**Obesity in Children with Down syndrome: Causes, Effects, and Potential Solutions from a Nutritionist Perspective**

**Overview:**

In America, obesity is becoming a major health problem within the population of children with Down syndrome. Down syndrome, also called Trisomy 21 and abbreviated as DS, is defined as a chromosomal disorder that results from genetic changes on chromosome 21. This disorder is characterized by its unique phenotype and is also associated with a variety of congenital anomalies. As Julie Murray and Patricia Ryan-Krause highlighted in their study, “some degree of cognitive deficit occurs in all children with Down syndrome, although intellectual abilities vary greatly from being mildly affected to severely impaired.”6 Individuals with Down syndrome possess many common inherent characteristics, such as impaired motor skills and intellectual disabilities. Due to these additional physical and intellectual impairments, proper eating and participation in different physical activity programs may be a more complicated task. Without receiving adequate nutrition and exercise, many children with DS are placed at a higher risk than children without DS for developing obesity. To treat this growing health issue of obesity, it will be necessary to combine healthy eating with increased physical activity into a health promotion program that is specifically mindful of the unique needs of children with Down syndrome.

Children with Down syndrome have a range of physical and intellectual impairments, such as decreased motor skills, difficulties processing emotions, and social interaction issues. These impairments can either be reduced or augmented depending on the patient’s environment. For example, Whitt-Glover, et al.’s study demonstrated that siblings with and without Down syndrome are equally able to engage in physical activities. This finding suggests that in environments where children with DS are given the same opportunities as children without DS, they are able to participate in physical activities that they may not normally have done.9 When being mindful of environments, it is also important to keep in mind the findings of Block and Zeman’s study that inclusion of children with DS in physical activities is only beneficial, or at least maximally beneficial, when it is well planned out.1 In relation to planning to include children with DS in physical activities, it is also important to be aware of the finding that increased physical activity is more likely to be sustained if the activity is both fun and enables the children to socialize with their peers in a non-competitive way.6

**Analyzing Environments:**

In terms of limited physical and intellectual capabilities, the eating environments in America surrounding children with Down syndrome pose a major obstacle. The “obesogenic” society, the family, and the media collectively influence the eating habits and attitudes towards food of individuals with DS. In American society today, “obesogenic” refers to the high accessibility of sweet, high-calorie, fatty snack foods, combined with the high frequency of sedentary daily behaviors. Not only are these snack foods easily accessible, but they taste good, are generally inexpensive, and are easy to consume quickly in large amounts. As Murray and Ryan-Krause described in their scientific article, children with DS tend to exhibit poor mastication. This is because children with DS can have problems physically chewing raw vegetables and fruits, and firm and fibrous foods. Due to their chewing difficulties, children with DS may end up eating softer foods which tend to be higher in carbohydrates, fats, cholesterol, and sugars.6 If these children are not given the proper guidance in healthy food choices, this “obesogenic” society combined with their limited intellectual capacities makes it more difficult to obtain proper nutrition. As a result, these children may end up consuming unhealthy foods on a regular basis. When poor nutrition is combined with high levels of inactivity, there is a high propensity for obesity.2,7 Due to the aforementioned circumstances, it is necessary to develop intervention methods to treat obesity in children with DS that are mindful of these capabilities.

Another factor to consider in the prevalence of obesity in children with Down syndrome is the role of the family in determining eating and exercise habits. In order to improve the eating habits of children with DS, it is necessary to address the eating habits of the family. I agree with the conclusion drawn by Murray and Ryan-Krause that “…limiting portion sizes or identifying consumption of foods with hidden sugar, such as cereals and beverages, serve as basic strategies to reduce caloric intake. Encouraging families to limit fast food dining once per month is also an effective way to decrease the amount of calories consumed.”6 By improving the eating habits of the family, it would logically follow that the eating habits of the child with Down syndrome would improve as well. In terms of exercise habits, if these children’s families do not provide opportunities to participate in physical activities, then they will most likely remain in the comfort of their home watching TV or being plagued by boredom. Both of these sedentary activities have been linked to increased food consumption, particularly easily accessible and unhealthy foods. A major reason for the enticing nature of these snack foods can be found in the advertising and media industries. The advertising industry plays a prominent role in creating America’s “obesogenic” societal environment. Food companies and manufacturers are constantly creating new ways to enhance the appeal of their products. This can be done by adding hidden sugars and fats, unhealthy artificial ingredients, and offering the lowest prices for their products. Taking into account the decreased mental functioning that can be characteristic of individuals with Down syndrome, this media influence adds to the struggle to eat healthier foods. This healthy eating struggle is further amplified by the fact that snack food manufacturers offer cheaper food prices than their healthy food alternatives. With the existing medical expenses generally associated with caring for a child with DS, the families of these children may tend to purchase the cheaper foods if that is all they can afford, unintentionally contributing to the development of obesity in their child. In summary, the exercise and eating habits of the family play a major role in either promoting or decreasing the health of children with DS.

**Early Implementation:**

In developing a method of intervention for overweight children with DS, it is important to implement the program early on in their lives. Multiple studies on weight management programs have demonstrated the greater effectiveness of early intervention during childhood rather than treating individuals after they reach adulthood. A study conducted by Mendonca, et al. clearly illustrated this importance of early intervention by demonstrating that treating children instead of adults can lengthen the improvement of life satisfaction and social acceptance.5 Early intervention is also important because, as highlighted by Luke, et al.’s study, Down syndrome itself may stigmatize a person, and adding the element of obesity can further restrict these individuals from participating in activities that are essential for proper emotional and physical development.4 Despite the abundance of evidence supporting the need for early intervention to treat obesity in DS children, there is a lack of the needed weight management programs. In order to act on the scientific evidence supporting early intervention, it is necessary to develop weight management programs specifically mindful of children with DS’s potentially limited physical and intellectual capabilities.

**Existing Programs:**

Some existing programs, such as Adapted Physical Education and Adaptive Sports, have developed well-planned methods of inclusion of individuals with varying degrees of intellectual and physical capabilities. Adapted Physical Education (APE) was created with the Individuals with Disabilities Education Act of 1990 to provide physical education to individuals with disabilities. APE’s mission is to help individuals develop physical and fundamental motor skills, as well as skills in aquatics, dance, and individual and group games and sports. Children with DS would qualify for participation in an APE program since they would be placed into the “mental retardation” category.8 Another similar existing program is the Adaptive Sports organization. Adaptive Sports was founded by President and Mrs. Carter in 1987, with the goal of helping improve the lives of individuals with disabilities through outdoor adventure activities. This organization provides opportunities for individuals with disabilities and their families to participate in outdoor activities such as skiing, cycling, and kayaking. Both of these organizations are mindful of the fact that children with DS have varying degrees of intellectual and physical capabilities. As a result, these two organizations create their programs to be particularly mindful of the physical activity participation limits of children with DS. While these organizations are certainly helpful for increasing participation in physical activities, they do not address the need for healthier eating habits of children with DS.

**Developing an Intervention Method:**

To develop a more effective method of intervention to treat the growing problem of obesity in children with Down syndrome, I propose a weight management program that combines increased physical activity with healthier eating. As Heller, et al.’s study indicated, the interventions most effective for decreasing obesity were the ones that combined health behavior education with healthy eating and exercise components.3 By teaching children with DS about making healthier food choices and healthy eating, they will have better physical health to be able to participate in physical activities. In order to teach healthier eating habits that will be sustained, this intervention method would consist of a component to teach both the children with Down syndrome and their families. The second component to this proposed program would be to provide the children with opportunities to increase their participation in exercise activities. Increasing participation in physical activity would be done in such a way that enables the children to both have a fun time and interact with their peers. Ensuring that the children with DS are entertained and have a fun time participating in the physical activity, instead of feeling like they are being forced to participate, will increase the likelihood of them remaining physically active. This approach will also help to ensure that the children do not feel distinctly different or separate from their peers who do not have DS or intellectual or physical disabilities. This health promotion intervention method is necessary to test out and implement because obesity is a major health risk to children with DS. By treating and preventing obesity in children with Down syndrome, these children will be able to increase their physical fitness and health while experiencing greater life satisfaction.

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