Biochemistry Section

Assessment of Obesity, Overweight and Its Association with the Fast Food Consumption in Medical Students

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ABSTRACT

Introduction: Obesity is a condition in which excess body fat accumulates, which leads to various adverse effects on health, particularly cardiovascular diseases (CVDs), which reduce life expectancy and/or increase health problems. Fast food consumption is one of the factors which have been reported as a cause of obesity. Body mass index (BMI) is used to assess obesity and overweight, which can be calculated by using the formula, weight in kg, divided by square of height in metres.

Aim: This study focused on the relationship of body mass index with fast food consumption, associated soft drink consumption and physical activity.

Methods: Descriptive cross-sectional study was conducted in Department of Biochemistry, SBKS MI and RC, and Sumandeep Vidyapeeth. This study was approved by the ethical review board .One hundred and forty seven medical students from 1st year MBBS course were included in this study. Self-structured

questionnaire was used, which contained several data like information on age, height, weight, education level. The formula used for calculating BMI was, weight in kg, divided by square of height in metres (Kg/m²).

Results: In our study, out of 147 students, a total of 138 students (more than 90%) used to have fast food. Among these, a total of 47 students (34.05%) were pre-obese and obese. Out of 147 students, 87 students (59.18%) were in normal weight range, while 13 (8.84%) students were underweight.

Statistical Analysis: Data was compiled in an Excel worksheet and it was analyzed for percentages and proportions. Chi-square and Pearson's correlation test were also applied wherever they were applicable and Alpha error was set at a 5% level.

Conclusion: In our study, a significant relationship was found between BMI and fast food consumption, less physical activity, and intake of soft drinks.

INTRODUCTION

Overweight and obesity continue to increase substantially worldwide, affecting all ages, sexes and races. There is convincing evidence that increase in the energy density of the diet by fat or sugar, together with concomitant eating behaviours like snacking, binge eating and eating out, promote unhealthy weight gain through passive overconsumption of energy [1]. BMI is a measure of how appropriate a person's weight, is for his/her height. Based on BMI, obesity is divided into different classes; normal range (18.5-24.9), below normal range (< 18.5), pre-obesity (25-29.9), obesity class I (30-34.9), obesity class II (35-39.9), obesity class III (above 40) [2]. Fast food consumption is one of the factors which have been reported to cause obesity. Fast food is a specific variety of convenience food which is commonly associated with a high energy density; yet, there has been ambiguity in the definition of fast food in the existing empirical research [3]. The factors which influence fast food consumption are convenience, costs and menu choices [4] and flavour and taste [5] Restaurant and fast food consumption, large portion size and beverages with sugar are positively associated with overweight and obesity [6-8]. Conversely, low–energy- dense foods, fruits and vegetables and a healthy breakfast are negatively associated with overweight and obesity [9-10]. The relationship between fast food consumption and BMI has been well established, although the mechanisms have not been well understood [11, 12].

METHODOLOGY

Descriptive cross-sectional study was conducted in Department of Biochemistry, SBKS MI and RC, Sumandeep Vidyapeeth. This

study was approved by the ethical review board of SBKS MI and RC (SVIEC/ON/MEDI/RP/B121). One hundred and forty seven medical students from 1st year MBBS course were included in this study. Written consents were taken from all students and absentees were covered on subsequent dates, to ensure complete coverage. The data was collected by using a self-structured questionnaire, based on a review of similar studies, which was done. The questionnaire contained several data like information on age, height, weight, education level. Height was determined by using a measuring tape which was in cm and it was recorded to the nearest 0.5 cm. Weight was measured by using a Kg weight scale and it was recorded to the nearest 0.1 kg by using an electronic scale. The formula used for calculating BMI was weight in kg, divided by square of height in metres. BMI was classified into six groups according to the National Institute of Health (NIH) guidelines, 1998; Group 1 -underweight (BMI - < 18.5), Group 2 -normal (BMI - 18.5 to 24.9), Group 3 -overweight (BMI - 25-29.9) and Group 4 –obesity, which was subdivided in to obesity grade 1 (BMI - 30-34.9), obesity grade 2 (BMI- 35-39.9) and obesity grade 3 (BMI - ≥40).

The questionnaire included fast food consumption and its frequency (once in week/ more than once in a week/ everyday/not so often), time of eating (morning/afternoon/evening or night) and physical activity (no exercise/ 30 minutes daily walk/ 30 minutes brisk walk or gym or jogging). Associated eating of sugar added soft drinks and vegetables were also analyzed. Socio-demographic data, family history of diabetes or hypertension, dietary habits (veg/ nonveg) and knowledge of study subjects on fast food (whether healthy/ unhealthy) were noted.

Data was collected and it was grouped by using MS Excel. Descriptive data was represented by the percentage. For the correlation between fast food consumption, its frequency and BMI Pearson's correlation test was used, and for the association of fast food consumption with its frequency, physical activity, vegetable intake and time of eating with respect to BMI, Chi-square test was used. A probability level, p-value of < 0.05 was set for statistical analysis.

STATISTICAL ANALYSIS

Statistical analysis done: Data was compiled in an Excel worksheet, and it was analyzed for percentages and proportions. Chi-square and Pearson's correlation test were also applied wherever they were applicable and Alpha error was set at a 5% level.

RESULT

Out of 138 students, 58.4% students agreed that they liked fast food, 34% students consumed it due to non availability of homemade food, while remaining students consumed it because of their life styles. [Table/Fig-1] shows that 59.18 % were normal weight students, that 22.4 % were overweight and that 9.52 % were obese students respectively.

More than 60% of the students were unaware about the fact that fast food was unhealthy. More than 80% of the students were vegetarians and only 15% students were non vegetarians. It was found that more than 50% students were having soft drinks with fast food and this was more common in obese and overweight groups. Data shows that 20% students were not having fruits and vegetables in their daily routine.

We analyzed the above data in different BMI groups. [Table/Fig-2] showed distribution of all participants according to frequency, timings of fast food consumption, simultaneous consumption of soft drinks and vegetables and daily physical activity. Chi-square test was used for statistical analysis. A significant relationship of BMI with more frequency of fast food consumption (X^2=37.93, p=0.000001), less physical activity (X^2=18.13, p=0.0004), evening or night time eating (X^2=13.77, p 0.03) and soft drink intake (X^2 = 11.48, p 0.009) was found, while a non significant association was found between BMI and vegetable consumption.

DISCUSSION

This was a cross sectional descriptive study, where we assessed BMI in medical students and their correlation with fast food consumption. Although our study was done on a small scale, we found interesting results for BMI and fast food consumption. Medical profession is a challenging and stressful one and so it affects the day to day routine, which includes choice of food also. This is probably the first study which has reported such a correlation among medical students in India. Our study found that 34.05% students were overweight and obese (with BMI of more than 25). Another study indicated a positive association between fast food intake and BMI in both cross-sectional and longitudinal analyses among young adults [12]. Probable hypothesis is that more fast food consumption is associated with more energy intake from non-fast-food and fast food sources [13]. French et al., found that an increase of only one fast food meal in a week was associated with a daily energy intake increase of 234.4 KJ and a weight gain which was over and above the average weight gain of .72 kg [14].

One study exhibited that high BMI was significantly associated with soft drink intake, especially carbonated beverages which were sweetened by using sugar. College students are highly exposed to unhealthy eating habits, particularly fast food and soft drinks, leading to body weight gain [15]. Fast food consumption spread rapidly in past ten years, especially among teenagers and youth. For instance, a significant direct association between fast food intake and sugar sweetened beverages (SSB) has been reported [16].

Groups	Number (n=147)	(%)	BMI (Mean ±SD)
Group 1 (BMI <18.5)	13	8.84	17.141±0.58
Group 2 (BMI 18.5 to 24.9)	87	59.18	20.15± 2.63
Group 3 (BMI 25-29-9)	33	22.44	27.05± 1.48
Group 4 grade 1 (BMI 30-34.9)	14	9.52	32.28±2.14
Group 4 grade 2 (BMI 35-39.9)	NA	NA	NA
Group 4 grade 3 (BMI ≥40)	NA	NA	NA

[Table/Fig-1]: Distribution of students as per their BMI

	Group 1 (%) (n=13)	Group 2 (%) (n=87)	Group 3 (%) (n=33)	Group 4 (%) (n=14)	Chi-square (p-value)
Frequency of fast food consumption					
Everyday	09 (69%)	20 (25.7%)	25 (75.7%)	07 (50%)	X^2 = 37.92 (0.00001)
Once in a week	02 (15%)	50 (64%)	04 (12.2%)	03 (21.4%)	
>once in a week	02 (15%)	08 (10.2%)	04 (12.1%)	04 (28.6%)	
Timings of fast food consumption					
Morning hrs	02 (15.4%)	03 (3.8%)	04 (12.1%)	02 (14.3%)	X^2 = 13.77 (0.03)
Afternoon or lunch	02 (15.4%)	36 (46.2%)	06 (18.1%)	03 (21.4%)	
Evening or night	09 (69.2%)	39 (50%)	23 (69.6%)	09 (64.3%)	
Soft drink consumption with fast food					
YES	8 (61.5%)	28 (35.8%)	23 (69.6%)	11 (78.5%)	X^2 = 11.48 (0.009)
NO	5 (38.5%)	40 (51.3%)	10 (30.3%)	3 (21.4%)	
Often	-	10 (12.82%)	-	-	
Vegetables					
Yes	09 (69.2%)	49 (62.8%)	28 (35.8%)	06 (42.8%)	X^2 = 10.2 (0.11) NS
no	02 (15.4%)	19 (24.4%)	03 (3.8%)	04 (28.5%)	
often	02 (15.4%)	10 (12.8%)	02 (6.6%)	04 (64.3%)	
Physical activity walk, jogging or gym					
No exercise	9 (69.3%)	10 (12.8%)	22 (66.6%)	10 (71.4%)	X^2 = 18.13 (0.004)
30 min walk daily	4 (30.7%)	30 (38.5%)	11 (33.3%)	4 (28.5%)	
30 min jogging/ gym activity	-	38 (48.7%)	-	-	

[Table/Fig-2]: Distribution of participants according to physical activity, frequency and timings of fast food consumption, simultaneous consumption of soft drink and vegetables

Beyond the high sugar content of SSBs, these kinds of beverages may decrease satiety and increase subsequent food intake [13]. Such findings may explain the mechanism of the relationship between increased energy intake from non fast food sources and fast food consumption. The results of the present study revealed that association between fast food intake and obesity was not totally mediated by energy intake. While adjusting for demographic factors, simultaneous consumption of fast food and beverages with sugar being added was found to be positively associated with BMI, and consuming full portion sizes was found to be positively associated with obesity [17].

Our study found that more than 20% students were not having fruits and vegetables in daily diet and that more than 60% were unaware about the unhealthy part of fast food. Fruits and vegetables play an important role in improving general health. Fruit and vegetable consumption is inversely related to total and low density lipoprotein cholesterol and to risk of cardiovascular disease [18].

We found a high proportion of students with low levels of physical activity, 68.08% obese and overweight students who were not involved in any physical activity and remaining who were walking for 30 minutes daily. Students with normal BMIs were undertaking physical activities, 48.7% were jogging, brisk walking and gymming, while 38.5% were walking for 30 minutes daily. Physical activity is a major determinant of health and when it exceeds the minimum recommended amount, it helps in improving physical fitness, reducing the risk of chronic diseases and disability and in preventing

unhealthy weight gain [19]. This significantly low level of physical activity can be attributed to the lifestyle of a medical student, that requires long hours of sitting for his/her studies [20].

Our study found that high BMI was significantly associated with evening and night time fast food eating. Night time food intake has rarely been studied in medical students and only one study had observed a correlation between self-reported night time eating and weight gain, but it remains to be determined as to whether this behaviour indicated more night time eating and food intake in those who were prone to gain weight [21].

CONCLUSION

In our study, 90% students were having fast food in their diet, but only 22.45% and 9.52% were found to be pre obese and obese respectively. On the same side, more frequency of fast food in a week and less physical exercise were significantly related to high BMI. So, in conclusion, there is a significant relationship between BMI and fast food consumption, along with less physical activity and intake of soft drinks.

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