NUTRITIONAL STATUS OF RURAL COLLEGE GIRLS

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ABSTRACT

In India with varying social customs and common beliefs against females there is a high prevalence of malnutrition amongst girls. It is reported that the nutritional status which is often poor during early life gets worsened as the adolescent growth spurt occurs. Girls in rural areas get married early before completion of their growth. The nutritional status and development of young girls is related to their nutritional requirements, dietary intake, dietary practices, cultural traditions and meal patterns. Diets of Indian girls especially in rural areas are inadequate both in terms of quality and quantity. They mainly consume cereal based food but grossly deficient in legumes, animal foods and green leafy vegetables. Against this background, the present study was conducted in a degree college of Haryana in March, 2019 to explore the current nutritional status of 130 young girls between 18-23 years of age. The nutritional status assessment was undertaken by using two techniques i.e. Anthropometric Measurement and Biomedical Impedance. In Anthropometric Measurement mainly three aspects: Height, Weight and BMI (Body Mass Index) were assessed. The height was taken barefoot in centimetres using a stadiometer. The weight was measured in kilogram without shoes and BMI was calculated. Bio-medical impedance was used for analysis of fat percent and visceral fat which was measured by Body Composition Monitor BFS08. The data so collected were compiled in MS Excel and analyzed for each age group using SPSS 16. The mean age of the studied subjects was 20.5 ±1.42 year. The mean height, weight and BMI of studied subjects were 156.34 ±7.52cm, 47.3 ±5.39kg, 19.37 ±1.95kg/m^2 respectively which was low in comparison to the standards of ICMR (1990). The data of bio-medical impedance revealed that the fat per cent of the studied subjects lies between 14.31-18.43 per cent which should be 18-23 per cent on an average indicating less body fat and visceral fat between 1.25-2.42 per cent with very low deviations from standards which is quite normal. The studied data made it obvious that that there is a need to initiate intervention strategies for young girls and encourage the girls to improve their dietary intake so that their nutritional status and thereby of coming generations could be improved.

Keywords—*Adolescents, nutritional status, intervention, diet, malnutrition*

INTRODUCTION

Choudhary *et al*. (2010) believed that in poor communities young girls are often last to be given food even when pregnancy further increases their nutritional needs. In addition, while staple food items like rice, pulse, bread, etc. are distributed fairly equally; side dishes usually containing a higher proportion of micronutrients as expensive vegetables, meat, eggs, curd, paneer, ghee, etc. are often preferentially allocated to valued household members, including adult males and small children. In general, young girls are the worst sufferers of the ravages of various forms of malnutrition (viz. protein energy malnutrition, iron, iodine, calcium, vitamin A and other specific nutrient deficiencies) because of their increased nutritional needs but decreased intake. At the same time low literacy level of mothers/families and rural girls, lack of nutrition related knowledge and lack of awareness about their nutritional requirements further aggravate this dismal situation. There is substantial evidence that inadequate diets affect females ability to learn and work at maximum productivity. Under nutrition increases the risk of poor obstetric outcomes for young mothers and jeopardizes the healthy development of their future children. Considering these facts, the present study titled 'Nutritional Status of Rural College Girls' was conducted.

OBJECTIVE

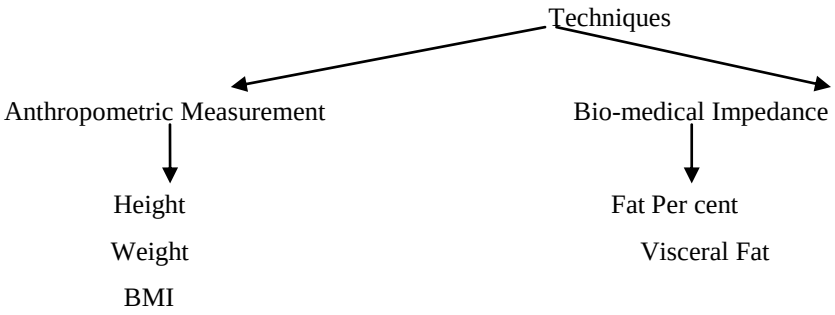
In this study, an attempt has been made to explore the current nutritional status of young girls of one degree college of Haryana by:

- Anthropometric Measurement
- Biomedical Impedance

MATERIAL AND METHODS

Sample Size- This was a college-based study done among 130 girls aged between 18–23 years. The selection of girls was done by simple random sampling method after taking prior permission from Principal of the college and seeking consent of the students.

Techniques- Mainly two techniques were used to assess the nutritional status of the subjects:



In Anthropometric Measurement mainly three aspects: Height, Weight and BMI (Body Mass Index) were assessed. The height was taken barefoot in centimetres using a stadiometer. It was recorded to the nearest 1 cm. The weight was measured in kilogram without shoes using Omron weighing machine having precision of 0.5 kg. Checks on the scale were made routinely before recording the weight of each student and the pointer was adjusted to zero using the screw provided. The body weight was recorded when the display of the body weight became stabilised. The BMI defined as weight (kg)/height $(m)^2$ was used to assess the nutritional status of girls. BMI is often used as an indirect measure of body fatness because it is relatively simple to measure and is correlated with total body fat in populations and most individuals (WHO 2000). A limitation of BMI is that it does not differentiate between lean and fat mass therefore two individuals with the same BMI may have different proportions of lean and fat mass.

Bio-medical impedance was used for analysis of fat percent and visceral fat which was measured by Body Composition Monitor BFS08. Bio-medical impedance analysis is a widely used technique for estimating body composition and it is particularly useful in large, population-based studies because it is quick, potable, inexpensive and non-invasive. The data so collected were compiled in MS Excel. Mean and standard deviations of the data were analyzed for each age group using SPSS 16.

Results and Discussion

A total of 130 young girls aged 18-23 years were assessed for nutritional status in a degree college of Haryana in March, 2014. The mean age of the subjects was 20.5 ±1.42 years. The age-wise distribution of studied girls and their anthropometric measurements are given in Table 1.

Anthropometric Measurement

It was observed that the mean height of young girls of age 18 and 19 years was 156.64 ±7.87cm and 157.23±5.70cm whereas, girls of age 20 and 22 years have approximate same mean height. Data also depicts that girls of age 21 years have highest mean i.e. 159.27 ±8.94cm and 23 years old girls have the lowest mean height of 154.55 ±8.43cm.

Table-1: Age-Wise Distribution of Studied Subjects with Anthropometric Measurements

Age (Years)	N	Mean Height (cm)	S.D.	Mean Weight (kg)	S.D.	Mean BMI (kg/m^2)	S.D.
18+	13	156.64	±7.87	48.20	±5.48	19.59	±0.93
19+	20	157.23	±5.70	45.63	±3.43	18.45	±0.95
20+	31	155.10	±8.11	45.03	±6.46	18.75	±2.46
21+	29	159.27	±8.94	49.92	±5.69	19.72	±2.11
22+	25	155.24	±4.85	47.00	±4.36	19.53	±1.88
23+	12	154.55	±8.43	48.06	±3.29	20.20	±1.76

Body weight reflects height and body composition, which comprises lean body mass (muscle, bone and water) and fat (adipose tissue). The data reveals that the mean body weight of girls at 18, 19 and 20 yr was 48.20 ±5.48 kg, 45.63 ±3.43 kg and 45.03 ±6.46 kg, respectively whereas, the mean body weight of girls at 21, 22 and 23 yr was 49.92 ±5.69kg, 47.00 ±4.36 kg and 48.06 ±3.29 kg, respectively. It is evident from the data that highest variation in body weight was found at the age of 21 years and the lowest is recorded at 22 years.

Gibson (2005) opines that weight is a better indicator of short-term nutritional status, whereas height reflects longer-term nutritional status. If the weight centile is substantially lower than the height centile, this difference may indicate acute nutritional problems. With long-term nutritional problems, both the weight and height centiles may be low. (Mann and Truswell 2007). It is well known that in growing children conception leads to cessation of growth. Young mothers belonging to poor socioeconomic strata suffer more because chronic under-nutrition retards skeletal growth and maturation. Gopalan (1989) also stated that girls with height <145 cm and weight <38 kg are at risk for delivering low birth weight babies.

The Body Mass Index is a measure of the body weight relative to height that is associated with body fat and health risk and is calculated by dividing weight in kilograms by height in metres squared (kg/m^2). From the studied data, it was observed that the mean BMI, which is considered as an index of chronic energy deficiency was 19.59±0.93kg/m^2, 18.45±0.95kg/m^2, 18.75±2.46kg/m^2, 19.72±2.11kg/m^2, 19.53 ±1.88kg/m^2, 20.20 ±1.76kg/m^2 for 18-23 years of age respectively. According to Chaturvedi *et al.*(1995), girls with BMI values less than 18.5 were considered to be suffering from chronic energy deficiency (CED).

The figure 1 illustrates the anthropometric data of the studied girls in comparison to standards of ICMR (1990). It reflects 5 per cent lower height, 13 per cent lesser weight and 12 per cent low BMI of the studied subjects than the respective standards.

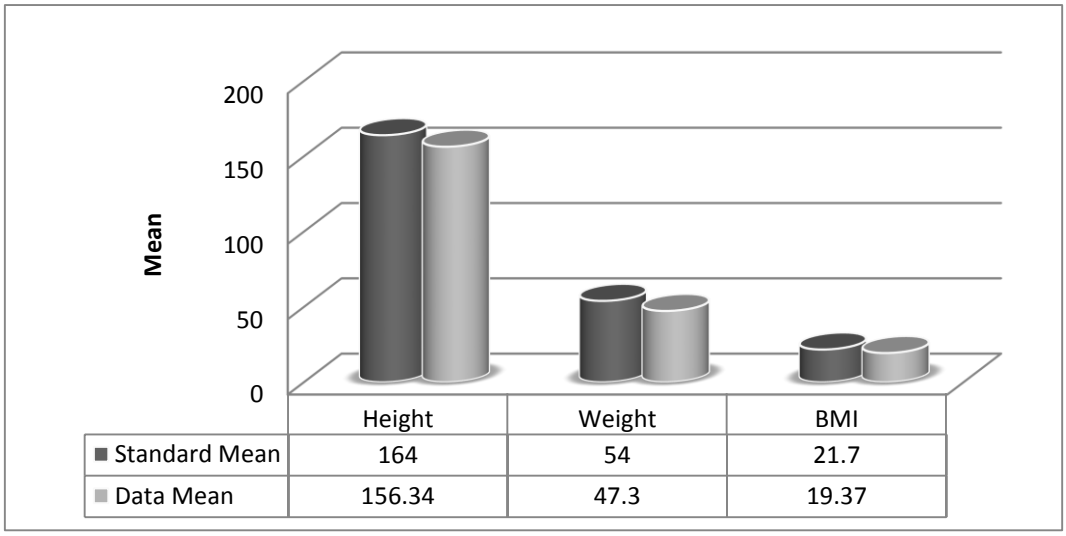


Figure1. Comparison of Means of Anthropometric Data with Standards of ICMR (1990)

It can be reported that studied subjects are not well nourished and specifically 19 and 20 year subjects are marginally undernourished and at risk of suffering from chronic energy deficiency if their nutritional needs are not addressed properly well in time.

BIO-MEDICAL IMPEDANCE

The body fat per cent of a human or other living being is the total mass of fat divided by total body mass; body fat includes essential body fat and storage body fat. Essential body fat is necessary to maintain life and reproductive functions. The percentage of essential body fat for females is greater than that for males, due to the demands of childbearing and other hormonal functions. The average fat per cent is 8-19.9 per cent in males and 21–32.9 per cent in females of age 20-39 years (Gallagher *et al.*, 2000). Fat per cent below the average is associated with malnutrition and above average may lead to diseases associated with obesity. There is no single ideal percentage of body fat for everyone. Levels of body fat are epidemiologically dependent on sex and age (Jackson *et al.*, 2002) Different authorities have developed different recommendations for ideal body fat percentages. It is a measure of fitness level, since it is the only body measurement which directly calculates a person's relative body composition without regard to height or weight.

Table 2 reflects the mean of body fat per cent and visceral fat. From the data it was found that mean fat per cent lies between 14.31 - 18.43 per cent. Age group of 19+ girls were having least mean fat percent i.e.14.31 ±3.69 whereas, age group of 18+ girls were having highest mean fat per cent i.e.18.43 ±4.27. Girls of age 21 and 22 years had almost same mean fat per cent (16%). Although each group was having the required per cent of essential fat i.e. 10-12 per cent but on the whole, almost all the age groups were having low fat per cent.

Table- 2: Fat Per Cent and Visceral Fat of Studied Subjects

Age (Years)	No.	Mean Fat Per Cent	S.D.	Mean Visceral Fat	S.D.
18+	13	18.43	±4.27	2.42	±0.27
19+	20	14.31	±3.69	1.45	±0.60
20+	31	17.65	±6.49	2.35	±0.66
21+	29	16.47	±4.42	1.80	±0.61
22+	25	15.10	±3.58	1.46	±0.90
23+	12	16.43	±7.01	1.25	±0.86

Visceral fat, or abdominal fat, is a type of body fat that exists in the abdomen and surrounds the internal organs. Everyone has some, especially those who are sedentary, chronically stressed, or maintain unhealthy diets have high levels of visceral fat. In fact, excessive deposits of visceral fat are thought to be closely linked to increased levels of fat in the bloodstream, which can lead to common diseases such as hyperlipidemia and diabetes, which impairs the ability of insulin to transfer energy from the bloodstream and using it in cells. In order to prevent or improve conditions of common diseases, it is important to try and reduce visceral fat levels to an acceptable level. People with high visceral levels tend to have large stomach. However, this is not always the case and high visceral fat levels can lead to metabolic obesity. Metabolic obesity (visceral obesity with normal weight) represent fat levels that are higher than average, even if a person's weight is at or below the standard for their height. The data of visceral fat depicts that girls of age 19, 21, 22, 23 have approximately same means (1.25-1.80) with very low deviations and the mean for 18+ and 22+ girls were 2.35 ±0.66 and 2.42 ±0.27. The visceral fat level range 1-9 is considered to be normal (Omron Healthcare figure).

CONCLUSION

There is substantial evidence that inadequate diets affect females ability to learn and work at maximum productivity. Under nutrition increases the risk of poor obstetric outcomes for young mothers and jeopardizes the healthy development of their future children. Results of the studied data indicate that the girls of rural Haryana are malnourished as their anthropometric measurements were below the standards of ICMR. However, their visceral fat was quite normal. But their fat per cent was below average. So, we can conclude that there is a need to initiate intervention measures to improve the nutritional status of young girls. The studied data made it obvious that that there is a need to initiate intervention strategies for young girls and encourage the girls to improve their dietary intake so that their nutritional status and thereby of coming generations could be improved.

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