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Assessment of Food Consumption among the Students of a Medical College in Costal Andhra Pradesh In Comparison To Balanced Diet

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Abstract:

Introduction: The dietary pattern varies widely in different parts of the world. The present study was under taken with the objectives to find out BMI of the medical students, to know whether they belongs to reference Indian adult man or woman, to assess daily raw food intake of the medical students in comparison to balanced diet and to find out daily calories consumption. **Methodology:** It is a descriptive cross-sectional study with a sample size of 108 students. BMI was calculated and standard semi quantitative interviewer administered questionnaire was used to gather information regarding raw food consumption. **Results:** Mean BMI of male participants was 21.74 and for female participants was 22.91. About 2% of male and 12.5% of female students were obese. Only 19 respondents were in the category of reference Indian adult man or woman. Oil consumption amongst males was 49 gm as compared to 53 gm in case of female. Calorie intake per capita per day among male medical students was 2493 Calories and among female medical students was 2359 K Calories. **Discussion:** Obesity was 7.4% (1.9% of males and 12.5% of females). However, Abdalla and Mohamed in their study reported obesity to be 9%, this is somewhat higher from our study. Oil consumption among males is in excess by 9 gm, milk consumption was in deficient by 15 ml & fruit less than one per day in comparison with balanced diet. Among females cereal consumption was deficient by 102 gm. Calorie intake per capita per day among males was 2493 Calories and among females was 2359 K Calories which is more as compared to the National Sample Survey 68th round which was 2281 kcal in Andhra Pradesh. **Conclusions:** Consumption of cereals, vegetables and fruits among these students is less and Oil and Junk food consumption is more. Hence, Nutritional education must be given to all Medical students so that students can take sufficient amount of cereals, fruits and vegetables, and they may avoid junk foods

Introduction

It has been said that food is not only a collection of nutrients open to statistical or dietary study but also simultaneously a system of communication a protocol for customs, situations and behaviour. The dietary pattern varies widely in different parts of the world. It is generally developed around the kinds of food produced (or imported) depending upon the climatic conditions of the region, economic capacity, religion, customs, taboos, tastes and habits of the people [1]. Balanced diet formulated by the ICMR was considered as standard for this study [2]. Medical college students, most of them stays at the hostel and eats from the common mess. Some students stay at their home and consume the same food as their other family members. Most of them have to attain regular classes every day and to face exam on regular basis. So they are always in tension. To get relief from tension, some of them engage in smoking, some indulge in taking coffee, tea, alcohol. It is commonly seen that in-group they eat more. The mess is common platform from where all students get food. Generally, equal quantity is being prepared for all students from the mess. During the meals, they eat more. Same menu continues for a year. Within a year, some student's weight increases due to

mess food, junk food, colas, alcohol and non-vegetarian food. Other students, who stay at home, usually take junk food at restaurants and hotels. So their weight also increases. Physical inactivity is the other reason. Nutritional experts recommends that one should take 400 gm of vegetables and fruits or servings/portion per day[3] but it is found that medical students are not taking adequate fruits and vegetables even though those food are protective and having good source of vitamins and minerals. Cereal consumption is also less in college going students. There is less scope for the consumption of well balanced diet in the medical students because of their academic responsibilities. So there is need to evaluate the pattern of their dietary habits because they are the valuable human resources in the health care system of India. Hence the present study was under taken with the fallowing objectives, to find out BMI of the medical students, to know whether they belongs to reference Indian adult man or woman, to assess daily raw food intake of the medical students in comparison to balanced diet and to find out daily calories consumption.

Methodology:

Descriptive cross-sectional study has been conducted at the Dept. Of Community Medicine, Dr Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation (Dr.PSIMS), Chinoutapalli, Krishna District, Andhra Pradesh. The purpose of this study was explained to second and third year MBBS students, in the age group of 18 to 21 years and was asked to participate in the study. Out of them only 108 students participated in this present study. BMI was calculated according to their weight and height. Weight was measured up to Kg and height was measured up to cm. Calibrated standard weighing machine was used to take their weight. Measuring tape was used to take their height. A standard semi quantitative interviewer administered questionnaire was administered to all participants [4]. The information regarding raw food

consumption for e.g. Cereals, pulses, green leafy vegetables, other vegetables, roots and tubers, milk, oil, salt, sugar etc. including all meal times collected.

Standardization and validity of measurement:

Measurement of raw food is the key element in this research project. Tools used in the measurements were as follows

1. One cup = 200 ml
2. One teaspoon = 5 ml

A cup of 200 ml was taken as standard tool instrument to measure cooked recipe serving/portion amount and then converted to raw food intake [4]. Food frequency questionnaire method based on number of times a cooked food taken in a day, mostly during breakfast, lunch, teatime and dinner was used[5].Semi quantitative interviewer administered questionnaire has been used to measure the quantity of food intake. Size of the portion/serving is according to sample meal plan for adult man or woman (sedentary). Frequency of serving was usually 4 times e.g. Breakfast, lunch, snacks time, dinner. Accordingly the raw food intake was calculated from serving/size of the portion.

Meal Time	Food Group	Raw	Cooked Recipe	Servings Amounts
Breakfast	Milk	100 ml	Milk or	½ Cup
	Sugar	10 g	Tea or	2 Cups
			Coffee	1 Cup
	Cereals	50 g	Break fast item	
	Pulses	20 g		
Lunch	Cereals	100 g	Rice	1 Cup
			Pulkas	2 Nos
	Pulses	20 g	Dhal	½ Cup
	Vegetables	100 g	Veg. Curry	½ Cup
	Vegetables	50 g	Veg. Salad	7 – 8 Slices
	Milk	100 ml	Curd	½ Cup
Tea	Cereals	50 g	Snack	
	Milk	50 ml	Tea	1 Cup
	Sugar	10 g		
Dinner	Cereals	100 g	Rice	1 Cup
			Phulkas	2 Nos.
	Pulses	20 g	Dhal	½ Cup
	Vegetables	100 g	Veg. Curry	½ Cup
	Milk(curd)	50 ml		
	Vegetables	50 g		
	Fruits	100 g	Seasonal	1 Medium

Dietary Guidelines for Indian A manual NIN, Hyderabad [4]

Sample meal plan for Adult Woman (Sedentary)

- 1 Cup = 200 ml

- 20 g visible fat and <5 g salt during preparation of meal per day.
- **Breakfast items:** Idli – 3 Nos./ Dosa – 2 Nos. / Upma – 1 Cup/ Bread – 3 slices/ / Corn flakes with milk – 1-1/2 Cup.
- **Snacks:** Poha – 1 Cup / Toast – 2 Slice/Dhokla – 4 Nos.
- For Non-Vegetarians – Substitute one pulse portion with one portion of egg/meat/chicken/fish

After knowing the raw food consumption amongst medical students their caloric consumption was also calculated from Average Nutritive Value of Food per 100 gm [6]. Data was collected, compiled and analysed using SPSS-V19. Statistical tools applied were means, SD, Percentages and t-Test.

Definitions:

Balanced diet: A balanced diet is defined as one, which contains a variety of foods in such quantities, and proportions that the need for energy, amino acids, vitamins, minerals, fats, carbohydrate and other nutrients is adequately made for maintaining health, vitality and general wellbeing and makes a small provision for extra nutrients to withstand short duration of leanness. A balanced diet has become an accepted meal to safe guard population from nutritional deficiencies [1].

Balanced Diet ICMR-1990[2]

Food Item	Adult man			Adult woman		
	Sedentary	Moderate	Heavy	Sedentary	Moderate	Heavy
Cereal	460	520	670	410	440	575
Pulses	40	50	60	40	45	50
Leafy Vegetables	40	40	40	100	100	50
Other Vegetables	60	70	80	40	40	100
Roots & Tubers	50	60	80	50	50	60
Milk	150	200	250	100	150	200
Oil & Fat	40	45	65	20	25	40
Sugar	30	35	55	20	20	40

Reference Indian Adult Man: A Reference man is aged between 18 – 29 years and weighs 60 kg with height of 1.73 meter and BMI of 20.3; is free from disease and physically fit for active work. On each working day, he is engaged in 8 hrs of occupation which usually involves moderate activity; while when not yet work he spends 8 hrs in bed, 4-6 hrs in sitting and moving about, two hrs in walking and in active recreation or house hold duties[7].

Reference Indian Adult woman: A Reference woman is aged between 18 – 29 years, non pregnant non lactating (NPNL) and weighs 55 kg with height of 1.61 meter and BMI of 21.2; is free from disease and physically fit for active work. On each working day, she is engaged in 8 hrs of occupation which usually involves moderate activity; while when not yet work she spends 8 hrs in bed, 4-6 hrs in sitting and moving about, two hrs in walking and in active recreation or house hold duties[7].

- Sedentary male; Teacher, Student, Tailor, Barber, Executive shoemaker, Priest, Retired personnel, Landlord, Peon etc.
- Sedentary female: Teacher, Student, Tailor, Executive house wife, Nurse etc[8]

Results:

Parameter	**Frequency**	**Percent**
Gender		
Male	52	48.1
Female	56	51.9
Stay		
Hostel	60	55.6
Home	48	44.4
Diet		
Vegetarian	22	20.4
Mixed	86	79.6
Reference Man/Woman		
Yes	19	17.6
No	89	82.4
Family History of DM/HTN		
Yes	48	44.44
No	60	55.55

Table 1: Students information

Table 1 depicts that out of 108 respondents, 56 respondents were females and 52 respondents were males. Among them 60 students were staying at the hostel and 48 students were day scholars. About 80% students were following mixed diet and only 20% were vegetarians. About 48% of respondents had family history of hypertension and diabetes.

BMI						
Gender	**N**	**Minimum**	**Maximum**	**Mean**	**SD**	**P-value**
Male	52	16.85	31.02	21.74	2.76	0.07 NS
Female	56	16.14	30.43	22.91	3.83	
Total	108	16.14	31.02	22.35	3.39	

Table 2: Summary statistics of BMI

Table 2 depicts that the mean BMI of male participants was 21.74 and for female participants was 22.91.The observed difference in mean among males and females is not found statistically significant as p>0.05

Table 3: Classification of BMI according to gender

Gender	**BMI**				**Total**
	Under weight	**Normal**	**Over Weight**	**Obese**	
Male	6 11.50%	43 82.70%	2 3.80%	1 1.90%	52 100.00%
Female	6 10.70%	35 62.50%	8 14.30%	7 12.50%	56 100.00%
Total	12 11.10%	78 72.20%	10 9.30%	8 7.40%	108 100.00%

Table 3 depicts that about 11% of medical students were with underweight. About 2% of male and 12.5% of female students were obese

Table 4: Indian adult Reference Man or Woman

Table 4 depicts out of 108 participants only 19 respondents were in the category of reference Indian adult man or woman. Out of them 10 were male and 9 were female.

Gender	**Ref Man / Woman**		**Total**
	Yes	**No**	
Male	10 19.20%	42 80.80%	52 100.00%
Female	9 16.10%	47 83.90%	56 100.00%
Total	19 17.60%	89 82.40%	108 100.00%

Table5: Food intake per capita per day according to gender

Parameter	**Gender**					
	Male		**Female**		**P-value**	**Inference**
	Mean	**SD**	**Mean**	**SD**		
Cereals	355.19	31.404	308.48	23.47	<0.01	HS
Pulses	59.23	7.098	53.12	8.343	<0.01	HS
Leafy Vegetables	53.94	5.63	51.52	8.362	0.08	NS
Other Vegetables	64.13	6	56.79	10.11	<0.01	HS
Roots Tuber	56.54	5.985	53.57	8.776	0.04	S
Oil	48.65	8.291	52.86	12.093	0.04	S
Milk	135.27	130.71	189.42	100.89	0.02	S
Sugar	23.46	3.058	18.02	3.222	0.36	NS
Fruits	56.73	43.192	70.54	60.134	0.2	NS

Average daily consumption of cereals were 355 gm in case of male as compared to 308 gm in case of female and the observed difference in mean consumption found statistically significant. Mostly cereals were in the form of rise and only few were eating rotis and chapattis. In case of pulses, daily consumption in male were 59 gm compared to 53 gm in case of females .Green leafy vegetables consumption amongst male were 54 gm as compared to 52 gm in case of female. Other vegetable consumption amongst males was 64 gm as compared to 57 gm in case of female. Roots and tubers consumption amongst males were 57 gm as compared to 54 gm in case of female. Oil consumption amongst males was 49 gm as compared to 53 gm in case of female. Males were taking 135 ml milk in comparison with nearly 200 ml in case of female. Males were taking 23 gm of

sugar daily and females were taking 18 gm of sugar daily. Females were eating one fruit per day and male less than one fruit per day. Both males and females were taking nearly one teaspoon of salt.

Table 6: Calorie intake per capita per day.

Parameter (CALORIES)	Gender			
	Male		Female	
	Mean	SD	Mean	SD
Cereals	1222.00	108.03	1061.00	80.74
Pulses	202.57	24.27	181.69	28.53
Leafy vegetables	24.27	2.53	23.18	3.76
Other vegetables	23.09	2.16	20.44	3.64
Roots & tubers	39.58	4.19	37.50	6.14
Oil	437.88	74.62	475.71	108.83
Milk	114.98	111.11	161.01	85.76
Sugar	93.37	12.17	71.71	12.82
Junk Food	164.42	116.04	171.43	122.79
Fruits	44.82	34.12	55.72	47.51
Non-Vegetarian	125.96	87.72	99.11	78.91
Total calories	2493	249.30	2359	294.87

Table 6 depicts calorie intake per capita per day among male medical students was 2493 Calories and among female medical students was 2359 K Calories.

Discussion:

In this present study, about 72% of students had normal BMI. A study conducted at Malaysian medical college by Boo et al reported that 69% of students had a normal BMI [9]. Another study conducted at Dow medical college in Pakistan showed similar results with 59% of students having normal BMI[10].Studies reported from Malaysia and Pakistan elicited obesity was about 3-8% among medical students [10]. Gupta et al reported 3% obesity among medical students of Kolkata[11] while Chhabra et al reported obesity to be 2% among medical students of Delhi.[12] In this present study, Obesity was found among 7.4% of students (1.9% of males and 12.5% of females) and these results were consistent with the results given by other researchers. However, Abdalla and Mohamed in their study on medical students of Ribat University, Khartoum, and reported obesity to be 9%, this is somewhat higher from our study. In this study, 14.30% females and 3.80% males were over weight. Similar studies conducted in India by Chhabra et al reported it as 12% and [12] Gupta et al to be 17.5%[11] According to and Abdalla and Mohamed stated it to be 18%[13].All these results were consistent with our results.

In the present study, underweight students were 11.1%, (11.5% males and 10.7% females). According to Boo et al. in a Malaysian study, 15% of medical students were underweight (7% males and 24% females) [9]. This could be due to the current trend for slimness rather than malnutrition. This trend was also highlighted by Minhas et al in a similar study Dow medical college Karachi. [10] Only 17.5% students were in the category of reference Indian adult man or woman. (Male were 10 and Female were 9 out of 108 participants).In the present study, cereals intake among male medical students were deficient by105 gm, pulses consumption was in excess by 19 gm, green leafy vegetables was in excess by 14 gm, other vegetables and roots & tubers consumption were nearly equal. Oil consumption is in excess by 9 gm, milk consumption was in deficient by 15 ml sugar consumption was less by 6 gm & fruit less than one per day in comparison with balanced diet. In case of female medical students, cereal consumption was deficient by 102 gm,, pulse consumption in excess by 13 gm, green leafy vegetables in deficient by 48 gm,, other vegetables consumption was in excess by 17 gm, roots & tubers consumption were almost equal, oil consumption was in excess by 33 gm, milk consumption was in excess by 89 ml, sugar consumption almost equal & one fruit a day in comparison with balanced diet.

Survey carried out by National Nutrition Monitoring Bureau (NNMB) in 1984, in urban areas among middle income groups, cereal consumption was deficient by 29 gm, pulses consumption was in excess by 7 gm, leafy vegetable was in excess by 32 gm, other vegetables was less by 28 gm, milk consumption was in deficient by 88 ml, oil consumption was in excess by 16 gm and sugar consumption was deficient by 9 gm.[14]In the present study average calories intake per capita per day among male medical students was 2493 Calories and among female medical students was 2359 K Calories which is more as compared to the National Sample Survey 68th round which was 2281 kcal in Andhra Pradesh. In the same National Sample Survey 68th round, for the class of 10-20 years age group, calories intake per capita per day in urban area was 1856 K Calories.[15]Nutritional expert recommends that one should take 400 gm of fruit and vegetables per day, but in the present study it was observed that medical students were eating less than 400 gm of fruits and vegetable.[3] The main limitations of this study were that the foods taken in between lunch, snacks and dinner was not taken into consideration. The energy intake of some food stuff such as

condiment, nuts, papad, energy drink, ice-cream etc might be missed. Exact measurement of the foodstuffs was not possible due to travel and food habits of individuals. Hence Medical students must take sufficient amount of cereals, fruits and vegetables, and they must avoid junk foods. Nutritional education must be given to all Medical students.

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