

“Impact of Junk and Ultra-Processed Foods on Brain Development in Adolescents”

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Abstract

The period of adolescence represents a fundamental developmental stage in humans which enables young people to undergo physical changes and emotional development and cognitive growth because their brains develop through this time. The proper nutrition during this period enables people to develop their memory skills and their ability to learn and their capacity to focus and their total cognitive abilities. The rising junk food and ultra-processed food consumption among teenagers has created major worries because of its negative effects on their brain function. The consumption of junk and ultra-processed foods leads to high levels of sugar and salt and unhealthy fats and artificial additives which create a food product that lacks essential nutrients needed for brain development. The study investigates how adolescents who consume these foods regularly develop their cognitive abilities and academic performance. The study shows that excessive food intake leads to multiple negative effects which include decreased focus ability and memory loss and weight gain and emotional changes and social interaction problems. The study investigates how teenagers who adopt unhealthy eating habits experience decreasing academic performance. The research proves that proper nutrition helps people develop their brainpower and their physical health. The results show that teaching adolescents to adopt healthy eating patterns while decreasing their use of processed foods will improve their cognitive abilities and academic performance.

Keywords

Junk Food, Ultra-Processed Foods, Adolescents, Brain Development, Cognitive Function, Memory, Learning Outcomes, Nutrition, Academic Performance, Healthy Diet

1 Introduction

Adolescence is a critical human life stage which begins at age 10 and ends at age 19 because it brings about major physical and emotional and mental transformations. The brain undergoes its most significant development during this time which determines the learning capacity and memory function and decision-making process and behavioral patterns of individuals. Brain growth and cognitive abilities depend on essential nourishment which serves as their foundation. Adolescent junk food and ultra-processed food consumption has risen sharply during the past few years because of urban development and fast-paced living and advertising and easy product access.

Junk foods and ultra-processed foods contain high levels of sugar and salt and harmful fats while lacking essential vitamins and minerals and proteins needed for human nutrition. The foods create negative effects which harm brain development by causing decreased concentration and impaired memory and disrupted

emotional balance. Adolescents who frequently consume such foods are also more likely to develop unhealthy eating habits, obesity, and mental health issues such as stress and anxiety.

Adolescence marks a period when the brain undergoes its most intense growth because this time brings about essential development to systems that govern learning and reasoning and impulse control. Nutrition during this time period becomes crucial because it determines both immediate cognitive development and future academic success. Research investigates how junk food and ultra-processed food consumption affects brain development in adolescents while demonstrating the need for proper dietary practices. The study investigates how poor nutritional choices create negative effects on academic achievement and cognitive development.

The research aims to inform people about how balanced diets enhance both brain function and complete body health. The research demonstrates that educational programs need to be established together with policy measures which should aim to decrease unhealthy dietary patterns among teenagers.

1.1 Meaning of Junk Foods

Junk foods refer to food items that are high in calories, sugar, salt, and unhealthy fats but low in essential nutrients such as vitamins, minerals, fiber, and proteins. These foods are often highly processed and are designed for quick consumption rather than nutritional value. Common examples of junk foods include chips, burgers, pizzas, fries, chocolates, candies, sugary drinks, and packaged snacks. The adolescent population consumes junk food because it tastes good and they can find it easily and companies spend money to advertise it. However, they provide little or no nutritional benefit to the body and can negatively affect physical and mental health if consumed in excess. People who frequently eat junk food will experience weight gain and digestive issues and exhaustion and nutritional deficiencies.

From a cognitive perspective, junk food consumption can impact brain development by reducing concentration, memory power, and learning ability. High sugar and fat content can affect brain function and lead to mood swings and behavioral problems. Adolescents who eat junk food on a daily basis will experience negative effects because their brains are still developing. Proper cognitive development requires children to consume fruits and vegetables and whole grains as healthy food options.

1.2 Meaning of Ultra-Processed Foods

Ultra-processed foods are industrially manufactured food products that contain multiple ingredients, which include artificial flavors and preservatives and colorings and emulsifiers and other chemical additives. The food products undergo extensive processing which results in complete transformation from their original natural state. The products include instant noodles and packaged biscuits and soft drinks and frozen meals and ready-to-eat snacks and processed meats.

Ultra-processed foods differ from minimally processed foods because their design purpose was to provide consumers with products that maintain quality during extended storage while delivering superior flavor. The products do not contain vital nutrients which people need to support their healthy development. The products contain excessive amounts of refined sugar together with unhealthful fats and sodium and

synthetic ingredients.

The health of adolescents suffers through physical and mental decline because they eat too many ultra-processed foods. The foods connect to three health problems which include obesity and metabolic disorders and inadequate nutritional intake. The substances disrupt proper brain development because they impact memory and attention span and cognitive performance. Research shows that eating too much of these foods can change emotional patterns which raise the possibility of experiencing stress and anxiety and depression.

Adolescents need to limit their consumption of ultra-processed foods because natural nutrient-rich foods provide the necessary components for brain development and overall health maintenance.

1.3 The Significance of Adolescent Brain Development

1. A crucial time for the development of memory and learning capabilities
2. aids in making decisions and solving problems.
3. regulates the development of emotions and behaviour
4. increases focus and attention span
5. affects intellect and academic achievement
6. influences social behaviour and personality.

1.4 Objectives of the Study

1. To research the idea of junk and highly processed foods
2. To examine how they affect teenage brain development
3. To comprehend how nutrition affects cognitive function
4. To investigate impacts on learning capacity, memory, and focus
5. To determine the health hazards connected to the consumption of bad foods
6. To raise awareness of the importance of eating healthily

2 Review of Literature

1. Arushi Jain & P. Mathur (2020) The research study investigated ultra-processed food consumption patterns among adolescents who belong to low- and middle-income families in Delhi, India. The authors discovered that adolescents who consume high amounts of packaged and processed foods experience two negative effects which include nutritional deficiencies and poor dietary quality. The research demonstrated that such dietary patterns prevent essential nutrients from reaching the brain which results in decrease of cognitive development.

2. Sandeep Kaur, Rajesh Kumar & Manmeet Kaur (2026) The Indian cluster randomised controlled trial tested behaviour change interventions to reduce ultra processed food consumption among adolescents who attended schools. The research results showed that people who consume UPFs in high amounts experience two negative effects which include poor diet quality and increased risk of obesity and decreased overall health status that results in impaired cognitive function and learning capabilities.

3. Singh, J. S., Singh, S. P., & Gupta, S. R. (2015–2018) The Indian ecological and environmental

nutrition research project shows that processed food diets lead to negative health effects for adolescents. The researchers established that nutrient deficiency during adolescence results in three negative effects which include impaired brain development and reduced attention span and weak memory functions.

4. Rohitashwa Kumar (2016) The research investigates environmental adaptation but results show how nutritional deficiencies and dietary problems affect Indian rural communities who live in arid regions. The research shows how inadequate nutrition during developmental periods leads to cognitive decline which persists into their teenage years.

5. Hanuman Prasad, Devendra Meghwal & Vijay Dayama (2018) The researchers examined how environmental factors and nutritional deficiencies affect adolescents in Rajasthan who eat poor-quality food which results in lower physical strength and mental capacity. The research demonstrates how inadequate nutrition leads to both cognitive decline and reduced academic performance.

6. Verma, S. K. & Verma, Mohit (2019) The research study investigates food consumption patterns from processed foods while studying environmental biology and nutrition because excessive processed food intake results in metabolic disorders which impair adolescent brain development and learning capabilities.

3 Research Methodology

3.1 Research Design

- Research Type: Descriptive and Analytical
- Qualitative and Quantitative Nature
- Study Area: Schools in urban and semi-urban areas
- Target Group: Young people (students)
- Sampling Technique : Simple Random Sampling Data Collection Tools : Questionnaire and Interview Method of Analysis : Percentage Analysis

3.2 Sample Sizes

The study was done on 100 adolescent pupils selected from different schools.

3.3 Data collection method

Primary data

- Pre-made questionnaires
- Student interviews
- Teacher Comments

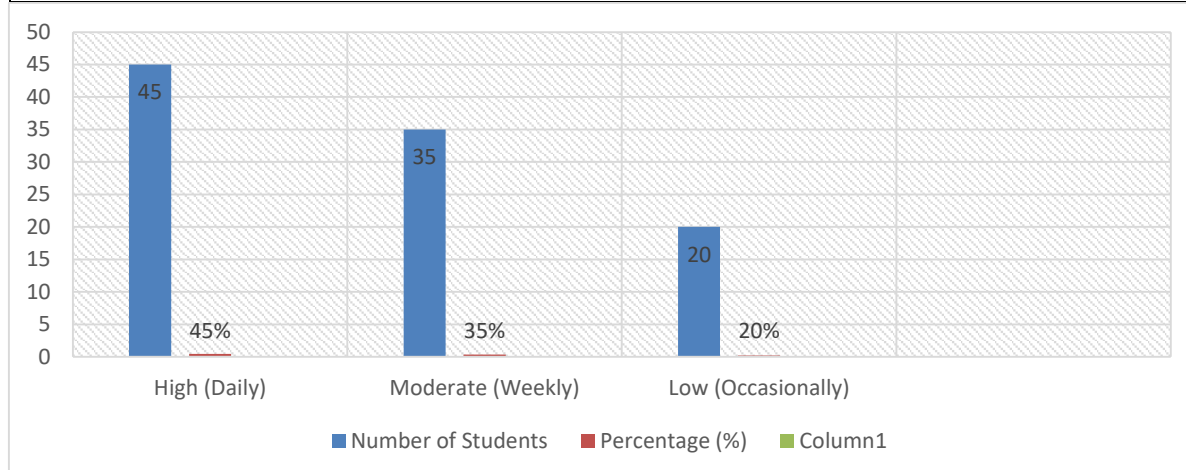
Data from secondary sources

- Journals of Research
- Health news
- Books on teenage health and nutrition
- Internet articles

4 Data Analysis

Table 1: Frequency of Junk Food Consumption

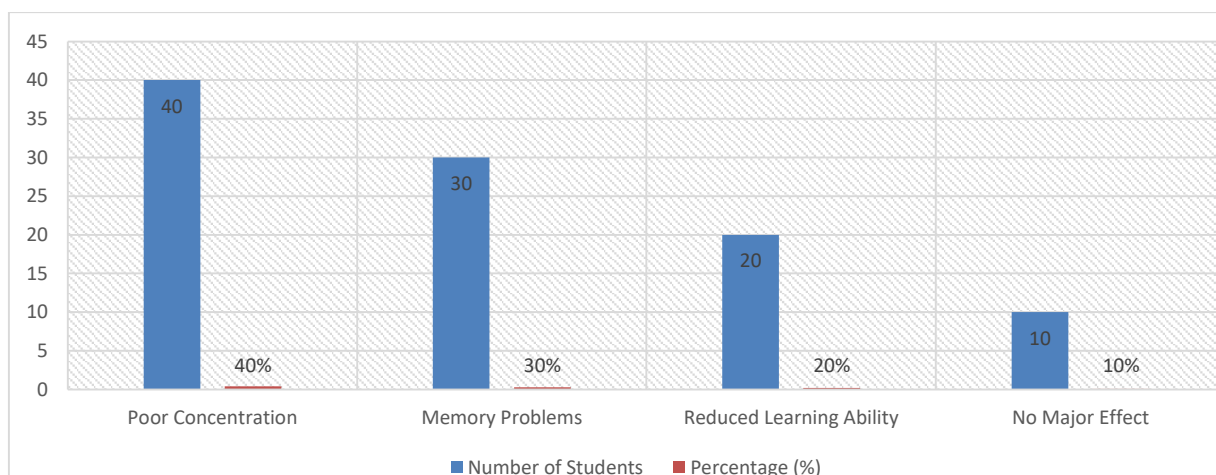
Consumption Level	Number of Students	Percentage (%)
High (Daily)	45	45%
Moderate (Weekly)	35	35%
Low (Occasionally)	20	20%



Interpretation The table shows that 45% of adolescents consume junk food daily, which is a high proportion. The data shows that 20% of people eat junk food on a regular basis while the rest of the population shows unhealthy eating patterns. The regular consumption of this substance has the potential to harm both brain development and academic success.

Table 2: Impact on Cognitive Abilities

Cognitive Effect	Number of Students	Percentage (%)
Poor Concentration	40	40%
Memory Problems	30	30%
Reduced Learning Ability	20	20%
No Major Effect	10	10%



The table shows that 40% of students experience concentration difficulties while 30% of students face memory problems because they eat junk food. Only 10% of the participants showed no important effects from the study. The research demonstrates that higher consumption of ultra-processed foods leads to lower development of cognitive abilities.

5 Discussion

The study proves that adolescent brain development suffers because of junk food and ultra-processed food consumption. The results show that most students choose to eat unhealthy food which includes chips burgers sugary drinks and packaged snacks. Adolescents require proper nutritional balance which they achieve through their current eating habits, which results in excessive food consumption. The research found that students experience difficulty concentrating while their memory capacity and learning skills decrease. The dietary choices of adolescents result in these cognitive problems. Proper nutrition is essential for academic success during the stage when adolescents experience major brain development. The study indicates that people who eat excessive amounts of processed food items will experience changes in their behavior which include becoming more irritable and fatigued while losing their ability to concentrate. The process diminishes both classroom performance and educational achievements. The discussion shows that students need proper nutritional habits because those habits will help them develop better cognitive skills which will lead to improved academic performance. Adolescents need to consume a balanced diet that includes fruits, vegetables, proteins, and whole grains to support their brain development.

6 Conclusion

The study shows that both junk food and ultra-processed food consumption together create serious harm to adolescent brain development. The results show that eating these types of foods results in three cognitive problems which include poor concentration and weak memory and decreased learning ability. Adolescence requires proper nutrition because it supports essential brain development which connects to academic learning and cognitive development. The data shows that a large percentage of students consume junk food regularly which is a serious concern for their physical and mental health. The lack of essential nutrients in these foods affects brain functioning and may lead to long-term cognitive problems. The study shows that students who eat better diets achieve higher academic results while their concentration and memory abilities improve. Dietary habits play an important role in shaping brain development and learning outcomes. Adolescents and parents together with schools need to learn about the harmful effects of junk food and ultra-processed food. Healthy eating habits lead to better cognitive abilities which bring overall health improvements.

The main purpose of balanced nutrition is to support healthy brain development which leads to better academic results in adolescents.

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