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Changes in Body Mass Index (BMI) During First Year among Undergraduate Students of a Medical College in New Delhi

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ABSTRACT

Background: The transition from secondary school to university is a critical period in student's life which can influence their nutritional status impacting health in later life. The study conducted to assess changes in BMI after 8 months of admission among first year undergraduate students of a Medical College.

Methodology: A descriptive longitudinal study was conducted among 150 MBBS students of a Government Medical College, New Delhi, during April-May 2018 in which their weight and height were measured at the time of admission and at 8 months of follow up.

Results: There was significant decrease in mean BMI from the baseline (24.02 kg/m^2) to follow-up (23.02 kg/m^2) [t=-5.76, <0.001]. Compared to students with normal BMI at baseline, significant reduction in BMI was noted among overweight [Mean change:-1.33 kg/m^2; p=0.007] and obese students [Mean change:–2.21kg/m^2; p<0.001]. The number of students who were overweight/obese had decreased from 71(47%) at baseline to 56 (37%) at follow up.

Conclusion: There was a high prevalence of overweight/obesity among the newly admitted medical students with a decrease in BMI at follow up, especially among the overweight/obese individuals. Yet more than one third of the students were overweight/obese at eight months follow up.

Keywords: Body mass index, nutrition status, university students, obesity, Freshman 15.

INTRODUCTION

Moving from secondary school to university is a period of transition for students. This transition phase is often associated with high academic pressure, stress, more freedom, living away from home without parental supervision, new friends, substance use, unhealthy eating and change in physical activity.[1,2,3]Students also change their eating patterns like irregular eating pattern, numbers of meals per day, number of snacks per day, eating in restaurant, eating with group, take-away food, fast food, fresh food, prepared food[4] as well as a reduced intake of fruits, vegetables, and whole wheat cereal products.[5]Moreover, during the first year of college, the students go through stress and new challenges which put them at increased risk for substance abuse including tobacco[6,7]and alcohol use.[8] Among other effects, these changes can have an impact on their nutritional status[9] which itself is an important risk factor for both infectious and chronic diseases and can particularly trigger non-communicable disease(NCD) in later life. [10,11]

Every year more than 60000 students take admission for the MBBS curriculum in various government and private medical colleges in India. Students entering medical colleges are also in a phase of transition and experience changes in lifestyle. It is important to monitor these changes so that appropriate interventions are planned to ensure that students who will be bearing the responsibility of

community's health in future themselves maintain a healthy lifestyle and remain healthy.

In this study we have assessed the changes in nutritional status of medical students who have completed first semester of their MBBS curriculum.

METHODOLOGY

A descriptive longitudinal study was conducted at Vardhman Mahavir Medical College attached to the Safdarjung Hospital, New Delhi among 150 undergraduate medical students of 2017 batch. A baseline health checkup of the students admitted in August 2017 was conducted, within first week of their admission which included measurement of weight and height. Weight was measured using weighing scale [SAMSO SELECT Brand] and height was measured using stadiometer [SECA Brand Model no. 213]. The age and gender of each student was noted down.

Eight months after the baseline checkup the anthropometric measurements were repeated using the same weighing scale and stadiometer to assess the change in weight and BMI. The measurements were done by trained health workers.

Body Mass Index (BMI) was calculated for each student. The students were categorized according to thee BMI criteria[12] i.e. BMI <18.5 kg/m^2 Underweight; BMI 18.5-22.9 kg/m^2 Normal; 23-24.9 kg/m^2 Overweight; and ≥25 kg/m^2 Obesity.

Mean and standard deviation of weight and BMI at baseline and follow up were calculated and changes in these parameters were compared using paired t test. The change in BMI in different baseline categories of nutrition status was compared using ANOVA with post hoc analysis using Tukey test. A p<0.05 was considered to be statistically significant.

Formal approval for the study was obtained from the Institutional Ethical Committee of Vardhaman Mahavir Medical College& Safdarjung Hospital by institutional ethics committee. A written informed consent was taken from each student.

RESULTS

Of the total 150 students, 94 (63%) were males and the average age of all students was 18 years (sd= 1.3 years). The mean weight of all students at baseline was 67.14 kg and showed a significant reduction to 65.26 kg at eight months follow up (t=-3.86, p=0.00). (Table 1) The mean BMI at baseline was 24.02 kg/m^{2}and showed a significant decrease to 23.02 kg/m ^{2} at follow up (t=-5.76, p<0.001) (Table 1)The mean change in weight and BMI were – 1.88 kg and - 0.992 kg/m^2 respectively.

Table 1: Change in weight and BMI at follow up compared to baseline among first year MBBS students

Parameters	Baseline Mean (sd)	Follow up Mean (sd)	Change Mean (sd)	p value#
Weight	67.14 (16.59)	65.26 (14.30)	-1.88 (5.97)	<0.01
BMI	24.02 (5.11)	23.02 (4.33)	-0.99 (2.11)	<0.01

* Change at follow up compared to baseline;
#t test applied

Table 2: Change in nutritional status at individual level

Follow up Categories	Baseline Categories			
	Underweight	**Normal**	**Overweight**	**Obese**
Underweight	10 (7)	2 (1)	0 (0)	0 (0)
Normal	7 (5)	56 (37)	11 (7)	4 (3)
Overweight	0 (0)	4 (3)	7 (5)	11 (7)
Obese	0 (0)	0 (0)	0 (0)	38 (25)

Table 3 Mean change in BMI among different baseline BMI categories

Baseline	N	Mean change *	Std deviation
Underweight	17	0.74	1.43
Normal	62	-0.33	1.24
Overweight	18	-1.33	1.06
Obesity	53	-2.21	2.62

*during follow up compared to baseline;
F value 15.26, P value <0.001

Overall the number of students with normal BMI had increased from 62 (41%) at baseline to 78 (52%) during follow up. The number of underweight students were 17 (11%) and 12 (8%) at baseline and follow up respectively while the number of students who were overweight/obese had decreased from 71 (47%) to 56 (37%).

Table 2 describes the change in nutritional status at individual level. Out of the 150 students, 122 (81%) remained in the same category of nutritional status - 56 (37%) had normal BMI, 56 (37%) were overweight/obese and 10 (7%) were underweight at both baseline and follow up. A total of 4 (3%) moved from normal to overweight, 2 (1%) shifted from normal to underweight category. A total of four 7 (5%) students moved from underweight to normal category and 15 (10%) from overweight/obese to normal category.

Table 3 describes the mean change in BMI among students in different baseline categories on nutritional status. There was a significant difference among the mean change in BMI among different baseline categories of nutritional status (p<0.001). Major reduction in BMI was noted among overweight and obese students. Tukey post hoc tests indicated that the change in BMI among underweight

students was significantly different from those who were overweight (p=0.007) and obese (p<0.001).

DISCUSSION

Overall there was a significant decrease in weight and BMI at eight months of follow up following admission to the medical college. The reduction in BMI was significantly more in overweight/obese students.

Our findings are in contrast to other studies which have reported that students tend to gain weight during their first year of university. The phenomenon has been called the 'Freshman 15', in reference to the perception that students gain 15lbs(6.8kg) during their first year in university. But studies have reported a weight gain of 1kg to 4kg, during this period. [4,13,14,15]Studies done in United States and Europe have shown that students attending their first year of university or college gain significantly more weight than age matched individuals who did not attend university or college. [1,4]

Obesity is a known risk factor for many chronic diseases.[10]In the present study the prevalence of overweight /obesity among medical students at the time of admission was 47% and at the time of follow-up after 8 months was 37%.Prevalence of overweight and obesity among university students in India has been reported to range from 11% to 37.5%. [16-19] In our study a major shift observed was from overweight/obese category to normal BMI. We have not studied the reasons for these shifts but put forth a few possible reasons. The students gain entry into a medical college after giving the National Eligibility cum Entrance Test (NEET) exam which is a competitive exam requiring intensive preparation with long hours of study leading to sedentary lifestyle. Stress and improper diet can be other contributing risk factors for overweight/obesity. Admission to medical college marks a transition where students may get time to modify their routine. The medical curriculum itself may motivate them to take up healthy lifestyle

Even though the study was conducted at a single institute located in Delhi but the findings give a hint about the need to understand the problem of overweight/obesity in this group of students and design effective interventions to address the issue.

CONCLUSION

There was a high prevalence of overweight and obesity among the newly admitted medical students with a decrease in weight and BMI during the follow up period, especially among the overweight and obese individuals. Yet more than one third of the students were found to be overweight/obese at eight months follow up. Hence, the study reinforces the need about maintaining healthy lifestyle, healthy balanced diet and a physically active daily routine targeting the students at the beginning of their college career to prevent the risks of developing chronic degenerative diseases.

RECOMMENDATIONS

Interventions should be designed and implemented for primordial prevention of obesity in schools. There is both a need and an opportunity to address the issue of overweight/obesity among medical students. The college administration can include topics of healthy lifestyle as a part of the induction program. Facilities for healthy diet and exercise should be made available in the college premises. Moreover, there is also need of future experimental research to evaluate the impact of such intervention programs.

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