). Additionally, with the hectic schedules of work and indulgence of television, sit-down family meals with home-cooked are presumed to be decreased in frequency. Unfortunately, children who do not eat meals with their families have been found to eat less fruits and vegetables, and consume more fast food and SSB’s than their peers who do eat meals with their families (Dietz et al., 2001).

SocioEconomic Influences on OW/OB

_____Race, socioeconomic status, and access to health care among many other demographic variables have been linked with OW and OB. The incidence of obesity is higher in non-white, “minority” children as well as low-income children (Anderson et al., 2006). For instance, in 2007 and 2008, Latin-American boys were much more likely to obese than their non-Hispanic white peers, and African-American girls were much more likely to be obese than non-Hispanic white girls (NHANES, 2008). Another study done on the subject showed that 35% of low-income, preschool aged Hispanic children were above the 85th percentile of BMI, compared

with 24% of White low-income children and 27% of Black low-income children (Kimbrow et al., 2007). Socioeconomic status (SES) is associated with OW/OB as well: a direct correlation has been found between OB/OW and parental income level, and education level (ibid). More descriptively, lower parental income, and lower parental education level (high school education or some college, compared to one having a college or post-graduate degree) have been associated with the increased likelihood of a child being OB/OW (Brisbois et al., 2011). These socioeconomic variables are further related to parental habits, outlooks, and financial instability that all lead to some of the root causes of childhood obesity, such as lack of physical activity, and the consumption of fast, convenient, nutrient-poor diets. While health disparities exist, researchers know that it isn't demographic factors alone at play to cause the large obesity statistics seen today (Anderson et al., 2006). One of the overarching goals of Healthy People 2020 is to eliminate health disparities by increasing the availability and access to nutritious food, decent and safe housing, and health insurance among other resources: as mentioned earlier, research has shown that certain populations are more at risk for disease, specifically OW and OB, and public and private organizations have been, and continue to be working on decreasing the effects of inherent inequalities among people in the US (Healthy People, 2010).

Using this Lens to Look at San Luis Obispo County

With all of this background, where do San Luis Obispo County, California as a whole, and its children fit in this sketch of childhood OB and OW in the United States? When looking at the demographic numbers alone, one can see that about 21% of San Luis Obispo (SLO) County residents are Latino, 2.1% are African-American, and 82.6% are white compared to California's 38.6%, 7.4%, and 6.6% respectively (U.S. Census Bureau, 2010). SLO County does not appear

to be an overly poor county, and 65% of families who have children under age 6 have both parents in employment (ibid). In 2002, it was found that 16.2% of children under age five in California were overweight, compared to 13.5% of young children in the United States as a whole (Gross et al., 2005).

From this snapshot, SLO county should have a fair amount of preschool childhood OW and OB. A study by Jankovitz et al. (2012) was completed on this subject which delineated the weight status of SLO county's preschool children and the health disparities that exist in the county. Jankovitz et al found, among other significant information regarding OB/OW in SLO county preschoolers, that there was a great level of health disparity: in the 2009-2010 school year, Hispanic children were 2.7 times more likely to be obese than Caucasian children (2012). Thus, the purpose of the study to be preformed is to not only examine the extent of OW and OB in the county's children compared to Jankovitz et al.'s 2009 data, but to examine which factors of those discussed above play the largest role in the obtained data. Upon the completion of the study, childcare providers, government agencies, and parents alike will have a better understanding of what causes obesity in SLO county preschool children, and which of many possible interventions would be most successful in reducing OB and OW in this population.

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