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Junk Food Consumption and Its Association with Anthropometric Indices and Cardiovascular Parameters among College Going Students

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ABSTRACT

Background: Junk foods are defined as meals or beverages with little nutritional value that are made to be easily accessible for consumption with little to no thought to their nutritional potential. The present study has been objectively conducted to assess the association of consumption of junk foods with anthropometric indices and its impact on blood pressure levels.

Methods: The present study was conducted on 200 medical students at Postgraduate Department of Physiology, Government Medical College, Jammu over a period of one year from November 2019 to October 2020.

Results: Mean weight and mean height of studied individuals was 62.39±3.75 kg and 165.44 ± 9.50 cms respectively. The study population's mean body mass index (BMI), which ranged from 16.19 to 37.7 kg/m2, was 22.74±3.17 kg/m^2. The average waist circumference, average hip circumference (HC) and the average waist-to-hip ratio of studied individuals was (79.83±9.30) cms, (93.25 ± 8.34) cms, and (0.85 ± 0.07) respectively. The study population's average systolic and diastolic blood pressure was 120.08 ± 8.85 mmHg and 79.06 ± 5.82 mmHg respectively.

Conclusion: The findings of the present study revealed that there was no significant association of junk food/soda drinks consumption with BMI, WHR, systolic BP, and diastolic BP.

Keywords: Junk Food Consumption, Anthropometric Indices, Cardiovascular Parameters, BMI, WHR, BP, College Going Students

INTRODUCTION

In many developing countries, changes in diet and lifestyle have led to increase in prevalence of obesity which is one of the major risk factors for CVD. Overweight and obesity are defined as abnormal or excess fat accumulation that may impair health. Body mass index (BMI) is a simple index of weight for height that is commonly used to classify weight and obesity in adults. It is defined as person's weight in kilograms divided by square of height (in metres). BMI $\geq$ 25 kg/m^2 is defined as overweight, while BMI $\geq$ 30 kg/m^2 is categorized as obesity (WHO, 1998).[1] BMI, waist circumference, waist-to-hip ratio (WHR) and waist-to-height ratio are the most commonly used predictors for cardiovascular risk factors in clinical practice and epidemiological studies (Mellati AA et al., 2009).[2]

Junk foods are defined as meals or beverages with little nutritional value that are made to be easily accessible for consumption with little to no thought to their nutritional potential. In other words, they offer minimum amounts of minerals, vital amino acids, and lipids while providing calories from fat or added sugar.[3] Because of its accessibility and affordability, people around the world are eating more junk food, which has a prevalence of over 70%.[4] Junk food, a popular substitute for traditional food that has little nutrition, is consumed by many people. This is regarded as an up-and-coming significant public health concern for all age groups, but particularly for young adults.[4,5] The rising rates of overweight and obesity in children and adolescents today have been linked to the increased consumption of high-energy foods with poor nutritional value (junk food), which accounts for a sizeable share (15–40%) of children's total daily calorie intake.[6] Nowadays, junk foods like chips, biscuits, doughnuts, chocolates, noodles, as well as aerated drinks like coke, fanta, and sprite, have largely replaced nutrient-dense foods. This shift in eating habits among children and adolescents has been cited as a major factor in the global rise in obesity and its related consequences in both developed and developing nations. The present study has been objectively conducted to assess the association of consumption of junk with anthropometric and its impact on blood pressure levels.[7]

METHODS

The present study was conducted at Postgraduate Department of Physiology, Government Medical College, Jammu over a period of one year from November 2019 to October 2020. The study was conducted on 200 medical students, belonging to 18-25 years age group, who were randomly enrolled in the study from Government Medical College, Jammu. After detailed discussion regarding the purpose and methodology of the study, all eligible subjects were requested to participate in the study.

Inclusion criteria

1. Age ranging between 18 to 25 years.
2. Subjects in the state of good physical and mental well-being.

Exclusion criteria

1. Age less than 18 years and more than 25 years.
2. History of diabetes mellitus, hypertension, cardiopulmonary disease, or any recent illness.
3. Subjects on medications for any illness.

A questionnaire with questions was used to study the profile of risk factors for cardiovascular disease.

Physical measurements

Weight of the subjects was measured in kilograms by using calibrated weighing machine with minimum on and with shoes taken-off by the subjects. The individual stood still with body weight evenly distributed between both feet (WHO 1995).[8]The height was measured by using a vertical measuring rod fixed to wall. The individual was asked to stand straight on flat floor in front of the measuring rod with shoes taken off, a headboard was brought in contact with the uppermost part of head lightly compressing the hair for accuracy in measurement. The height was recorded to the nearest centimetre (cm) (WHO, 1995).[8]

BMI: Body mass index was calculated by dividing weight (Wt) measured in kilograms (kgs) by square of height (Ht) measured in metres (m) *i.e.* BMI = Wt (in kg)/(Ht [in metres])^2

Classification of study subjects as per BMI into various categorized was done as per following criteria (WHO, 1995):[8]

Body mass index (BMI) range	Category
<18.5 kg/m^2	Underweight
18.5 – 24.9 kg/m^2	Normal
25.0 – 29.9 kg/m^2	Overweight
≥30.0 kg/m^2	Obese

Waist circumference (WC): It was measured with a flexible inelastic tape placed on the midpoint between lowest costal margin and the upper margin of iliac crest at the end of full expiration with the subject in the standing position (WHO, 1995).8

Hip circumference: Subject stood erect with arms on the sides and feet together. It was measured at the widest circumference between the anterior superior iliac crests and the ischial tuberosities using a non-stretchable tape (WHO, 1995).[8]

Waist-hip ratio (WHR): It was calculated as the ratio of waist to that of hip of each subject.

- WHR > 0.9 in men indicated abdominal obesity
- WHR > 0.85 in women indicated abdominal obesity (WHO, 2008)[1]

Blood pressure (BP): BP was recorded by auscultatory method with the help of mercury sphygmomanometer. Systolic and diastolic BP were noted. Three readings were recorded and their mean was taken as final reading in mm Hg for SBP and DBP, respectively (Chobanian A. et al., 2003).[9]

Category	Systolic BP (mm Hg)		Diastolic BP (mm Hg)
Normal BP	<120	and	<80
Prehypertension	120-139	or	80-89
Hypertension	≥140	or	≥90

STATISTICAL ANALYSIS

The information obtained was compiled in the form of an excel sheet. Statistical analyses were done by using appropriate tools. Descriptive statistics were calculated for summarizing quantitative variables (mean [± SD] or median [range]). The significance of difference between quantitative variables was assessed by student *t*-test. The qualitative variables were assessed by applying chi-square test. *p*-value <0.05 was considered statistically significant.

Results

In the present study, a total of 200 participants were included in the study, of them 87 (43.5%) were males and 113 (56.5%) were females. The mean age of the study population was 21.48 (±3.46) years (range 18 - 25 years), with maximum number participants (48.0%) belonging to the age group of 20-21 years and minimum number of participants (2.5%) belonging to the age group 24-25 years.

Table 1: Distribution of male and female study subjects according to different age groups.

Age groups (years)	Males		Females		Total	
	N	%	N	%	N	%
18-19	13	14.9	7	6.2	20	10.0
20-21	41	47.1	55	48.7	96	48.0
22-23	30	34.5	49	43.3	79	39.5
24-25	3	3.4	2	1.8	5	2.5
Total	87	100.0	113	100.0	200	100.0

We observe that majority of male 41(41.1%) and female individual 55(48.7%) were belonging to the age group (20-21) years and the least number of males (3.4%) and females (1.8%) were belonging to the age group of 24-25 years as shown in table 1.

Table 2: Anthropometric and cardiovascular parameters of the study subjects

Variable	Mean ± SD	Range	
		Minimum	Maximum
Weight (kg)	62.39 ± 3.75	38	92
Height (cms)	165.44 ± 9.50	137	192
BMI (kg/m^2)	22.74 ± 3.17	16.19	37.7
WC (cms)	79.83 ± 9.30	55	118
HC (cms)	93.25 ± 8.34	55	124
Waist hip ratio	0.85 ± 0.07	0.67	1.07
SBP (mm Hg)	120.08 ± 8.85	76	179
DBP (mm Hg)	79.06 ± 5.82	68	110

SD: standard deviation; BMI: body mass index; WC: waist circumference; HC: hip circumference; SBP: systolic blood pressure; DBP: diastolic blood pressure

We determined that the mean weight and mean height of studied individuals was 62.39±3.75 kg and 165.44 ± 9.50 cms respectively. The study population's mean body mass index (BMI), which ranged from 16.19 to 37.7 kg/m2, was 22.74±3.17 kg/m^2. The average waist circumference, average hip circumference (HC) and the average waist-to-hip ratio of studied individuals was (79.83±9.30) cms, (93.25 ± 8.34) cms, and (0.85 ± 0.07) respectively. The study population's average systolic and diastolic blood pressure was 120.08 ± 8.85 mmHg and 79.06 ± 5.82 respectively.

Table 3: Distribution of study subjects according to junk food consumption

Junk food intake	Number of subjects	Percentage (%)
Often	42	21.0
Occasionally	150	75.0
Never	8	4.0
Total	200	100.0

42 participants (21.0%) said they frequently ate fast food. About 150 respondents (75.0%) admitted to consuming junk food occasionally. Eight individuals (4.0%) outright denied having ever consumed junk food.

Table 5: Association of anthropometric and cardiovascular parameters with junk food consumption among the study subjects

Variable	Junk food consumption			*p*-value
	Frequent (N = 42)	Occasionally (N = 150)	Never (N = 8)	
	Mean ± SD	Mean ± SD	Mean ± SD	
BMI (kg/m^2)	23.04 ± 3.93	22.63 ±2.98	23.3 ±2.94	0.85
Waist hip ratio	0.86 ± 0.07	0.85 ±0.06	0.87 ±0.07	0.92
SBP (mm Hg)	119.9 ± 8.38	119.80 ±6.94	123.25 ±8.27	0.65
DBP (mm Hg)	78.09 ±4.67	79.01 ±5.46	80.25 ±7.57	0.37

SD: standard deviation; BMI: body mass index; SBP: systolic blood pressure; DBP: diastolic blood pressure

We observe that there is no significant association between the consumption of junk food consumption with BMI, WHR, SBP and DBP.

DISCUSSION

Of all the modifiable cardiovascular risk factors, diet is one of the most important. Food preferences change throughout life, and are influenced and driven by several biological, social, and environmental factors. Junk foods consumption in institutions of higher learning has increasingly become an important part of students' diet. The sole goal of this study was to assess the association of consumption of junk with anthropometric and its impact on blood pressure levels. In the present study, a total of 200 participants were included in the study, of them 87 (43.5%) were males and 113 (56.5%) were females. The mean age of the study population was 21.48 (±3.46) years (range 18 - 25 years), with maximum number participants (48.0%) belonging to the age group of 20-21 years and minimum number of participants (2.5%) belonging to the age group 24-25 years. In our study, the mean BMI of study population was (22.74 ±3.17) kg/m^2. The mean BMI of males and females were (23.75±2.60) kg/m^2 and (21.96±3.36) kg/m^2, respectively. The total number of study subjects categorised as underweight, normal weight, overweight and obese as per BMI were 9 (4.5%), 148 (74%), 40 (20%) and 3 (1.5%), respectively. Among the males, the number of subjects who belonged to underweight, normal weight, overweight and obese categories were 1 (0.5%), 59 (29.5%), 27 (13.5%) and 0, respectively. Among the females, the number of subjects in the respective categories were 8 (4%), 89 (44.5%), 13 (6.5%) and 3 (1.5%). The difference in the proportion of subjects under BMI categories was statistically significant between males and females (p <0.05). In this study, the majority of the study population (148 subjects; 74%) had a normal BMI (18.5-24.9 kg/m^2). It was similar to the study conducted at Malaysian Medical College, which showed 69% of students having normal BMI (Boo NY et al., 2010).[10] In our study, the prevalence of obesity was 4.5%. A similar study conducted by Gupta S et al., (2009) reported 3% obesity among medical students from Kolkata while Chhabra P et al., (2006) reported obesity among 2% of the medical students from Delhi.[11,12] In our study, overweight subjects constituted 20% of the study population. In a similar study conducted by Akhter H et al., (2014) at Dhaka, the overweight subjects comprised 20.5% of the study cohort.[13] In our study, the proportion of overweight subjects among males (27 subjects; 13.5%) was significantly higher than females (13 subjects; 6.5%) (*p* <0.05). The proportion of underweight subjects among females (8 subjects; 4%) was higher than males (1 subject; 0.5%). This was consistent with the findings of Kuan PX et al., (2011) from Malaysia where they found that more males (33.7%) were overweight, whereas more females were underweight (25.3%).[14] In our study, a total of 87 subjects (43.5%) had high-risk WHR. The distribution of subjects according to WHR was significantly different between males and females. The number of subjects with high-risk WHR was significantly higher among males (43 subjects; 49.4%) as compared to females (44 subjects; 38.9%) (p < 0.05). This finding is inconsistent with the study conducted by Vallish BN et al., (2018) in Tamil Nadu.[15] Contrary to our study, the incidence of high-risk WHR was 90% in their study population; and, the incidence of high-risk WHR was significantly higher among females (96.0%) than males (84.0%). The very high incidence of high-risk WHR in this study can be attributed to use of lower cut-offs for defining high-risk waist-hip ratio for males (>0.89) and females (>0.81). In addition to medical students, the students belonging to engineering stream were also included in their study. The influence of differences in social, ethnic and demographic background on study results cannot be ruled out. In our study, the mean systolic BP of study population was 120.08 (±8.85) mm Hg and 81 subjects (40.5%) had systolic BP ≤120 mm Hg. The mean diastolic BP of the study population was 79.06 (±5.82) mm Hg and 51 subjects (25.5%) had diastolic BP ≤80 mm Hg. There was no significant difference between mean systolic BP of males and females [122.86 (±8.29) mm Hg *vs* 117.94 (±8.71) mm Hg], respectively. There was no significant difference between mean diastolic BP of males and females [80.91 (±6.41) mm Hg *vs* 77.62 (±4.90) mm Hg], respectively. A total of 47 subjects (23.5%) were categorized as normotensive [females 37 (32.7%), males 10 (11.5%)]. One-hundred fifty three subjects (76.5%) were categorized as having prehypertension [females 76 (67.3%), males 77 (88.5%)]. None of the study subjects were categorized as hypertensive. The incidence of prehypertension in our study is higher than the study performed by Shetty SS and Nayak A (2012).[16] This study on 500 medical students from coastal Karnataka revealed 55.4% incidence of prehypertension; 29% had high systolic BP, 26.4% had high diastolic BP, and 33.2% had both high systolic and diastolic BP. Our study is also incongruent with the study performed on undergraduate students at Kolkata by Chattopadhyay A et al. (2014), who reported 13.88% and 19.18% incidence of hypertension and prehypertension among 850 students, respectively.[17]This was a cross-sectional study comprising of MBBS students from 2nd to 4th year. A study performed by Ofori EK et al. (2018) at a tertiary institution in Ghana revealed that high systolic BP (>120 mm Hg) and diastolic BP (>80 mm Hg) were observed in 45% and 32.5% undergraduate nursing students, respectively.[18] MBBS students have one of the toughest course curriculums. Vast syllabus, exams stress and bedside clinical challenges and growing competition to clear super-speciality exams constantly keep them under stress. This could be one of the possible reasons for relatively high incidence of prehypertension in our study population. As our study had a cross-sectional design, heterogeneity in the timing of BP measurement cannot be ruled out as well. Instead of a single-time assessment, a prospective observational study aimed at regular BP examination would have been more appropriate. In our study, majority of the subjects (75%) reported occasional consumption of junk food/soda drinks; 21% reported frequent consumption and 4% denied any consumption. No significant association of junk food/soda drinks consumption was found with BMI, WHR, systolic BP, and diastolic BP. Our study is in agreement with Mohammadbeigi A et al., (2018) who also showed no association between junk food intake and BMI, while a study from Iran (Payab M et al., 2015) found significant association between junk food consumption, BP levels, and anthropometric indices.[19,20] In our study, 51 subjects (25.5%) reported daily consumption of fruits and vegetables in their diet. Low fruit intake is associated with increased risk of hypertension and CVDs (Whelton PK et al., 1997).[21] A similar finding was noted in a study conducted by Borlu A et al., (2019) who also revealed that adequate consumption of fruits and vegetables among medical students was low.[22] In contrast, a study conducted by Kutty NAM et al., (2015) found that 76.5% of the medical students consumed at least 2 portions of fruits and vegetable every day.[23]

CONCLUSION

The findings of the present study revealed that there was no significant association of junk food/soda drinks consumption with BMI, WHR, systolic BP, and diastolic BP. However; these results cannot be generalized because the study was confined to a single study centre and lacks the ethnic heterogeneity among the respondents. Moreover; the role of confounding factors was not assessed and there was no evidence of a causal relationship between fast food consumption and other factors provided by the study design.

Declaration by Authors

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REFERENCES

1. World Health Organization. Obesity: Preventing and Managing the Global Epidemic. *WHO Technical Report Series*, Switzerland 1998; 894
2. Mellati AA, Mousavinasab Sn, Sokhanvar S, Kazemi SAN, Esmailli MH, Dinmohamadi H. Correlation of anthropometric indices with common cardiovascular risk factors in an urban adult population of Iran: data from Zanjan Healthy Heart Study. *Asia Pac J Clin Nutr* 2009; 18(2): 217-25
3. Merriam EW. Junk food consumption and its association with body mass index among school adolescents. Int J of Nutr and Food Sci 2015; 90: 93-110.
4. Roberto SB, Mdrory MA, Saltzman E. The influence of dietary consumption on energy intake and body weight. J American Coll Nutr 2014; 21: 140-145. https://doi.org/10.1080/07315724.2002.10719211
5. Azadbakht L, Esmaillzadeb A. Dietary diversity score is related to obesity and abdominal adiposity among lranian female youth Public Health Nutrition. J Obesity 2011; 1: 62- 69
6. Briefel RR, Wilson A, Gleason PM. Consumption of low nutrient, energy dense food and beverage at school, home and other locations among school long participants. J Diet Asso 2009; 163-168.
7. Ashakrain A, Deepth R. Fast food and their impact on health. J Nutr 2012; 23: 52-54.
8. World Health Organisation. Physical status: the use and interpretation of anthropometry. *WHO Technical Report Series*, Switzerland 1995; 854: 427-33
9. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo Jr JL et al. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. *Hypertension* 2003; 42: 1206-52
10. Boo NY, Chia GJQ, Wong LC, chew RM, Chong W, Loo RCN. The prevalence of obesity among clinical students in a Malaysian medical school. *Singapore Med J* 2010; 51(2): 126-32.
11. Gupta S, Ray TG, Saha I. Overweight, obesity and influence of stress on body weight among undergraduate medical students. *Ind J Com Med* 2009; 34 (3): 255-57
12. Chhabra P, Grover VL, Aggarwal K, Kanan AT. Nutritional status and blood pressure of Medical students of Delhi. *Ind J Com Med* 2006; 31: 248-51.
13. Akhter H, Jahan N, Mahmud F, Sultana N, Ferdous T, Akhter H. Study of Body Mass

Index (BMI) on medical students. *KYAMC Journal* 2014; 5(1): 472-75
14. Kuan PX, Ho HL, Shuhaili MS, Siti AA, Gudum HR. Gender differences in body mass index, body weight perception and weight loss strategies among undergraduates in Universiti Malaysia Sarawak. *Malays J Nutr* 2011;17(1): 67-75
15. Vallish BN, Priyan NS, Mohan J, Mahato RK, Brahadeesh M. Prevalence of cardiovascular risk factors in Engineering and Medical students in Madurai, Tamil Nadu. *Indian J Physiol Pharmacol* 2018; 62(3): 298-305
16. Shetty SS, Nayak A. Prevalence of prehypertension amongst medical students in coastal Karnataka. *J Evolution Med Dent Sci* 2012; 1(6): 975-80
17. Chattopadhay A, Taraphdar P, KumarSahu B, Maulik S, Ghosh R, Sinha A, et al. A study on prevalence of Hypertension and its related risk factors among undergraduate medical student in Kolkata. *IOSR J of Dental and Medical Sciences* 2014; 13(11): 1-7
18. Ofori EK, Intiful FD, Asante M, Asare GA, Adjei PK, Steele-Dadzie RK et al. Prevalence of cardiovascular disease risk factors among students of a tertiary institution in Ghana. *Food Sci Nutr* 2018; 6: 381-87
19. Mohammadbeigi A, Asgarian A, Moshir E, Heideri H, Afrashteh S, Khazaei S et al. Fast food consumption and overweight/obesity prevalence in students and its association with general and abdominal obesity. *J Prev Med Hyg* 2018; 59(3): E236-E240
20. Payab M, Kelishadi R, Qorbani M, Motlagh ME, Ranjbar SH, Ardalan G et al. Association of junk food consumption with high blood pressure and obesity in Iranian children and adolescents: the CASPIAN-IV Study. *Jornal de pediatria* 2015; 91(2): 196–205.
21. Whelton PK, He J, Cutler JA, Brancati FL, Appel AJ, Follman D et al. Effects of oral potassium on blood pressure. Meta-analysis of randomized controlled clinical trials. *JAMA* 1997; 277(20): 1624-32
22. Borlu A, Aykut M, Celik N, Gun I, Timur A, Karaca S. Fruit and vegetable consumption of last grade medical students and related factors. *Progress in Nutrition* 2019; 21: 86-92
23. Kutty NAM, Ru TY, Chiang VHQ, Zhi WY. Association of dietary habits and body mass index among university students in Malaysia: a cross-sectional study. *J Nurs Health Sci* 2015; 4(5): 78-85

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