



Full Length Research Article

BODY MASS INDEX OF NEPALESE MEDICAL STUDENTS: A CROSS-SECTIONAL STUDY

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ARTICLE INFO

Article History:

Received 17th December, 2013
Received in revised form
30th January, 2014
Accepted 19th February, 2014
Published online 25th March, 2014

Key words:

Body mass index,
Medical students,
Nepal,
Obesity.

ABSTRACT

Background: Obesity, usually defined by body mass index (BMI), has become a global public health threat by its epidemic proportions. The prevalence of obesity and overweight in Nepalese medical students has not been reported.

Methods: A cross-sectional analytical study was conducted in two private sector medical colleges of Nepal. BMI was calculated based on self-reported height and weight of the students and students were grouped into categories of underweight, normal, overweight, and obese (BMI Kg/m² <18.5, 18.5-24.9, 25-29.9, and ≥30 respectively).

Results: Of total 355 students, 55.77% were girls and average BMI was 20.80±2.4. Girls were younger and leaner than boys. More students were from first year and less from fourth year. Categorization showed 18.31% students underweight, 77.18% normal, 4.23% overweight, and 0.3% obese (one male student). However, using 23 Kg/m² cutoff value recommended for Asian Indian adult population, prevalence of overweight was 19.4%. BMI values were more in new students.

Conclusion: Prevalence of overweight and obesity is moderate in Nepalese medical students. Factors affecting BMI in medical students should be explored further.

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INTRODUCTION

Obesity has become very common and an increasing health burden worldwide in recent years. Overweight and obesity is an excessive amount of body fat; it is a great health risk to an individual (Ofei, 2005). Obesity is usually expressed by body mass index (BMI) which is calculated by dividing the weight of an individual in Kilograms (Kg) by his/her height given in meter square (m²) (James et al, 2001). The ideal body weight of individual would be a BMI between 18.5 to 24.99 Kg/m²; BMI >25 to 30 Kg/m² would be considered as overweight and BMI > 30 Kg/m² would be considered as obese (WHO, 2000). Problem of overweight and obesity has been recognized as public health problem worldwide due to the fact that it increases the risk of several disorders such as hypertension, coronary artery disease and stroke, diabetes, respiratory effects, arthritis, psychological effects, and some cancers (Haslam and James, 2005). The results affect the individual's life expectancy and the national productivity on the long run. Due to the very big world population suffering from obesity and its increasing trend, it has become a very important issue

in public health. The burden of overweight and obesity is very high among developed countries such as USA (Flegel et al, 1998). Recently, obesity incidence is increasing even in the developing countries like Nepal (Vaidya et al, 2010). Apart from the general population, prevalence of overweight and obesity is also on the rise among medical college students (Zafar et al, 2007; Boo et al, 2010; Gopalkrishnan et al, 2012; Selvaraj and Sivaprakasam, 2013). There is no published work available about the height and weight status of Nepalese medical students although this group of population is sizeable and increasing in number. Medical students are the future doctors and role models of the society, whose lifestyle and health conditions are highly valued by the general public in the country. However, due to the very demanding course and time schedules of the medical degree, medical students are known to be involved in less physical activity and more sedentary life style. This may be reflected in their BMI status.

MATERIALS AND METHODS

A cross sectional analytical study was conducted in two private sector medical institutes of Nepal: Nepal Medical College, Kathmandu and Chitwan Medical College, Chitwan in November – December, 2013. Data was collected from

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medical students in first year through fourth year of MBBS program, including both males and females. Students having history of fever, typhoid, diarrhea, metabolic disorders, or any other medical condition in last two months which could have affected their body weight were excluded from the study. Students were required to provide information about their year of study, age in completed years, last measured height, and last measured weight. The information was collected in a class room setting. There was no potential risk to participants as the study did not involve any intervention. The study aimed to include all students of the two colleges but only available and consenting students were enrolled. Results of a prior pre-test in another set of similar students had showed high degree of agreement between self-reported and measured values of height as well as weight of the students. On this basis, this study employed self-reported data, with the view of simplicity, swiftness, more participation, and convenience. Ethical clearance was obtained from the college Institutional Review Board. Weight was recorded in kilograms (Kg) and height was recorded in meters (m). Height given by students in inches was converted to meters by multiplying by 2.54. Body mass index (BMI) was calculated as weight (Kg) divided by square of height (m²). Based on the BMI, students were grouped into four categories: underweight (BMI < 18.5), normal (BMI range 19 - 24.9), overweight (BMI range 25 - 29.9), and obese (BMI ≥ 30) (WHO, 2000). Software Microsoft Excel 2007 was used for data entry, calculations, and presentation. Software SPSS 11.5 was used for data analysis. Means, standard deviations, and frequency tables were used for continuous and categorical variables. A significance level of 95% was set for measures of correlation (Pearson's).

RESULTS

Of the total 355 students who participated, 157 (44.23%) were males and 198 (55.77%) were females (Table 1).

Table 1. General characteristics of students

Variables	Number (%) or mean (±SD)		
	Male	Female	Total
Number	157 (44.23)	198 (55.77)	355 (100.00)
Mean age (years ± SD)	20.88 (±1.78)	19.93 (±1.57)	20.35 (±1.73)
Year of study:			
First	49 (41.5)	69 (58.5)	118 (33.24)
Second	44 (46.8)	50 (53.2)	94 (26.48)
Third	42 (43.3)	55 (56.7)	97 (27.35)
Fourth	22 (47.8)	24 (52.2)	46 (12.97)
Mean height (m ± SD)	1.70 (±0.07)	1.58 (±0.54)	1.63 (±0.09)
Mean weight (kg ± SD)	62.36 (±7.51)	50.27 (±5.44)	55.62 (±8.81)
Mean BMI (kg/m ² ± SD)	21.54 (±2.37)	20.22 (±2.27)	20.80 (±2.40)

About one-third of the students (n=118) were in the first year while least students (n=46) were in the fourth year of MBBS program. In all years, more number of female students responded than male students. Students were grouped into four BMI categories as underweight, normal, overweight, and obese (Table 2). The mean BMI for all students was 20.8 kg/m² (minimum: 15.9, maximum: 30.3) and most students had BMI within normal range. Overall, 18.31% (n=65) students were underweight and 4.23% students were overweight. Among the underweight students, 80% were females; among the overweight, 60% were females. Only one student, a male student in first year, was obese with BMI 30.3 kg/m². Number of students with normal BMI was equal for males and females. Gender-wise, mean BMI value was higher in males (Table 1) and the difference was statistically significant (p value 0.000). Of the total 15 overweight students, 6 were in the first year (40%) and 5 were in second year (33%) (Table 2). Correlations among different variables were sought through contingency table (Table 3). Understandably, mean age of students linearly increased from first to fourth year; students in lower years of study had greater BMI values than higher grade students (p 0.000). Male students were older than female students (p 0.000). However, the gender distribution correlated poorly with BMI values and years of study of the students.

Table 3. Pearson's correlation coefficient values for different variables

Variables	Completed years of age	Year of study	Value of BMI	Gender distribution
Completed years of age	1	-0.273**	.119*	.733**
Year of study	-0.273**	1	-0.272**	-0.031
Value of BMI	.119*	-0.272**	1	-0.004
Gender distribution	.733**	-0.031	-0.004	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

A high degree of agreement between self-reported and measured values of height and weight justifies the validity of using self-reported values in epidemiological studies (Sharples et al, 2012). In a separate prior study in 116 medical students, involving equal number of boys and girls, we had observed a very high level of agreement between self-reported and actually measured values for weight as well as height (kappa 0.998 and 0.993 respectively, results unpublished). We have regarded this as adequate evidence to depend on self-reported

Table 2. Frequency distribution of students by their BMI categories

BMI category	Gender	First year	Second year	Third year	Fourth year	Total (n=355)
Underweight (< 18.5)	Male	5	5	2	1	13
	Female	19	16	15	2	52
	Total	24 (36.92%)	21 (32.31%)	17 (26.15%)	3 (4.62%)	65 (18.31%)
Normal (18.5 - 24.9)	Male	42	37	38	20	137
	Female	45	31	39	22	137
	Total	87 (31.75%)	68 (24.82%)	77 (28.1%)	42 (15.33%)	274 (77.18%)
Overweight (25 - 29.9)	Male	1	2	2	1	6
	Female	5	3	1	0	9
	Total	6 (40%)	5 (33.33%)	3 (20%)	1 (6.67%)	15 (4.23%)
Obese (≥ 30)	Male	1	0	0	0	1
	Female	0	0	0	0	0
	Total	1 (100%)	0	0	0	1 (0.3%)
Total (n=355)	Male	49 (41.4%)	44 (46.8%)	42 (43.3%)	22 (47.8%)	157
	Female	69 (58.5%)	50 (53.2%)	55 (56.7%)	24 (52.2%)	198
	Total	118 (100%)	94 (100%)	97 (100%)	46 (100%)	355 (100%)

values of weight and height for this study with view of convenience, more participation, and time effort saving. Female students participated in more numbers than male students; girls were younger and leaner than boys. Overall, 4.53% students had BMI > 25 Kg/m² (overweight or obese). However, if we consider the recommended cut off value of 23 kg/m² for the Asian Indian adults (Snehalatha *et al*, 2003), the incidence of overweight and obesity is a substantial 19.4% (result not shown in table). The figure is comparable to or slightly higher than reports from other regional countries like Pakistan, Malaysia, and India (Zafar *et al*, 2007; Boo *et al*, 2010; Gopalkrishnan *et al*, 2012; Selvaraj and Sivaprakasam, 2013). The BMI values were negatively correlated with years of study of the MBBS program, overweight incidence being more in new students. This probably is due to the more stressful lifestyle in later years owing to the demands of the study program that avail less time to look after personal care. A prospective study could be designed to determine or establish this causal relationship by following the same newly enrolled students over the years. Similar to reports by Mahmood *et al* (2013), we found that overweight is more common among male students. Underweight students comprised 18.3% of the total, more percentage being girls. Incidence of underweight among medical students has been reported to be 14.8% in a Malaysian medical college (Gopalkrishnan *et al*, 2012). Minhas *et al* (2010) have reported nearly 30% incidence of underweight in a public sector medical college in Pakistan. Our study, being conducted in two private medical colleges of Nepal, might consist students from higher socio-economic classes than a public sector or government college.

Conclusion

This study, reporting the body mass index of Nepalese medical students, could serve as a reference for future studies as there are no other similar studies published so far for the population. Prevalence of overweight, if considered by recommended cutoff values for Asian Indian population, is nearly one-fifth of the total population studied. This should be an alert signal because medical students are the future doctors – health leaders and role models to the community. Larger scale, prospective studies are recommended to determine the trend in incidence of overweight or obesity among medical students. Also, factors affecting BMI and body fat composition among medical students need to be explored.

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