Review Article

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Risk Factors for Obesity and Unhealthy Weight Gain in Autism Spectrum Disorder Children

Abstract

A developmental disorder known as Autism Spectrum Disorder (ASD) is characterized by repetitive behaviors as well as deficits in social and communication skills. Additionally, children with ASD are more likely than children with normal development to become overweight or obese (TD). Obesity in childhood has been linked to a variety of negative health outcomes, such as insulin resistance, diabetes, heart disease, and some types of cancer. Importantly, lifestyle factors and biological influences, in addition to secondary comorbidities and medications, play a mediating role in these higher obesity rates. This review provides a summary of the most recent findings regarding behavioral and lifestyle factors that may contribute to children with ASD's unhealthy weight gain. It also discusses the most recent findings regarding emerging risk factors, such as the potential influence of sleep issues, the gut micro biome, endocrine influences, and maternal metabolic disorders. We also talk about some of these risk factors' clinical implications and areas for future research.

Keywords: Autisim spectrum disease • Overweight • Insulin resistance • Diabetes • Heart disease • Behavioral factors • Gut microbiota

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Introduction

Repetitive behaviors and impairments in social and communication are hallmarks of Autism Spectrum Disorder (ASD). One in 160 children is thought to be affected worldwide but current estimates for the North American populations are closer to one in sixty. Additionally, children with ASD are more likely than children with Typical Development (TD) to become overweight (BMI-for-age 85th percentile) or obese (BMI-for-age 95th percentile). These BMI levels are linked to negative health outcomes like diabetes, insulin resistance, heart disease, and some types of cancer. Childhood obesity can have negative effects on physical, emotional, and social functioning as well as academic performance which could exacerbate the disability and diminished quality of life associated with ASD [1].

Eating habits lifestyle secondary comorbidities and medication use are known key factors that may mediate the higher rates of obesity observed in children with ASD. Reduced gut microbiota diversity, hormonal imbalances, and maternal metabolic disorders may also influence the development of ASD or childhood obesity alone, according to evidence. However, it is still unclear whether or not these emerging factors contribute to children with ASD's unhealthy weight gain and obesity [2].

Because obesity has a negative impact on a child's overall health and well-being and frequently persists into adulthood, it is essential to prevent unhealthy weight gain and obesity in children with ASD. A comprehensive understanding of the risk factors for obesity development in ASD is necessary for the development of effective strategies. As a result, the goal of this narrative review is to critically summarize the current understanding of the behavioral, lifestyle, and biological factors that could cause children with ASD to gain weight in an unhealthy way. Additionally, we talk about the state of the art in our understanding of novel emerging risk factors for pediatric obesity in ASD [3].

Feeding methods

Children with ASD have high reported rates of atypical behavior in response to sensory experiences. People with autism who were 3 to 56 years old had abnormal oral sensory processing when compared to sex- and age-matched controls. This abnormal oral sensory processing was characterized by either greater oral seeking (such as a child putting everything in their mouth) or oral defensiveness (such as avoiding certain textures and tastes and/or only eating a limited variety of foods). It is interesting to note that age-group analyses showed that differences in sensory processing difficulties between children with ASD and TD decreased over time, indicating that children are the most affected. These tactile hardships can prompt abnormal eating ways of behaving and taking care of practices in ASD, as kids might stay away from specific food varieties because of surface as well as taste and just eat a restricted assortment of food varieties (i.e., food selectivity). In fact, a recent meta-analysis found that children with ASD had five times more feeding issues and ate less calcium than children with TD [4]. In this way, kids with ASD might be in danger for deficient micronutrient consumption. Although the prevalence of overweight and obesity has been the subject of a number of studies describing feeding behaviors in children with ASD, few have attempted to determine whether differences in feeding behavior are related to body weight categories. As far as anyone is concerned, just a single report viewed that as male youngsters with ASD, who were overweight or large, had more risky supper time and taking care of ways of behaving than overweight or hefty TD youngsters, as shown by the higher scores on a Way of Behaving Pediatrics Taking care of Evaluation Scale (BPFA) in the ASD bunch. The BPFA scores of children with ASD and TD, regardless of their thin or adequate weight status, were identical. However, a different study of younger male and female children found no differences in feeding behaviors across weight categories (as measured by a questionnaire that included questions about oral function, eating disorders, and other issues). Children with ASD may also gain weight because of the distribution of macronutrients and total energy intake [5]. Three-day food record and Food Frequency Questionnaires (FFQs) data from six prospective studies and 14 observational studies were included in two recent meta-analyses regarding total energy intake. There were no significant differences in total energy intake between TD children and ASD children. The distribution of macronutrients, which can affect body weight and cardio metabolic risk profiles, must also be taken into account. However, the optimal macronutrient distribution for enhancing children's and adolescents' weight status is still poorly understood. The same two meta-analyses that looked at energy intake also looked at macronutrient intake, and neither ASD nor TD children had significantly different intakes of carbohydrates or fats. The acceptable macronutrient distribution range (AMDR) also tended to apply to intake. Children with ASD ate less protein than children with TD, but both groups ate more protein than the current dietary guidelines call for. Micronutrients play an important role in a variety of metabolic pathways and are essential to maintaining a healthy weight. The Gluten-Free, Casein-Free (GFCF) diet is frequently prescribed to children with ASD, which may limit their intake of certain micronutrients.

Some of the behavioral symptoms of ASD have been considered to be treatable with GFCF diets; however, there isn't enough evidence. Three studies were found in a recent systematic review to show that even after controlling for common elimination diets like GFCF regimens, nutrient deficiencies tended to persist in children with ASD. Vitamin A, vitamin D, the B-complex vitamins, calcium, and zinc deficiencies may be linked to increased fat deposition, according to evidence. A meta-analysis confirms dietary recommendations and calcium and vitamin D deficiencies in ASD children in comparison to TD children. However, no causal link has been established between the intake of micronutrients and fat accumulation. Dietary supplements, which are frequently given to children with ASD, should also be taken into consideration in future research. Anecdotal reports indicate that children with ASD may limit their intake of fruits and vegetables due to factors such as taste and texture. This is in addition to these feeding patterns and behaviors [6].

It has been demonstrated that the consumption of fruits and vegetables has a negative correlation with changes in weight and body adipose. Notwithstanding, concentrates on in light of imminent three-day food records for the most part exhibit no distinction in the admission of vegetables or natural products between kids with ASD and TD youngsters , with the two gatherings consuming underneath the proposals

for vegetable admission.

Children with ASD, on the other hand, are found to consume fewer daily servings of fruits and vegetables, according to a systematic review of studies utilizing FFQs, which evaluate subjective, longer-term eating patterns. Additionally, Bandini et al. FFQ data revealed that ASD children reject vegetables more frequently than TD children. According to a study, a bitter taste sensitivity associated with the TAS2R38 genotype may be the cause of some food refusal in children with ASD. Although little research has been done on the connection between polymorphisms in taste receptors and feeding behaviors in ASD, it has been shown that children with TD who have two sensitive bitter taste alleles have a lower threshold concentration for sucrose detection and consume more sugar than children with less sensitive alleles. As a result, specific eating behavior differences between groups, such as vegetable intake, may be better understood if further investigation into the prevalence of genetic taste receptor variants in ASD is carried out. In general, a lot of recent research seems to indicate that people with ASD consume roughly the same amount of energy and macronutrients as people with TD. However, these findings must be interpreted with caution due to the fact that methods for gathering dietary data are frequently constrained by variations in day-to-day food intake , under-reporting of energy intake , and behavioral responses to measurement (such as changes in food intake, particularly in obese individuals [6].

New considerations

Breastfeeding

During infancy, breast milk reduces the likelihood of various infections and provides energy, nutrients, and antibodies. Additionally, researchers have investigated the impact of breastfeeding on children's cognitive development. After adjusting for relevant demographic and social confounding variables, they found associations between breastfeeding for longer durations and better cognitive development and fewer autistic traits in children. Additionally, it was reported that children with ASD were significantly less likely than children without ASD to have been breastfed. Tseng and co. highlighted the nutrition theory, oxytocin stimulation, and neurotropic factor secretion as potential explanations for the role of breastfeeding in ASD pathophysiology. Specialists have additionally found that breastfeeding might bring down the gamble of life as youngster corpulence. Although these studies did not specifically examine these relationships in ASD, they do indicate that decreased breastfeeding may be a factor in obesity. As a result, the effects of breastfeeding on ASD children's growth patterns and long-term weight status may be the subject of future research [7].

Sleep

There is evidence to suggest that sleep quality and duration are risk factors for obesity. The risk of being overweight or obese has been found to be inversely correlated with sleep quality and Body Mass Index (BMI). A meta-analysis conducted in 2016 revealed a correlation between overweight and obesity in children and poor quality of sleep regardless of sleep duration. Sleep deprivation can alter hormones that control appetite and glucose metabolism, which can have an effect on weight gain. As a result, both a positive relationship between total sleep and leptin levels and an inverse relationship between total sleep and ghrelin levels have been reported. Hormones that control appetite and influence food intake are ghrelin and leptin. Obstructive Sleep Apnea (OSA), a sleep disorder caused by obesity in children, can occur. OSA may be associated with specific metabolic markers like insulin resistance and hypertension. Inadequate sleep duration and quality are also associated with OSA. When compared to TD controls, children with ASD have a higher prevalence of sleep issues. One study found that children with ASD had poor sleep quality and were overweight, with 86% of obese kids having clinically significant sleep issues compared to 76% of healthy kids. Sleep-disordered breathing, such as OSA, insomnia, and circadian rhythm disorders are more prevalent in children with ASD. Daytime sleepiness and metabolic risk factors may reduce daytime activity, resulting in unhealthy weight gain. Even though many studies show that children with ASD are more likely to have trouble sleeping, little is known about how this group's BMI affects sleep. However, children with ASD may be at an increased risk for unhealthy weight gain if they have a history of sleep problems, which may be exacerbated by poor sleep quality and duration [8, 9].

Endocrinal cues

Endocrine factors' involvement in ASD's pathogenesis has also been investigated by researchers. It has been hypothesized that neurotransmitters (such as dopamine and

serotonin) and specific chemical messengers, such as endocrine hormones and neuropeptides, collaborate to influence the developing fetal brain. As a result, some of the social behaviors that people with ASD exhibit may be caused by faulty encoding as a result of chemical transmission imbalances. Understanding how hormonal imbalances and differences may play a role in the pathogenesis of ASD has been the primary focus of research in this field. The research on specific appetite hormones like leptin, adiponectin, and ghrelin is discussed in this section [10].

Conclusion

Overall, there is evidence to suggest that oral sensitivities may mediate food selectivity, food and nutrient intake, and weight gain in ASD may be exacerbated by other factors like PA, SB, sleep, genetics, and medication use. In addition, research into the roles of developmental risk factors, sleep disorders, the gut micro biome, and the endocrine system has begun. Assessment of biological and lifestyle-related factors, as well as tests for mediating and moderating relationships like ASD severity, oral sensitivities, and differences between sex and age, should be included in future studies of obesity in ASD. In order to determine whether children with ASD experience unhealthy weight gain across the board or whether some children are more susceptible than others, it is essential to take into account these various factors in conjunction with individual factors. To effectively prevent and treat unhealthy weight gain in children with ASD and to facilitate the development of potential early intervention strategies, it is essential to comprehend each of these distinct risk factors and components. The development of individualized strategies to assist children with ASD in managing their weight, including dietary recommendations, medical therapies, nutrition and exercise regimens, would be made possible by an understanding of each child's individual risk factors. In general, clinicians should consider more individualized medical surveillance in children with ASD as part of a care and management plan, in conjunction with the clinical guidelines for pediatric obesity and ASD care.

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