

# Impact of Junk food on Physical and Mental health of the Youngsters in Bhopal city - A Cross Sectional Survey Study

## Research Article

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### Abstract

Background- *Ayurveda* has given a unique concept of *Viruddha Ahara*. Junk food an energy-dense food could be consider as *Viruddha Ahara* because of its serious physical and mental health consequences. Aim - Find out the frequency of consumption of Junk food preparation and their effects on Physical & Mental health in the youngsters of Bhopal city with special reference to *Viruddha Ahara*. Study Design- was Observational cross sectional study. Material and Method- Modified Questionnaire based on WHO STEPS1, 2 and 3 guidelines was used to collect the data. 600 youngsters of age group between 12-25 years from various schools and colleges of Bhopal city were selected by stratified random sampling technique and Statistical Analysis was done with epi info™ version 7 software. Appropriate statistical tests were applied such as frequency distribution, cross tabulation (M x N/ 2 x 2 Table), chi square test, z statistics and logistic regression analysis. Odds ratios (OR) with 95% confidence intervals (C.I) and p-value (significant <0.05) were also calculated as per need. Result- It was observed that all subjects were consuming different kinds of junk food with high mean frequency that was 3.28 days per week. Maximum youngsters were suffering from various physical and mental health consequences like 80.83% subjects were suffering from nutritional problem, 73.50% skin problems, 73.33 % GIT problems and 58.67% had anxiety disorder and 38.50% had recognised with mood disorder. Conclusion: The result of the survey study indicating that serious health consequences are developing in youngsters by consumption of *viruddha ahara* (Junk Food) and that could be converted them in chronic disease patients in near future.

**Key Words:** *Viruddha Ahara, Junk Food, Junk Food impact on health, Impact of Viruddha Ahara on Health.*

### Introduction

Food is very much essential for the sustainment of life of all living beings. The consumption of *Viruddha Ahara* is considered important causative factor for several acute to chronic diseases and even death in *Ayurveda* (1). Various research studies reported junk-food can trigger overweight, and other health problems among adolescents. Increasing trends of Obesity in youngsters due to consumption of Junk food has been also responsible for risk factors for type-2 diabetes and Cardiovascular diseases (2). By virtue of its health effects and preparation Junk food could be consider as *Viruddha Ahara*.

### Aim & Objectives of the Study

Find out the most commonly consumed Junk food preparations, their frequency along with their Physical & Mental health consequences on the youngsters of Bhopal city, M.P. with special reference to *Viruddha Ahara*.

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### Methodology

#### Study Design

This study was an observational cross sectional study.

#### Duration of Study

8 months (1<sup>st</sup> August 2017 to 31<sup>st</sup> March 2018)

#### Place of Study

Bhopal City.

#### Ethical clearance

The study protocol was approved by the Institutional Ethical Committee dated on 28/05/16.

#### Pilot Study

Before main study the pilot study was carried out to assess the feasibility and applicability of the questionnaire in 50 subjects.

Sample Design: Sampling was done by using disproportionate stratified random sampling technique (DSRS). The study population divided into 2 strata on the bases of age then irrespective of cast, creed, religion, sex etc. subjects between the age group of 12 to 25 years and those willingly sign the informed written consent were selected from OPD & IPD of Department of *Swasthavritta, Panchkarma*,

Kayachikitsa of Pt. Khushilal Sharma Govt. Autonomous Ayurveda College & Institute and from schools and other colleges of Bhopal City.

**Sample Size:** was 600

For the calculation of the required sample size, the formula used was-  $[N = z^2 P (1-P) / e^2]$  where N = sample size, z = statistics for  $\alpha$  error, P = estimated prevalence of junk food consumption, e = precision error (marginal error). According to prevalence of junk food consumption rate of previous studies (10-50%) (3) and at 5% allowable error the calculated sample size was 384 but on the convenience bases sample size was increased to 600 to increase the confidence level.

### Inclusion Criteria

All youngsters between the age group of 12 to 25 years and willing to participate in study and ready to give consent were included in the study.

### Data Collection Instrument

Modified Questionnaire based on World Health Organization

(WHO) Steps wise approach for Chronic Disease Risk Factor Surveillance i.e. WHO

STEPS1 and STEPS 2, STEPS 3 guidelines, Patient Health Questionnaire (PHQ-9), questionnaire for Attention deficit hyperactivity disorder (ADHD), Generalized anxiety and Mood disorder and Anger assessment. This questionnaire also contained questions which could be assess the physical activity, dietary pattern, junk food consumption pattern, *viruddha ahara* consumption pattern, sleeping pattern, physical and mental health problems of the study subjects.

Investigation: Height, weight, Body Mass Index (BMI), waist-hip ratio, abdominal Girth, Systolic and Diastolic blood pressure were carried out in all subjects. Random blood sugar and triglycerides and High-density lipoprotein (HDL) cholesterol and Haemoglobin test were carried out in some selected patients.

### Survey Methodology

Structured interview schedule was employed using pre structured modified questionnaire and were recorded Demographic details, current health status (biochemical measurements), health related risk factors such as physical activity, dietary pattern, junk food consumption pattern, *viruddha ahara* consumption pattern, sleeping pattern, physical and mental health problems of the study subjects. Each day average 5 participants were invited for interview and anthropometric measurements and simple clinical examinations were conducted.

Variables were recorded as, Blood pressure (in sitting posture, with mercurial sphygmomanometer), height in cm, weight in Kg, Abdominal girth in cm, waist and hip circumference in cm. Selected

Participants were provided the appointment date and time (usually the next morning) for laboratory investigations - haemoglobin, random blood sugar, and triglyceride and HDL level.

Socioeconomic status of the Subjects was classified as per the modified Kuppaswamy scale. Raised Waist Circumference: > 90 cm for males and > 80 cm for females in age between 19-25 years. WC >95<sup>th</sup> percentile was considered Raised WC in age between 12-18 years (4). Overweight and obesity defined by BMI for gender and age. BMI >85<sup>th</sup> percentile of reference data was considered overweight, and those with a BMI >95<sup>th</sup> percentile was considered obese (5). Abdominal Obesity (Waist hip ratio):  $\geq 0.85$  for female and  $\geq 0.90$  for male in age between 19-25 years. As per guideline of world health organization WHR >95<sup>th</sup> percentile was considered Raised WHR in age between 12-18 years. Raised Abdominal Girth: >90 for females and >100 for male in age between 19-25 years. >95<sup>th</sup> percentile was considered Raised AG in age between 12-18 years. Hypertension: Defined as systolic blood pressure (SBP)  $\geq 140$  mmHg or diastolic blood pressure (DBP)  $\geq 90$  mmHg in age between 19-25 years. >95<sup>th</sup> percentile was considered Raised HTN in age between 12-18 years. As per guideline of WHO Anemia defined as Hb Male- <13 gm%, in Female <12 gm%. The severity of anemia was graded as mild (Hb 10 - 12 gm %), moderate (Hb. 7-10 gm %) and severe (Hb. <7 gm %). Physically inactivity considered not involved in at least 30 minutes of regular moderate to vigorous activity at least 5 days in a week. Questions were asked to subjects regarding dietary habit, junk food consumption pattern which they were following since last 1 year. Duration of junk food consumption was categorized as 1-3 years, > 3 years and > 6 years. Meal timing was categorized as regular and irregular. Lunch time was categorized as before 1 pm and after 1 pm and Dinner time before 8 pm and after 8 pm. Number of servings and frequency of Junk food consumption per week was asked in order to assess the junk food pattern of the subject. Question regarding *viruddha ahara* consumption were asked in Yes or No.

### Data Management and Analysis

The data thus collected manually was transformed to Microsoft Excel and analysis was done on epi info™ version 7. (Means, 95% confident interval (CI), standard deviation (SD) and /or standard error (SE) were included in descriptive analysis) appropriate statistical tests were applied such as frequency distribution, cross tabulation (M x N/ 2 x 2 Table), chi square test, z statistics and logistic regression analysis and result was presented in the form of tables and graphs. Odds ratios (OR) with 95% confidence intervals

(C.I) and p-value (significant <0.05) were calculated as per need.

### Observations and Results

In the present study out of total 600 subjects 37% (n=222) were male and 63% (n=378) were female. Subjects between 12-18 years were 54% (n=324), among them 48% (n=156) and 52% (n=168) were male and female respectively. Subjects between 19-25 years were 46% (n=276), among them 24% (n=66) and 76% (n=210) were male and female respectively.

**Table No 1: Demographic Observations of Survey subjects**

Max 52.17%	Youngsters were Graduate
Max 79.50%	belonged to middle class socioeconomic status
94.17%	belonged to Hindu community
48% and 67%	<i>Vata- Pittaj and Vata- Kaphaj Prakriti respectively</i>
55.17%	Having <i>Madhyama satwa</i>
12.50% (n=75) (M-39, F-36)	Were found overweight
28.33% (n=170, M-72, F-98)	Subjects were having raised WHR
6.17%	Having raised Abdominal Girth.
Out of 176 subjects (69.88%) subjects (M-12, F-111)	Were found anaemic, in which 88 were mild anaemic (M-11, F-77), 34 were moderate anaemic (M-1, F-33) and only 1 female subject was found severe anaemic.

### Lifestyle Observation

58% subjects were vegetarian. 26% subjects were consuming junk food for 1-3 years, 32% subjects for 3-6 Years and 42% since more than 6 Years. Mean frequency of junk food consumption was 3.28 days per week. 11% subjects were consuming junk food throughout the day and 10% subjects at late night (after 10 pm) and 79% subjects were at any time. Maximum 62% subjects prefer to take outside meal at evening time, 20% at lunch time, 12.17 % at dinner time and only 5.67% were during breakfast. 68.87% were irregularly and 31.33% taking their meal regularly. 71% subjects were taking their lunch after 1 pm. 83% subjects were taking their dinner after 8 pm. 36.17% were having disturbed sleep. 70% taking 6-8 hours sleep at night, 15 % were taking more than 8 hours sleep and 15 % were taking sleep less than 6 hours at night. 91% were slept after 10 pm in which most of them were slept after 12 pm. 51% subjects were found habitual for day dreaming. Frequency of various kinds of Junk food and *Viruddha Ahara* by survey participants had been recorded and represented in the table No 2 and 3.

**Table No 2: Frequency of various Junk Food Consumption by Survey subjects**

Type of Junk Food	12-18 Years (n=324)	19-25 Years (n=276)	Total (n=600)	Male (n=222)	Female (n=378)
Salty Snacks	249 (54.01%)	212 (45.99%)	461 (76.83%)	178 (38.61%)	283 (61.39%)
Sweet Junk Food	237 (53.62%)	205 (46.38%)	442 (73.67%)	176 (39.82%)	266 (60.18%)
Bakery Based Junk Food	171 (51.38%)	162 (48.65%)	333 (55.50%)	128 (38.44%)	205 (61.56%)
Chinese Junk Food	177 (56.19%)	138 (43.81%)	315 (52.50%)	130 (41.27%)	185 (58.73%)
Indian Junk Food	253 (53.38%)	221 (46.62%)	474 (79.00%)	183 (38.61%)	291 (61.39%)
Other type of Junk Food	117 (60.00%)	78 (40.00%)	195 (32.50%)	86 (44.10%)	109 (55.90%)
Sweetened Beverages	147 (53.07%)	130 (46.93%)	277 (46.17%)	120 (43.32%)	157 (56.68%)

**Table No 3: Types of *Viruddha Ahara* Consumption Frequency by survey subject**

Type of <i>Viruddha</i>	12-18years (n=324)	19-25 years (n=276)	Total (n=600)	Male (n=222)	Female (n=378)
<i>Samyoga viruddha</i>	202 (58.05%)	146 (41.95%)	348 (58.00%)	148 (42.53%)	200 (57.47%)
<i>Veerya viruddha</i>	73 (62.93%)	43 (37.07%)	116 (19.33%)	43 (37.07%)	73 (62.93%)
<i>Kala viruddha</i>	71 (54.20%)	60 (45.80%)	131 (21.83%)	39 (29.77%)	92 (70.23%)
<i>Karma viruddha</i>	62 (53.45%)	54 (46.55%)	116 (19.33%)	37 (31.90%)	79 (68.10%)



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<i>Parihar viruddha</i>	172 (59.93%)	115 (40.07%)	287 (47.83%)	128 (44.60%)	159 (55.40%)
<i>Paka viruddha</i>	65 (54.12%)	55 (45.83%)	120 (20.00%)	48 (40.00%)	72 (60.00%)
<i>Krama viruddha</i>	279 (58.13%)	201 (41.88%)	480 (80.00%)	185 (38.54%)	295 (61.46%)
<i>Vidhi viruddha</i>	304 (57.90%)	221 (42.10%)	525 (87.50%)	201 (38.29%)	324 (61.71%)
<i>Avastha viruddha</i>	135 (55.10%)	110 (44.90%)	245 (40.83%)	96 (39.18%)	149 (60.82%)
<i>Ajeerne Ashniyat</i>	102 (49.28 %)	105 (50.72%)	207 (34.50%)	92 (44.44%)	115 (55.56%)
Curd With Non vegetarian	24 (48.98%)	25 (51.02%)	49 (8.17%)	14 (28.57 %)	35 (71.43%)
Packed food	223 (61.10%)	142 (38.90%)	365 (60.83%)	147 (40.27%)	218 (59.73%)

## Discussion

Today, Food habits of society are changing dramatically because of urbanization and easy availability of market food i. e. junk and fast food. The most of the market foods are having added additives and prepared with various combinations of food items those are incompatible to each other. The trends to eat market food also gradually increasing thus we are frequently exposed to various incompatible food i. e. *Viruddha Ahara* which causing various serious health hazards.

In present study maximum 79.5% were belonged to middle class and maximum junk food consumption as well as physical and mental health problems was also reported in this group youngsters. 48.33% subjects were belonging to *Vata- Pittaj*, 34.17% *Vata- Kaphaj* and 17.50 % were *Pitta Kaphaj Prakriti*.

Total 55.17 % subjects (M-66.77%, F-33.23%) were physically inactive. In age group 12-18 years 53.78% and in age group 19-25 years 46.22% subjects were physically inactive. Ranasinghe et al. revealed the overall prevalence of inactivity in India was 18.5%-88.4% (6).

In the present study as per WHO criteria; 12.50% (n=75) (M-39, F-36) of study subjects were overweight while 2 % (n=12; M-4, F-8) were found obese. A cross-sectional study was conducted in randomly selected 2158 school children of age 7 to 14 years of government and private schools in Indore (M.P.) has been reported 14.97% overall prevalence of obesity (7)

In the present study, out of 600 subjects 9.50% (n=57, M-11, F-46) were having raised waist circumference; in which maximum 14.99% (n=40) from 19-25 age group while 5.25% (n=17) have raised WC in 12-18 year age group. A.L. Faris, N et. al. (2015) in a study suggested that Adolescent girls were mostly consuming Burgers and carbonated soft drinks and those were consuming large portion sizes of fast food had significantly higher mean waist circumference and hip circumference (8).

In total 176 subjects; 123 (69.88%) subjects were found anaemic; in which maximum were females 111 (90.24%). In 111 amaemic females 77 were found mild, 33 Moderate, and only 01 was found severe

anaemic. According to World Health Organization the global prevalence of anemia is 24.8% (9).

In the present study Max. 46% subjects were consuming junk food since more than 6 years, 32% from more than 3 to 6 Years and 26% from 1 to 3 years. Rouhani et al. reported that the rate of fast-food consumption has increased in the past years, particularly among children and adolescents (10).

In present study total 66% subjects (55.81% between 12-18year age group and 44.19% in 19-25 year age group) were taking junk food more than 3 days in week, mean frequency of junk food consumption were found 3.28 days per week. In a cross-sectional survey, Al Faris et. al., in study trends of fast food consumption among adolescent and young adult Saudi reported that 25.2% of adolescent girls and 20.3% of young adult girls consumed fast food twice or more per week (11).

In the present study it was observed that subjects those were consuming junk food 3 to 4 day per week were overweight i.e. 19.32% (n=32). In another study, Li M et al., and Savige et. al., found that, adolescents aged 11-17 years those were overweight or obese were significantly frequent users of fast foods (once or more in a day) (12, 13).

In this study 6.33% subjects were almost every day consuming fast food. In a longitudinal American study, Healthy girls (n=101) between the ages of 8 and 12 years at baseline and 11 and 19 years at the Massachusetts Institute of Technology, showed that increasing frequency of eating quick-service food was associated with increasing z-BMI in female adolescents (14).

In the present study observed that the 62.17% youngsters were consuming Junk food mainly in the form of snacks from shops during evening after the end of school/college/work.

76.83% subjects were consuming salty snacks and they were associated with skin problems (OR=1.38, 95% CI 0.89; 2.13), Respiratory problems (OR= 1.70, 95% CI 0.89; 3.24), Anorectal problems (OR=1.48, 95%CI 0.73; 2.99) and *Indriye Daurbalya* (OR=1.59, 95% CI 0.93; 2.72).

73.67% subjects were consuming sweet junk food. They were associated with GIT problems (OR=1.31, 95% CI 0.85; 2.02), Anorectal problems

(OR=1.51, 95% CI 0.78; 2.94), Hypothyroidisms (OR=1.33, 95% CI 0.35; 5.02), *Indriye Daurbalya* (OR=1.34, 95% CI 0.81; 2.23) and with Anger (OR=1.79, 95% CI 1.15; 2.77).

55.50% subjects were consuming Bakery based junk food. They were associated with Anorectal problems (OR=1.58, 95%CI 0.90; 2.76), Menstrual problems (OR=1.22, 95%CI 0.84; 1.77), Hypothyroidism (OR=1.97, 95%CI 0.58; 6.65) and Kidney Stone (OR=2.00, 95%CI 0.68; 5.87).

52.50% subjects were consuming Chinese junk food, in which 58.73% were female subjects. They were associated with Anorectal problems (OR=1.43, 95% CI 0.83; 2.45) and Hypothyroidisms (OR=1.44, 95% CI 0.45; 4.55).

79% subject was consuming Indian junk food. They were associated with Anorectal problems

(OR=1.30, 95%CI 0.65; 2.59), *Indriye Daurbalya* (OR=1.65, 95%CI 0.94; 2.90), ADHD (OR=1.30, 95%CI 0.79; 2.14) and Anger (OR=1.38, 95%CI 0.86; 2.21).

32.50% were consuming other type of junk food (Pasta, Macaroni). They were associated with Skin Problem (OR=1.57, 95%CI 1.02; 2.40) and Anger (OR=1.45, 95%CI 0.97; 2.17).

46.17% subjects were habitual to take sweetened beverages They were associated with GIT problems (OR=1.94, 95%CI 1.30; 2.91), Hypothyroidism (OR=1.85, 95%CI 0.58; 5.91), Locomotors problems (OR=1.31, 95%CI 0.90; 1.90) and ADHD (OR=1.31, 95%CI 0.89; 1.94). In another study by Harrell et al, in New Delhi found that 30% school going children was consuming soft drink daily and 70 % once in 2 days (15).

**Table No 04: Viruddha Ahara consumption frequency and their health consequences**

%of Youngsters eating viruddha Ahara.	Consumption of Type of Viruddha Ahara	Health Consequences
87.50% (n=525) subjects were consuming	<i>Vidhiviruddha Ahara.</i>	They all were associated with Skin problems (OR=1.40, 95%CI 0.80; 2.42), <i>Indriye Daurbalya</i> (OR=1.68, 95%CI 0.81; 3.49) and ADHD (OR=2.82, 95%CI 1.41; 5.63).
80% (n=480) subjects were consuming	<i>Kramaviruddha Ahara</i>	But in 80%, 58% (n=348) were associated with Locomotors problems (OR=1.49, 95%CI 0.91; 2.43), <i>Indriye Daurbalya</i> (OR=1.41, 95%CI 0.80; 2.49), ADHD (OR=2.40, 95%CI 1.39; 4.13) and Generalized Anxiety Disorder (OR=1.64, 95%CI 1.01; 2.66).
58% (n=348) subjects were consuming	<i>Samyogaviruddha Ahara</i>	They all were associated with Respiratory problems (OR=1.78, 95%CI 1.07; 2.94).
47.83% (n=287) subjects were consuming	<i>Parihar viruddha Ahara</i>	They all were associated with Respiratory problems (OR=1.78, 95%CI 1.10; 2.88).
40.83% (n=245) subjects were consuming	<i>Avastha viruddha Ahara.</i>	They were associated with Respiratory problems (OR=1.64, 95%CI 1.01; 2.66), Anorectal problem (OR=1.50, 95%CI 0.88; 2.59), Kidney stone (OR=1.56, 95%CI 0.58; 4.19), Locomotor problem (OR=1.40 95%CI 0.96; 2.05) and <i>Indriye Daurbalya</i> (OR=1.57, 95%CI 1.03; 2.40).
21.83% (n=131) subjects were consuming	<i>Kala viruddha Ahara</i>	They all were associated with Menstrual problems (OR=1.59, 95%CI 0.97; 2.28), Nutritional problems (OR=1.59, 95%CI 0.90; 2.79), Hypothyroidism (OR=1.60, 95% CI 0.46; 5.51) and Kidney Stone (OR=2.08, 95%CI 0.76; 5.69)
20% (n=120) were consuming	<i>Paka viruddha Ahara.</i>	They all were associated with Respiratory problems (OR=1.84, 95%CI 1.06; 3.19), Anorectal problem (OR=1.42, 95%CI 0.75; 2.72), Hypothyroidism (OR=2.90, 95%CI 0.87; 9.68), Locomotor problem (OR=1.95 95%CI 1.23; 3.10), ADHD (OR=1.45, 95%CI 0.90; 2.35) and Generalized Anxiety Disorders (OR=1.41, 95%CI 0.86; 2.30).
19.33% (n=116) subjects were consuming	<i>Karma viruddha Ahara</i>	They all were associated with Respiratory problems (OR=1.91, 95%CI 1.11; 3.28), Menstrual Problem (OR=1.43, 95%CI 0.91; 2.24) and Hypothyroidism (OR=2.78, 95%CI 0.85; 9.04).
19.33% (n=116) were consuming	<i>Veerya viruddha Ahara</i>	They all were associated with Skin Problems (OR=1.32, 95%CI 0.81; 2.16), Hypothyroidism (OR=1.30, 95%CI 0.34; 4.94) and Mood Disorder (OR=1.39, 95%CI 0.86; 2.24).

34.50% (n=207) subjects were doing *Ajeereneashniyat*. They were associated with GIT problems (OR=1.51, 95%CI 0.97; 2.37), Skin problem (OR=1.36, 95%CI 0.88; 2.11), Respiratory problem (OR=1.98, 95%CI 1.20; 3.26), Anorectal problem (OR=3.20 95%CI 1.81; 5.66), Kidney stone (OR=1.47, 95%CI 0.52; 4.11), Locomotors problems

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(OR=1.39, 95%CI 0.93; 2.08), *Indriye Daurbalya* (OR=1.65, 95%CI 1.06; 2.58), ADHD (OR=1.73 95%CI 1.15; 2.61) and Generalized Anxiety Disorder (OR=1.35, 95%CI 0.88; 2.07).

60.83% (n=365) subjects were habitual to consuming packed food. They were associated with Skin problems (OR=1.52, 95%CI 1.04; 2.26), Hypothyroidism (OR=2.32, 95%CI 0.67; 8.78) and ADHD (OR=1.31, 95%CI 0.87; 1.96).

8.17% (n=49) subjects were consuming curd with non-vegetarian diet. They were associated with GIT problems (OR=1.92, 95%CI 0.80; 4.58), Respiratory problem (OR=2.73, 95%CI 1.31; 5.71), Menstrual problem (OR=2.17, 95%CI 1.16; 4.06), Hypothyroidism (OR=1.94 95%CI 0.38; 9.80) and Mood Disorders (OR=2.44, 95%CI 1.20; 4.97).

Large portion size, high amount of refined carbohydrates and added sugar, and high glycemic load are the characteristics of fast food. Consumption of added sugars has been associated with increased risk of obesity<sup>14</sup> as well as increased risk factors for cardiovascular disease (16), including dyslipidemia, elevated blood pressure, diabetes (17), non-alcoholic fatty liver disease (18) and even cognitive decline (19) and cancer (20). Another research indicating that high consumption of ultra-processed foods associated with higher prevalence of Metabolic Syndrome in adolescents and risk of insulin resistance (21). The participants in the present study also showed multiple systemic problems which can cause various NCD's in future.

Generally, consumption of *viruddha ahara* lead to vitiation in *Dosha & Dhatu* (22) and *Agni* (23) which is root cause of development of every disease. Because vitiation in *Jatharagni* leads to vitiation of *Dhatvagni* and *Bhutagni*. This imbalance in *Agni* can produce *Ama* in the body which can disturb the immune system & vitiate all the *Doshas* and the *srotas* then by obstructing these *srotas* can cause various dangerous diseases.

**Observed Physical health consequences in all participants (represented in Table no 05 and Graph No 01)**

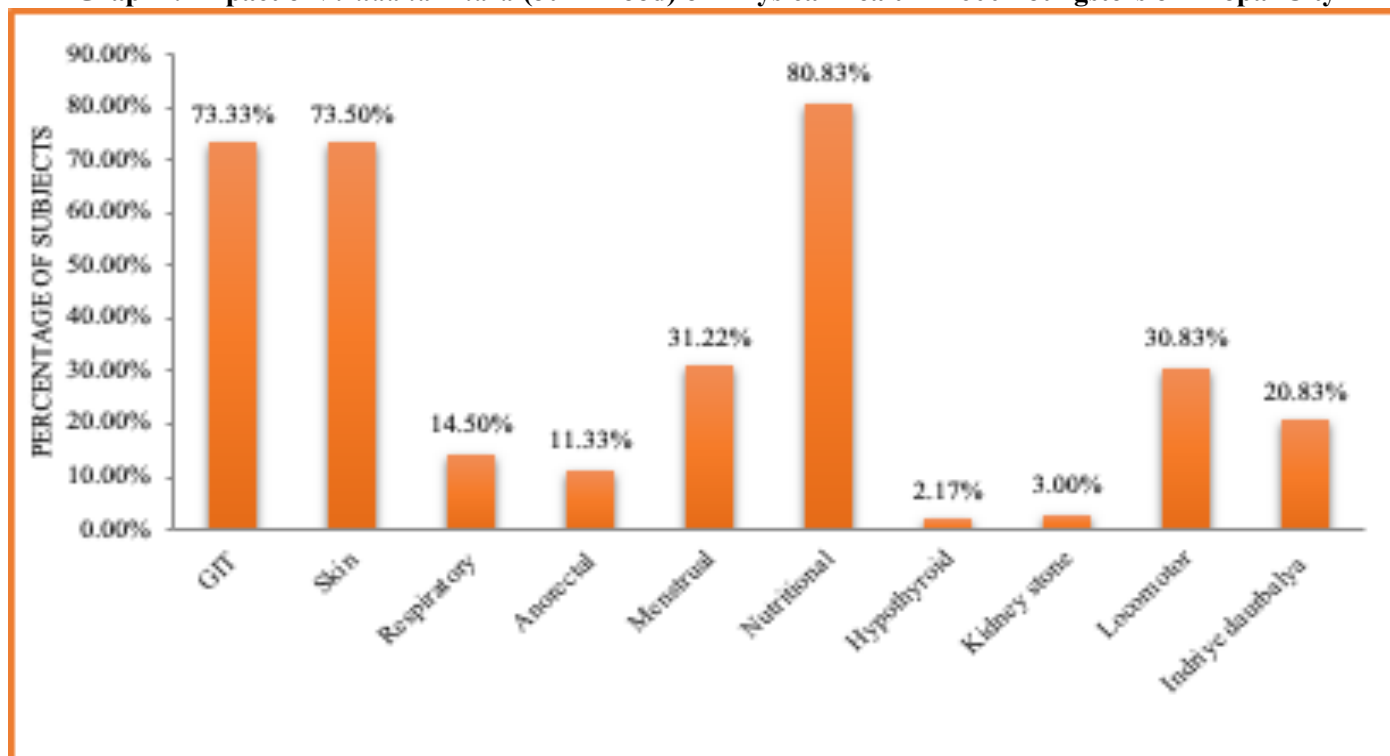
In the present study, out of total 600 subjects, (n=485) 80.83% were suffering from nutritional problems (Hair fall, Hair graying). It may be because junk food lack in micronutrients. 73.50% (n=441) subjects were suffering from various kinds of skin problem (Acne, Eczema, Urticaria, white spots and skin rashes). In another study Talekar M. also observed that 23.55% subjects were suffering from skin disease those were consuming *Viruddha Ahara* (24).

In present survey study 31.22% (n=197) were suffering from PMS, PCOD. In a cross-sectional survey Raval CM et al. found in 489 college girls 18.4% were suffering from moderate to severe PMS (25). In the present study 73.33% (n=440) subjects were suffering from GIT problems (Abdominal pain, abdominal distension, constipation, acidity and IBS), 30.83% (n=185) were having Locomotors problems (Stiffness in neck, joint pain), 20.83% (n=125) were having *Indriyedaurbalya* (using spectacle), 14.50% (n=87) were having Respiratory problems (Asthma), 11.33% (n=68) were having Anorectal problem (Piles, Fissure, Fistula), 3.00% (n=18) were having Kidney stone and 2.17% (n=13) were having Hypothyroidism.

**Table No 5: Observation of Physical Health Problems in Survey Subjects**

Physical Health Problem	12-18 Years (n=324)	19-25 Years (n=276)	Total (n=600)	Male (n=222)	Female (n=378)
GIT	211 (47.95 %)	229 (52.05%)	440 (73.33%)	142 (32.27 %)	298 (67.73%)
SKIN	243 (55.10%)	198 (44.90%)	441 (73.50%)	176 (39.91%)	265 (60.09%)
RESPIRATORY	34 (39.08%)	53 (60.92%)	87 (14.50%)	30 (34.48%)	57 (65.52%)
ANORECTAL	22 (32.35%)	46 (67.65%)	68 (11.33%)	21 (20.88 %)	47 (69.12%)
MENSTRUAL	49 (41.53%)	69 (58.47%)	118 (31.22%)	0 (0%)	118 (31.22%)
NUTRITIONAL	243 (50.10%)	242 (49.90%)	485 (80.83%)	163 (33.61%)	322 (66.39%)
HYPOTHYROID	5 (38.46%)	8 (61.54%)	13 (2.17%)	3 (23.08%)	10 (76.92%)
KIDNEY STONE	7 (38.89%)	11 (61.11%)	18 (3.00%)	4 (22.22%)	14 (77.78%)
LOCOMOTOR	83 (44.86%)	102 (55.14%)	185 (30.83%)	66 (35.68%)	119 (64.32%)
INDRIYE DAURBALYA	49 (39.20%)	76 (60.80%)	125 (20.83%)	38 (30.40%)	87 (69.60%)

**Graph1: Impact of Viruddha Ahara (Junk Food) on Physical Health in 600 Youngsters of Bhopal City**



**Observed Mental health consequences in all participants (represented in table no 06 and Graph No 02)**

Junk food has a negative effect on mental health. High-fat, high-sugar diets can affect proteins that are important in brain development, such as the signaling molecule brain-derived neurotrophic factor (26). In the present survey 23.33% subjects (n=140) were found suffering from mild to moderate depression, in which maximum 67.86% (n=95) subjects were belonging to age between 19-25 years. A cohort study conducted by Sánchez A. in 2012 found higher risk of depression was associated with consumption of fast food (hamburgers, sausages, pizza) (hazard ratio (HR) = 1.36; 95 % CI 1.02, 1.81; P trend = 0.003).

In the present survey 30.17% (n=181, F-67.96%,M-32.04%) subjects were having ADHD. The percent was higher 59.12% in age between 12-18 years than 40.88% in age between 19-25 years. McCann, Donna et al. in the study revealed artificial colors or a sodium benzoate preservative (or both) in the diet result in increased hyperactivity in 3-year-old and 8/9-year-old children (27).

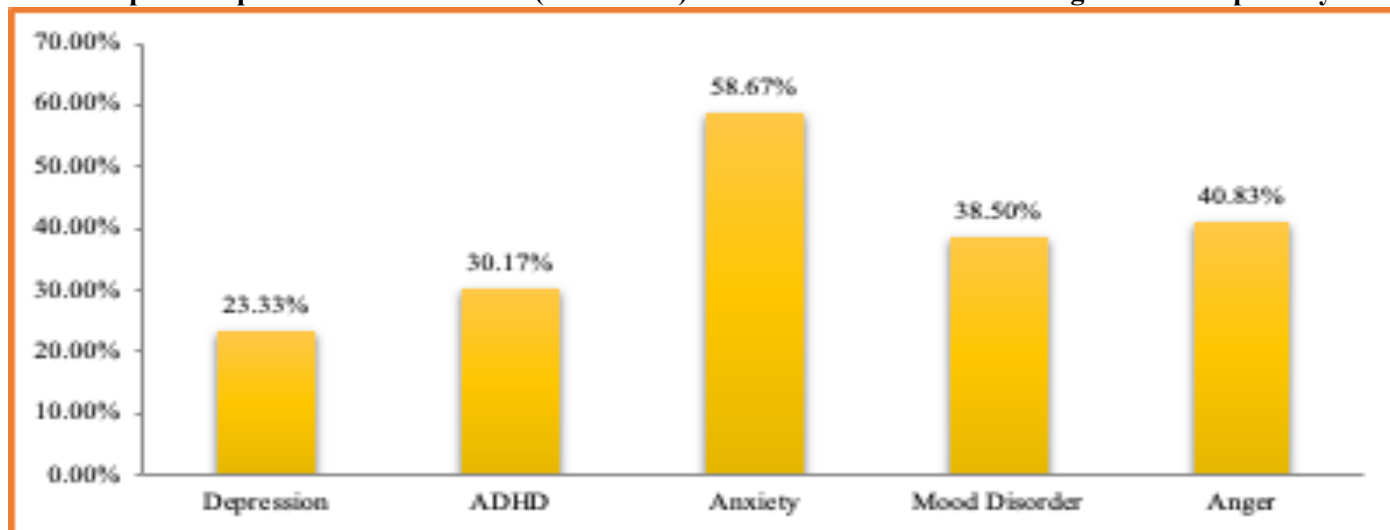
In the present survey 58.67% (n=352) subjects were having generalized anxiety disorder, 38.50% (n=231) were suffering from mood disorders and 40.83% (n=245) were experiencing frequent anger. Same observation found by Bakhtiyari M et al., in a cross-sectional study on students of medical sciences universities in Tehran observed seven folds higher anxiety found in students who frequently consume fast-food cuisine than those students who rarely use fast food (OR=7.0, 95% CI, 2.35-9.74, P<0.001) it was also determined that rate of anxiety level might increase by increase in consumption of fast- food cuisine (28).

**Table No 6: Observed Mental Health Problems in Survey subjects**

Mental Health Problems	12-18 Years (n=324)	19-25 Years (n=276)	Total (n=600)	Male (n=222)	Female (n=378)
DEPRESSION	49 (35.00%)	91 (65.00%)	140 (23.33%)	45 (32.14%)	95 (67.86%)
ADHD	107 (59.12%)	74 (40.88%)	181 (30.17%)	58 (32.04%)	123 (67.96%)
GENERALIZED ANXIETY DISORDER	201 (57.10%)	151 (42.90%)	352 (58.67%)	134 (38.07%)	218 (61.93%)
MOOD DISORDER	142 (61.47%)	89 (38.53%)	231 (38.50%)	89 (38.53%)	142 (61.47%)
ANGER	127 (51.84%)	118 (48.16%)	245 (40.83%)	89 (36.33%)	156 (63.67%)



**Graph 2: Impact of *Viruddha Ahara* (Junk Food) on Mental Health in 600 Youngsters of Bhopal City**



### Conclusion

Result of Survey Study indicating that all subjects were consuming various types of junk food and *Viruddha Ahara* (incompatible diet) and various physical and mental health consequences were found significantly linked with high consumption of *Viruddha Ahara* (Junk food). It could be concluded that consumption of *Viruddha Ahara* (Junk food) has significant adverse impact on physical and mental health of youngsters.

### Limitation

This study was carried out on small sample size because of the limitations of the resources.

### Further Recommendations

Future observational research could be carried out exclusively with single *Viruudha Ahara* or a single junk food effect on physical and mental health.

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