ASSESSMENT OF NUTRITIONAL STATUS THROUGH BODY MASS INDEX (BMI) AMONG FIRST YEAR STUDENTS OF MBBS & BSC NURSING COURSE OF GOVERNMENT MEDICAL EDUCATION INSTITUTES IN DHAKA

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Abstract
Context: Adequate knowledge about nutritional status of a community is necessary to have a comprehensive idea about its development process, as under-nutrition is one of the major health problems in developing countries. As an individual’s height and weight can be readily and inexpensively measured, body mass index (BMI) has become a popular heuristic approximation for body fatness in epidemiology and clinical practice. The BMI is the most common surrogate measure of obesity as well as nutritional assessment for individual. For this reasons an attempt has been taken to assess the nutritional status through the body mass index (BMI) among first year students of MBBS and B.Sc nursing course of government medical education institutes in Dhaka.

Material and Methods: This descriptive type of analytic study was conducted in the Anatomy Department of Dhaka Medical College, Dhaka. The study sample was 177 individuals of first year students of MBBS and B.Sc nursing course admitted in the session of 2017-2018 in the Dhaka Medical College & Dhaka Nursing College, Dhaka. Body Mass Index (BMI) was calculated as student’s weight in kilograms divided by the square of the student’s height in meters (kg/m²). The warning sign of poor nutritional health was calculated according to the checklist adapted by the Nutrition Screening Initiative, American Academy of Family Physicians July 2001. With the help of statistical software SPSS-20 comparisons between the two groups were done.

Result: The mean (±SD) height (meter), weight (kg) and BMI of groups MBBS and B.Sc nursing were 1.63±0.09, 61.65±11.22, 23.11±3.53 and 1.56±0.07, 49.05±9.42, 20.15±3.47 respectively. Good nutritional health status was found 61.80% in MBBS and 53.30% in B.Sc nursing groups.

Conclusion: The present study showed that the BMI of first year students of MBBS course is higher than first year students of B.Sc nursing course.

Key words: BMI, nutritional status, MBBS students, B.Sc nursing students

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Introduction:
There are many measures to assess the nutritional status of a population. Body mass index (BMI) is one of them. Anthropometry is considered to be an important tool for assessing nutritional status of individuals or of the community. Hence, measurements like stature, sitting height, weight and indices based on these measurements developed by different scholars have been extensively used to define the extent of malnutrition. Body mass index (BMI) relates weight to height in a normalized index that was first published

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in Quetelet’s 18th Century article on ‘the
average man’. Adolphe Quetelet (1796–
1874) was a Belgian mathematician,
astronomer and statistician, who developed a
passionate interest in probability calculus that
he applied to study human physical
characteristics and social aptitudes. His
pioneering cross-sectional studies of human
growth led him to conclude that other than the
spurts of growth after birth and during puberty,
‘the weight increases as the square of the
height’, known as the Quetelet Index until it
was termed the Body Mass Index in 1972 by
Ancel Keys (1904–2004).3

With the increasing importance of nutritional
assessment and obesity detection, it is useful
to reevaluate how body fat is determined. For
adults, the body mass index (BMI) is commonly
used. Its popularity stems in part from its
convenience, safety and minimal cost, and its
use is widespread, despite not being able to
distinguish lean body mass from fat mass.4
Obesity has been proposed as the most
important determinant of metabolic syndrome
(characterized by insulin resistance, hypertri-
glyceridaemia, hypo-HDL-cholesterolaemia, and
hypertension), and so it is important to develop
simple and reliable anthropo-metric
measurement tools for obesity, to facilitate the
prevention of metabolic syndrome.5

Knowledge of the nutritional status of a
community is necessary to have a
comprehensive idea about its development
process, as under-nutrition is one of the major
health problems in developing countries.1 Under
nutrition may be due to inadequate nutrient
intake, or secondary to infection, injury, chronic
disease, or excessive nutrient loss as occurs in
chronic diarrhea or some drug therapy.6 As an
individual’s height and weight can be readily
and inexpensively measured, BMI has become
a popular heuristic approximation for body
fatness in epidemiology and clinical practice.2

The body mass index (BMI) is the most common
surrogate measure of obesity as well as
nutritional assessment for individual7. There
was a graded relationship between male socio-
economic status (SES), defined as educational
status, and BMI when adjusted for background
variables, while for females, only a low
educational level was associated with a higher
BMI.8

Screening programs for BMI assess the weight
status of individual students to identify those
at risk and provide parents with information to
help them take appropriate action.9 Facial
markers of body composition have been of
increasing interest to multiple disciplines, such
as evolutionary psychology (e.g., as a marker
of attractiveness) and computational face
recognition. Since body mass and fat
distribution is indicators of various health and
live-style aspects, facial cues are likely to
influence facial perception and can even be
important for forensic purposes.10

The body mass index (BMI) is the metric
currently in use for defining anthropometric
height/weight characteristics in adults and for
classifying (categorizing) them into groups. The
common interpretation is that it represents an
index of an individual’s fatness. It also is widely
used as a risk factor for the development of or
the prevalence of several health issues11. So
far reviewing the different available journals no
research paper was found regarding assessment
of nutritional status through body mass index
among the students of medical science in our
country. May be it is the first initiatives to assess
nutritional status through BMI in medical
science students in Bangladesh.

Materials and Methods:
This descriptive type of analytic study was
conducted in the Anatomy Department of
Dhaka Medical College, Dhaka from 1st
February’2018 to 30th September’2018. The
study samples were the first year students of
MBBS and B.Sc nursing course admitted in the
session of 2017-2018 in the Dhaka Medical
College & Dhaka Nursing College, Dhaka. Both
institutes are government medical education
institute in Dhaka. The data were collected
randomly on 177 individuals from first year
students of MBBS and B.Sc nursing course by
questionnaires. The study samples were divided
into two groups as MBBS and B.Sc nursing.
Table-I  
*Grouping of the samples.*

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBBS</td>
<td>102</td>
</tr>
<tr>
<td>B Sc nursing</td>
<td>75</td>
</tr>
</tbody>
</table>

Subjects were not chosen on the basis of bodily structures and proportion. Body Mass Index (BMI) was calculated as student’s weight in kilograms divided by the square of the student’s height in meters (kg/m$^2$). The nutritional statuses of the two groups were categorized according to world health organization (WHO) as follows:

Table-II  
*Nutritional status*¹²

<table>
<thead>
<tr>
<th>BMI</th>
<th>Nutritional status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18.5</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.5–24.9</td>
<td>Normal weight</td>
</tr>
<tr>
<td>25.0–29.9</td>
<td>Pre-obesity</td>
</tr>
<tr>
<td>30.0–34.9</td>
<td>Obesity class I</td>
</tr>
<tr>
<td>35.0–39.9</td>
<td>Obesity class II</td>
</tr>
<tr>
<td>Above 40</td>
<td>Obesity class III</td>
</tr>
</tbody>
</table>

The warning sign of poor nutritional health was calculated according to the checklist adapted by the Nutrition Screening Initiative, American Academy of Family Physicians July 2001.

**Nutritional health checklist¹³:**

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have an illness or condition that made me change the kind and/or amount of food I eat.</td>
<td>2</td>
</tr>
<tr>
<td>I eat fewer than 2 meals per day.</td>
<td>3</td>
</tr>
<tr>
<td>I eat few fruits and vegetables, or milk products.</td>
<td>2</td>
</tr>
<tr>
<td>I have 3 or more drinks of beer, liquor or wine almost every day.</td>
<td>2</td>
</tr>
<tr>
<td>I have tooth or mouth problems that make it hard for me to eat.</td>
<td>2</td>
</tr>
<tr>
<td>I don't always have enough money to buy the food I need.</td>
<td>4</td>
</tr>
<tr>
<td>I eat alone most of the time.</td>
<td>1</td>
</tr>
<tr>
<td>I take 3 or more different prescribed or over-the-counter drugs a day.</td>
<td>1</td>
</tr>
<tr>
<td>Without wanting to, I have lost or gained 10 pounds in the last 6 months</td>
<td>2</td>
</tr>
<tr>
<td>I am not always physically able to shop, cook and/or feed myself</td>
<td>2</td>
</tr>
</tbody>
</table>

(For each yes answer, score the number listed for the total nutritional score.) **TOTAL**

Scoring:  
- 0-2 = Good, recheck in 6 months  
- 3-5 = Moderate nutritional risk, recheck in 3 months.  
- 6 or greater = High nutritional risk, see physician, dietician, etc.

The convenience sampling was performed and written consent was obtained from the participants. The descriptive statistics method was used to categorize information in frequency tables for warning sign of poor nutritional health, as well as students t-test was calculated with the help of statistical software SPSS-20 to find out the significant relation of BMI between the two groups of students.

**Results:**  
The mean (±SD) height (meter), weight (kg) and BMI of groups MBBS and B Sc nursing were 1.63±0.09, 61.65±11.22, 23.11±3.53 and 1.56±0.07, 49.05±9.42, 20.15±3.47 respectively (table-III). It was observed that the differences between the two groups were statically significant ($P<0.001$) in all three variables. Body mass index was significantly higher in MBBS group than B Sc nursing group (table-III, Fig-1).
Good nutritional health status was found 61.80% and 53.30% in MBBS and B Sc nursing groups respectively (table-IV). Moderate nutritional risk was found 27.50% and 32.00%, high nutritional risk was found 10.80% and 14.70% in MBBS and B Sc nursing groups respectively (table-IV, Fig-2). The present study showed that the B Sc nursing students are more at high nutritional risk than the MBBS students.

Table -III

<table>
<thead>
<tr>
<th>Group</th>
<th>Height (meter)</th>
<th>Weight (kg)</th>
<th>BMI (Mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBBS (n=102)</td>
<td>1.63±0.09</td>
<td>61.65±11.22</td>
<td>23.11±3.53</td>
</tr>
<tr>
<td>B Sc Nursing</td>
<td>1.56±0.07</td>
<td>49.05±9.42</td>
<td>20.15±3.47</td>
</tr>
</tbody>
</table>

P value <0.001*** <0.001*** <0.001***

Figure in parentheses indicate range. Comparison between groups done by student’s ‘t’ test, */*/*/* = significant.

Table-IV

<table>
<thead>
<tr>
<th>Nutritional score</th>
<th>Group</th>
<th>MBBS (n=102) (%)</th>
<th>B.Sc Nursing (n=75) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>3 (61.80)</td>
<td>40 (53.3)</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>28 (27.50)</td>
<td>24 (32.0)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>11 (10.80)</td>
<td>11 (14.7)</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Adult malnutrition is much more widespread than is commonly recognized14. Described in this article is the use of body mass index (BMI = weight in kg/height in metres²) as a measure of adult nutritional status, both in first year students of MBBS and B Sc nursing course in Dhaka Medical College & Dhaka Nursing College, Dhaka. The mean height and weight
was 1.63 meters and 61.65 kg in MBBS group; and 1.56 meters and 49.05 kg in B Sc nursing group respectively (table-III). Body mass index was calculated and it was found higher (23.11>20.15) in MBBS students which was statically significant ($P<0.001$). It indicates that there is a significant relation between BMI and the students of different courses of medical educations such as MBBS, B Sc nursing course etc.

Poor nutritional health is often overlooked. For this reasons, according to the American Academy of Family Physician to determine the nutritional health, a checklist was calculated between the two groups. Moderate nutritional risk was found in 27.50% and 32.00%, high nutritional risk was found in 10.80% and 14.70% in MBBS and B Sc nursing groups respectively (table-IV, Fig-2). It was observed that B Sc nursing students are more (14.70%>10.80%) in high nutritional risk than the MBBS students.

The first year students of MBBS and B Sc nursing course admitted in the Dhaka Medical College & Dhaka Nursing College from the whole country through the competitive admission test examination. It is well known, to admit in the MBBS course the students have to face much greater challenge than the B Sc nursing course. To prove best in the admission test better nutritional health status of the individuals are required. For this reasons an attempt were taken to assess the nutritional status among the 1st year students of MBBS and B Sc nursing course in Dhaka Medical College & Dhaka Nursing College as a government medical institutes in Dhaka through body mass index. It is clear from the above findings that on average the B Sc nursing students has lower height and weight than the MBBS students. Both of the groups, MBBS and B Sc nursing belong to normal BMI range (18.5 to 24.9). Body mass index in MBBS (23.11) group is more than B Sc nursing (20.15) group and it was statically significant ($P<0.001$).

**Limitation**

- BMI was calculated to assess the nutritional status. Others anthropometric, clinical, biochemical and dietary methods were not assessed.
- For each of the groups only one institute was chosen to compare, and the study sample was small.

**Conclusion**

The present study showed that the BMI of students of MBBS course is higher than B Sc nursing course students. At the same time B Sc nursing course students are more in nutritional risk than MBBS course students. The BMI is therefore a useful tool in both clinical and public health practice for assessing adult nutritional status.

**References**

10. Mayer C, Windhager S, Schaefer K, Mitteroecker P. BMI and WHR Are Reflected in Female Facial Shape


