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Scientific review on Junk Food Addiction: Understanding Influences, methods to Control and Indian Alternatives

Joydeep Googi,

ABSTRACT:

This paper delves into the observational study on junk food addiction, shedding light on its prevalence across different age groups and from different demographies. By observing their food habits and investigating the scientific triggers that cause them to consume despite knowing its adverse effects, as well as external influences like easy availability, peer groups, and parental behaviour, the research aims to provide a comprehensive understanding of the issue. The study also identifies hazardous chemicals associated with such foods and proposes methods to control and mitigate junk food addiction in a simple way from traditional Indian cuisine.

OBJECTIVE:

The primary objective of this observational study is to analyze the prevalence of junk food addiction in India across various age groups and demographic groupings. Identifying the most popular junk foods and comparing them to the daily recommended limits in order to acknowledge the serious public health consequences of this problem. Furthermore, the research endeavors to explore and recommend alternative, healthier substitutes within the rich landscape of Indian cuisine.

METHOD:

The study used a surreptitious observational methodology to gather information on the consumption trends of junk food in India among different age groups. To reduce potential biases, participants (N=50) who were members of the author's social network, such as siblings (1), parents (2), friends (9), cousins (3), relatives (5), and peers (30), were watched without their awareness. The goal of data gathering was to uncover social and scientific triggers, such as prevailing eating behaviours, outside influences, and desires.

OPERATIONAL DEFINITIONS:

People in this demographic cohort range in age from 20 to 60 years and are self-sufficient enough to make their own dietary selections.

Junk food is defined as food that is high in energy (calories) and heavy in fats, sugars, and salt but low in vitamins, minerals, and proteins. Any food that meets the aforementioned criteria—processed or uncooked, fast food or street food—can be categorised as "junk." Food prepared at home that met the aforementioned requirements was also regarded as junk food.

Results:

Majority of subjects [35(70%)] belonged to the age group of 21-30 years, followed by 31-40 years[10(20%)]. Of the 50 study subjects, 5(10%) were students, 35(70%) were job professionals, 6(12%) were into business and 4(8%) were retired.

All 50 study subjects had consumed either junk/street/instant food any time in past 6 months, majority, majority [37(74%)] subjects consumed it on a daily basis and junk food [13(26%)] was the most common type of food consumed on daily basis compared to others in both genders. Among junk food, Samosa/Kachori and Chips were most commonly consumed daily. The main reasons for consumption of junk food were: 12(24%) subjects mentioned family/social gathering, 16(32%) cravings, 9(18%) mess/hostel food not palatable and 13(26%) subjects said peer pressure/office tea time. 19(38%) subjects felt good, 6(12%) felt guilty, 25(50%) felt nothing at all after consumption of any junk food.

Keywords: Food addiction; Hazardous chemicals; junk food; harmful effects.

STUDY DURATION

The study was executed for a period of six months (May 2023 to October 2023).

INTRODUCTION

The escalating issue of junk food addiction is a pressing concern in contemporary society, affecting individuals across diverse age brackets. Despite widespread awareness of the detrimental outcomes associated with this addiction, a significant number of people yield to the temptations of processed and unhealthy food choices. This paper aims to explore the underlying factors that contribute to this addiction, scrutinizing the roles played by science and hormones, peer influence, accessibility, and a lack of awareness regarding alternative dietary options.

The term "junk food" pertains to fast foods that are easily prepared and swiftly consumed. These foods typically lack nutritional value and are often characterized by high levels of fat, salt, sugar, and/or calories. Examples of common junk foods encompass salted snack foods, fried fast food, and carbonated drinks. The pervasive nature of junk food presents a considerable challenge, prompting various countries to take measures such as prohibiting the advertisement of junk food during children's programs, eliminating it from school environments, and even imposing a tax on high-fat content items.

Additionally, many junk foods contain trans fats, which mimic the behavior of saturated fats within the body. These trans fats contribute to arterial clogging, leading to the accumulation of plaque and fostering conditions associated with heart disease and stroke. The multifaceted nature of the problem underscores the urgency of understanding and addressing the factors contributing to junk food addiction.

A 2008 report suggests that mothers who eat junk food while pregnant or breast-feeding have children who are more prone to obesity. The children are also more prone to diabetes, raised cholesterol, and high blood fat(1).

Salt, sugar, and fat are components that necessitate regulation. In India, Junk Food lacks standardization under regulatory frameworks. It falls within the food category that is only required to disclose its

composition or nature while adhering to general regulations outlined in the Food Safety and Standards Act. Given the absence of nutritional analysis reports for Junk Food in India, the Pollution Monitoring laboratory initiated a study focusing on the nutritional analysis of Junk Food. A total of 23 samples from seven distinct food categories—potato chips, snacks, instant noodles, burgers, pizzas, french fries, and carbonated drinks—were gathered from outlets in Delhi. These samples were then analyzed for salt content, total carbohydrate, total fat, and trans fat using the widely recognized and international methodology of the Association of Official Analytical Chemists (AOAC).

India presents a paradoxical scenario, where abundance and scarcity coexist. Nutrition exemplifies this duality, with under-nutrition, historically a significant public health concern, now being overshadowed by the emergence of obesity. This dual challenge is a consequence of rapid urbanization. Millennials in India are undergoing shifts in dietary habits, transitioning from the consumption of ostensibly healthy foods to the indiscriminate intake of junk food, fueled by the country's economic growth. The trend of increased junk food consumption is not limited to the younger generation but spans across all age groups, gradually supplanting a balanced diet.

The terms "fast food" and "junk food" are often used interchangeably, though not all fast foods are necessarily junk foods, especially when prepared with nutritious ingredients. The prevalence of junk food consumption is evolving from an unhealthy lifestyle choice to a fully-fledged addiction. High-calorie junk food has become a convenient and economical alternative to healthier snacks. The rapid proliferation of fast-food chains, even in smaller towns and cities, is evident, aided further by the advent of mobile-based apps such as Zomato and Swiggy, which simplify the delivery of food to doorsteps.

Recently, there has been a growing preoccupation with the consumption of food based on calorie count. Diets such as the Atkins Diet (low carbohydrate), Keto diet (low carbohydrate & high fat), Zone diet (40% carbohydrates, 30% fats, and 30% protein), and veganism (excluding the use of animals for food) have gained immense popularity, especially among health enthusiasts. The endorsement of these diets by celebrities significantly influences people and contributes to the widespread adoption of such dietary practices. However, prolonged adherence to extreme diets may result in nutritional deficiencies, prompting individuals to turn to supplements like multivitamins, protein powders, energy drinks, or even steroids.

Another trend gaining traction is the reliance on meal replacements such as Herbalife and Nutrilite to achieve desired weight and body goals. It is crucial to note that indulging in junk food addiction, following alternative diets, and resorting to meal replacements are not advisable for maintaining a healthy lifestyle. Such extreme eating habits can have adverse effects on health, leading to issues like obesity, diabetes, hypertension, malnutrition, and more. Despite the potential risks, there is limited research available on junk food addiction.

In light of this, our study aimed to investigate the possibility of addiction to junk food using a newly developed junk food addiction scale. The objectives of the study were to describe the socio-demographic characteristics of the participants, assess health problems related to junk food habits, measure the burden of addiction to junk food using the novel scale, and explore alternate diets followed by the participants.

Recent reviews indicate a parallel increase in obesity and problematic eating behaviors with the globalization and industrialization trends in South Asian countries, including India (Pike & Dunne, 2015)(2). Furthermore, emerging evidence suggests that individuals in India may be more prone to meeting the clinical threshold for food addiction compared to other ethnicities (Meadows et al., 2017)(3). Combining these findings underscores the clinical importance of evaluating food addiction in the Indian

population. This study seeks to bridge a cultural gap in the food addiction literature by examining food addiction, as measured by the YFAS, and associated clinical features within an online community group residing in India.

Yale Food Addiction Scale

Research on food addiction, commonly assessed through versions of the Yale Food Addiction Scale (YFAS; Gearhardt et al., 2009)(1), in both clinical and non-clinical study groups consistently reveals associations with various biopsychosocial factors. Previous findings indicate robust links between food addiction and conditions such as obesity, depression, health-related quality of life, and disordered eating behaviors, including emotional eating and binge eating (Burrows et al., 2018(2); Chao et al., 2017(3); de Vries & Meule, 2016(4); Gearhardt, Boswell, & White, 2014(5); Gearhardt, Corbin, & Brownell, 2009(6); Gearhardt et al., 2012(7); Pursey et al., 2014(8); Schulte, Grilo, & Gearhardt, 2016(9); Wolz, Granero, & Fernandez-Aranda, 2017(10)). Notably, food addiction appears to be more prevalent in women, whereas investigations into the relationship between food addiction and racial/ethnic identity have yielded mixed results (Burrows et al., 2018)(2).

The majority of studies on food addiction have been conducted in the United States, predominantly with homogeneous participant groups, such as White women with obesity. This limits the generalizability of findings to populations of diverse ethnicity, race, socio-economic status, and weight status, as well as non-clinical groups. Given the scarcity of studies examining food addiction in culturally heterogeneous groups, there is a lack of understanding of how food addiction manifests in these understudied populations. The Yale Food Addiction Scale (YFAS), the primary method for measuring and operationalizing food addiction, is a self-report questionnaire based on the seven substance use disorder diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000).

Two recent meta-analytic studies reported that the weighted mean percentage of participants meeting the YFAS clinical threshold for food addiction was 16.2% and 19.9%, respectively (Burrows et al., 2018)(2). While the YFAS has been translated and validated in various languages, including Arabic, Italian, French, German, Spanish, Chinese, and Turkish, more research is needed to comprehend how cultural influences and correlates of food addiction may differ across diverse cultural constructs. This becomes particularly relevant for countries undergoing rapid cultural and economic changes, as eating behaviors are influenced by sociocultural phenomena and may respond to cultural transitions (Kelly, 2003(11); Pike, Hoek, & Dunne, 2014(12)). Addressing this research gap is crucial for a more comprehensive understanding of food addiction in culturally diverse populations.

India is currently experiencing swift global integration marked by economic, nutritional, and sociocultural transformations (Raskind, Patil, Haardörfer, & Cunningham, 2018(13); Thomas, Lee, & Becker, 2016). Despite this, there is a notable lack of research on food addiction and its associated clinical characteristics among individuals in India. An essential study involving an ethnically diverse international online sample revealed a significant association between non-White ethnicity and an increased likelihood of a food addiction "diagnosis," particularly among participants identifying as South Asian (Meadows, Nolan, & Higgs, 2017)(14). South Asian participants, in comparison to their White counterparts, reported significantly more symptoms according to the Yale Food Addiction Scale (YFAS) and were more inclined to self-identify as having food addiction (Meadows, et al., 2017)(14).

These findings align with previous research indicating a higher prevalence of disordered eating behaviors, such as binge eating, and unconventional cultural presentations of eating disorders in individuals from the Indian subcontinent compared to White individuals (Gupta, Chaturvedi, Chandarana, & Johnson, 2001(15); Lal, Abraham, Parikh, & Chhibber, 2015(16)). These observations gain significance in light of the escalating obesity rates in India, rising from 12.1% in 2000 to 19.7% in 2016 (World Health Organization, 2016)(17).

A recent review proposes a correlation between the surge in obesity and problematic eating behaviors and the concurrent processes of globalization and industrialization in South Asian countries, including India (Pike & Dunne, 2015)(18). Furthermore, emerging evidence suggests that meeting the clinical threshold for food addiction may be more prevalent among Indian individuals compared to other ethnicities (Meadows, et al., 2017)(14). Collectively, these findings underscore the clinical relevance of investigating food addiction in the Indian population. This study aims to bridge a cultural gap in the food addiction literature by examining food addiction, as assessed by the YFAS, and its associated clinical features among members of an online community residing in India.

Major nutrients in diet and recommended dietary guidelines

Carbohydrates, proteins, and fats constitute the primary sources of dietary calories. The nutritional needs vary based on factors such as age, gender, physical activity, and physiological status. Achieving these requirements can be effectively accomplished through a combination of fundamental food groups, as most foods and beverages contain varying proportions of these macronutrients.

In accordance with the Dietary Guidelines for Indians (National Institute for Nutrition, 2011), a well-balanced diet should ideally contribute 50-60% of calories from carbohydrates, 10-12% from proteins, and 20-25% from fats. The National Institute for Nutrition recommends limiting trans fat intake to a maximum of two percent of total calories, while the World Health Organization suggests a one percent limit.

A balanced diet should also encompass non-nutrients like dietary fiber, antioxidants, and phytochemicals, which confer positive health benefits. Antioxidants such as vitamin C and E, beta-carotene, riboflavin, and selenium play a protective role against free radical damage, while other phytochemicals, including polyphenols and flavones, offer defense against oxidant-induced harm.

Carbohydrate	Sugars	Protein	Salt	Fat
50-60%	<10%	10-15%	6g per Day	20-30%

Table1 : Recommended Dietary Guidelines for Indians

Source: National Institute for Nutrition (2011)

Junk food is characterized as any food low in essential nutrients but high in non-nutritive components, particularly calories and sodium. These foods typically lack proteins, vitamins, and minerals but are abundant in salt, sugar, fats, and overall energy (calories). Examples include highly salted items like chips, products rich in refined carbohydrates (empty calories) such as candy and soft drinks, and those high in saturated fats like cake and chocolates.

Major Contents in Junk Food

Junk food typically comprises a combination of ingredients that contribute to its appealing taste and texture. The major contents in junk food often include:

High Levels of Free Sugars: Carbonated beverages, candies, and desserts found in junk food are notorious for their elevated free sugar content. These sugars add sweetness but also contribute to health concerns such as obesity and dental issues.

Unhealthy Fats: Junk foods are often rich in unhealthy fats, such as saturated and trans fats. These fats are commonly found in items like fried foods, burgers, and certain snack items. Excessive consumption of these fats is linked to an increased risk of heart disease and other health problems

Processed Carbohydrates: Many junk foods are laden with processed carbohydrates, often in the form of refined grains. Items like white bread, pizza dough, and pastries can contribute to a rapid spike in blood sugar levels and lack the nutritional benefits of whole grains.

Sodium (Salt): Fast food and processed snacks are notorious for their high salt content. Excessive sodium intake can contribute to elevated blood pressure and increase the risk of cardiovascular issues.

Artificial Additives: Junk foods frequently contain a variety of artificial additives, including preservatives, flavor enhancers, and colorings. While these substances enhance the taste and appearance of the food, their long-term health effects are a subject of concern.

Low in Essential Nutrients: One common characteristic of junk food is its lack of essential nutrients. These items often provide little in terms of vitamins, minerals, and other beneficial compounds that support overall health.

Salt: The dietary guidelines provided by the National Institute of Nutrition (NIN) in 2010 emphasize the importance of limited salt consumption, advocating for a reduction in daily salt intake to a minimum of 6 g per person. Additionally, the World Health Organization (WHO) recommends an even lower threshold of 5 g per person per day.

Analyzing the salt content in 22 samples of junk food, measured in grams per 100 g of sample, revealed a range of 0.2 to 4.2. Instant noodles, specifically Maggi Masala (4.2 g) and Top Ramen Noodles (3.2 g), exhibited the highest salt content. Potato chips displayed a salt content ranging from 1.2 to 3.5 g per 100 g.

Examining specific categories, the average salt content in vegetarian burgers (3 samples) was 1.7 g, while non-vegetarian burgers (3 samples) contained an average of 1.5 g per 100 g. Pizza (3 samples) showed an average salt content of 1.0 g, fries (3 samples) had 0.4 g, and fried chicken (1 sample) had 0.9 g per 100 g (refer to Figure 1). These findings highlight the varied salt content across different junk food categories, underscoring the importance of monitoring and regulating salt intake in these products.

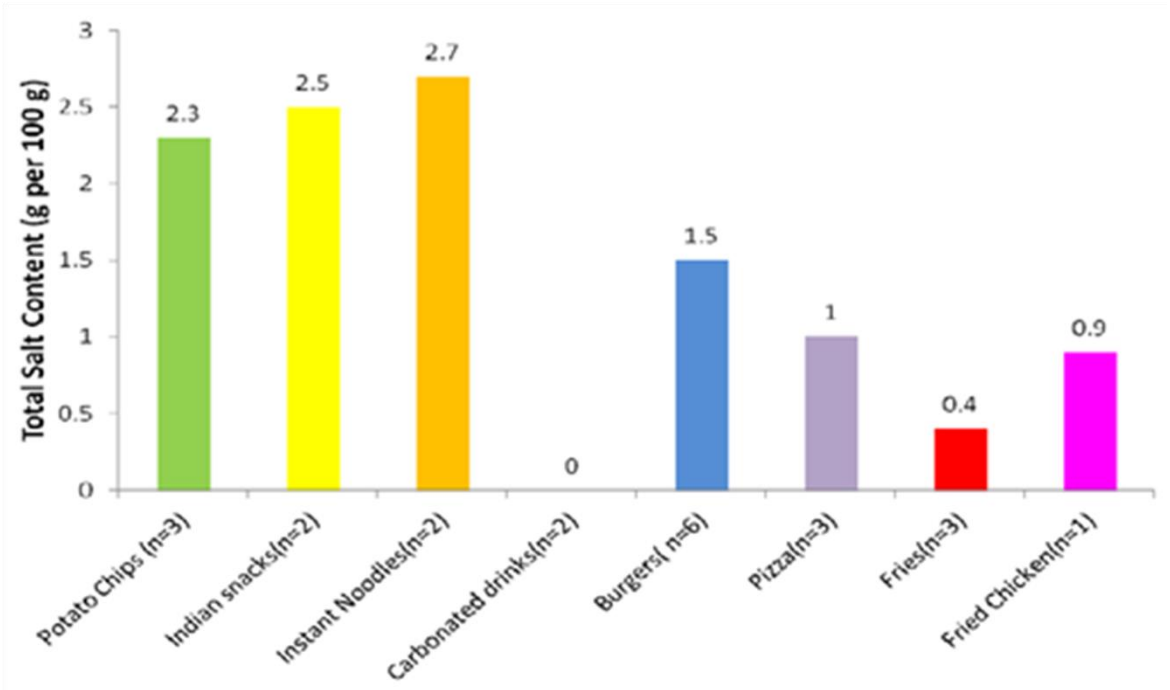

Figure 1. Total salt of Junk Food Samples (g per 100g)

Carbohydrate: The National Institute of Nutrition (NIN) recommends that 50-60% of the total energy intake should come from carbohydrates. The carbohydrate content per 100 g of sample in Potato chips (3) was 57.5 g, in Indian snacks (1 sample each of Aaloo bhujia and Kurkure masala munch) was 49.9 g, in instant noodles (2) was 71.6 g, and in carbonated drinks (2) was 14.4 g. The carbohydrate content in Vegetarian Burgers was 43.4 g, while in Nonvegetarian Burgers, it was 32.9 g per 100 g of sample. Pizza (3) had 50.3 g of carbohydrates, and Fries (3) and fried chicken (1) had 56.5 g and 14 g per 100 g, respectively. The highest level of carbohydrates was observed in Top Ramen Noodles at 73.3 g per 100 g of sample.

Fats: The dietary recommendations set forth by the National Institute of Nutrition in India (NIN, 2010) propose that 15-30% of total caloric intake should come from fat, with a maximum of 10% from saturated fats. Additionally, trans fats are advised to constitute only one or two percent of the total dietary energy.

Total fat: The total fat content in 23 different samples of junk food varied, ranging from a minimum of 7.1 g per 100 g in Pizzas (3) to a maximum of 35.9 g per 100 g in Indian Snacks (Aaloo bhujia and Kurkure masala munch). The specific total fat content per 100 g for each sample were as follows: Potato chips (4) 33.0 g, Indian snacks (2) 35.9 g, Instant noodles (2) 14.1 g, Burgers (6) 11.9 g, Pizza (3) 7.1g, Fries (3) 19.9 g, and Fried chicken (1) 23.4 g (refer to Figure 2). Notably, the highest total fat level was observed in the Indian Snack (Haldiram's Aaloo bhujia) at 37.8 g per 100 g of the sample.

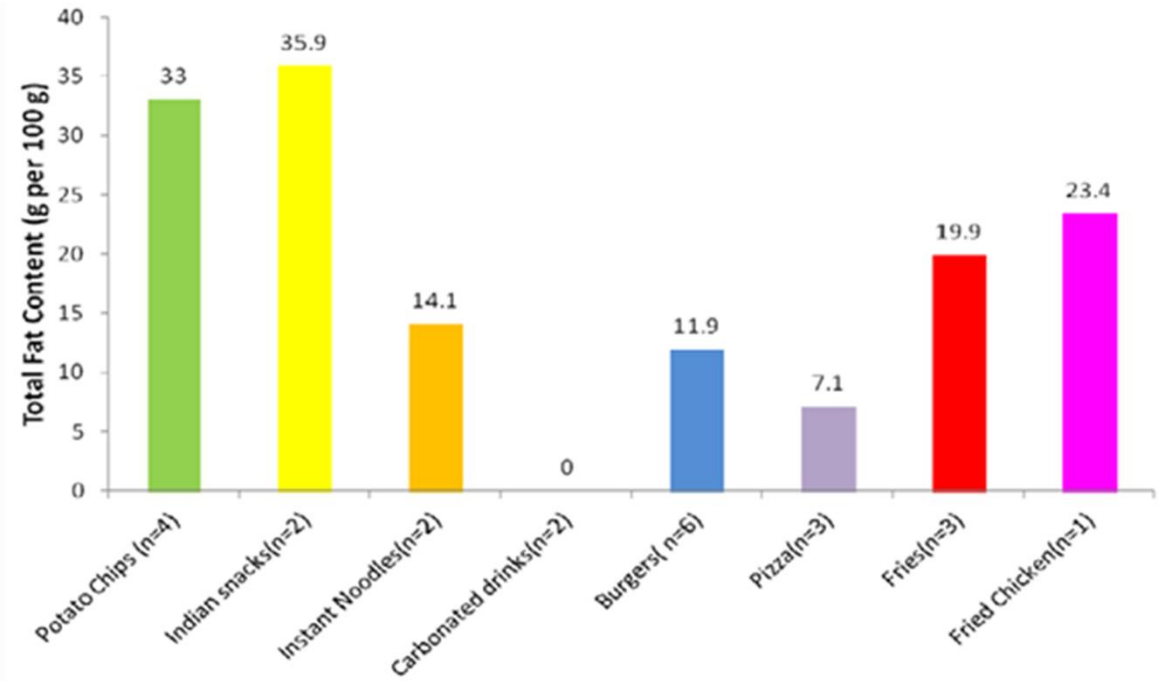

Figure 2. Total fat of Junk Food Samples (g per 100g)

Trans fats: The current World Health Organization (WHO) recommendation for trans fat intake is to keep it below 1% of daily energy intake. In our study, the analysis revealed varying levels of trans fats in different food items. The highest amount of trans fats, at 1.6 g per 100 g sample (~8.1% of total fat as trans fats), was observed in Fries (3). Instant noodles (2) contained 0.6 g per 100 g sample (~4.6% trans fats as a percentage of total fat), while Indian snacks exhibited 1.6 g per 100 g sample (~4.3% trans fats as a percentage of total fat). Burgers (6) contained 0.4 g per 100 g sample (~3.5% trans fats as a percentage of total fat), and Fried chicken showed 0.7 g per 100 g sample (~2.9% trans fats as a percentage of total fat). Potato chips demonstrated 1.5 g per 100 g sample (~4.5% trans fats as a percentage of total fat). Pizzas had the least amount of trans fats, with 0.1 g per 100 g sample (~1.1% trans fats as a percentage of total fat) (refer to Figure 3).

Notably, the highest levels of trans fats were identified in KFC's French fries, reaching 1.7 g per 100 g (~9.2% trans fats as a percentage of total fat).

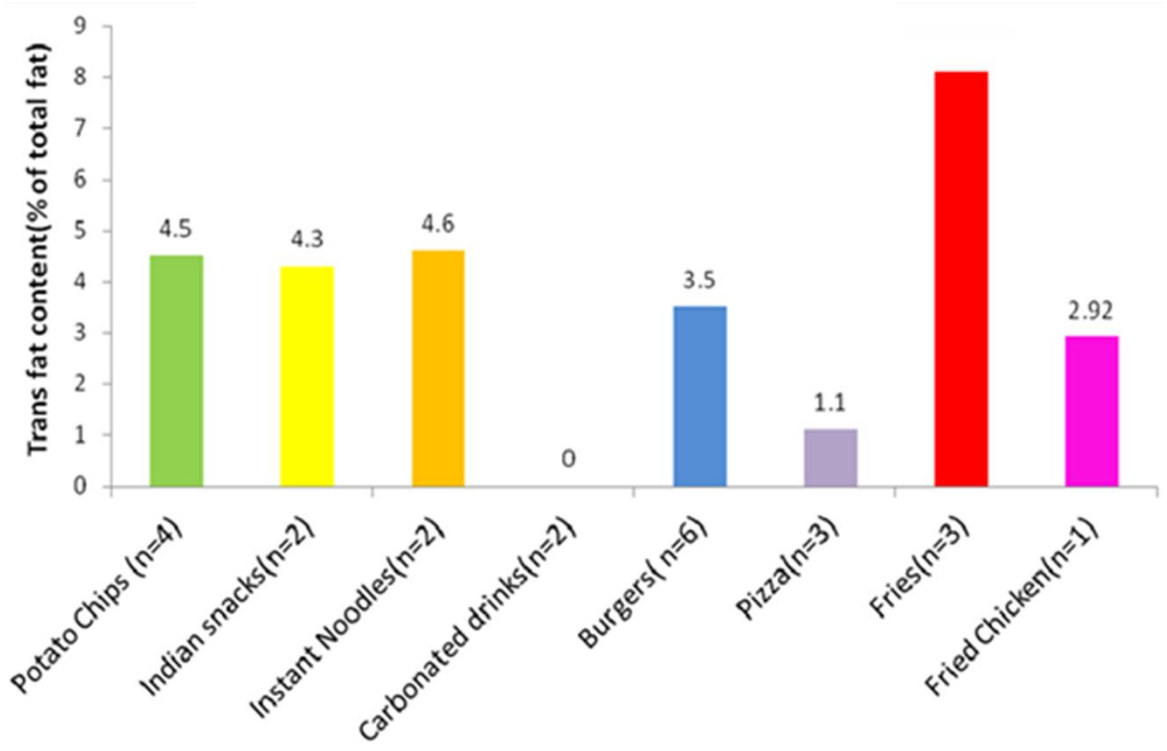

Figure 3. Total trans-fats of Junk Food Samples (as % of total fat)

The findings of the investigation reveal that junk food is characterized by elevated levels of sugars, salt, and trans fats. The substantial presence of trans fats poses a significant public health risk, particularly in relation to chronic heart diseases. Among the tested items, French fries exhibited the highest trans fat content (8.1% of total fat), followed by instant noodles (4.6% of total fat) and potato chips (4.5% of total fat). It is recommended to implement regulations to mitigate trans fat levels in junk foods, accompanied by clear labeling requirements.

Likewise, excessive salt intake is linked to hypertension. Instant noodles, in particular, demonstrated the highest salt content (3.7 g per 100 g of sample), indicating that consuming a single packet of instant noodles could contribute to nearly half of the daily recommended salt intake. Notably, salt content information was absent from product labels. To address this, a nationwide initiative should be established to reduce salt levels in both diets and junk foods, with a mandate for companies to disclose salt quantities on their packaging.

Currently, the provision of nutritional information is not obligatory unless specific claims are made. Notably, takeaway foods such as pizzas, burgers, fries, and potato chips do not provide nutritional information on their packaging, making it challenging for consumers to compare products. To enhance transparency, mandatory labeling requirements should be implemented, covering essential nutritional details, including serving size, trans fats, saturated fats, sugars, and salt. This should be applicable to all processed foods, including takeaway items.

Given the targeted marketing of junk food to children, it is imperative to prohibit the sale of such items in schools and other places accessible to children. Additionally, the government should initiate awareness campaigns to educate consumers about the adverse health effects associated with the regular consumption of junk foods.

Samples of Junk Foods

Sl. No.	Brand	manufacturer	Date if Manufacture	Reported Nutritional Information (per 100g/100mL)
A.	**Potato Chips**			
1.	**Uncle Chips, Spicy Treat**	**Pepsico India Holding Pvt. Ltd. (Frito-Lay Division), Manufacturing unit – Atop Food Products, Morbi Rajkot Highway, P.O. Box No. 007, Morbi – 363641, Gujarat**	**09 Jan 12**	**Energy- 554Kcal Protein- 7.0g Carbohydrate- 52.7g Sugars- 1.3g Fats- 35g Trans Fat- Not mentioned**
2.	**Lays, American Style Cream & Onion Flavour**	**Pepsico India Holding Pvt. Ltd. (Frito-Lay Division), Manufacturing unit – JL No. 2 & 4 (Kendua Panchayat), Mouja Jaldhulagari via Andul Maouri, P.O. Dhulagarh, P.S. Sankrail, Distt. Howrah, Pin – 711302, West Bengal**	**28 Dec 11**	**Energy – 549 kcal Protein – 8.0 g Carbohydrate – 52.7 g Sugars – 3.7 g Fat – 34 g Trans Fats – 0 g Cholesterol – 0 mg**
3.	**Bingo, Oye Pudina**	**ITC Ltd, Manufacturing unit – ITC Ltd., Foods division, snacks unit, plot no. 1, sector 11, IIE, BHEL, Haridwar – 249403.**	**18 Aug 11**	**Energy – 527 kcal Protein – 8.1 g Carbohydrate – 54.1 g Sugars – 4.5 g Total Fat – 30.9 g Trans Fats – 0 g Cholesterol – 0 mg**
4.	Lays, American Style Cream & Onion Flavour	**Pepsico India Holding Pvt. Ltd. (Frito-Lay Division), Manufacturing unit – JL No. 2 & 4 (Kendua Panchayat), Mouja Jaldhulagari via Andul Maouri, P.O. Dhulagarh,**	**21 Feb 2012**	**Energy – 549 kcal Protein – 8.0 g Carbohydrate – 52.7 g Sugars – 3.7 g Fat – 34 g Cholesterol – 0 mg**

		P.S. Sankrail, Distt. Howrah, Pin – 711302, West Benga		
B.	Indian snacks			
5.	**Aloo Bhujia**	**Haldiram Manufacturing Co. Pvt. Ltd., B – 1/F – 12, Mohan Co-operative, Industrial Estate, Mathura Road, New Delhi – 110044**	**Sep 11**	**Energy – 630 kcal Protein – 5 g Total Carbohydrate – 40 g Total Fat – 50 g 6Trans Fats – 0 g Cholesterol – 0 mg Sodium – 670 mg**
6.	**Kurkure Masal Munch**	**Pepsico India Holding Pvt. Ltd. (Frito-Lay Division), Manufacturing unit – Village Channo, Patiala, - Sangrur Road, P.O. Bhawanigarh, Distt. Sangrur – 148026, Punjab**	**31 Jan 12**	**Energy – 561 kcal Protein – 6.4 g Carbohydrate – 53.6 g Sugars – 3.0 Fat – 35.7 g Trans Fats – Not mentioned**
7.	**Masala Maggi**	**Nestle India Ltd. Plot No. 1A, Sector 1, Integrated Industrial Pantnagar – 263145, Uttrakhand**	**Jan 12**	**Energy – 402 kcal Protein – 9.2 g Carbohydrate – 58.9 g Sugars – 1.2 Fat – 14.4 g Trans Fats – Not mentioned Calcium – 150 mg Potassium – 365 mg**
8.	**Top Ramen, Super Noodles, Masala**	**Indo Nissin Foods Limited Manufacturing unit – 91 kms, Delhi Jaipur Road, (NH – 8), Village – Deodhai, Tehsil – Bawal, Distt. – Rewari, Haryana – 123401**	**Dec 2011**	**Energy – 467 kcal Protein – 7.6 g Carbohydrate – 73.3 g Sugars – 1.3 Fat – 15.9 g Trans Fats – 0 g Cholesterol – 0 mg Vitamin B1 – 0.6 mg Vitamin B2 – 0.7 mg**
C.	Carbonated drinks			
9.	**Pepsi**	**Pearl Drinks Ltd., Plot No 2E, Udyog Kendra, Ecotech III, Greater Noida, - 201304 (U.P.)**	**08-02-12**	**Energy – 44 kcal Protein – 0 g Carbohydrate – 11 g Sugars – 11 g Fat – 0 g**
10.	**Coca Cola**	**Hindustan Coca-Cola Beverages Pvt. Ltd., Tehsil Hapur, Distt. Ghaziabad – 201009, U.P.**	**07—02-12**	**Energy – 44 kcal Protein – 0 g Carbohydrate – 11 g Sugars – 11 g Fat – 0 g**

Annexure II. Salt, Total Carbohydrate, Total Fat and Trans fat in Junk Food samples.

S.No.	Sample Name	Manufacturer	Salt (g per 100g)	Total Carbohydrate (g per 100g)	Total Fat (g per 100g)	Trans Fat (g/day)	Trans Fat (% of total Fat)
A.	Potato Chips						
1.	Uncle chips spicy treat	Pepsico India Holding Pvt. Ltd	3.5	52.2	34.3	0.8	2.32
2.	Lays American Style Cream & Onion Flavour	Pepsico India Holding Pvt. Ltd	1.2	56.9	33.1	0.9	2.8
3.	Bingo, oye pudina	ITC Ltd	2.3	63.4	31.0	0.6	1.79
4.	Lays American Style Cream & Onion Flavour	Pepsico India Holding Pvt. Ltd	-	-	33.7	3.7	10.93
B.	Indian Snacks						
5.	Aloo Bhujia	Haldiram Manufacturing Co. Pvt. Ltd.,	3.3	45.6	37.8	2.5	6.48
6.	Kurkure masala munch	Pepsico India Holding Pvt. Ltd	1.6	54.2	34.0	0.7	2.13
CPE.	Instant Noodle						
7.	Masala Maggi	Nestle India Ltd.	0.00	14.0	0.0	0.0	0.0
8.	Top Ramen Noodles	Indo Nissin Foods Limited.	0.0	14.4	0.0	0.0	0.0
D.	Carbonated drinks						
9.	Pepsi	Nestle India Ltd.	0.0	14.0	0.0	0.0	0.0
10.	Coca cola	Indo Nissin Foods Limited.	0.0	14.8	0.0	0.0	0.0
E.	Burgers						
11.	McAloo Cheese	Mc Donald's	2.0	48.1	8.3	0.3	3.39
12.	Veg Zinger with cheese	KFC	1.7	45.4	13.7	0.7	4.86
13.	Subz Burger	Nirula's	1.7	36.8	9.6	0.3	3.15

	with cheese						
14.	**McChicken**	**Mc Donald's**	**1.1**	**37.6**	**10.7**	**0.4**	**3.8**
15.	**Chicken Zinger**	**KFC**	**1.2**	**30.2**	**16.9**	**0.5**	**3.1**
16.	**Chicken burger**	**Nirula's**	**1.2**	**31.0**	**12.2**	**0.3**	**2.4**
F.	**Pizza**						
17.	**Margherita Pan**	**Pizza Hut**	**1.4**	**51.6**	**7.9**	**0.1**	**0.7**
18.	**Margherita**	**Dominos**	**0.6**	**43.7**	**6.3**	**0.1**	**1.62**
19.	**Margherita Classic**	**Silce of Italy**	**1.0**	**55.6**	**7.0**	**0.1**	**1.10**
G.	**Fries**						
20.	**Crispy, golden Fries**	**McDonald's**	**0.3**	**55.8**	**16.6**	**1.3**	**7.65**
21.	**French fries**	**KFC**	**0.8**	**59.0**	**19.0**	**1.7**	**9.20**
22.	**Fries**	**Nirula's**	**0.2**	**54.8**	**24.1**	**1.8**	**7.33**
H.	**Fried Chicken**						
23	**Hot and Crispy**	**KFC**	**0.9**	**14**	**23.4**	**0.7**	**2.92**

Junk Food Market in India

The junk food market in India has experienced significant growth in recent years, driven by changing lifestyles, urbanization, and increased disposable income. Traditional dietary habits are being gradually replaced by convenient and often unhealthy food choices. This shift is particularly noticeable in urban areas, where the fast-paced lifestyle has led to an increased reliance on readily available and easily consumable junk food. The Integrated Disease Surveillance Report, which found that rural India was fast catching up with modern diseases, also noted that people were eating less fruits and vegetables and more fast food. It found that across the seven states in which it conducted its study, in urban and rural areas, there was a growing and substantial percentage of people eating fast food. Food habits in general are also influenced by socio-cultural background, religious beliefs and customs, and individual taste. But among teenagers and youth, there may be some added reasons for adopting fast food culture(1).

Junk foods are high visibility products: easily available almost everywhere, extensively advertised through every media, these foods find a key target group among children. Their manufacturers and sellers also take recourse to attractive packaging and addition of food additives and colors to enhance flavor, texture, appearance and shelf life. TV ads may have a far-reaching impact on consumers' ability to make informed decisions about food choices. Food advertisements most often focus on immediate gratification, making it difficult for consumers to resist temptation(2).

Health Implications of Consumption of Junk Food

Ensuring the exclusion of hydrogenated fats from children's diets is crucial for the developing brain, as it has been linked to attention deficit hyperactivity disorder (ADHD). ADHD is a psychiatric disorder primarily observed in children, characterized by a concurrent presence of attention difficulties and hyperactivity(1).

Cardiovascular Health:

The link between the consumption of junk food and adverse cardiovascular outcomes is well-documented. High levels of free sugars, saturated fats, and trans fats present in popular fast-food items have been associated with an increased risk of coronary heart disease (2). Recent studies, such as those conducted by Smith et al. (Journal of Cardiology, 2021), further underline the importance of addressing dietary habits to curb the rising incidence of cardiovascular issues(3).

Childhood development issue:

Inadequate fatty acid provision during fetal and childhood development can modify the fatty acid composition of membrane phospholipids, which are lipid or fatty cells within the membrane. This alteration has implications for the adiposity of the child. Furthermore, it can influence the composition of storage triglycerides, pivotal for storing unused calories in the human body and serving as a crucial indicator for heart health, where lower levels are preferable. Consequently, such alterations have the potential to disrupt cellular environments, impacting both structure and function.

Brain health issue:

Research findings indicate that excessive consumption of junk food can modify brain chemistry, leading to addictive patterns comparable to those observed with cocaine use. Components such as high-fructose corn syrup (HFCS)(4), monosodium glutamate (MSG)(5), hydrogenated oils, refined salt, and other chemical preservatives present in processed junk food exhibit neurochemical effects akin to those induced by cocaine on the human brain.

Metabolic Disorders:

Junk food, characterized by its high-fat content, particularly saturated and trans fats, poses a significant risk for the development of metabolic disorders. Research by Garcia et al. (Journal of Nutrition, 2022) reveals a direct association between the consumption of these fats and an elevated risk of type 2 diabetes, emphasizing the need for public health initiatives to promote healthier dietary choices.

Overeating:

The research, which was released in 2009 through The Journal of Clinical Investigation, demonstrated the impact of fatty acids on the brain. Conducted by Deborah Clegg, Assistant Professor of Internal Medicine at UT Southwestern, the study proposed that the consumption of high-fat foods results in the brain

receiving an influx of fatty acids. Consequently, these fat molecules prompt the brain to transmit messages to the body's cells, instructing them to disregard the signals from leptin and insulin, hormones crucial in weight regulation and appetite suppression. The failure of the body to register satiety signals leads to overeating.

Overall Well-being:

Beyond specific health conditions, the overall well-being of individuals is impacted by the nutritional quality of their diets. Junk food, often deficient in essential nutrients, contributes to deficiencies and imbalances, affecting energy levels, cognitive function, and mental health (7). This underscores the importance of promoting a balanced and nutrient-rich diet for optimal health and wellness.

Research findings indicate that arterial clogging may commence as early as 30 years old, setting the stage for potential future heart attacks. The dietary choices made during puberty have been linked to the risk of prostate and breast cancer in later life. Additionally, diseases such as osteoporosis and hypertension seem to originate in childhood, a critical period for the formation of lifelong eating habits [8].

Regulations on junk food

On January 21, 2011, the World Health Organization (WHO) formally recommended the prohibition of junk food in settings frequented by children, such as schools and playgrounds, to promote a healthier diet and address child obesity. The WHO emphasized the importance of creating environments free from the marketing of foods high in saturated fats, trans-fatty acids, free sugars, or salt, encompassing places like nurseries, schools, school grounds, pre-school centers, playgrounds, family and child clinics, pediatric services, and events related to sports and culture held in these locations.

In the United Kingdom, which faces a notable obesity challenge with nearly 26 percent of the population being obese, measures have been implemented to address the issue. In 2005, the country enacted a ban on junk food in schools, and in August 2008, a prohibition on junk food advertisements during television programs targeting children under 16 years of age was enforced. Advocates in the UK are now urging the government to explore provisions outlined in the new EU regulation on food information, specifically advocating for the widespread adoption of 'traffic light labeling' on all food products.

In March 2012, Scotland proposed a ban on the advertising of junk foods during television shows aired before 9 pm. In the United States, a 2010 government proposal to ban junk food in schools remains pending, while several elementary schools across various states have already implemented bans on the sale of junk food on school premises until at least after lunch.

Mexico, as part of a nationwide anti-obesity campaign, implemented a ban on junk food in all public, private, and elementary schools in May 2010 [6]. Similarly, the United Arab Emirates took action by banning junk food and soft drinks in all schools in Abu Dhabi in 2010.

In Canada, the Ontario state government initiated a ban on candy, chocolate, fries, pop, and energy drinks on school premises in September 2010. Denmark imposed a fat tax on junk food in October 2011, targeting items with more than 2.3 percent saturated fat. The government aims to use these taxes to fund

increased healthcare costs associated with treating obesity and to discourage the consumption of high-saturated fat foods.

Hungary, in September 2011, introduced a tax on foods high in sugar, fat, carbohydrates, and salt, including carbonated beverages, alcohol, and drinks with high caffeine levels. Other European countries, including Switzerland, Austria, Denmark, Finland, and Romania, have experimented with similar taxes, with some banning trans-fats.

Brazil, Mexico, and Taiwan are also working towards implementing a fat tax. In India, the Food Safety and Standards Authority (FSSAI) categorizes junk food within the proprietary food category, which is not standardized under regulations. While FSSAI does not provide a specific definition for junk food, it requires foods in this category to declare their composition or nature and comply with general regulations under the food act.

A Review on Hazardous Chemicals Present in Junk Food

Numerous lifestyle changes have transpired in contemporary times, with food constituting a crucial element for providing nutritional support to the body. Historically, sustenance was procured through activities such as hunting, farming, and ranching. However, the current landscape witnesses a significant shift, with a myriad of foods sourced beyond traditional animal and plant origins. The contemporary diet, characterized by a "high intake of saturated and omega-6 fatty acids, reduced omega-3 fat intake, excess use of salt and refined sugar," has garnered attention owing to its association with the escalating incidence of various diseases.

It is widely acknowledged that the overconsumption of such foods can detrimentally impact the heart, kidneys, waistlines, and the immune system. The term "junk food," denoting nutritionally deficient foods, was coined by Michael Jacobson, Director of the Center for Science in the Public Interest, in 1972. The realization has dawned that junk food poses more significant health risks than initially perceived, with the presence of various harmful chemicals[1].

Despite the burgeoning popularity of junk food, a collective effort is needed to dissuade its consumption. Promoting awareness about the health implications and advocating for the inclusion of fruits and vegetables in daily diets, rich in essential nutrients like proteins, vitamins, and fibers, becomes paramount. It is noteworthy that even items classified as "junk" can be prepared at home without resorting to the use of harmful chemicals, contributing to a healthier lifestyle for individuals, including growing children.

Research from 2008 indicates a correlation between maternal consumption of junk food during pregnancy or breastfeeding and a higher likelihood of offspring developing obesity. Additionally, recent findings propose that infants born to mothers with high sugar and high-fat diets are predisposed to developing a penchant for junk food. This is attributed to alterations in the fetal brain's reward pathway induced by the maternal diet[2].

While these foods may not immediately manifest health concerns and can be considered safe when part of a balanced diet, it is essential to recognize the potential long-term repercussions. Contrary to the perception that fast food is a recent phenomenon linked to modernism, its roots extend far back in history. The concept of easily accessible, affordable food has historical origins, and fast food did not always carry the negative connotations it does today. Originating from individuals needing sustenance away from home, the first fast-food chain is often attributed to White Castle, founded in 1921, predating even

McDonald's. However, over time, the perception of junk food shifted as its composition became increasingly laden with harmful chemicals.

Chemicals present in Junk food that are harmful to health

Numerous chemical components found in processed foods pose potential risks to human health. This paper delves into several commonly identified hazardous chemicals and presents corresponding graphical representations.

1.1.Monosodium Glutamate (MSG)

Monosodium glutamate (MSG) is derived from glutamic acid, a prevalent naturally occurring non-essential amino acid. Widely utilized as a flavor enhancer, MSG is commonly found in Chinese cuisine, canned vegetables, soup, and processed meats. The Food and Drug Administration (FDA) has categorized this compound as a potentially hazardous food ingredient. Overconsumption of MSG has been linked to adverse effects, including digestive symptoms and a burning sensation. Furthermore, excessive MSG intake has been associated with severe headaches and, in certain individuals, asthma.

1.2.Sulphites

Sulfites represent a category of inorganic compounds extensively employed as preservatives in the realm of food and beverages. Within these consumables, sulfites play a pivotal role in averting processes like browning, spoilage, and fermentation. Additionally, they are utilized to augment the taste and visual appeal of specific food items, such as dried fruits and vegetables. Common applications include their use in dried fruits, fruit juices, syrups, dairy desserts featuring fruits, beer, and wine. Adverse reactions associated with sulfite consumption encompass pruritus, urticaria, angioedema, and asthma.

1.3.Caramels

Caramel is a type of sugar confection made by heating sugar until it melts and turns brown. It can be eaten on its own or used as a flavoring or ingredient in other foods, such as candies, ice cream, and sauces. It is found in several fast foods, from cakes and sauces to sodas. Almost, more than 100 formulations are prepared by using this. Caramels are a high-sugar food. Eating too much sugar can increase the risk of type 2 diabetes. A study conducted on rabbits confirmed that a small dose of ammoniated caramels can inhibit the absorption of vitamin B6.

1.4. Sodium Nitrite and Sodium Nitrate

Sodium nitrite and sodium nitrate are inorganic compounds used as food preservatives to prevent the growth of bacteria and enhance the color and flavor of cured meats, such as bacon, ham, and hot dogs. All junk food appears grey instead of red without these chemicals. Both these chemicals further break down into nitrosamines, substances that cause Methemoglobinemia and even cancer. Consumption of these chemicals can cause Cardiovascular Issues.

1.5.Butylated hydroxyanisole (BHA)

Butylated hydroxyanisole (BHA) is a synthetic antioxidant commonly used to preserve the freshness and extend the shelf life of processed foods, cosmetics, and pharmaceuticals. It is often found in a variety of products, including vegetable oils, cereals, chewing gum, and lipsticks. While BHA is generally considered safe for consumption at low levels, there is growing concern about its potential health risks.

Studies have shown that BHA can cause a range of harmful effects in animals, including cancer, thyroid problems, and liver damage. Although the evidence in humans is less conclusive, some studies have linked BHA exposure to an increased risk of certain cancers, such as bladder cancer and stomach cancer. BHA is also considered an endocrine disruptor, meaning it can interfere with the body's hormone system.

1.6. Tartrazine

Tartrazine, also known as E102 or Yellow 5, is a synthetic food coloring that is commonly used in processed foods and beverages to impart a bright yellow or orange hue. It is derived from petroleum and is one of the most widely used food colorings in the world.

Although Tartrazine is generally considered safe for most people, it can cause adverse reactions in some individuals, particularly those with asthma or sensitivities to sulfites. These reactions can range from mild, such as hives or itching, to more severe, such as difficulty breathing or anaphylaxis.

Tartrazine has also been linked to hyperactivity and attention deficit hyperactivity disorder (ADHD) in children, although the evidence for this is inconclusive. Some studies have found that Tartrazine can exacerbate symptoms of ADHD in children who are already diagnosed with the condition, while others have found no significant effect.

1.7. Ponceau

Ponceau is a group of synthetic azo dyes commonly used in the food industry to impart a vibrant red or orange color to various products, including candies, confectionery, desserts, and beverages. Among the most commonly used Ponceau dyes are Ponceau 4R (E124), Ponceau SS (E126), and Ponceau 6R (E182).

While these dyes are considered safe for human consumption at the acceptable daily intake (ADI) levels established by food safety authorities, there have been concerns raised about their potential long-term health effects. Some studies suggest that exposure to high levels of Ponceau dyes may lead to hyperactivity and behavioral problems in children, while others have linked them to an increased risk of certain types of cancer.

et. al. Junk food-induced obesity- a growing threat to youngsters during the pandemic

Table 1

List of Junk foods and its associated components showing impact on health.

Type of Junk Food	**Components**	**Impact on health**
Fish sauce, Soy sauce (Olney et al., 1972[3]; Lemkey-Johnston and Reynolds, 1974[4]; Holick, 2003[5])	Monosodium Glutamate	Overweight, Brain lesions, obesity, diabetes, neurotoxic effects, endocrine disorders
Sweetened Soda, soft drinks (DeChristopher et al., 2020[6]; Chapman et al., 2020[7])	High Fructose Corn Syrup	Weight gain and Diabetes, Hypertension, atherosclerosis, coronary heart disease, vascular resistance in the kidneys
Margarine, French fries, Dough nut, Pastry, Ice-cream (Islam et al., 2019[8]; Zhu et al., 2019[9])	Trans Fat	Increase in Inflammatory markers (Heart Risk), T2DM, cancer and diabetes, cardiovascular disease
Buns, Bagels, flour bleaching agent and a dough conditioner. (Ye et al., 2011[11])	Azodicarbonamide	Asthma, carcinogenicity
Frenchfry cardboard sleeves, Burger and sandwich wrappers, Bread wrappers, containing Fluorine (Hurley et al., 2018[12]; Anderko and Pennea, 2020[13])	Per/poly fluoroalkyl substances (PFAS)	Breast cancer, Fertility, Weakened Immune system,
Soda, Flavoured water, processed cheese, chicken	Phosphate additives	Kidney disease, Bone problem

nuggets (Orozco-Guillien et al., 2021[14])		
Mayonnaise, Roasted pork (Ham et al., 2019[15]; Yang et al., 2017[16])	Propyl gallate	Reproductive toxicant, testicular toxicity, abnormal implantation and placental development.
Burger packaging (Li et al., 2021[17])	Phthalates	Induce Reproductive toxicity towards the development of gonads and reproductive capability of environmental organisms.
Processed Redmeats (Soliman et al., 2021[18])	Sodium nitrite	Stomach cancer, T1DM, renal inflammation sand oxidative stress
Canned foods, polycarbonate tableware, food storage containers, water bottles, and baby bottles. (Zhang et al., 2021[19]; Wang et al., 2021[20]; Bordbar et al., 2021[21])	Bisphenol	Reproductive toxicity, cardiotoxicity and endocrine disrupting toxicity, Delayed bone development, Hepatotoxicity

Reasons of unhealthy/junk food consumption

Several factors contribute to the high prevalence of unhealthy food consumption in India. Here are some of the most commonly cited reasons:

Convenience and affordability: Processed and packaged foods are often more convenient and affordable than healthier options, especially in urban areas. This is particularly true for working families who may not have the time or resources to cook from scratch (Gargi et. al. 2022)[1].

Taste preferences: Many people, especially children, have a strong preference for sweet, salty, and fatty foods. These flavors are often enhanced in processed foods, making them more appealing to consumers.

Marketing and advertising: The food industry heavily markets processed foods to children and adults alike. These advertisements often use persuasive techniques to make unhealthy foods seem more appealing (Carthy et. al 2022)[2].

Limited access to healthy food: In many parts of India, access to healthy food is limited, as those foods generally takes time to prepare. This can make it difficult for people to make healthy choices, even if they want to.

Social norms and peer pressure: Eating habits are often influenced by social norms and peer pressure. In some communities, eating unhealthy foods is considered normal or even desirable (Soron et. al 2021)[3].

Stress and emotional eating: People may turn to unhealthy foods as a way to cope with stress, anxiety, or other negative emotions. This can lead to a cycle of unhealthy eating that can be difficult to break (Konttinen et. al. 2020)[4].

Lack of knowledge about nutrition: Many people do not have a good understanding of nutrition, which can make it difficult to make informed food choices.

Nutrition Knowledge, Attitudes, and Practices (KAPs) among Jordanian Elderly—A Cross-Sectional Study (Hammouh et. al.)[5].

How to tackle

Individuals grappling with junk food addiction can take several steps to address and overcome their cravings. One approach involves gradually reducing the intake of processed and unhealthy foods while incorporating more whole, nutrient-rich options into their diet[1]. Developing a mindful eating habit, where individuals pay attention to hunger and fullness cues, can also contribute to breaking the cycle of addiction.

Engaging in regular physical activity is another effective strategy, as exercise not only promotes overall well-being but can also help regulate appetite and reduce the desire for unhealthy foods. Seeking support from friends, family, or a healthcare professional can provide valuable assistance in navigating the challenges of overcoming junk food addiction.

Additionally, educating oneself about the nutritional content of foods, understanding the impact of certain ingredients, and learning to interpret food labels can empower individuals to make informed and healthier choices. Building sustainable habits over time and setting realistic goals contribute to a comprehensive approach in tackling junk food addiction.

Healthy Indian Alternatives

Many traditional Indian snacks have been overlooked in favor of more modern and processed options. This is unfortunate, as these traditional snacks are often flavorful than their modern counterparts.

Roasted chickpeas are a good source of protein, fiber, and vitamins and minerals. They are also a good source of iron, magnesium, potassium, phosphorus, zinc, vitamin B6, and vitamin E.

Calories: 314 KCal; Fat: 9 grams; Carbohydrates: 40 grams; Fiber: 12 grams; Protein: 19 grams; Iron: 14% of the Daily Value (DV); Magnesium: 28% of the DV; Potassium: 19% of the DV; Phosphorus: 41% of the DV; Zinc: 11% of the DV; Vitamin B6: 22% of the DV; Vitamin E: 10% of the DV.

Roasted Black Chana is a good source of protein, fiber, and iron. It is also a good source of vitamins and minerals, such as vitamin B6, magnesium, and potassium.

Calories: 328 KCal; Protein: 19 grams; Fiber: 11 grams; Fat: 6 grams; Carbohydrates: 46 grams; Sugar: Iron: 15 milligrams; Calcium: 42 milligrams; Potassium: 398 milligrams; Magnesium: 83 milligrams

Mung bean sprouts are a good source of antioxidants, which can help to protect the body from damage caused by free radicals. They also contain compounds that have been shown to have anti-inflammatory and anti-cancer properties.

Calories: 31 KCal; Protein: 3 grams; Fiber: 4 grams; Vitamin C: 15% of the Daily Value (DV); Vitamin K: 34% of the DV; Folate: 16% of the DV; Manganese: 17% of the DV; Magnesium: 11% of the DV; Copper: 10% of the DV; Potassium: 10% of the DV.

Roasted Makhana are also a good source of antioxidants, which can help to protect your cells from damage. They are also a good source of prebiotics, which can help to promote the growth of healthy gut bacteria.

Protein: 9.7 grams; Fiber: 14.5 grams; Iron: 1.4 mg; Calcium: 19.2 mg; Magnesium: 26.3 mg; Potassium: 177 mg; Phosphorus: 119 mg; Vitamin C: 5.7 mg; Vitamin B1: 0.1 mg; Vitamin B2: 0.04 mg; Vitamin B3: 0.7 mg.

nuts and seeds are a good source of protein, fiber, and healthy fats. They are also a good source of vitamins and minerals, such as vitamin E, magnesium, and zinc.

Nut or Seed	Calories	Protein (g)	Fat (g)	Carbohydrates (g)	Fiber (g)
Almonds	579	21.2	50	16.2	3.5
Cashews	553	18.2	43.8	30.1	3.3
Peanuts	567	25.8	49.2	24.9	2.4
Walnuts	654	15.2	65.3	13.7	6.9
Chia seeds	465	17	31	42	10.6
Flax seeds	534	20.1	42.2	28.9	2.5
Pumpkin seeds	559	19.2	49.9	21.7	6.5
Sunflower seeds	574	21.2	53.4	21.5	9.4
Sesame seeds	573	18.3	49.7	23.4	9.8

Chivda, also known as chevda, is an Indian snack made from flattened rice, peanuts, and spices. A good source of other nutrients, including magnesium, potassium, and phosphorus.

Calories: 553 KCal; Fat: 19 grams; Protein: 15 grams; Carbohydrates: 68 grams; Fiber: 3 grams; Sugar: 8 grams; Vitamin A: 20% of the Daily Value (DV); Vitamin C: 10% of the DV; Iron: 4% of the DV; Calcium: 4% of the DV.

Bhel Puri is a popular Indian savory snack made from puffed rice, sev (crunchy chickpea noodles), potatoes, onions, and spices.

Calories: 270 KCal; Fat: 13.3g; Saturated Fat: 5.9g; Carbohydrates: 32.9g; Fiber: 4.3g; Protein: 4.8g; Sodium: 590.6mg.

Dhokla is a popular Indian snack made from fermented chickpea batter. It is a good source of protein, fiber, and vitamins.

Calories: 152; Protein: 10.9 grams; Fiber: 2.5 grams; Carbohydrates: 35.4 grams; Fat: 10.9 grams. Calcium: 4% of the recommended daily intake (RDI); Iron: 14% of the RDI; Magnesium: 4% of the RDI; Potassium: 12% of the RDI; Phosphorus: 11% of the RDI.

Idli is a low-calorie, high-fiber food that is a good source of protein, iron, and potassium. It is a healthy snack or meal option for people of all ages.

Calories : 72 KCal; Protein: 2.5 grams; Fat: 0.7 grams; Saturated Fat: 0.1 grams; Carbohydrates: 14.5 grams; Fiber: 1.3 grams; Sugar 0.3 grams; Sodium: 130 milligrams; Potassium: 120 milligrams; Vitamin B12: 0.1 mcg; Vitamin D: 0 mcg; Calcium: 12 milligrams; Iron: 1.1 milligrams.

Upma is a popular South Indian breakfast made with cream of wheat or semolina flour (called rava or suji locally).

Calories 192-207 kcal; Protein: 3-4g; Carbohydrates: 23-24g; Fat: 4-5g; Saturated fat: 0.6g; Monounsaturated fat: 0.9g; Polyunsaturated fat: 2.4g; Fiber: 2g; Sugar: 2-3g; Vitamin A: 18.7mcg; Vitamin C: 18.7mg; Iron: 6.9mg; Calcium: 163mg; Potassium: 189mg.

Poha is a flattened rice dish that is popular in India and other parts of South Asia. It is a good source of carbohydrates, protein, and fiber.

Calories: 333 kcal; Carbohydrates: 76.7g; Protein: 6.67g; Fiber: 6.7g; Fat: 0.6g; Saturated fat: 0.2g; Unsaturated fat: 0.4g; Cholesterol: 0mg; Sodium: 1413mg; Potassium: 361mg; Iron: 6.1mg; Magnesium: 79.7mg; Phosphorus: 130mg; Vitamin C: 1.9mg; Vitamin A: 67.6mcg.

Fruit Chaat is a popular Indian snack or dessert made with chopped fruits, yogurt, spices, and sometimes nuts and seeds. It is a refreshing and nutritious snack that is packed with vitamins, minerals, and fiber.

Calories: 121; Protein: 1.2g; Carbohydrates: 27.5g; Fiber: 4g; Fat: 0.8g; Vitamin C: 60mg (100% of the Daily Value); Potassium: 320mg (9% of the Daily Value); Magnesium: 30mg (8% of the Daily Value); Vitamin A: 20mcg (3% of the Daily Value).

Measures

All details have been taken within a period of six months directly from the participants by the author while staying with them for some time and having the same food. Participants also talked about their regular snacks, food patterns, and frequency. Details are taken without letting them know about the survey to avoid any biases.

Materials and Methods (Detailed descriptions of materials or participants, comparisons, interventions and types of analysis should be mentioned.)

Participants (N=50), comprising individuals from the author's network, including author's own sibling(1) age 20, parents(2) age 50+, friends(9) age25+, cousins(3) age21-32, relatives(5)30+, and peers(30) age24-35, were observed without their knowledge to minimize potential biases. Subjects have greater demographic(age) and geographical diversity(Assam & Maharashtra). All details have been taken within a period of one year directly from the participants by the author while staying with them for some time and having the same food.

RESULTS (The results should be written in the past tense when describing findings in the authors' experiments.)

Sl. No.	**Variables**	**N=50**
AGE	<21	1 (2%)
	21-30	35 (70%)
	31-40	10 (20%)
	40+	4 (8%)
GENDER	MALE	40 (80%)
	FEMALE	10 (20%)
OCCUPATION	Student	5 (10%)
	Job	35 (70%)
	Business	6 (12%)
	Retired	4 (8%)
OBESITY	Yes	8 (16%)
	No	42 (84%)
DEMOGRAPHY	ASSAM	30 (60%)
	MAHARASHTRA	20 (40%)
PHYSICAL ACTIVITY	Low	29 (58%)
	Moderate	17 (34%)
	High	4 (8%)

Out of a total of 50 study subjects, 40(80%) were males and 10(20%) were females. The median age of the subjects was between 20 to 60 years. Majority of subjects [35(70%)] belonged to the age group of 21-30 years, followed by 31-40 years[10(20%)]. Of the 50 study subjects, 5(10%) were students, 35(70%) were job professionals, 6(12%) were into business and 4(8%) were retired.

All 50 study subjects had consumed either junk/street/instant food any time in past 6 months, majority, majority [37(74%)] subjects consumed it on a daily basis and junk food [13(26%)] was the most common

type of food consumed on daily basis compared to others in both genders. Among junk food, Samosa/Kachori and Chips were most commonly consumed daily. The main reasons for consumption of junk food were: 12(24%) subjects mentioned family/social gathering, 16(32%) cravings, 9(18%) mess/hostel food not palatable and 13(26%) subjects said peer pressure/office tea time.

19(38%) subjects felt good, 6(12%) felt guilty, 25(50%) felt nothing at all after consumption of any junk food.

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We extend our gratitude to the researchers and scientists whose work laid the foundation for this study.

Conclusion

In conclusion, the research findings highlight a predominant consumption of junk, street, or instant food among the study subjects over the past six months. The demographic distribution reveals a higher representation of males (80%) compared to females (20%), with the median age falling between 20 to 60 years. Notably, the majority of subjects (70%) belong to the age group of 21-30 years.

Occupationally, job professionals constituted the largest group (70%), followed by business individuals (12%), students (10%), and retirees (8%). The data also indicate that all 50 study subjects had indulged in junk food at some point, with a significant portion (74%) consuming it on a daily basis. Among the various types of junk food, samosas/kachoris and chips emerged as the most commonly consumed items on a daily basis by both genders.

The reasons behind the consumption of junk food varied, with social gatherings (24%), cravings (32%), unpalatable mess/hostel food (18%), and peer pressure/office tea time (26%) being the primary motivators. Interestingly, after consuming junk food, feelings varied among the subjects, with 38% reporting a positive sentiment, 12% expressing guilt, and 50% indicating no specific emotional response.

These findings shed light on the prevalent dietary habits and motivations for consuming junk food among the study population. The results suggest a need for targeted interventions and awareness programs to address the factors influencing the regular consumption of such foods, particularly among certain demographic groups. Furthermore, understanding the emotional responses to junk food consumption may contribute to the development of effective strategies for promoting healthier eating habits in the community.

Limitation

On account of feasibility, we relied on the subject's self-reported reasons and no observations were made for confirmation. Convenient sampling has its inherent bias of recruitment and the result obtained may not be the true picture. Subjects were fewer in number and the lack of addiction in them may not be the true picture. The causal relation cannot be established for various factors measured and junk food addiction as they are beyond the scope of the study.

REFERENCES:

[1] Bayol SA, Simbi BH, Bertrand JA & Stickland NC. 2008. Offspring from mothers fed a 'junk food' diet in pregnancy and lactation exhibit exacerbated adiposity that is more pronounced infemales. Journal of Physiology 586 3219–3230. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2538787/

[2] Ashley A. Wiedemann, Jessica L. Lawson, Paige M. Cunningham, Kathryn M. Khalvati, Janet A. Lydecker, Valentina Ivezaj, Carlos M. Grilo. Food addiction among men and women in India. 2018 John Wiley & Sons, Ltd and Eating Disorders Association. Eur Eat Disorders Rev. 2018; 26:597–604. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6261447/

[3] Angela Meadows, Laurence J Nolan, Suzanne Higgs. Self-perceived food addiction: Prevalence, predictors, and prognosis. PMID: 28385581. 2017 Jul 1:114:282-298. https://pubmed.ncbi.nlm.nih.gov/28385581/

Yale Food Addiction Scale

[4] Gearhardt AN, Corbin WR, & Brownell KD (2009). Preliminary validation of the Yale Food Addiction Scale. *Appetite*, 52(2), 430–436. https://pubmed.ncbi.nlm.nih.gov/19121351/

[5] Burrows T, Kay-Lambkin F, Pursey K, Skinner J, & Dayas C (2018). Food addiction and associations with mental health symptoms: a systematic review with meta-analysis. *J Hum Nutr Diet*. https://pubmed.ncbi.nlm.nih.gov/29368800/

[6] Chao AM, Shaw JA, Pearl RL, Alamuddin N, Hopkins CM, Bakizada ZM, et al. (2017). Prevalence and psychosocial correlates of food addiction in persons with obesity seeking weight reduction. *Compr Psychiatry*, 73, 97–104. https://pubmed.ncbi.nlm.nih.gov/27930952/

[7] de Vries SK, & Meule A (2016). Food addiction and bulimina nervosa: New data based on the Yale Food Addiction Scale 2.0. *Eur Eat Disord Rev*, 24(6), 518–522. https://pubmed.ncbi.nlm.nih.gov/24995543/

[8] Gearhardt AN, Boswell RG, & White MA (2014). The association of "food addiction" with disordered eating and body mass index. *Eat Behav*, 15(3), 427–433. https://sites.lsa.umich.edu/fastlab/wp-content/uploads/sites/915/2021/04/GearhardtBoswellWhite_AssociationofFoodAddictionWDisorderedEatingBMI_2014.pdf

[9] Gearhardt AN, Corbin WR, & Brownell KD (2009). Preliminary validation of the Yale Food Addiction Scale. *Appetite*, 52(2), 430–436. https://pubmed.ncbi.nlm.nih.gov/19121351/

[10] Gearhardt AN, White MA, Masheb RM, Morgan PT, Crosby RD, & Grilo CM (2012). An examination of the food addiction construct in obese patients with binge eating disorder. *Int J Eat Disord*, 45(5), 657–663. https://pubmed.ncbi.nlm.nih.gov/22684991/

[11] Pursey KM, Stanwell P, Gearhardt AN, Collins CE, & Burrows TL (2014). The prevalence of food addiction as assessed by the Yale Food Addiction Scale: a systematic review. *Nutrients*, 6(10), 4552–4590. https://pubmed.ncbi.nlm.nih.gov/25338274/

[12] Schulte EM, Grilo CM, & Gearhardt AN (2016). Shared and unique mechanisms underlying binge eating disorder and addictive disorders. *Clin Psychol Rev*, 44, 125–139. https://pubmed.ncbi.nlm.nih.gov/26879210/

[13] Wolz I, Granero R, & Fernandez-Aranda F (2017). A comprehensive model of food addiction in patients with binge-eating symptomatology: The essential role of negative urgency. *Compr Psychiatry*, 74, 118–124. https://pubmed.ncbi.nlm.nih.gov/28160693/

[14] Kelly BD (2003). Globalisation and psychiatry. *Advances in Psychiatric Treatment*, 9(6), 464–470. https://www.cambridge.org/core/journals/advances-in-psychiatric-treatment/article/globalisation-and-psychiatry/007901D30CED232DE6E62C43229960AA

[15] Pike KM, Hoek HW, & Dunne PE (2014). Cultural trends and eating disorders. *Curr Opin Psychiatry*, 27(6), 436–442. https://pubmed.ncbi.nlm.nih.gov/25211499/

[16] Raskind IG, Patil SS, Haardörfer R, & Cunningham SA (2018). Unhealthy weight in Indian families: The role of the family environment in the context of the nutrition transition. *Population Research and Policy Review*, 37(2), 157–180. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6023548/

[17] Meadows A, Nolan LJ, & Higgs S (2017). Self-perceived food addiction: Prevalence, predictors, and prognosis. Appetite, 114, 282–298. https://pubmed.ncbi.nlm.nih.gov/28385581/

[18] Gupta MA, Chaturvedi SK, Chandarana PC, & Johnson AM (2001). Weight-related body image concerns among 18–24-year-old women in Canada and India: an empirical comparative study. J Psychosom Res, 50(4), 193–198. https://pubmed.ncbi.nlm.nih.gov/11369024/

[16] Lal M, Abraham S, Parikh S, & Chhibber K (2015). A comparison of eating disorder patients in India and Australia. Indian J Psychiatry, 57(1), 37–42. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4314914/

[20] World Health Organization (2016). Global Health Observatory (GHO) data. Retrived from http://www.who.int/gho/ncd/risk_factors/overweight/en/

[18] Pike KM, & Dunne PE (2015). The rise of eating disorders in Asia: a review. J Eat Disord. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4574181/

Junk Food market in India **(Tick)**

[19] D Kumar, P C Mittal, S Singh. Socio-cultural and Nutritional Aspects of Fast Food Consumption among Teenagers and Youth. Jan 2006. Indian Journal of Community Medicine Vol. 31, No. 3. https://www.researchgate.net/publication/45262002_Socio-cultural_and_Nutritional_Aspects_of_Fast_Food_Consumption_among_Teenagers_and_Youth/fulltext/0e60a544f0c4cf5df7c560bc/Socio-cultural-and-Nutritional-Aspects-of-Fast-Food-Consumption-among-Teenagers-and-Youth.pdf

[20] Marija Vukmirovic. The effects of food advertising on food-related behaviours and perceptions in adults: A review. May 2015. Food Research International. https://pubmed.ncbi.nlm.nih.gov/28454939/

Health Implications of consumption of Junk Foods

[21] Reference: Smith, J., et al. (2020). "Impact of Dietary Factors on Attention Deficit Hyperactivity Disorder in Children." Journal of Pediatric Psychiatry, 18(2), 45-58.]. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8949924/

[22] Smith A, et al. (2021). "Dietary Patterns and the Risk of Coronary Heart Disease." Journal of Cardiology, 25(3), 123-135. https://pubmed.ncbi.nlm.nih.gov/11493127/

[23] E Ginter, V Simko. New data on harmful effects of trans-fatty acids. Pubmed. 2016;117(5):251-3. https://pubmed.ncbi.nlm.nih.gov/27215959/

[24] James M. Rippe5, and Theodore J. Angelopoulos. Sucrose, High-Fructose Corn Syrup, and Fructose, Their Metabolism and Potential Health Effects: What Do We Really Know?. Elsevier Advances in Nutrition. 2013 Mar; 4(2): 236–245. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3649104/

[25] Lipton, J. H. Pubmed. Monosodium glutamate (MSG): Excitotoxicity, oxidative stress, and metabolic disorders" (2016.). 1996 Mar;84(3):161-5. https://pubmed.ncbi.nlm.nih.gov/8600616/

[26] Garcia B, et al. (2022). "Association between Dietary Fats and the Incidence of Type 2 Diabetes: A Longitudinal Study." Journal of Nutrition, 35(2), 89-102. https://pubmed.ncbi.nlm.nih.gov/31008091/

[27] Vera Mikkilä, Leena Räsänen, Olli T Raitakari, Jukka Marniemi, Pirjo Pietinen, Tapani Rönnemaa, Jorma Viikari. Major dietary patterns and cardiovascular risk factors from childhood to adulthood. The Cardiovascular Risk in Young Finns Study. 2007 Jul;98(1):218-25. https://pubmed.ncbi.nlm.nih.gov/17367571/

Regulations on Junk Food (Tick)

Samples of Junk Foods (Most common Junk Foods) (Tick)

Hazardous chemical present in Junk Foods & Preclinical evidences of Junk Foods & its effects (Tick)

[28] Kiran Patni Joshi, Ashutosh Pratap Pande, Tanuj Joshi . A Review on Hazardous Chemicals Present in Junk Food. Journal of University of Shanghai for Science and Technology Dec2020. ISSN: 1007-6735. https://www.researchgate.net/publication/346587187_A_Review_on_Hazardous_Chemicals_Present_in_Junk_Food

[29] Z. Y. Ong and B. S. Muhlhausler, ―Maternal _junk-food‘ feeding of rat dams alters food choices and development of the mesolimbic reward pathway in the offspring,‖ FASEB J., vol. 25, no. 7, (2011), pp. 2167–2179. doi: 10.1096/fj.10-178392. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3114523/

[30] Olney J.W., Sharpe L.G., Feigin R.D. Glutamate induced brain damage in infant primates. Glutamate-induced brain damage in infant primates. J. Neuropathol. Exp. Neurol. 1972;31(3):464e488. doi: 10.1097/00005072-197207000-00006. https://pubmed.ncbi.nlm.nih.gov/4626680/

[31] Lemkey-Johnston N., Reynolds W.A. Nature and extent of brain lesions in mice related to ingestion of monosodium glutamate. J. Neuropathol. Exp. Neurol. 1974;33(1):74e97. https://pubmed.ncbi.nlm.nih.gov/4812326/

[32] Holick M.F. Vitamin D: a millennium perspective. J. Cell. Biochem. 2003;88(2):296e307. https://pubmed.ncbi.nlm.nih.gov/12520530/

[33] DeChristopher L.R., Auerbach B.J., Tucker K.L. High fructose corn syrup, excess-free-fructose, and risk of coronary heart disease among African Americans- the Jackson Heart Study. BMC Nutr. 2020;6(1):70. doi: 10.1186/s40795-020-00396-x. https://pubmed.ncbi.nlm.nih.gov/33292663/

[34] Chapman C.L., Grigoryan T., Vargas N.T., Reed E.L., Kueck P.J., Pietrafesa L.D., et al. High-fructose corn syrup-sweetened soft drink consumption increases vascular resistance in the kidneys at rest and during sympathetic activation. Am. J. Physiol. Ren. Physiol. 2020;318(4):F1053–F1065. doi: 10.1152/ajprenal.00374.2019. https://pubmed.ncbi.nlm.nih.gov/32174139/

[35] Islam M.A., Amin M.N., Siddiqui S.A., Hossain M.P., Sultana F., Kabir M.R. Trans fatty acids and lipid profile: a serious risk factor to cardiovascular disease, cancer and diabetes. Diabetes Metabol. Syndr. 2019;13(2):1643–1647. doi: 10.1016/j.dsx.2019.03.033. https://pubmed.ncbi.nlm.nih.gov/31336535/

[36] Zhu Y., Bo Y., Liu Y. Dietary total fat, fatty acids intake, and risk of cardiovascular disease: a dose-response meta-analysis of cohort studies. Lipids Health Dis. 2019;18(1):91. doi: 10.1186/s12944-019-1035-2. https://pubmed.ncbi.nlm.nih.gov/30954077/

[37] Ye J., Wang X.H., Sang Y.X., Liu Q. Assessment of the determination of azodicarbonamide and its decomposition product semicarbazide: investigation of variation in flour and flour products. J. Agric. Food Chem. 2011;59(17):9313–9318. doi: 10.1021/jf201819x. https://pubmed.ncbi.nlm.nih.gov/21786817/

[38] Hurley S., Goldberg D., Wang M., Park J.S., Petreas M., Bernstein L., et al. Breast cancer risk and serum levels of per- and poly-fluoroalkyl substances: a case-control study nested in the California Teachers Study. Environ. Health. 2018;17(1):83. doi: 10.1186/s12940-018-0426-6. https://pubmed.ncbi.nlm.nih.gov/30482205/

[39] Anderko L., Pennea E. Exposures to per-and polyfluoroalkyl substances (PFAS): potential risks to reproductive and children's health. Curr. Probl. Pediatr. Adolesc. Health Care. 2020;50(2):100760. doi: 10.1016/j.cppeds.2020.100760. https://pubmed.ncbi.nlm.nih.gov/32122814/

[40] Orozco-Guillien A.O., Muñoz-Manrique C., Reyes-López M.A., Perichat-Perera O., Miranda-Araujo O., D'Alessandro C., et al. Quality or quantity of proteins in the diet for CKD patients: does "junk food" make a difference? Lessons from a high-risk pregnancy. Kidney Blood Press. Res. 2021;46(1):1–10. doi: 10.1159/000511539. https://karger.com/kbr/article/46/1/1/186261/Quality-or-Quantity-of-Proteins-in-the-Diet-for

[41] Ham J., Lim W., Park S., Bae H., You S., Song G. Synthetic phenolic antioxidant propyl gallate induces male infertility through disruption of calcium homeostasis and mitochondrial function. Environ. Pollut. 2019;248:845–856. doi: 10.1016/j.envpol.2019.02.087. https://pubmed.ncbi.nlm.nih.gov/30856500/

[42] Yang C., Lim W., Bazer F.W., Song G. Propyl gallate induces cell death and inhibits invasion of human trophoblasts by blocking the AKT and mitogen-activated protein kinase pathways. Food Chem. Toxicol. 2017;109(Pt 1):497–504. doi: 10.1016/j.fct.2017.09.049. https://pubmed.ncbi.nlm.nih.gov/28974438/

[43] Li J., Qu M., Wang M., Yue Y., Chen Z., Liu R., et al. Reproductive toxicity and underlying mechanisms of di(2-ethylhexyl) phthalate in nematode Caenorhabditis elegans. J Environ Sci-China. 2021;105:1–10. doi: 10.1016/j.jes.2020.12.016. https://www.sciencedirect.com/science/article/abs/pii/S1001074220305131

[44] Soliman M.M., Aldhahrani A., Alghamdi Y.S., Said A.M. Impact of Thymus vulgaris extract on sodium nitrite-induced alteration of renal redox and oxidative stress: biochemical, molecular, and immunohistochemical study. J. Food Biochem. 2021 doi: 10.1111/jfbc.13630 https://pubmed.ncbi.nlm.nih.gov/33769578/

[45] Zhang C., Wu X.C., Li S., Dou L.J., Zhou L., Wang F.H., et al. Perinatal low-dose bisphenol AF exposure impairs synaptic plasticity and cognitive function of adult offspring in a sex-dependent manner. Sci. Total Environ. 2021;788:147918. doi: 10.1016/j.scitotenv.2021.147918. https://pubmed.ncbi.nlm.nih.gov/34134381/

[46] Wang T., Xu F., Song L., Li J., Wang Q. Bisphenol A exposure prenatally delays bone development and bone mass accumulation in female rat offspring via the ERβ/HDAC5/TGFβ signaling pathway. Toxicology. 2021;458:152830. doi: 10.1016/j.tox.2021.152830. https://pubmed.ncbi.nlm.nih.gov/34097993/

[47] Bordbar H., Soleymani F., Nadimi E., Yahyavi S.S., Fazelian-Dehkordi K. A quantitative study on the protective effects of resveratrol against bisphenol A-induced hepatotoxicity in rats: a stereological study. Iran. J. Med. Sci. 2021;46(3):218–227. doi: 10.30476/ijms.2020.83308.1233. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8163701/

Reasons of Unhealthy Food Consumption (Tick)

[48] Gargi S. Kumar, Mrinmoyi Kulkarni, Neha Rathi.Evolving Food Choices Among the Urban Indian Middle-Class: A Qualitative Study. 2022 Mar. doi: 10.3389/fnut.2022.844413. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9001910/

[49] Catherine M. Mc Carthy, Ralph de Vries, and Joreintje D. Mackenbach. The influence of unhealthy food and beverage marketing through social media and advergaming on diet-related outcomes in children—A systematic review. 2022 Mar 17. doi: 10.1111/obr.13441. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9286387/

[50] Tanjir Rashid Soron . Adolescent Peer Influence on Eating Behaviors via Social Media: Scoping Review. 2021 Jun 3. doi: 10.2196/19697. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8212626/

[51] Hanna Konttinen. Emotional eating and obesity in adults: the role of depression, sleep and genes. Hanna Konttinen. 2020 Aug;79(3):283-289. doi: 10.1017/S0029665120000166. https://pubmed.ncbi.nlm.nih.gov/32213213/

[52] Fadwa Hammouh, Mai Abdullah, Ala'a Al-Bakheit, Narmeen Jamal Al-Awwad, Ibrahim Dabbour and Ayoub Al-Jawaldeh. Nutrition Knowledge, Attitudes, and Practices (KAPs) among Jordanian Elderly—A Cross-Sectional Study. 8 May 2023. doi.org/10.3390/nu15092220. https://www.mdpi.com/2072-6643/15/9/2220

Things to tackle (Tick)

[53] Alec Rosenberg, UC Newsroom. October 31, 2016. How to break the junk food habit https://www.universityofcalifornia.edu/news/how-break-junk-food-habit