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Analysis of Factors Determining Food Consumption Patterns Among Adolescents

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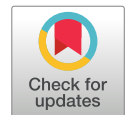
Shilpa Deo [1] 🔘 ✉, Sushil Sharma [2] 🔘 & Anjali Sane [3] 🔘

[1] School of Humanities & Social Sciences, DES Pune University, Pune, India
[2] Faculty Affairs and Dean of Graduate & International Education, Texas A&M University, Texarkana, USA
[3] MIT-WPU School of Economics & Commerce, Dr. Vishwanath Karad MIT World Peace University, Pune, India

Abstract   The extent of fast-food consumption among adolescents has been growing rapidly over the years. Excessive fast-food consumption can result in obesity, poor concentration, and several other physical and mental health disorders. In this study, an attempt has been made to understand the factors influencing the self-reported consumption patterns of adolescents staying in urban areas. The method of proportionate stratified sampling was utilized to determine the sample size from a private university in Western Maharashtra. Chi-square test and logistic regression techniques were used to answer the research questions. Adolescents were consuming healthy food more frequently than fast food during the spread of the COVID-19 pandemic. However, a significant percentage were overweight and obese, which cannot be overlooked. Further, logistic regression analysis of factors influencing the preference for fast food revealed that household income and residential status had a significant influence. The theory of bounded rationality enabled the researchers to elucidate the factors influencing the decision of fast-food consumption. The recommendations of this paper will provide valuable inputs not only to the adolescents but also to the policymakers while designing policies to ensure good health and societal well-being.

Keywords   Adolescents · Health and Well-being · Responsible Consumption · Bounded Rationality

✉ Corresponding author: Shilpa Deo shilpaddeo@gmail.com

1. Introduction

"It is health that is real wealth and not pieces of gold and silver" (Gandhi, 1948). Health can be defined as "a satisfactory and acceptable state of physical (biological), mental (intellectual), emotional (psychological), economic (financial), and social (societal) well-being" (Oleribe, 2018). Ensuring good health and well-being [Sustainable Development Goal (SDG) 3] with the help of responsible consumption and production (SDG 12) practices makes it pertinent to undertake research in this area and come up with certain policy recommendations to achieve the stated goals.

It is likely to become challenging to ensure good health and responsible consumption due to increased fast food consumption worldwide (Majabadi et al., 2016). Fast food is any food that is highly processed, high in calories, and low in nutrients. It is also usually high in added sugars, salt, and saturated or trans fats (Brissette, 2018). A healthy diet, on the contrary, includes the consumption of fruits, vegetables, legumes, nuts, and whole grains. Fast food consumption by children and teenagers may raise the risk of mental health problems such as violent behaviors and psychiatric distress (Zahedi et al., 2014; Fuhrman, 2018; Hafizurrachman & Hartono, 2021; Malmir et al., 2023). Furthermore, it can increase the risk of both general and abdominal obesity (Payab et al., 2015). It is recognized that obesity, heart attacks, diabetes, dementia, cancer, and strokes are all linked to the fast food that people consume (Fuhrman, 2018; Mumena et al., 2022). The attitude of college students toward fast food consumption is understudied (Haines et al., 2010).

The younger generation can prove to be a demographic 'dividend' for India in the long run, only if they are physically and mentally fit (Hossain & Purohit, 2019; Mukherjee et al., 2020). Add to this the problems of sleep deprivation, lack of exercise, alcohol consumption and smoking amongst these youngsters, and they will turn out to be demographic 'disasters' if the problem is not tackled at an early age. Smoking was positively and significantly associated with regular soda use, high-fat food consumption, and fast-food restaurant usage. Moreover, high-fat food consumption was also positively and significantly associated with alcohol and marijuana use (Arcan et al., 2011; Hassapidou et al., 2016). In addition, positive and robust links have been found between the consumption of carbonated soft drinks and fast-food and stress-related sleep problems (Khan et al., 2021). Furthermore, it is equally important to know why adolescents consume fast food. Fast-food consumption has been gradually growing due to convenience, low price, consistent taste, time paucity, ease of availability, and the marketing efforts of the industry. In addition, key factors that have been contributing to fast food consumption are age, ethnicity, sex, locality, frequency of eating out, etc. (Rydell et al., 2008; Min et al., 2018; Mohiuddin & Nasirullah, 2020).

According to the World Bank, India is a lower-middle-income country and has 67.27% of the population belonging to the 15-64 age group. India has the world's second-largest urban system, with approximately 11% of the global urban population residing in Indian cities. In terms of absolute numbers, India's urban population outnumbers that of other highly urbanized countries and areas throughout the world. In a few decades, half of the country will be 'urbanized', signaling a turning point in the country's economic transition (NITI Aayog, 2021). The intake of fast food in cities poses a threat to one's nutritional security (d'Amour et al., 2020). Even though a major proportion of the populace is aware of the negative implications of fast-food intake, high fast-food consumption has been documented in school-aged children and is rather substantial in university students. The consumption of fast food is increasing in India across all income groups, adding considerably to the growing trend of non-communicable diseases (Keshari & Mishra, 2016). Therefore, understanding the consumption pattern of youngsters living in urban areas, the reasons for following that consumption pattern, along with their sleeping patterns and overall lifestyle, will be instrumental in trying to shape a better future for them. The paper is organized into the following sections: section 2 explains the literature review, relevance of the study, hypotheses, and methodology used for primary data collection; section 3 encompasses data analysis and results;

section 4 elaborates on key findings with supporting/contrasting evidences in the form of discussion and summary; and section 5 discusses limitations of the work and proposes future research directions.

2. Literature Review

The National Family Health Survey (NFHS) is a multi-round, large-scale survey that is undertaken in a representative sample of Indian households. It is a good indicator that gathers data on population, health, quality of health, and nutrition, with a focus on women and young children, family planning services, domestic violence, reproductive health, anemia, and women's status. According to the NFHS–4, the number of obese people has doubled in India in the past decade (Pandey, 2016). Obesity rates are directly related to the number of fast-food restaurants in each location, according to research into fast food consumption (Maddock, 2004; Currie et al., 2010; Patel et al., 2018). Frequent visits to fast food outlets were linked to a negative perception of health and a higher body mass index (BMI), but surprisingly, living near such outlets was not (Jiao et al., 2015; Downs, 2013). In 54 low- and medium-income countries, factors such as BMI, age, food insecurity, sex, fruit and vegetable consumption, smoking, soft drink intake, physical activity level, and sedentary behavior level were found to be linked to fast-food consumption (Li et al., 2020).

Continuous sleep deprivation causes the brain to become more susceptible to food smells (Greer et al., 2013; Bhutani et al., 2019). People with irregular sleeping habits are more likely to binge on unhealthy foods and eat fast food (Krause et al., 2017). Although excessive fast-food consumption is hazardous to physical and mental health, it is pertinent to understand why it is still consumed by adolescents. Consumption of any form of fast food daily can be defined as excessive fast-food consumption. According to Van et al. (2010), a higher proportion of participants belonging to lower socio-economic groups show a more frequent use of fast-food consumption. The major reasons for consuming fast food are found to be time constraints, convenience, and taste. In addition to this, the ease of accessibility of fast-food outlets, a greater variety of fast food in comparison to home-cooked food options, affordability, and eating out fast food as entertainment with friends were cited as some of the prominent reasons for consuming fast food in a qualitative study (Majabadi et al., 2016). Further, Jacob et al. (2020) found a positive relation between fast food consumption and suicide attempts among adolescents.

In the middle of the spread of the COVID-19 pandemic, consumer behavior has been gradually changing. Emerging research suggests that during pandemic lockdowns, a significant shift in the population's use of high-sodium meals occurred in people from various countries and cultures (Zhang et al., 2021; Lee et al., 2024). In Denmark and Germany, there was a decrease in the consumption of fresh foods and an increase in the consumption of goods with longer shelf life (Janssen et al., 2021). More food was consumed, and more convenience products were purchased, such as ready-made meals and canned food with a longer shelf life. Alcohol and sweets consumption also increased in Germany (Profeta et al., 2021). In addition, COVID-19-induced inflammatory responses can have long-term consequences in survivors, contributing to chronic disorders, including dementia and neurodegenerative disease, through neuroinflammatory mechanisms linked to a poor diet. As a result, greater access to nutritious foods should be a top priority now more than ever, and individuals should be mindful of healthy eating practices to avoid COVID-19 complications (Bohlouli et al., 2021).

There has been a lot of research undertaken to study the impact of fast-food consumption on the health of school-going children. Although it is essential to tackle the problem of excessive fast-food consumption at an early age, it is equally important to know the extent of fast-food consumption among adolescents. Furthermore, adolescents can easily become addicted to fast food consumption due to peer pressure and the availability of more pocket money and freedom compared to school-going children. Adolescents have quickly entered the world of fast food and vending machines, completely oblivious to the havoc they are wreaking on themselves and their welfare. Along with the physical health

hazards, there are also mental health hazards associated with fast food consumption, such as poor concentration and hypertension (Kazi et al., 2020).

2.1. Hypotheses

It is postulated that a lack of physical activity and exercise is associated with negative effects on health. Moreover, there is an overwhelming consensus in the literature that both sufficient sleep and adequate exercise are pivotal in maintaining health (Dolezal et al., 2017). Hence, it can be hypothesized that lack of adequate sleep and exercise deteriorates the physical health of adolescents (Figure 1). The consumption pattern of undergraduate management students and commerce students varied.

Figure 1
Hypotheses
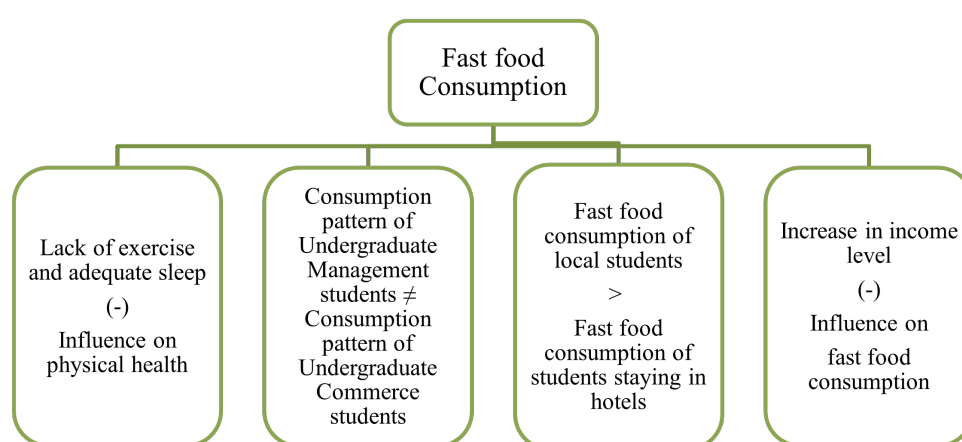
Agnificant difference was reported across disciplines regarding fast food consumption among adolescents (Mahajan & Gothankar, 2020). The consumption of fast food was maximum among the undergraduates who were local students in comparison to the ones staying as paying guests and in hostels (Mahajan & Gothankar, 2020). Hence, it can be hypothesized that local students eat more fat food compared to students living in dormitories. There has been growing evidence regarding the linkages between income level and consumption of fast food (Schwartz, 2019; Mahajan & Gothankar, 2020; Li et al., 2020). Hence, it would be interesting to analyze the correlation between the two concerning the primary data. Furthermore, it is hypothesized that there is a substantial influence of income level on fast-food intake.

2.2. Theoretical Framework

Herbert Simon introduced the concept of bounded rationality. This means rational decision-making, which considers the cognitive limits to decision-making, including knowledge and computational power. Bounded rationality is central to behavioral economics and is "concerned with how the actual decision-making process influences the decisions that are reached." Whereas the theory of subjective expected utility (SEU) assumes that choices are made based on a fixed set of alternatives, the theory of bounded rationality emphasizes generating alternatives, which is a more costly and time-consuming process. Furthermore, unlike the SEU theory, which postulates the maximization of a utility function, the aim is to find satisfactory alternatives. Personal relations, social organizations, limitation of cognitive capacity in terms of forecasting the future, and lack of knowledge can also influence the ability to generate alternatives. Moreover, Simon highlights in his theory that human choices cannot be consistent (Simon, 1990).

The theory of bounded rationality can be linked to adolescents' decision-making on fast food consumption. An attempt can be made to determine whether this decision is being influenced by cognitive limitations, personal relations, and social organizations.

2.3. Research Methodology

The study has presented an analysis of the primary data. The primary data were collected from 148 undergraduate management and 60 commerce students at a private university in Western Maharashtra. A proportionate stratified sampling method was used to determine the sample size. In proportionate stratified random samples, the sample strata use the same sampling fraction as the population strata from which the cases are sampled, i.e., they have the same proportion of cases. This sampling approach is critical for generalizing the sample results back to the population sampled because it ensures that no stratum in the combined sample has an undue impact on the study's overall results (McTavish and Loether, 2002). Since this method ensures the representativeness of the sample to the population, it has been used for deciding the sample size.

The total sample size (208) was determined based on the total number of the proposed intake of the university (6056) in 2019–20. The parameter for determining the sample size was decided to be 10% (i.e., 605) of the total proposed intake. Furthermore, out of the total proposed intake of major colleges (engineering, management, law, and liberal arts) of 2460, the undergraduate management & commerce college represented 32.52%. Hence, 32.52% of 605 is 197. However, 11 more undergraduate management students shared their responses. Hence, 208 is the final sample from which the information has been collected. Ethics approval was sought from the Dean, Research and Innovation of the university to conduct the online survey. All participants of the study provided their informed consent. The primary data were collected through a Google Form from May to September 2020. The snowballing technique was used to obtain the required information from the adolescents. Since these data was collected during the spread of the COVID-19 pandemic, the researchers could not meet the respondents in person to gather the information.

The questionnaire was divided into two sections: section 1 consisted of personal information-based questions such as residential status, self-reported height and weight figures, parents' qualifications and kind of occupations, and annual income of the family. In section 2, questions were specifically incorporated to understand the consumption behavior of the respondents. Therefore, several healthy and fast-food options were given to the adolescents to check the frequency of their consumption, such as rice, dal, chapati, vegetables, sprouted grains, fruits, pizza, burgers, fried foods, bakery products, etc. The investigator tried to assess whether the adolescents were conscious of their consumption behavior by asking questions such as Do you read the content label before purchasing fast food items, Why do you eat fast food, the weekly amount spent on fast food, preferred food items in hotels, etc. In addition, there are several other factors that influence the physical and mental health of adolescents. Hence, their sleeping and exercising patterns, addiction to smoking and alcohol consumption, their frequency, and whether they were stricken with any non-communicable diseases were assessed as control variables. Finally, a few open-ended questions were asked to the respondents to check if they were aware of the harmful effects of fast-food consumption and had taken any measures to reduce it. The primary data were analyzed using IBM SPSS Statistics 25 and Excel.

3. Data Analysis and Results

It has always been said that "Health is Wealth." However, is it deemed wealth in a true sense? Does one give so much importance to health? An attempt has been made to understand whether the adolescents have been taking care of their health by consuming more healthy food than fast food, exercising, sleeping well, and not becoming addicted to smoking and alcohol consumption.

Figure 2

Comparative analysis of BMI
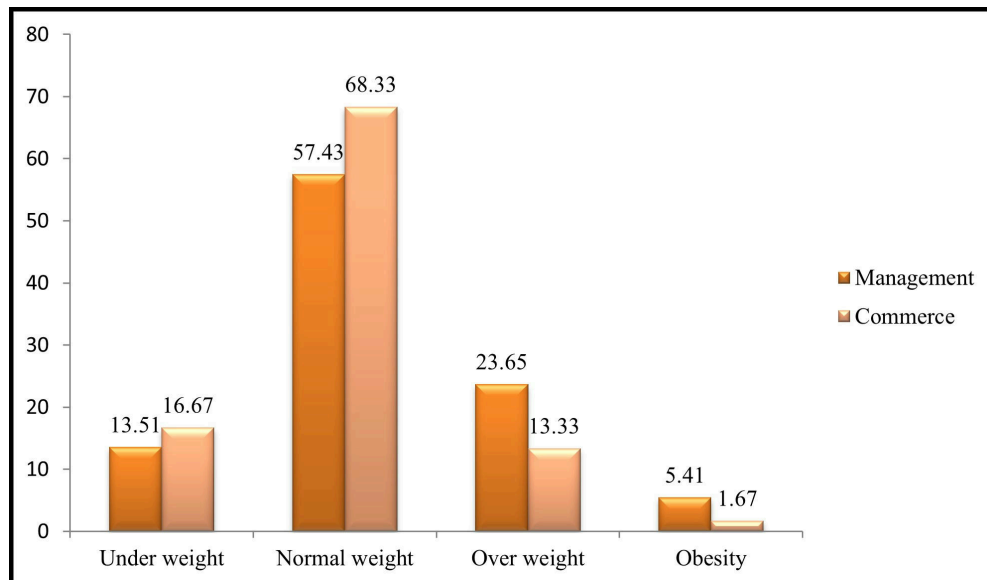
Source: Primary data

From Figure 2, it can be observed that although most of the respondents, in the case of management college, belonged to the normal weight (57.4%), 29% of them belonged to the overweight and obese category, which cannot be overlooked. A higher percentage of those belonging to the commerce college (68.33%) had normal weight, and only 15% were overweight and obese. However, the difference between the management and commerce college respondents w.r.t the body mass index was not significant (see Table 1). For calculating the BMI, self-reported values of height and weight were used.

Table 1

Comparative analysis of BMI

Analysis of BMI	Education stream Management	Commerce	Total
Underweight	20 (13.51)	10 (16.67)	30 (14.42)
Normal weight	85 (57.43)	41 (68.33)	126 (60.58)
Overweight	35 (23.65)	8 (13.33)	43 (20.67)
Obesity	8 (5.41)	1 (1.67)	9 (4.33)
Total	148 (100)	60 (100)	208 (100)

Pearson chi2 (3) = 4.7083 Pr = 0.194

Note: Figures in brackets indicate percentages Source: Primary data

Eating healthy food, exercising, and sleeping well are some ways through which one can try to have a normal weight. Were the respondents following these techniques to be healthy? Let us have a look at it.

Figure 3

Frequency of healthy food consumption among adolescents
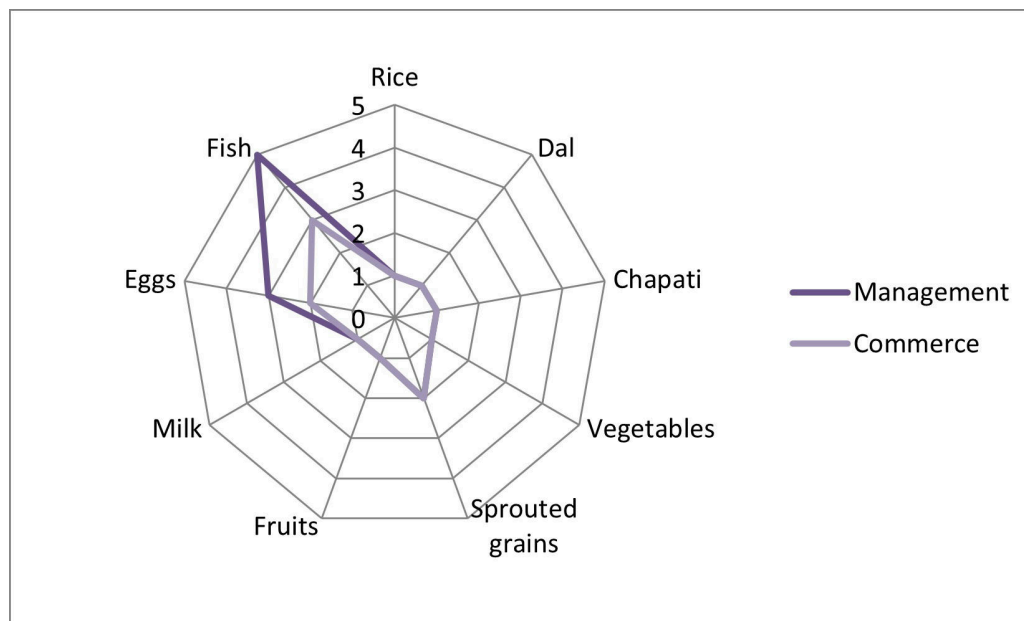
Note: The frequencies of healthy food consumption are the median values of the responses, where 1 – Daily; 2 – Weekly; 3 – Fortnightly; 4 – Monthly; 5– Rarely. **Source:** Primary data

As can be observed from Figure 3, the respondents were found to be eating healthy food more frequently, i.e., on a daily, weekly, and fortnightly basis, than fast food. The management students consumed fish rarely, perhaps due to their greater preference for vegetarian food.

Figure 4

Frequency of healthy food consumption among adolescents
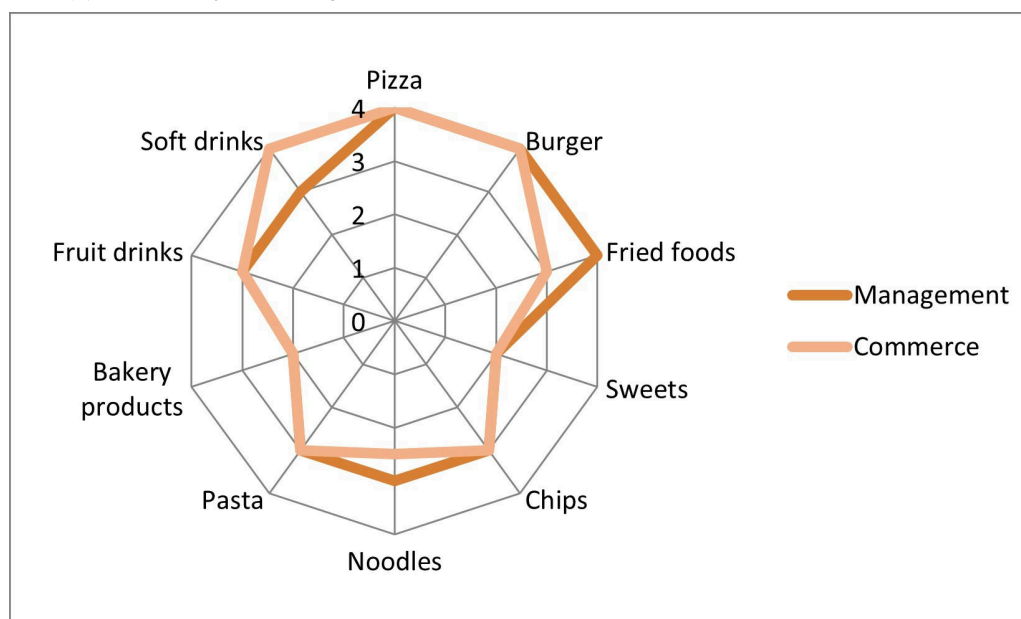
Note: The frequencies of unhealthy food consumption are the median values of the responses, where 1 – Daily; 2 – Weekly; 3 – Fortnightly; 4 – Monthly; 5–Rarely. **Source:** Primary data

It can be revealed from Figure 4 that both the management and commerce respondents were found to be consuming certain food items such as bakery products and sweets weekly. Most of the other fast-food items were consumed by them every fortnight. Still, other fast-food items such as pizza and burgers were consumed by the respondents every month. This reveals that the respondents were not engaged in excessive fast-food consumption. Interestingly, Mahajan and Gothankar (2020) discovered that 7% of the students across all disciplines were daily consumers of fast food, with 17% consuming pizzas, burgers, french fries with coke, and so on, more than four times each week.

In the studied region, a mother cooks food at home most of the time and plays a vital role in influencing the food habits of the family members. Let us now try to understand whether her qualification and type of occupation influenced the food habits of the respondents.

It was observed that as the qualification went up to the doctorate level, there was a preference shift toward home-cooked food from fast food among the respondents. The results were found to be significant at a 2% level of significance.

An attempt has been made to understand whether the mother's type of occupation also played any role in determining what the adolescents ate during the college break time. a A significant association was found between the mother's type of occupation and the kind of food available to the respondents during the break time.

Further, it would be interesting to understand what is driving the increasing demand for fast food.

Figure 5

Reasons for eating fast food
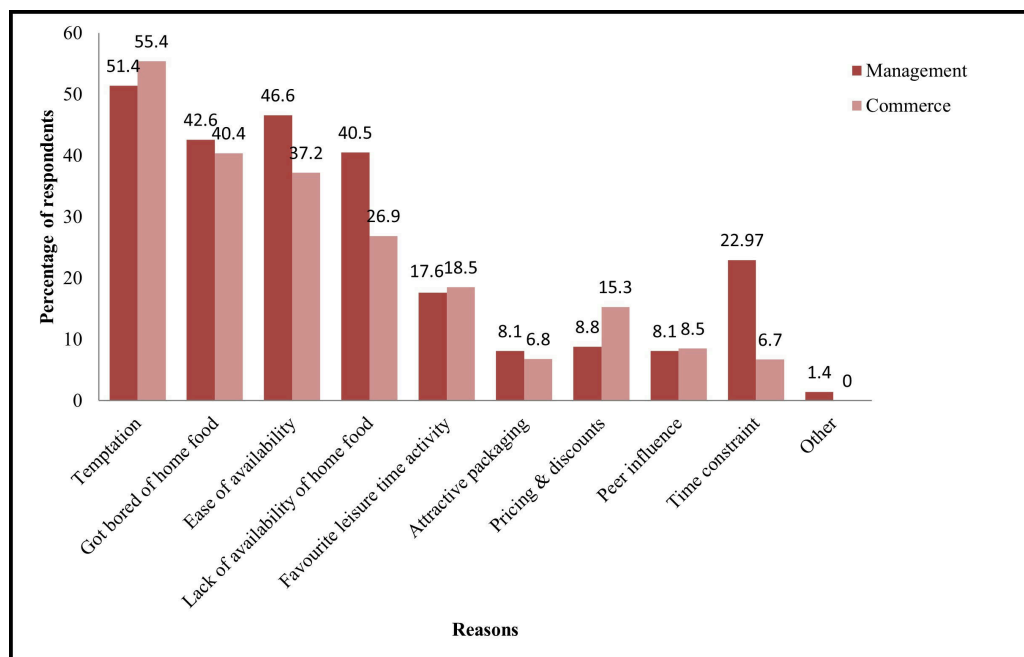
Note: The percentage of respondents selecting different reasons will not total to 100 as the respondents had selected multiple reasons simultaneously.

Source: Primary data

From Figure 5 it can be observed that for both management and commerce respondents, some of the prominent reasons for preferring fast food instead of healthy food were temptation, ease of availability, and lack of availability of home-cooked food. Though home-cooked food was available, getting bored with it and preferring fast food also turned out to be one of the vital reasons. Therefore, in line with the bounded rationality theory, cognitive limitations such as temptation and boredom with home-cooked food led to a preference for fast food and may enable one to evaluate long-term health consequences. Due to time, money, and resource constraints, respondents make satisficing rather than optimizing decisions. Past studies have interpreted fast food consumption behavior with the help of the theory of planned behavior (Dunn et al., 2011; Sharifirad et al., 2013; Bîlbîie et al., 2021; Shetu, 2022). There is a stark difference between the management and commerce respondents' responses with respect to time constraints and pricing and discounts. Although peer influence did not seem to be determining the preference for fast food to a great extent, it would be interesting to find out whether the respondents' friends played an important role in introducing them to fast food in the first place. In a study conducted by Mahajan & Gothankar (2020), the respondents cited the following reasons for their preference for fast food: it is more appetizing, nutritious, and immediately available for consumption. The main reasons why students consume fast food were found to be convenience, good taste, time considerations, and low cost (Haines et al., 2010; Mohiuddin & Nasirullah, 2020).

Figure 6

Introduction to fast food
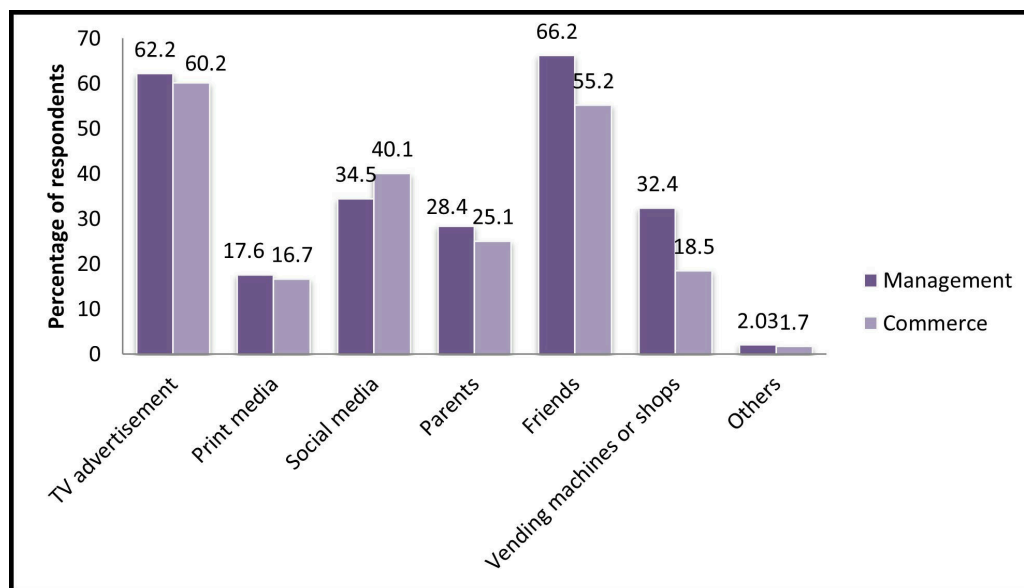
Note: The percentage of respondents selecting different channels will not total to 100 as the respondents had selected multiple channels simultaneously.

Source: Primary data

Hence, it can be known with the help of Figure 6 that it is the friends and TV advertisements that introduced fast food to the respondents in a major way. So, although adolescents generally use social media, TV advertisements were overpowering it. Hence, Payab et al. (2015) emphasized that a way to reduce fast-food consumption would be to limit TV commercials. Moreover, friends/peer influence played a harmful role and overshadowed the role of parents. Hence, like the bounded rationality theory, personal relations, in this case, the friends of the respondents, were largely determining the decision to consume fast food. Due to time constraints and limited availability of information through TV advertisements and friends, the adolescents were found to make satisfactory and 'good enough' decisions to prefer fast food. There is a major difference between the management and commerce respondents' responses with respect to the vending machines or shops. Besides TV advertisements and friends, one of the other factors that can play a vital role in determining the preference for fast food can be the respondents' type of residential status.

Since most of the respondents were found to belong to the normal weight category, it would be interesting to analyze their exercise and sleeping patterns. Most of the respondents were found to be exercising on a daily and weekly basis (81.8% and 66.7% for management and commerce respondents, respectively), and for around 1–9 hours (79.05% and 90% for management and commerce respondents, respectively) per week. So, if the respondents were eating more healthy food than fast food and exercising well, what was driving 44% (for both commerce and management) of them into the overweight and obese category? Individuals are more susceptible to physical and psychological issues when they stay up late at night. Late rising can also trigger issues such as depression.

Table 2

Sleeping time

Sleeping time	Management	Commerce
8 pm–11 pm	30.41	40
11:01 pm–2 am	59.46	8.4
5:01 am–8 am	0.7	-
Total	98	-
Missing	2	-
Total	100	100

Source: Primary data

Table 3

Wake-up time

Wake-up time	Management	Commerce
4 am–7 am	33.78	50
7:01 am–10 am	56.08	45
10:01 am–1 pm	8.11	5
1:01 pm–4 pm	0.68	-
Total	98.6	-
Missing	1.4	-
Total	100	100

Source: Primary data

Since the data was collected during the spread of COVID-19, the respondents were found to be sleeping well. Very few were sleep-deprived. However, it is alarming to note their sleeping and waking up time. From Tables 2 and 3, it can be observed that around 60% of the management and 50% of the commerce respondents slept and woke up at odd time. This can be dangerous for their physical and mental health. In addition, certain addictions such as smoking and alcohol consumption can be highly detrimental to their health.

It was found that the percentage of respondents addicted to smoking (10.1% and 3.3% for management and commerce respondents, respectively) was much less in comparison to those addicted to alcohol consumption (26.4% and 10% for management and commerce respondents, respectively). However, according to the anecdotal evidence a much higher proportion of respondents studying at the private university were addicted to drugs and smoking. Since smoking was banned on the university campus, it may be possible that the respondents have not revealed the truth. Finally, an attempt has also been made to understand whether the level of family income influences the preference for fast food.

The previous results of the study revealed that adolescents were not found to be consuming fast food excessively. Hence, there is no strong association between preference for fast food and BMI as well. However, Li et al. (2020) postulated that fast food consumption is negatively correlated with BMI. Even in the present study, around 20% (for both commerce and management) of the respondents were found to be suffering from digestive issues, diabetes, hypertension, and obesity. This percentage can go higher if the respondents are not exercising and sleeping well. Similarly, reducing the extent of smoking and alcohol consumption can also play a vital role in ensuring a healthy generation.

Table 4

Association of fast-food consumption with risk factors

Fast food Body Mass Index					
	Underweight	**Normal weight**	**Overweight**	**Obesity**	**Total**
Yes	19 (63.33)	93 (73.81)	31 (72.09)	6 (66.67)	149 (71.63)
No	11 (36.67)	33 (26.19)	12 (27.91)	3 (33.33)	59 (28.37)
Total	30 (100)	126 (100)	43 (100)	9 (100)	208 (100)
$X^2 = 1.4245, p = 0.700$					
Sleep deprivation					
Yes	0 (0)	2 (1.59)	5 (12.20)	1 (11.11)	8 (3.90)
No	29 (100)	124 (98.41)	36 (87.80)	8 (88.89)	197 (96.10)
Total	29 (100)	126 (100)	41 (100)	9 (100)	205 (100)
$X^2 = 11.7440, p = 0.008$					
Exercise					
Yes	18 (60)	111 (88.10)	38 (88.37)	8 (88.89)	175 (84.13)
No	12 (40)	15 (11.90)	5 (11.63)	1 (11.11)	33 (15.87)
Total	30 (100)	126 (100)	43 (100)	9 (100)	208 (100)
$X^2 = 15.3027, p = 0.002$					
Smoking					
Yes	4 (13.33)	7 (5.56)	4 (9.30)	2 (22.22)	17 (8.17)
No	26 (86.67)	119 (94.44)	39 (90.70)	7 (77.78)	191 (91.83)
Total	30 (100)	126 (100)	43 (100)	9 (100)	208 (100)
$X^2 = 4.6547, p = 0.199$					
Alcohol consumption					
Yes	6 (20)	27 (21.43)	10 (23.26)	2 (22.22)	45 (21.63)
No	24 (80)	99 (78.57)	33 (76.74)	7 (77.78)	163 (78.37)
Total	30 (100)	126 (100)	43 (100)	9 (100)	208 (100)
$X^2 = 0.1189, p = 0.989$					

Source: Primary data

There is no strong association between smoking and alcohol consumption on the one hand and body mass index on the other. Furthermore, Liao et al. (2016) found that independent of the hereditary effects, cigarette smoking was linked to a higher BMI. Also, the effect of genes on BMI was modulated by alcohol consumption, so genetic factors became less important for people who drank frequently. In addition, normal weight can be achieved by combining a physically active lifestyle with the avoidance of smoking, moderate alcohol intake, and eating healthy food (Lahti-Koski et al., 2002). Hence, interventions to combat rising youth obesity rates around the world should also consider lowering alcohol consumption by raising costs and limiting availability and marketing exposure (Albani et al., 2018).

Hypothesis 1: Lack of adequate sleep and exercise deteriorates the physical health of adolescents.

Exercise (2% level of significance) was very strongly associated with the Body Mass Index. Hence, the hypothesis can be **partially accepted**. Because the respondents were found to be sleeping well during the time of data collection, no significant association was found between sleep deprivation and body mass index. However, the positive association between sleep deprivation and obesity has been observed in several other studies (Patel et al., 2006; Mirdha et al., 2019). Similarly, a strong association between physical activity and BMI has been cited by Hemmingsson & Ekelund (2007) and Mork et al. (2010).

Hypothesis 2: The consumption pattern of undergraduate management students and commerce students varies.

There was a stark difference between the commerce and management students regarding their addiction to smoking and alcohol consumption; some of the reasons for preferring fast food (time constraints and pricing and discounts) and factors influencing the introduction to fast food (vending machines or shops). Hence, the hypothesis can be **accepted** at least for the consumption pattern and trends with respect to certain products.

As discussed earlier, the respondents were found to be sleeping well, at least during the spread of COVID-19. Most of them were also exercising regularly. However, true information regarding smoking and alcohol consumption had not been revealed by the respondents, perhaps due to the importance given to the value-based education at the university.

Several factors can play a vital role in determining the preference for fast food. Some of them could be income level, residential status, exercise, and sleeping patterns. Hence, logistic regression was used to determine which of these factors influences the preference for fast food. Four dummy variables were created for the same purpose. Hence, the dependent variable (preference for fast food) took the value of 1 if respondents preferred consuming fast food, 0 otherwise; residential status took the value of 1 if the respondent was local, 0 otherwise; exercise took the value of 1 if a respondent was found to be exercising, 0 otherwise; and sleep deprivation took the value of 1 if a respondent was found to be sleep-deprived (slept for less than 6 hours a day), 0 otherwise. Table 5 presents the results of the following regression model:

Preference to fast food = $\beta_0 + \beta_1$ Family income + β_2 Residential status + β_3 Exercise + β_4 Sleep deprivation + μ

Table 5

Determinants of preference for fast food

Preference for fast food	Odds Ratio	z	P>|z|	[95% Conf. Interval]	
Annual income	.9999999	−2.42	0.016	.9999998	1
Residential status	2.767698	2.94	0.003	1.402899	5.460231
Exercise	.7544698	−0.62	0.538	.307688	1.850006
Sleep deprivation	.8188299	−0.24	0.814	.1551235	4.32225

Source: Primary data

Hypothesis 3: Local students eat more fast food compared to students living in dormitories. Surprisingly, the local respondents were found to prefer fast food more compared to the other available food items, and the results are highly significant (p-value − 0.003). Therefore, the availability of home-cooked food does not make difference in the preferences of local students. Hence, the hypothesis is **accepted**.

Hypothesis 4: There is a substantial influence of income level on fast food intake.

Interestingly, it can be found that as the level of the family income goes up, the preference for fast food goes down, and the results are significant, as the p-value is 0.016. Therefore, the hypothesis is **accepted**. Some studies conducted in the past indicate a positive relationship between the two, whereas few others indicate a negative relationship between the income level and fast-food consumption (Khan et al., 2012; Yahya et al., 2013; Mumena et al., 2022).

In line with the latter, the present study also estimates a significant negative relationship between income and fast-food consumption. As the family income goes up, adolescents were found to have more access to resources and prefer healthier food options due to it. Their awareness of the benefits of healthy food also led them to prefer less fast food. The role of mothers' education and occupation cannot be denied in increasing the family income and making adolescents better aware of the hazards of fast-food consumption.

Moreover, there is a negative relationship between exercise and sleep deprivation on the one hand and preference for fast food on the other. However, the results are not significant.

4. Discussion

Although the respondents were not found to have major adverse health effects due to fast food consumption according to their self-reported health history, if they continue to have such sleeping patterns and indulge in smoking and alcohol consumption, it can be highly detrimental to their health in the long run. They were also aware of the adverse effects of excessive fast-food consumption and tried to reduce it by controlling the temptations and preferring healthier and home-cooked food. The respondents suggested that increasing the price of fast food, reducing the price of healthier alternatives, spreading awareness about its ill effects, and providing healthy food through college canteens are some of the measures that can be taken by society. A respondent aptly mentioned that "Eating home-cooked food or bringing tiffin doesn't make you uncool or boring."

The role of the mother in trying to reduce the extent of fast-food consumption seemed to be overshadowed by peer pressure, as friends turned out to be playing a pivotal role in introducing the respondents to fast food. The cognitive limitations and personal relations influenced the decision to consume fast food, as discussed in the theory of bounded rationality. This study indicates that although some respondents were willing to consume healthy food, they were left with no option but to buy fast food. This was particularly true in the case of students staying in hostels. Providing healthier food alternatives at affordable rates can ensure a reduction in the fast-food intake of not just those staying in hostels but also the local students. In the studied university, importance was given to the mental health of students. Along with that, it will be noteworthy if the university takes steps to ensure access to healthy food at a reasonable price for these students. Further, a suggestion will be made to the studied and other universities to integrate a mandatory two-credit multidisciplinary course on nutritional literacy. Awareness about the harmful effects of sleep deprivation and excessive fast-food consumption can also be created among the students as well as their parents by arranging guest lectures by nutritionists and dieticians. Moreover, just as cigarette packets have warning signs printed on them, warning signs can also be printed on fast food packets to discourage excessive consumption. These steps will go a long way in providing a physically and mentally healthy generation to the growing economy of India. Finally, ensuring responsible consumption is the need of the hour to achieve sustainable development eventually. Rather, as the deadline to meet the SDGs is nearing, experts believe that COVID-19 has provided us with an opportunity, especially in ensuring good health and well-being and responsible consumption and production (Ray, 2021). Hence, there is an urgent need to promote good health and responsible consumption and reduce the extent of fast-food consumption among adolescents (Kwon, 2016).

5. Limitations and Future Research Directions

This study was restricted to students studying in the Undergraduate Management and Commerce program. This gives further scope for research to expand the study to other schools and universities. Health records of the students can substantiate the primary data-based findings. However, the health checkup could not be conducted during the spread of COVID-19 (when the primary data was collected). There is also the chance of respondents' recall bias regarding their consumption patterns. Rather, the self-reported nature of the data, especially in the case of BMI, food consumption, and smoking/alcohol consumption, is a key limitation of the study, as the reliability of responses can be a challenge due to social desirability bias. Furthermore, collecting similar information from other universities can help to undertake a comparative analysis in the future.

Author Details

Shilpa Deo

[1] School of Humanities & Social Sciences, DES Pune University, Pune, India

🆔 0000-0002-1417-383X   ✉ shilpaddeo@gmail.com

Sushil Sharma

[2] Faculty Affairs and Dean of Graduate & International Education, Texas A&M University, Texarkana, USA

🆔 0000-0002-2232-794X   ✉ ssharma@tamut.edu

Anjali Sane

[3] MIT-WPU School of Economics & Commerce, Dr. Vishwanath Karad MIT World Peace University, Pune, India

🆔 0000-0001-7284-848X   ✉ anjali.sane@mitwpu.edu.in

References

Albani, V., Bradley, J., Wrieden, W. L., Scott, S., Muir, C., Power, C., Fitzgerald, N., Stead, M., Kaner, E., & Adamson, A. J. (2018). Examining associations between body mass index in 18–25-year-olds and energy intake from alcohol: Findings from the Health Survey for England and the Scottish Health Survey. *Nutrients*, 10(11), 1477. https://doi.org/10.3390/nu10111477

Arcan, C., Kubik, M. Y., Fulkerson, J. A., Hannan, P., & Story, M. (2011). Substance use and dietary practices among students attending alternative high schools: Results from a pilot study. *BMC Public Health, 11*(1), 263. https://doi.org/10.1186/1471-2458-11-263

Bhutani, S., Howard, J. D., Reynolds, R., Zee, P. C., Gottfried, J., & Kahnt, T. (2019). Olfactory connectivity mediates sleep-dependent food choices in humans. *Elife, 8*, e49053. https://doi.org/10.7554/eLife.49053.001

Bîlbîie, A., Druică, E., Dumitrescu, R., Aducovschi, D., Sakizlian, R., & Sakizlian, M. (2021). Determinants of fast-food consumption in Romania: An application of the theory of planned behavior. *Foods, 10*(8), 1877. https://doi.org/10.3390/foods10081877

Bohlouli, J., Moravejolahkami, A., Dashti, M., Zehi, Z., Kermani, M., Borzoo-Isfahani, M., & Bahreini-Esfahani, N. (2021). COVID-19 and fast foods consumption: A review. *International Journal of Food Properties, 24*(1), 1873–1883. https://doi.org/10.1080/10942912.2021.1983586

Brissette, C. (2018, February 26). This is your body on fast food. *The Washington Post.* https://www.washingtonpost.com/lifestyle/wellness/sneaking-a-little-fast-food-doesnt-mean-all-is-lost/2018/02/26/828b75fa-1b36-11e8-9de1-147dd2df3829_story.html

Currie, J., DellaVigna, S., Moretti, E., & Pathania, V. (2010). The effect of fast-food restaurants on obesity and weight gain. *American Economic Journal: Economic Policy, 2*(3), 32–63. https://doi.org/10.1257/pol.2.3.32

d'Amour, C. B., Pandey, B., Reba, M., Ahmad, S., Creutzig, F., & Seto, K. (2020). Urbanization, processed foods, and eating out in India. *Global Food Security, 25*, 100361. https://doi.org/10.1016/j.gfs.2020.100361

Dolezal, B. A., Neufeld, E. V., Boland, D. M., Martin, J. L., & Cooper, C. B. (2017). Interrelationship between sleep and exercise: A systematic review. *Advances in Preventive Medicine, 2017*, 1364387. https://doi.org/10.1155/2017/1364387

Downs, J. S. (2013). Does "healthy" fast food exist? The gap between perceptions and behavior. *Journal of Adolescent Health, 53*(1), 12–13. https://doi.org/10.1016/j.jadohealth.2013.03.012

Dunn, K. I., Mohr, P., Wilson, C. J., & Wittert, G. A. (2011). Determinants of fast-food consumption. An application of the theory of planned behaviour. *Appetite, 57*(2), 349–357. https://doi.org/10.1016/j.appet.2011.06.004

Fuhrman, J. (2018). The hidden dangers of fast and processed food. *American Journal of Lifestyle Medicine, 12*(5), 375–381. https://doi.org/10.1177/1559827618766483

Gandhi, M. (1948). *Keys to health*. Navjivan Publishing House.

Greer, S. M., Goldstein, A. N., & Walker, M. P. (2013). The impact of sleep deprivation on food desire in the human brain. *Nature Communications, 4*, 2259. https://doi.org/10.1038/ncomms3259

Hafizurrachman, M., & Hartono, R. (2021). Junk food consumption and symptoms of mental health problems: A meta-analysis for public health awareness. *Kesmas: National Public Health Journal, 16*(3), 170–177. https://doi.org/10.21109/kesmas.v0i0.4682

Haines, C., O'Neil, C., & Zanovec, M. (2010). Fast-food consumption among college students and their attitudes toward healthier fast-food options. *The FASEB Journal, 24*(1 Supplement), 540.4. https://doi.org/10.1096/fasebj.24.1_supplement.540.4

Hassapidou, M., Fachantidou, A., Papadopoulou, S., Katsiki, N., Fachantidis, P., Daskalou, E., & Deligiannis, A. (2016). Relationships between alcohol consumption, smoking status and food habits in Greek adolescents: Vascular implications for the future. *Current Vascular Pharmacology, 14*(2), 185–193. https://doi.org/10.2174/1570161113666150909104015

Hemmingsson, E., & Ekelund, U. (2007). Is the association between physical activity and body mass index obesity dependent? *International Journal of Obesity*, 31(4), 663–668. https://doi.org/10.1038/sj.ijo.0803458

Hossain, M. M., & Purohit, N. (2019). Improving child and adolescent mental health in India: Status, services, policies, and way forward. *Indian Journal of Psychiatry, 61*(4), 415–419. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_217_18

Jacob, L., Stubbs, B., Firth, J., Smith, L., Haro, J. M., & Koyanagi, A. (2020). Fast food consumption and suicide attempts among adolescents aged 12–15 years from 32 countries. *Journal of Affective Disorders, 266*, 63–70. https://doi.org/10.1016/j.jad.2020.01.099

Janssen, M., Chang, B., Hristov, H., Pravst, I., Profeta, A., & Millard, J. (2021). Changes in food consumption during the COVID-19 pandemic: Analysis of consumer survey data from the first lockdown period in Denmark, Germany, and Slovenia. *Frontiers in Nutrition, 8*, 635859. https://doi.org/10.3389/fnut.2021.635859

Jiao, J., Moudon, A. V., Kim, S. Y., Hurvitz, P. M., & Drewnowski, A. (2015). Health implications of adults' eating at and living near fast food or quick-service restaurants. *Nutrition & Diabetes, 5*(1), e171. https://doi.org/10.1038/nutd.2015.11

Kazi, R., El-Kashif, M., & Ahsan, S. M. (2020). Prevalence of salt-rich fast-food consumption: A focus on physical activity and incidence of hypertension among female students of Saudi Arabia. *Saudi Journal of Biological Sciences, 27*(9), 2669–2673. https://doi.org/10.1016/j.sjbs.2020.06.001

Keshari, P., & Mishra, C. (2016). Growing menace of fast-food consumption in India: Time to act. *International Journal of Community Medicine and Public Health, 3*(5), 1355–1357. https://doi.org/10.18203/2394-6040.ijcmph20161364

Khan, A., Dix, C., Burton, N., Khan, S., & Uddin, R. (2021). Association of carbonated soft drink and fast-food intake with stress-related sleep disturbance among adolescents: A global perspective from 64 countries. *eClinicalMedicine, 31*, 100681. https://doi.org/10.1016/j.eclinm.2020.100681

Khan, T., Powell, L. M., & Wada, R. (2012). Fast-food consumption and food prices: Evidence from panel data on 5th and 8th-grade children. *Journal of Obesity*, 857697. https://doi.org/10.1155/2012/857697

Krause, A. J., Simon, E. B., Mander, B. A., Greer, S. M., Saletin, J. M., Goldstein-Piekarski, A. N., & Walker, M. P. (2017). The sleep-deprived human brain. *Nature Reviews Neuroscience, 18*(7), 404–418. https://doi.org/10.1038/nrn.2017.55

Kwon, H. (Ed.). (2016). A companion to interdisciplinary STEM project-based learning. Sense Publishers. https://doi.org/10.1007/978-94-6300-672-9

Lahti-Koski, M., Pietinen, P., Heliövaara, M., & Vartiainen, E. (2002). Associations of body mass index and obesity with physical activity, food choices, alcohol intake, and smoking in the 1982–1997 FINRISK studies. *The American Journal of Clinical Nutrition*, 75(5), 809–817. https://doi.org/10.1093/ajcn/75.5.809

Lee, J. Y., Moon, S., Cho, S. H., Kim, H., Kang, H. J., Kim, S. Y., Ryu, S., Kim, J. M., Shin, I. S., & Kim, S. W. (2024). The relationship between fast food consumption and daily lifestyle changes during school closures following the COVID-19 pandemic: A cross-sectional study among adolescents in Korea. *Psychiatry Investigation, 21*(5), 610–617. https://doi.org/10.30773/pi.2023.0291

Li, L., Sun, N., Zhang, L., Xu, G., Liu, J., Hu, J., Zhang, Z., Lou, J., Deng, H., Shen, Z., et al. (2020). Fast-food consumption among young adolescents aged 12–15 years in 54 low- and middle-income countries. *Global Health Action, 13*(1), 1795438. https://doi.org/10.1080/16549716.2020.1795438

Liao, C., Gao, W., & Cao, W. (2016). The association of cigarette smoking and alcohol drinking with body mass index: A cross-sectional, population-based study among Chinese adult male twins. *BMC Public Health, 16*, 311. https://doi.org/10.1186/s12889-016-2967-3

Maddock, J. (2004). The relationship between obesity and the prevalence of fast-food restaurants: State-level analysis. *American Journal of Health Promotion, 19*(2), 137–143. https://doi.org/10.4278/0890-1171-19.2.137

Mahajan, S., & Gothankar, J. (2020). Fast food consumption pattern amongst undergraduates of various disciplines of private colleges in Pune. *International Journal of Community Medicine and Public Health, 7*(2), 505–511. https://doi.org/10.18203/2394-6040.ijcmph20200423

Majabadi, H., Solhi, M., Montazeri, A., Shojaeizadeh, D., Nejat, S., Farahani, F., & Djazayeri, A. (2016). Factors influencing fast food consumption among adolescents in Tehran: A qualitative study. *Iranian Red Crescent Medical Journal, 18*(3), e23890. https://doi.org/10.5812/ircmj.23890

Malmir, H., Mahdavi, F. S., Ejtahed, H. S., Kazemian, E., Chaharrahi, A., Khonsari, N. M., Mahdavi-Gorabi, A., & Qorbani, M. (2023). Junk food consumption and psychological distress in children and adolescents: A systematic review and meta-analysis. *Nutritional Neuroscience, 26*(10), 807–827. https://doi.org/10.1080/1028415X.2021.1951092

McTavish, D., & Loether, H. (2002). *Social research: An evolving process*. PHI Learning Private Limited.

Min, J., Jahns, L., Xue, H., Kandiah, J., & Wang, Y. (2018). Americans' perceptions about fast food and how they associate with its consumption and obesity risk. *International Journal of Environmental Research and Public Health, 15*(12), 2719. https://doi.org/10.3390/ijerph15122719

Mirdha, M., Nanda, R., Sharma, H., & Mallick, H. (2019). Study of association between body mass index and sleep quality among Indian college students. *Indian Journal of Physiology and Pharmacology, 63*(3), 241–246.

Mohiuddin, A. K., & Nasirullah, M. (2020). Fast food addiction: A major public health issue. *Indian Journal of Nutrition, 6*(1), 1–6.

Mork, P. J., Vasseljen, O., & Nilsen, T. I. (2010). Association between physical exercise, body mass index, and risk of fibromyalgia: Longitudinal data from the Norwegian Nord-Trøndelag health study. *Arthritis Care & Research, 62*(5), 611–617. https://doi.org/10.1002/acr.20118

Mukherjee, D., Behal, S., & Kurian, O. (2020). Investing in adolescent health: Harnessing India's demographic dividend. *Observer Research Foundation*. https://www.orfonline.org/research/investing-in-adolescent-health-harnessing-indias-demographic-dividend/

Mumena, W. A., Ateek, A. A., Alamri, R. K., Alobaid, S. A., Alshallali, S. H., Afifi, S. Y., Aljohani, G. A., & Kutbi, H. A. (2022). Fast-food consumption, dietary quality, and dietary intake of adolescents in Saudi Arabia. *International Journal of Environmental Research and Public Health, 19*(23), 15083. https://doi.org/10.3390/ijerph192315083

NITI Aayog. (2021). *Reforms in urban planning capacity in India*. Government of India. https://www.niti.gov.in/sites/default/files/2021-09/UrbanPlanningCapacity-in-India-16092021.pdf

Oleribe, O. O., Ukwedeh, O., Burstow, N. J., Gomaa, A. I., Sonderup, M. W., Cook, N., Waked, I., Spearman, W., & Taylor-Robinson, S. D. (2018). Health: redefined. *Pan African medical journal, 30*(1). https://www.ajol.info/index.php/pamj/article/view/210470

Pandey, K. (2016, October 19). India's obesity doubled in 10 years: NFHS – 4. *Down To Earth*. https://www.downtoearth.org.in/news/health/nfhs-4-highlights-india-has-become-obese-more-than-doubled-in-one-decade-only-52527

Patel, O., Shahulhameed, S., Shivashankar, R., Tayyab, M., Rahman, A., Prabhakaran, D., Tandon, N., & Jaacks, L. (2018). Association between full service and fast-food restaurant density, dietary intake and overweight/obesity among adults in Delhi, India. *BMC Public Health, 18*(1), 36. https://doi.org/10.1186/s12889-017-4598-8

Patel, S. R., Malhotra, A., White, D. P., Gottlieb, D. J., & Hu, F. B. (2006). Association between reduced sleep and weight gain in women. *American Journal of Epidemiology, 164*(10), 947–954. https://doi.org/10.1093/aje/kwj280

Payab, M., Kelishadi, R., Qorbani, M., Motlagh, M. E., Ranjbar, S. H., Ardalan, G., Zahedi, H., Chinian, M., Asayesh, H., Larijani, B., et al. (2015). Association of junk food consumption with high blood pressure and obesity in Iranian children and adolescents: The CASPIAN-IV study. *Jornal de Pediatria, 91*(2), 196–205. https://doi.org/10.1016/j.jped.2014.07.006

Profeta, A., Siddiqui, S. A., Smetana, S., Hossaini, S. M., Heinz, V., & Kircher, C. (2021). The impact of Corona pandemic on consumer's food consumption: Vulnerability of households with children and income losses and change in sustainable consumption behavior. *Journal of Consumer Protection and Food Safety*. Advance online publication. https://doi.org/10.1007/s00003-021-01341-1

Ray, S. (2021, February 22). Covid delivers recipe for responsible consumption. The Economic Times. https://economictimes.indiatimes.com/news/politics-and-nation/covid-delivers-recipe-for-responsible-consumption/articleshow/81158780.cms

Rydell, S., Harnack, L., Oakes, J., Story, M., Jeffery, R., & French, S. (2008). Why eat at fast-food restaurants: Reported reasons among frequent consumers. *Journal of the American Dietetic Association, 108*(12), 2066–2070. https://doi.org/10.1016/j.jada.2008.09.008

Schwartz, E. (2019, June 10). A surprising fast-food fact. *Econlife*. https://econlife.com/2019/06/income-and-fast-food-consumption/

Sharifirad, G., Yarmohammadi, P., Azadbakht, L., Morowatisharifabad, M. A., & Hassanzadeh, A. (2013). Determinants of fast food consumption among Iranian high school students based on planned behavior theory. *Journal of Obesity, 2013*, 147589. https://doi.org/10.1155/2013/147589

Shetu, S. N. (2022). Application of theory of planned behavior (TPB) on fast-food consumption preferences among Generation Z in Dhaka City, Bangladesh: An empirical study. *Journal of Foodservice Business Research, 25*(6), 1–36. https://doi.org/10.1080/15378020.2022.2099979

Simon, H. A. (1990). Bounded rationality. In J. Eatwell, M. Milgate, & P. Newman (Eds.), *Utility and probability* (pp. 15–18). Palgrave Macmillan.

Van, M., Steyn, N., & Marais, M. (2010). Characteristics and factors influencing fast food intake of young adult consumers in South Africa. *South African Journal of Clinical Nutrition, 23*(3), 124–130. https://doi.org/10.1080/16070658.2010.11734320

Yahya, F., Zafar, R., & Shafiq, S. (2013). Trend of fast-food consumption and its effect on Pakistani society. *Food Science and Quality Management, 11*, 1–7.

Zahedi, H., Kelishadi, R., Heshmat, R., Motlagh, M. E., Ranjbar, S. H., Ardalan, G., Payab, M., Chinian, M., Asayesh, H., Larijani, B., et al. (2014). Association between junk food consumption and mental health in a national sample of Iranian children and adolescents: The CASPIAN-IV study. *Nutrition, 30*(11–12), 1391–1397. https://doi.org/10.1016/j.nut.2014.04.014

Zhang, X., Chen, B., Jia, P., & Han, J. (2021). Locked on salt? Excessive consumption of high-sodium foods during COVID-19 presents an underappreciated public health risk: A review. *Environmental Chemistry Letters, 19*(5), 3583–3595. https://doi.org/10.1007/s10311-021-01257-0