



HEALTH SURVEY IN STUDENTS OF DIFFERENT ETHNICITY

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ABSTRACT **Objective:** This study investigated ethnic differences in the dietary habits among medical students studying in India. **Methods:** A self-administered food frequency questionnaire derived from British Heart Foundation was used to assess dietary intake of medical students. Weight, total body fat and Body mass index (BMI) were obtained from Omron's Karada scan Body composition monitor (HBF-375); which works on the principle bioelectrical impedance (BIA). **Results:** Results displayed though both healthy and unhealthy dietary patterns are followed by IMS (Indian Medical Students) and MMS (Malaysian Medical students) IMS follow a healthier eating habits than MMS. **Conclusions:** In comparison with dietary habits, BMI and total body fat body fat; IMS follow better dietary habits when compared to MMS and thus have a healthier BMI of 21.923 Kg/m² in foil with BMI of 23 Kg/m² (though the numerical are in normal range between 18-24.23 Kg/m²) and total body fat of 22.64 % and 24.97% in IMS and MMS respectively which is statistically significant with a p value of 0.0358 (<0.05)

KEYWORDS : nutrition, questionnaire, ethnicity, body mass index, total body fat, dietary habits

INTRODUCTION:

The assessment of body composition has reached an outstanding position in studies in the area of nutrition, physical activity and health because of the important role of body components in human health, especially regarding the influence of excess body fat and its distribution on the onset of non-communicable chronic diseases.¹ Unhealthy dietary habits are major risk factors for chronic diseases, particularly if adopted during early years of adulthood.^{2,3}

Limited studies have explored the food consumption patterns among adolescents and young adults. Our study aimed to examine common dietary patterns and their correlates among students of two different ethnicity, focusing on correlation with gender and body mass index (BMI). The nutritional transition is affecting populations across developing countries^{4,5}; where traditional healthy diets, are being progressively replaced by more westernized dietary patterns^{6,7}

Students seem to be the most affected by this nutrition transition^{8,9}; studies from developed countries have shown that young adults leaving their parents and living away from home to attend college experience numerous health-related behavioral changes, including the adoption of unhealthy dietary habits^{10,11,12}

These behaviors are mostly attributed to drastic changes in the environment and resources available, frequent exposure to unhealthy foods and habits³; leading to higher consumption of high caloric snacks, fast foods, and lower consumption of fruits and vegetables, i.e., replacing their consumption of nutrient-dense foods with energy-dense nutrient-poor foods¹⁴ added to this, skipping meals may also become more frequent.¹⁵

OBJECTIVES:

The objective was to study the relationship between body mass index (BMI) and body fat per cent (BF%) in students of two different ethnic groups of Asia (IMS-IMS and MMS- MMS).

MATERIALS AND METHODS**General study design:**

A cross-sectional study was conducted, using a proportionate cluster sample of students from two different medical colleges in Belagavi, Karnataka, India.

A self-administered food frequency questionnaire was used to assess dietary intake of medical students. This questionnaire is derived from British Heart Foundation to assess the nutritional value of diet among medical students of two different ethnicity.

In this comparison study, we present findings on the main food categories fruits and vegetables, fats, starchy foods, mode of sugar consumption, mode of salt consumption, water consumption, alcohol intake and eating habits with respect to skipping meals and replacing with snacks and adopted by medical students in Belagavi, Karnataka, India.

We focus on differences in dietary intakes among MMS and IMS

studying in year I. Exploring the analogy of dietary patterns, focusing primarily on gender, age and ethnicity.

The researcher and field worker conducted the study according to the research ethics guidelines laid down in the Declaration of Helsinki.

Verbal and written informed consent was also obtained from all subjects prior to participating in the study and completing the self-administered questionnaire.

Ethics committee clearance has been obtained from Institutional Ethics Committee, USM-KLE, IMP Belagavi.

Anthropometric data:

Students involved in this study self-reported their heights; since they were medical students the reported height is expected to be authentic.

Weight, total body fat and Body mass index (BMI) were obtained from Omron's Karada scan Body composition monitor (HBF-375); which works on the principle bioelectrical impedance (BIA).

BIA is a method consisting of the passage of a painless electric current of low amplitude and low and high frequencies through the organism, applied by means of cables connected to electrodes or to conductive surfaces, which are placed in contact with the skin, permitting the measurement of resistance (R) and reactance (Xc). The R and Xc values are then used to calculate impedance (Z) and the phase angle (ϕ), and total body water (TBW) is estimated in addition to the quantity of extracellular (ECW) and intracellular (ICW) water. Fat-free mass (FFM) can then be calculated, assuming that TBW is a constant part of FFM. On this basis, other body compartments such as fat mass (FM) and body cell mass (BCM) can also be measured.¹⁶

According to the International Classification of adult weight to height status (i.e., underweight, overweight, and obese), BMI values were classified into four categories for individuals 20 years of age or older: underweight (BMI ≤18.5 kg/m²), normal weight (BMI between 18.5 and 24.9 kg/m²), overweight (BMI between 25 and 29.9 kg/m²), and obese (≥30 kg/m²)¹⁷; the method recommended by Cole and collaborators was used.¹⁸

RESULTS:

A total of 200 students (100 IMS and 100 MMS) were included in the analysis; among which 48 males & 52 females and 45 males & 55 females of respective groups participated in the study. Average age of the participants is 18.83 for IMS and 20.32 for MMS.

Table 1: Distribution of male and female participants by two group of participants

Sex	Indian medical students	%	MMS	%	Total	%
Male	48	48.00	45	45.00	93	46.50
Female	52	52.00	55	55.00	107	53.50

Table 2: Anthropometric variables in two group of participants

Variables	IMS		MMS		t-value	P value
	Mean	Std.Dev.	Mean	Std.Dev.		
Weight (Kg)	60.53	12.91	58.36	11.98	1.2312	0.2197
Height (cm)	165.68	8.67	159.44	16.86	3.2913	0.0012*
BMI	21.99	4.15	23.00	5.29	-1.5048	0.1340
Body fat (%)	22.64	7.90	24.97	7.68	-2.1134	0.0358*

Dietary intake of students as assessed by a questionnaire derived from British Heart Foundation to assess the nutritional value of diet among medical students of two different ethnicity.

Apropos fruits and vegetables consumption among two groups of participants:

Question being the at least 5 portions of fruits and/or vegetables every day (a portion is about a handful) ; 51 IMS and 23 MMS consume mentioned portion of fruits and vegetables and 49 and 77 of respective groups denied the 5 portions of consumptions of fruits and vegetables. This is statistically significant since Chi square $9(\chi^2)$ value being 16.8170, and p value is 0.0001.

Regarding consumption of >4 different types of fruits each week, 54 MMS & 23 of IMS consume the particular, which depicts statistically significant data (p-value 0.001).

When enquired about more than four different varieties of vegetables each week 95 IMS and 48 MMS consume the particular; depicting the statistically significant data (p-value 0.0001) on major consumption of IMS of > 4 different varieties of vegetables.

Further both student categories opt low fat products *choose baked/steamed/grilled when available, rather than fried foods*; about which there is statistically significant difference in the analyzed data.

Majority of MMS opt lean cuts of meat compared to IMS with statistically significant data (p-value 0.0001)

Consumption of fish is higher in MMS in contrast to IMS which is statistically significant (p-value 0.016). Both IMS and MMS base their main meal starchy. 51 IMS base their whole wheat adding cereals with no added sugar and 77 MMS prefer to add sugar to cereals, with a p-value of 0.0001; further 73 MMS indulge in adding extra sugar to drinks p-value 0.0001.

87 IMS regularly include pulses in their diet; in contrast to 21 MMS with statistically significant data p-value 0.0001.

Almost equal proportion of IMS and MMS indulge in drinking sugar fizzy drinks.

77 MMS regularly eat cakes, sweets, chocolate or biscuits at work over 64 IMS with statistically significant data (p-value 0.0440)

85 MMS have a custom of adding extra salt to the food over 65 IMS with a p-value of 0.007.

The convention of regular eating of savoury snacks at work is seen in 53 MMS over 27 IMS with a statistically significant data p-value 0.0001.

Both IMS and MMS have a craving for pre-prepared meals.

17 MMS regularly eat processed meats such as ham or bacon or smoked fish over 3 IMS with a statistically significant data p-value of 0.0010.

5 MMS has been advised of having high blood pressure by a general practitioner.

77 MMS drink plenty of fluids at regular intervals during the working day over 56 IMS with a statistically significant data p-value 0.0020. There is no statistically significant difference in avoiding fizzy drinks and alcohol consumption between IMS and MMS but the percentage of alcohol intake is much higher in MMS.

Regarding skipping of meals IMS skip breakfast and evening meals more often and MMS skip lunch more often; yet there is no statistical significant data over this.

DISCUSSION:

The questionnaire sectioned about consumption of fruits and vegetables Indian students have an upper hand over consumption of vegetables, whereas Malaysian students owe an upper hand in fruit consumption. Eating at least 5 portions of fruit and vegetables a day will contribute towards reducing the risk of coronary heart disease as they are source of vitamins and minerals in varied concentrations, and also good source of fiber.

Apropos fat consumption among the two group of participants; with queries regarding preference to low fat products, choosing baked/steamed/grilled over fried foods and opting lean meats and consuming oily fish over last week.

Sectioned questionnaire component regarding fat consumption displays 77% of IMS prefer over low fat products over 68% of MMS. 60% of IMS prefer baked food over fried foods in contrast to 48% of MMS. Further 73% of MMS opt lean meats and 24% of MMS consume grilled fish frequently (once a week) over IMS. Meat, dairy products and processed foods contain saturated fats. Thus replacing some saturated fats with monounsaturated fats and polyunsaturated fats will help to improve the ratio of HDL cholesterol over LDL and VLDL cholesterol.

When questioned about consumption of starchy foods; 93% of MMS base their main meals as starchy and 48% of IMS prefer whole meal bread over white. 51% of IMS regularly eat whole grain cereals. IMS regularly consume pulses 87% in converse with 21% of MMS. Starchy foods contain carbohydrate mainly in the form of starch, providing energy. They also contain some protein, minerals, vitamins and fiber. Fiber helps the digestive system function properly, preventing bowel disorders such as constipation.

MMS prefer to add extra sugar to the drinks 73% in foil with IMS 43%. 38% of IMS bolt over fizzy drinks with very little dissimilarity with MMS of 33%.

77% of MMS indulge in desserts like chocolates, cakes, sweets, biscuits etc in variance with 64% of IMS.

When enquired about salt cram; 85% of MMS add extra salt over dining table in converse with 69% of IMS. 53% of MMS eat savory snacks at work when compared to 27% of IMS. There were sufficient questions with respect to salt consumption, wherein 5 Malaysian students were advised by their general practitioners about recorded high blood pressure. Probably because of their consumption of savory snacks at work, pre-prepared meals (sandwiches, canned soups), processed meats (bacon/ham/smoked fish).

Prepared meal consumption has almost equal frequency in both the groups. 17% of MMS eat processed meats when compared to negligible fraction of 3% of IMS.

With this detailing about salt intake 5% of MMS demonstrate history of having high blood pressure in contrast to 1% of IMS.

Regarding intake of alcohols and fluids:

Nothing much dissimilarity was found except that MMS have higher intake of fluids. Alcohol consumption might be hidden by many, thus can't be relied upon; but indulging in sugar fizzy drinks and consumption of >2 units of alcohol /day (1 unit of alcohol is equivalent to 100 ml of 10% alcohol by volume) is also noticed among Malaysian students.

With regards to eating habits Indian students have a higher frequency of skipping breakfast (31%) and evening meals (20%) over the week. Further MMS skip meals but replace with snacks (31%). Students have the habituation of missing meals either to save time, or lack of time for sleepy heads. This might slower the metabolism, deprive brain of energy source glucose affecting their attention (especially when breakfast is missed). It's not necessarily bad to skip meals and replacing them with snack, as long as snacks provide sufficient nutrients. Many people who do lots of physical activity, snack throughout the day to maintain their energy levels. Skipping meals, particularly breakfast disturbs body's metabolism and can affect the way that one feels.

About intake of sugar:

The two group of carbs:

Carbohydrates are the principal source of energy. These molecules are

made of monosaccharide units. Simple carbs and complex carbs are the two broad classification. Simple carbs contain only one or two monomeric units; whereas complex carbs are made up of long chains of monomeric units. Dietary source of complex carbs being vegetables, grains, seeds and legumes.

Notice that carbs are not available from meat, poultry, fish or eggs. Trace amounts of carbs are found in dairy products. New ways of looking at carbs are creating new ways of classifying them. Nutritional consultants classify carbs into three other categories: non-starchy, starchy and sugary.

Non-starchy (fibrous) carbs includes a huge array of foods; viz vegetables such as broccoli, cauliflower and cabbage. Non-starchy carbs contain fiber. Fiber doesn't absorb into blood stream as of sugary or starchy carbs. The average person requires 25-30 grams of fiber per day.

Fiber aids elimination of fecal matter, sweeps away excess estrogen creates friendly environment for bacteria that populate digestive tract and even synthesize vitamin B12.

Foods that belong in the sugary category include health giving fruits and manufactured sugars (not-so-healthy). Consuming manufactured sugars in large quantities takes your body on a wild ride of soaring and crashing hormonal responses. Riding this biological roller coaster on a daily basis can drop you right into a frightening degenerative diseases.

A partial list of foods laden with sugary carbs includes:

- Soft drinks, commercially prepared fruit juices and sweetened coffee
- Sugary breakfast cereals
- Granola bars
- Designer yogurts
- Baked foods (brownie to muffins)
- Condiments such as ketchup, relishes and pickles
- Sauces
- Marinades
- Salad dressings
- Frozen desserts
- Candy bars

The brain registers sugar induced emergency. Hormones pour from the adrenals, insulin from islets of Langerhans to hold down glucose level in complementary antagonism to the adrenal hormones concerned with keeping glucose level up.

This impact resonates throughout every system of your body. Bloating and overgrowth of candida in digestive tract. One might feel foggy, moody or anxious as the central nervous system succumbs. Immune system functioning might get suppressed. Repeatedly ingesting refined sugar throughout the day creates a biological event after another, producing a kind of whiplash effect that wears out adrenal glands. The physical stress rapidly depletes adrenal glands out of Vitamin C with its attendant adverse effects on collagen production and immune system functions.

Fructose is the sweetest of all the natural sugars and is best as natural sweetener in fruits, beets, sweet potatoes, parsnips and onions.¹⁹

Fats:

Good fats are those that enable natural cellular operations. Various energy-intensive chemical reactions in our body. They help to prevent degenerative diseases, slow and even reverse aging processes, meet structural needs such as padding of organs and joints against shock help weight management.

Not all fats are bad. In fact essential fats; which the body cannot manufacture must be obtained from food. Omega-3 fatty acid (alpha-linolenic acid) and omega-6 fatty acid (linoleic acid) omega-3 fatty acids are converted into prostaglandins.

Lipids are of great importance to the body as the chief concentrated storage form of energy, besides their role in cellular structure and various biochemical functions. During the 20th century, the amount of traditional animal fat (saturated fats) fell from 83% to 62%. Simultaneously, consumption of alternative fats (vegetable oils and refined oils increased by a whopping 400%. Over the same period of

time, heart disease increased to epidemic proportions- opposite the expectation.

Essential fatty acids; which our body cannot synthesize performs critical functions. They are needed for the manufacture of cell membranes, where they play significant role in ensuring membrane fluidity and elasticity. When fluidity of the membrane decreases, cells have trouble communicating with other cells, and are the more difficulty absorbing and releasing nutrients. EFA deficiency leads to dysregulation of hormones; leading to endocrinopathies. Nuclear membrane has the same degree of flexibility and elasticity as the main cell membrane, thus DNA functioning is disrupted with EFA deficiency.²⁰

Prepared cereals also tend to offer questionable nutritional value. Instant meals sends blood sugar soaring faster than some candy bars. On analysis of diet questionnaire in two groups of participants from different ethnicity; IMS opted healthy options amongst 8 questions and MMS opted healthy questions amongst 6 questions. Further considering their responses with regards to opting unhealthy dietary habits IMS opted 4 amongst the questionnaire and MMS opted 8 amongst the questionnaire.

Comparing this with the Body Mass Index and total body fat (in percentage) 21.9 & 23 Kg/m² & 22.64 % and 24.97% among the Indian students and Malaysian students respectively.

CONCLUSIONS:

Living too short; Dying too long

As we rounded the corner into the twenty first century, physicians and medical researchers took special note of the state of health and medical care. Looking back over a century gone by, the incidence and prevalence of diseases are remarkable. In early 1900 people primarily died of infectious diseases. The four leading cause of death were pneumonia, tuberculosis, diphtheria and influenza. People had life expectancy of more than forty three years. As we move into the twenty-first century, we find people primarily suffering and dying from chronic degenerative diseases. These include coronary artery disease, cancer, stroke, diabetes, arthritis, macular degeneration, cataracts, Alzheimer's dementia, Parkinson's disease, multiple sclerosis and rheumatoid arthritis.

Physicians also realize that patients who eat low-fat diet, includes at least seven servings of fruits and vegetables daily and enjoy health benefits like weight loss, a decreased risk of diabetes/ heart disease/ neoplasia / hypertension/ dyslipidemia, enhanced immune system, increased insulin sensitivity etc. a healthy diet is a win/win solution.

In comparison with dietary habits, BMI and total body fat body fat; IMS follow better dietary habits when compared to MMS and thus have a healthier BMI of 21.923 Kg/m² in foil with BMI of 23 Kg/m² (though the numerical are in normal range between 18-2423 Kg/m²) and total body fat of 22.64 % and 24.97% in IMS and MMS respectively which is statistically significant with a p value of 0.0358 (<0.05)

Take home messages:

Its sweet and salty prepared food that provides some immediate satisfaction, but offers low levels of nutrition and its loaded with insidious ingredients :

Refined sugars and starches: contributes to glucose intolerance and precipitate diabetes mellitus

Chemical additives: host of food hyper sensitivities and allergies

Trans fats: cellular level damage

Conflicts of interest and bias:

Several limitations could, however, be stated for this study: reporting bias is possible given that food consumption frequencies. Food consumption may be differentially reported by males and females; there is a well-established evidence of underreporting of dietary intakes among females and over-reporting of dietary intakes among males, which may lead to an additional reporting bias.

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