

Current insights on nutritional deficits from junk food and their risk of early puberty and PCOS in females



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Abstract

High junk food consumption, low in essential nutrients, contributes to hormonal imbalances and metabolic issues that increase the risk of early puberty and Polycystic Ovary Syndrome (PCOS) in young females. Junk foods' unhealthy fats, sugars, and additives can lead to insulin resistance, obesity, and hormonal shifts, elevating PCOS risk, which affects between 3.7% and 22.5% of teenage girls and young women in India. Early puberty, now affecting about 10.4% of Indian children, is also linked to obesity and junk food intake. Addressing these risks through balanced nutrition, lifestyle changes, and education is essential. New anti-obesity drugs and nutritional counseling offer promising interventions to support hormonal health and prevent these conditions in adolescent girls. This newsletter underscores the importance of diet in hormonal development and reproductive health.

Keywords: Junk Food, Polycystic Ovary Syndrome, Obesity, Early Puberty

1. Introduction

Nutritional deficiencies can arise from junk food consumption (high levels of saturated fats, trans-fatty acids, and refined sugar), which may ultimately contribute to the development of Polycystic Ovary Syndrome (PCOS) due to its high calorie and low nutrient content. These junk foods are often rich in sugars, unhealthy fats, and additives but lack essential vitamins, minerals, and fibers. Regularly replacing nutritious meals with junk food can result in inadequate intake of vital nutrients, leading to conditions like infertility, early puberty, and PCOS in females resulting in cervical carcinoma (1). The global consumption of junk food is a widespread issue, with over 70% of people incorporating it into their diets were shown in Figure 1. This trend poses significant public health concerns, particularly among young adults. Research shows that women with PCOS are at risk of deficiencies in essential minerals like potassium and magnesium, as well as vitamins B12 and B9. Vitamin D deficiency is also associated with PCOS, depression, and insulin resistance. Maintaining a healthy body mass index (BMI) is crucial for regular menstrual cycles. Therefore, encouraging adolescent girls to adopt a balanced and nutrient-rich diet is vital for supporting a healthy menstrual cycle and sustaining a normal BMI. Numerous research has looked into the possibility that eating junk food can cause irregular menstruation (2). This newsletter aims to raise awareness among women and adults about the link between junk food consumption, PCOS, and early puberty syndrome. It provides nutritional approaches to help prevent PCOS and delay early puberty in females.

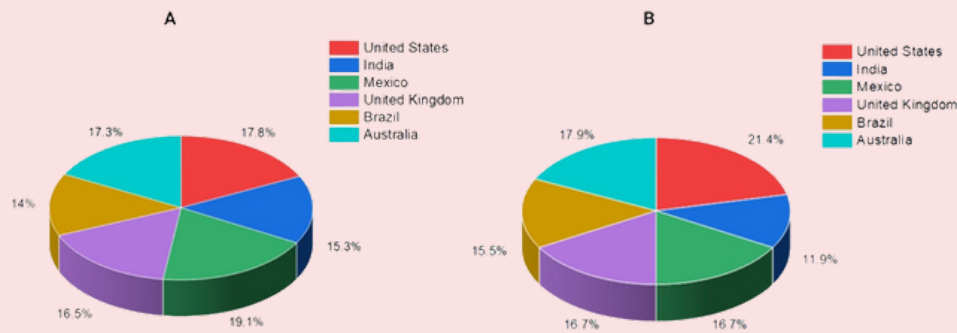


Figure 1. A) shows that in 2024, junk food consumption is high globally, with Mexico at the top (75%) followed by the U.S. (70%), Australia (68%), the U.K. (65%), India (60%), and Brazil (55%) (3). This widespread trend raises health concerns due to poor nutrition;

B) highlights obesity prevalence across the same countries, with the U.S. highest at 36.2%, followed by Australia (30.4%), Mexico (28.9%), the U.K. (28.0%), Brazil (26.8%), and India (20.5%). The data underscores the global impact of obesity, often linked to diet, lifestyle, and socioeconomic factors (4).

2. Junk food and PCOS

As of 2024, the prevalence rate of PCOS in India is a growing concern, with studies estimating that between 3.7% to 22.5% of Indian women of reproductive age are affected (5). Teenagers are the most vulnerable. PCOS is classified to be an oligogenic condition with a combination of hereditary and environmental factors that affect how the condition manifests in PCOS women in a variety of clinical and biochemical ways. Diet, way of life, and physical exercise all have an impact on the health of women (6). Women with PCOS often have elevated LH/FSH ratios and exhibit symptoms like anovulation, hyperandrogenism (e.g., hirsutism, acne, alopecia), and polycystic ovaries. Common complications include insulin resistance, weight gain, cardiovascular diseases, infertility, and pregnancy-related issues like miscarriage and gestational diabetes. A significant percentage (38-88%) of women with PCOS are overweight or obese, and a modest weight loss (5%) can notably improve symptoms (7). Obesity exacerbates PCOS symptoms, particularly hyperandrogenism, and is linked to junk food consumption. PCOS often runs in families and is considered a genetic condition with a peri-pubertal onset (8).

3. Junk food and early puberty

As of 2023, the prevalence of early puberty in India has been rising, with approximately 10.4% of children, particularly between the ages of 8 and 13, showing signs of early puberty (9). The consumption of junk food is increasingly being linked to the early onset of puberty in children. Junk foods, typically high in unhealthy fats, sugars, and artificial additives, contribute to rapid weight gain and obesity, which are significant risk factors for early puberty (10). These foods cause hormonal imbalances by influencing insulin levels and the release of sex hormones like estrogen. Excessive intake of such foods can lead to increased body fat, which affects leptin levels a hormone closely associated with the timing of puberty. Studies indicate that early puberty is linked to both physical and psychological challenges, including increased risk of obesity, type 2 diabetes, cardiovascular issues, and emotional stress. Early exposure to adult hormone levels also affects children's mental health, potentially leading to low self-esteem and increased rates of depression. Addressing junk food consumption is thus crucial for promoting healthy development and delaying the onset of puberty (11).

4. Junk food and obesity

Obesity, characterized by excessive body fat deposition, significantly increases the risk of various health issues. Body mass index (BMI), determined by weight, height, and age, is used to identify

obesity-related metabolic disorders. A high BMI is closely linked to women's metabolic processes and gynaecological issues, such as PCOS, abnormal uterine bleeding, infertility, and pregnancy failure. Obesity is a major public health challenge, with projections suggesting that by 2030, 55 to 60 percent of today's youth will be obese (12). In women with PCOS, excess androgens can lead to increased fat levels and appetite regulation issues, including dysregulated ghrelin and reduced cholecystokinin synthesis. This relationship highlights the serious health concerns associated with obesity and its co-morbidities, especially as lifespans increase. Junk food, high in unhealthy fats and sugars, contributes to weight gain and obesity, which disrupts hormone balance and promotes inflammation, increasing the risk of ovarian cancer in women is shown in Figure 2. Menstrual abnormalities, PCOS, and infertility are among the reproductive problems that obese women face.

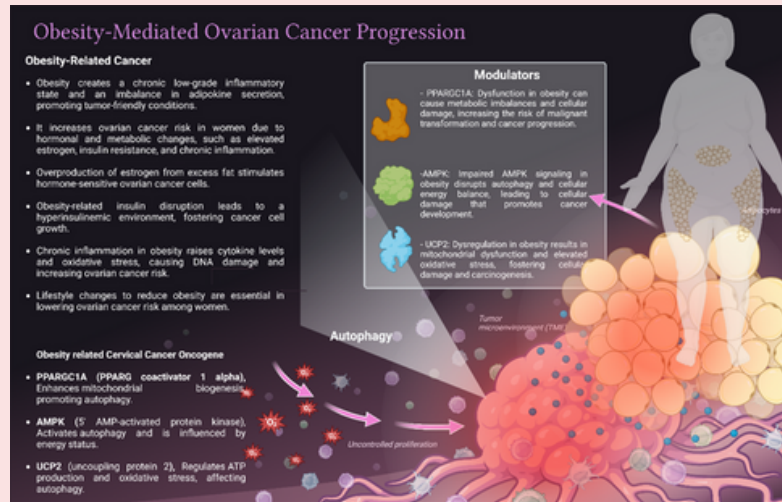


Figure 2. Obesity raises ovarian cancer risk, with nearly 15% of female cancer cases linked to obesity. It disrupts estrogen and insulin levels, causing chronic inflammation. Lifestyle changes are essential to lowering this risk, and a new drug targeting obesity-related ovarian cancer offers a promising treatment.

5. Strategies to overcome junk food and their risk of early puberty and PCOS in females

To address the impact of junk food on early puberty and PCOS in females, it's essential to focus on balanced nutrition, lifestyle changes, and awareness. Junk food, laden with unhealthy fats, sugars, and additives, contributes to weight gain, insulin resistance, and hormonal imbalances, all of which can accelerate puberty and increase the risk of PCOS in young females (13). Junk food-related physiological effects are shown in figure 3. Here are some strategies to counteract these effects:

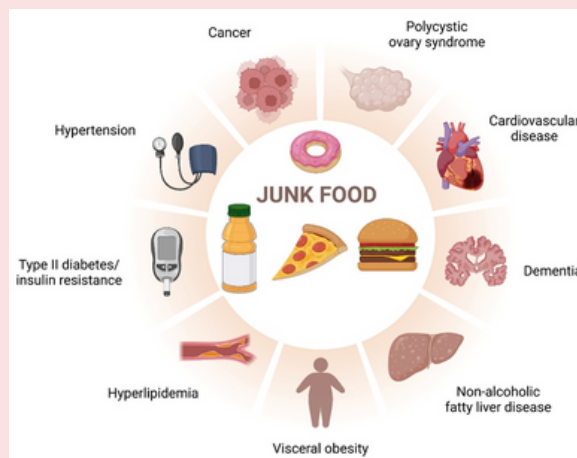


Figure 3. The figure shows health conditions and risks linked to lifestyle choices, especially poor diet and junk food consumption. It connects these habits to cancer, PCOS, hypertension, cardiovascular disease, type II diabetes, dementia, hyperlipidemia, and non-alcoholic fatty liver disease, emphasizing how junk food and obesity drive metabolic and chronic health issues.

Encouraging nutrient-dense diets rich in whole foods fruits, vegetables, whole grains, lean proteins, and healthy fats can support balanced hormonal growth and stabilize blood sugar levels, helping reduce risks of early puberty and PCOS. Limiting processed and sugary foods can prevent weight gain and insulin resistance, which are linked to these conditions; instead, healthier snacks like fruits, nuts, and yogurt are recommended. Regular physical activity, such as walking or cycling, maintains healthy weight, regulates hormones, and reduces stress. Education on the impact of junk food on hormonal health can motivate healthier choices among young females and parents. For those already experiencing early puberty or PCOS symptoms, professional support from healthcare providers and nutrition counselling can aid in managing these issues. Recent advancements in anti-obesity and nutritional drugs also offer potential solutions for addressing nutrient deficits tied to junk food, early puberty, and PCOS (14).

6. New drug discoveries

Novo Nordisk has introduced a new obesity pill named amycretin, which has shown greater efficacy than the existing drug Wegovy in early clinical trials. This medication targets the GLP-1 hormone, similar to other weight loss treatments, and may provide a faster rate of weight loss while maintaining a safe side effect profile comparable to that of Wegovy and Ozempic. In preliminary phase 1 trials, participants taking amycretin lost up to 13.1% of their body weight in just three months, indicating its potential as a significant advancement in obesity treatment (15).

Zepbound, a dual GIP/GLP-1 agonist approved in late 2023, has shown substantial weight loss, averaging 21% during clinical studies. Administered weekly, it effectively helps individuals with obesity and reduces the risk of developing type 2 diabetes from pre-diabetes (16). Semaglutide also plays a key role in managing obesity and cardiovascular risks. Nutritional recommendations for patients using these medications emphasize a balanced intake of whole grains, fruits, and vegetables while limiting sugars and saturated fats, with a target fiber intake of 21–25 grams per day for women. For adolescents with PCOS, Medical Nutrition Therapy focuses on personalized dietary interventions to improve insulin resistance and reproductive health, while metformin shows promise in managing early puberty and related weight issues (17).

7. Conclusion

Junk food, high in unhealthy fats and sugars and lacking essential nutrients, is linked to early puberty and PCOS in females. This diet causes nutritional deficiencies, weight gain, and insulin resistance, disrupting hormonal balance and exacerbating PCOS symptoms, particularly due to obesity. Adopting a balanced, nutrient-rich diet and promoting nutritional education among adolescents and parents are essential preventive measures. Emerging anti-obesity treatments and personalized dietary guidance offer support, but prevention remains key for better reproductive and metabolic health.

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