

Childhood Obesity in United States

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Introduction

WHO defined Overweight or Obesity as the abnormal or excessive fat accumulation that presents a risk to health. The body mass index (BMI) over 25 is considered overweight and above 30 is obese. According to CDC (2018), BMI is calculated by dividing the weight of the person in kg by height in meters square and BMI is age and sex specific for children and teens and is referred as BMI-for-age.

Krushnapriya Sahoo et.al.(2014); stated that the cause of childhood obesity is multifactorial like environmental, genetic, lifestyle, psychological, metabolic, socio-cultural factors. Moreover, these children are more likely to remain obese in adulthood and ultimately develop diseases like diabetes, cardiovascular, musculoskeletal, etc. at a very young age.

CDC and WHO claimed that Obesity and overweight are one of the leading causes of preventable deaths in the United States. According to Manu Raj, R. Krishna Kumar (2010), the emerging epidemics of obesity, CVD & diabetes are catching the attention of medical professionals among which obesity has become a global epidemic causing serious public health concern which resulted in 2.6 million deaths per year worldwide and it is an independent risk factor for cardiovascular diseases.

Historical context (and Present Situation)

Hippel and Nahhas (2014) in their article stated that America conducted national surveys to measure the BMI of children since 1963 which revealed that the BMI of children was steady from the 1960s to the 1980s and increased up towards the 2000s. A study was conducted to analyze the BMI's of 1,116 children aged between 3-18 yrs, born between 1930-1993 at Fels Longitudinal Trail near Dayton, Ohio, revealed that among boys obesity and overweight

increased after the birth year 1970 and among girls obesity started to escalate after birth in 1970, but in early 1930 and 1940's, overweight and BMI scores were already rising (Hippel & Nahhas 2014). The child obesity prevalence was stable through the 1960s and 1970s, then began to rise in the 1980s in the United States (Hippel & Nahhas, 2014).

According to 2013- 2014, National Health & Examination Nutrition Survey about 17% of US youth aged 2-19 yrs are obese and 16.2% are over weight. Researchers participated in Childhood Obesity Intervention Cost - Effective Study (CHOICES) to identify initiative programs that offer best value for the buck (Carla Kemp, 2017).

The National Survey on Children's Health (NSCH) 2016-2017 was conducted to measure the association between SDOH & overweight which revealed that younger children, single-parent children and children who lived in neighbourhood with no amenities were obese (Zenab et.al.; 2019). According to 2018-2019 NSCH data, prevalence of youth obesity (10 -17 yrs) is high in five states Kentucky, Mississippi, South Carolina, Tennessee, and Arkansas. Kentucky is highest with 23.8% and Utah is lowest with 9.6% (State of Child Obesity, 2020).

"The prevalence of obesity was 18.5% and affected about 13.7 million children and adolescents. Obesity prevalence was 13.9% among 2 to 5-year-olds, 18.4% among 6 to 10-year-olds, and 20.6% among 12 to 19 years olds"(CDC, 2019). According to the CDC (2019) prevalence of childhood obesity has decreased with an increase in education, in high-income groups among non-Hispanic Asian, non-Hispanic whites, and Hispanic girls. CDC presented data on how childhood obesity (2 - 9yrs) is related to parents' income and disclosed that 29.8% children are affected with obesity in lower-income families, 19.9% in middle-income families, and 10.9% in high-income families (CDC, 2019).

The Government of New Bedford and Fitchburg, MA came up with After School Program Learning to Prevent Childhood Obesity which included offering fruits and vegetables as snacks, serving water as a beverage, physical activity in schools, limited use of computers for homework purposes, eliminating the use of TV and movies (CDC, 2015). Later the state and local programs like the State Physical Activity and Nutrition Program, High Obesity Programs granted funds statewide to work collaboratively to reduce childhood obesity (CDC, Feb 2020).

Problem Statement

Childhood Obesity is an emerging epidemic both in developed and developing countries. It causes severe health and psychological damage to the child and if left unnoticed the current generation will grow into most obese generations in the US history. Crucial, immediate actions must be taken to stem the epidemic of childhood obesity. Public health sectors should prioritize research into etiology, treatment and prevention. Moreover, it is unlikely that necessary funding will be available from public and private sources for such studies until this problem is pushed higher on the public agenda.

Lack of physical activity, low fruit and vegetable intake, intake of fast food and more food than needed, decrease in sleep, heavy television watching are the major preventable causes of childhood obesity which can be controlled with collaborative efforts of parents or guardians, schools, and government. Breastfeeding is protective against childhood obesity (Lefebvre & Rita, 2013) and mothers should be educated about the importance of breastfeeding.

In school children prevalence of obesity is associated with race, ethnicity and other Social Determinants Of Health (SDOH). Additionally, psychosocial problems such as depression, lowered self esteem and bullying at school is experienced by these children. Therefore, the

development of novel approaches using SDOH risk and protective mechanisms is recommended as a guide for combating the emerging Childhood Obesity epidemic.

Determinants of Childhood Obesity

Given the drastic increase in the prevalence of Childhood Obesity in the United States, it is important to identify sociodemographic factors influencing it. Childhood obesity determinants include individual level factors such as biological, social and environmental which are influenced by the child family environment, which in turn imbedded in the framework of community environment (M.Karen Campbell, 2016).

Child obesity individual level determinant is a balance between the intake of the food and physical activity, later being affected by both physical activity and sedentary habits which leads these behavioral indicators as the frequent targets for therapeutic and preventive interventions (M. Karen Campbell, 2016). According to M. Karen Campbell (2016), the family, physical, and social environment affects child obesity directly through their nutrition and activity behaviors and indirectly through stress and there is evidence that childhood obesity is largely influenced by shared family meals, home food environment, and electronic media usage.

Research results indicate that family factors contribute to 71% of childhood obesity (Amy. S. Williams et al., 2018). For instance, a study has found that the BMI of parents is predictive of the BMI of children and that children will follow unhealthy eating behaviors of their parents or caregivers (Guillermo & Carolyn 2016). Prenatal risk factors for childhood obesity are maternal obesity, low educational status of parents, African-American race, low physical activity, poor nutritional knowledge, smoking, perceived neighborhood, irregular eating habits of parents (Amy. S. Williams et al., 2018).

The community environment influences child obesity through the increased use of canned food, sugar drinks, automobiles, computers, and televisions resulting in increased sedentary lifestyles and higher consumption of calorie-rich food and consequently, influencing food choices by distance to fast food outlets, supermarkets, and physical activity by the accessibility of transportation and walkability in the community (M. Karen Campbell, 2016). Therefore, in low-income families and racial/ethnic minorities prevalence of child obesity is high because they live in communities with limited access to healthy food and physical activity (Guillermo & Carolyn 2016).

There is evidence that psychosocial problems like stress and depression caused due to maltreatment, family communications, negative life events, and parental stress have a strong impact on child and youth obesity which has been explained by Wickrama et al. (2014) in the context of body mass index that inflammatory mechanism caused by excessive stress leads to arousal of hypothalamic-pituitary-adrenal axis leading to increase in cortisol levels and metabolic disruption resulting in hunger resulting in a reciprocal relationship between obesity and depression (Guillermo & Carolyn 2016). For instance, racial/ethnic minority children or youth are more obese as they experience severe stress due to discrimination, bullying (stressor) which increases anxiety, depression leading to Obesity. (Guillermo & Carolyn 2016).

The inequalities in Socioeconomic Status (SES) drives disparities in childhood obesity associated with race/ethnicity i.e prevalence of obesity is more in low SES children when compared to high SES children (Guillermo & Carolyn 2016). However, this correlation is not persistent in all races and all SES levels. For instance, studies suggested that African-American children with high SES have higher rates of obesity when compared to white children who exhibited lower obesity rates with high SES (Amy. S. Williams et al., 2018). According to Amy.

S. Williams et al., (2018) Demographic risk factors such as race/ethnicity and birth weight associated with child obesity often differ with SES.

Programs/Interventions

As the prevalence of childhood obesity is high among Hispanic children (25.8%) when compared to non-Hispanic white children (14.1%) and low SES children, Racial and Ethnic Approach to Community Health (REACH) is CDC administered national program started in 1999 to decrease Racial and Ethnic disparities (CDC 2020). CDC helps to remove barriers to health associated with race/ethnicity, education, community, income, and various social factors by REACH. REACH helps in addressing and solving health issues among Black or African American, Hispanic or Latino, Asian, American Indian, and natives of Hawaii, other Pacific Islands, and Alaska populations (CDC 2020).

Community-based childhood obesity prevention intervention for parents to improve health behaviors and food parenting practices among Hispanic, low-income parents came into force with goals for the parents to model child's healthy eating habits, supporting a varied and balanced diet to the child, involving children in food decisions and teaching them about nutrition (Laura Otterbach et al., 2018).

Healthy Children, Healthy Families: Parents Making a Difference! (HCHF) is an 8-week intervention for low-income parents/guardians of children aged between 3-12 yrs which is intended to improve physical activities, healthy eating habits, and reduce screen time (SNAP-ED TOOLKIT 2020).

Multi-Component School-based obesity prevention interventions are adopted by 50 states of America which include, Physical Activity and Teenage Health program (PATH); Sports, Play and Active Recreation for Kids program (SPARK); Eat Well and Keep Moving

program; 5-2-1-0+10 National Childhood Obesity Prevention Campaign; all of which aim to improve nutrition, health education, physical activity and reduce screen time (County Health Rankings and Roadmaps 2021). The 5-2-1-0+10 Childhood Obesity Prevention Campaign was adopted by East Baton Parish School System stands for 5 servings of fruits and vegetables, 2 hours or less screen time, 1 hour or more physical activity, 0 sugary drinks, and 10 hours of sleep every night (Healthy BR, 2021).

State programs to treat childhood obesity are "Mass in Motion" by Massachusetts, PHIT kids (Promoting Health in Teens and Kids) by Missouri, and Texas Medicaid Child Obesity Prevention Pilot (Amy & Richard 2014). Other State interventions include Farm-to-School Program, Colorado's Breakfast After the Bell Nutrition Program, West Virginia's Feed to Achieve (Amy & Richard 2014). School wellness programs include Rhode Island's local school committees, South Carolina's workplace wellness efforts program, Illinois efforts to improve Physical Education (PE) (Amy & Richard 2014).

The nations Cost-Effective Childhood Obesity interventions are an excise tax of one cent per ounce on sugar-sweetened beverages, eliminating tax subsidy of advertising nutritionally poor foods and beverages on television seen by children aged 2-19 yrs, labeling of calories on restaurant menus as modeled by federal menu guidelines to be enforced under Affordable Care Act, implementing higher nutrition quality for all foods and beverages sold in school and federally reimbursable school meals sold by National School Lunch and School Breakfast programs which are modeled by the rules of the US Department of Agriculture (USDA) adopted under Healthy, Hunger-Free Kids Act 2010, implementation of Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) program to improve health practices in early childhood education (Steve L. Gotmaker et al., 2015).

Programs/Interventions that have been effective

REACH by CDC has been most effective since 1999 and proved that local and culturally tailored interventions can be successful in reversing the interactable health disparities across the United States and the obesity prevalence has decreased in REACH US communities (CDC 2020).

The Hispanic and low-income parents who participated in Community-based Childhood Obesity Prevention Intervention showed significant improvement in encouraging balance and variety in parent and child dietary habits (Laura Otterbach et al., 2018). The HCHF curriculum has good impact on low SES parents and child physical activity and dietary habits including increase in fruit-vegetable intake, decrease in intake of fat dense food, and parents soda intake (Laura Otterbach et al., 2018).

Multi-Component School based obesity prevention interventions like School based physical activity intervention, School based dietary intervention has been shown to reduce or maintain the rates of overweight and obese children and these programs when implemented for longer durations with high intensity improved weight status of child (Anne Martin et al., 2018).

Sugary beverage taxation is an effective intervention as there is marked reduction in consumption. Research results revealed that there is 20% reduction in consumption of sugary beverages by increasing the price by 20% through taxations, thus preventing obesity in both children and parents (WHO 2017). Indeed, it is estimated that the excise tax of one cent per ounce of beverages can save more than US\$ 17billions in health care by 2027 (WHO 2017).

Research in Seattle, Washington noticed that restaurants have reduced 41kilocaloriess per entree after 18 months of implementing menu calorie labelling regulations (Steve L.

Gotmaker et al., 2015). Potentially, these market shifts have a larger impact on public health than attempting to shift customer behaviour directly with menu labelling (Jason & Christina 2014).

Challenges Dealing with Childhood Obesity

With one-third of Hispanic/Latino children living in poverty and two-thirds living in low-income families, the biggest challenge among them is their living conditions characterized by bigger family size with crowded housings, small residential units (Dean Jean. K 2016). These children usually live in communities with few grocery store chains which offer healthy food, limited space for exercise, easy access to convenience stores and fast food leading these children to consume calorie-dense food creating an imbalance (Nyberg. K et al., 2011). Limited access to grocery stores in communities influences the food choices in families and children of those families are affected.

Another challenge in child obesity is achieving a recommended amount of physical activity and the barrier is individual neighborhoods with limited access to public parks or recreational centers (Nyberg. K et al., 2011).

The risk factors of childhood obesity are one of the important challenges to public health practitioners. Obese children are more likely to develop high blood pressure, high cholesterol (risk factors of CVD), insulin resistance, type 2 diabetes (endocrine disorders), asthma, sleep apnea (Lung disorders), Joint problems (musculoskeletal disorders), Fatty liver disease, gallstones, and gastro-esophageal reflux (CDC 2020).

The common set of challenges linked to child obesity is child's psychological imbalance and substance use disorders which results in the early onset of Major Depressive Disorder (MDD) and tobacco use disorder (Melanie M. Wall et al., 2019). Psycho-Social challenges for childhood obesity are poverty, maltreatment, parental death, parental separation,

parental depression, parental alcohol/drug abuse, and therefore these childhood Psycho-Social challenges may lead to adult obesity development (Melanie M. Wall et al., 2019).

Discussion

The analysis of this literature review suggests that Childhood obesity in the United States is increasing at alarming rates and this epidemic is the result of various environmental factors which promote calorie-dense food, food adulteration, and lack of physical exercise. Indeed, this alarming increase will have long term consequences for Public Health.

Some of the interventions analyzed in this literature review were school based, family based, community based among which Multi-Component School-based obesity prevention interventions were highly effective in enhancing physical activity and nutritious diet education for children. Moreover, it is crucial to evaluate the effectiveness of existing interventions and statistical data collected from these interventions can be used in making more stronger effective interventions in future to reduce prevalence of childhood obesity.

It is important for the state or central government to form alliances with other health care organizations to take effective actions in health policy changing and environmentally friendly interventions to enhance opportunities for physical activity and improve mental health of children. Changing the health policies in terms of education regarding nutritious diet, physical activity importance, and healthy behavioural practices will have greater impact on the health of children in turn reducing childhood obesity.

As aforementioned, childhood obesity puts children at the risk for chronic health conditions such as Cardiovascular, pleural, hepatic, renal, gastrointestinal, musculoskeletal, endocrine disorders and even cancers, stroke in a few cases. Sahoo et al., (2015) stated that “childhood obesity can profoundly affect children’s physical health, social and emotional

well-being, as well as self-esteem.” Overall obesity is affecting all aspects of a child's health both physical and psychological and this association of obesity with other chronic health conditions makes childhood obesity a serious Public Health concern for children. Moreover, childhood obesity is associated with premature deaths making this epidemic a more crucial public health concern.

While there are several risk factors associated with childhood obesity, prevention is the key strategy to control it. Primarily we should focus on creating awareness about childhood obesity and educating children and families about nutritious food, the importance of physical activity, building self esteem in children and secondarily we should encourage them to follow them, making sure these children and families leave behind their unhealthy eating and behavioural habits . Therefore, implementation of these kinds of interventions will significantly help lowering the childhood obesity rates in the United States.

Limitations

The limitations of this study include the fact that there is very little documented evidence about childhood obesity in the United States before 1963. Moreover, due to the little evidence it is difficult to trace out whether childhood obesity is a recent phenomenon or continuation of older one.

In spite of several interventions by the government and various health care organizations, childhood obesity has more than doubled in the past 3 decades and made it difficult to find out how interventions have failed to actively engage parents/guardians/caregivers, who play a major role in modeling the child's diet and healthy lifestyle behaviours.

Conclusion

The prevalence of childhood obesity is increasing substantially in the United States over the years, and obesity related co-morbidities are increasing concomitantly in the paediatric population. Childhood Obesity is associated with several comorbid health conditions, which can have severe impact on a child's well being and the risk of these morbidities will significantly increase in their early adulthood.

Childhood Obesity is the major public health issue and failure to take appropriate actions will lead to serious public health concerns. Moreover, if present obese children are left untreated they are more likely to grow into obese adults therefore, increasing adult obesity prevalence in the United States in future resulting in increase in non communicable disease, all of which can be controlled by preventing and reducing the prevalence of childhood obesity at early stages.

There are several interventions for prevention and control of childhood obesity and sustainability of these interventions is important, so that children can develop and maintain healthy behaviours throughout their life and ultimately lead a healthy life. A combination of community based, family based and school based interventions together is more effective in preventing childhood obesity and with these combinations we can ensure that health of future generations will reach its full potential.

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