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Prevalence of Anemia, Overweight and Underweight- Triple Burden among Young Women

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Abstract
Background: *Healthy women give rise to healthy nation. Nutritional status is an important predicator of one's health. On one hand, young women are more prone to anemia and underweight. On the other hand, overweight is also equally prevalent. This is high time to assess the nutritional status of young women in order to prevent non-communicable and deficiency-based diseases.*
Objectives: *To assess the nutritional status of the young women with respect to hemoglobin level and BMI.*
Materials and Methods: *A total of 500 young people in the age group of 19-22 years were selected by using purposive random sampling. General profile and eating patterns were obtained from the participants using an interview schedule. Anthropometric measurements and hemoglobin levels of them were assessed. Thus obtained information was subjected to statistical analysis.*
Results: *In our study, only 39% of the participants had normal BMI. About 24% reported under nutrition, and 24.4% reported to fall under the category of overweight and obese category. The prevalence of anemia was reported among 77.8%.*
Conclusion: *Nutrition Education programs such as workshops, camps, and nutrition screening should be periodically conducted to combat anemia, under nutrition, and over nutrition. Inclusion of nutrient-dense foods from childhood should be encouraged to lead a healthy life.*
Keyword: *BMI, anemia, hemoglobin, underweight, overweight.*

Introduction

'Today's college-going girls are future mothers'. It is ubiquitous that women involve in market production, home production, and reproduction. In order to maintain the health of the future mothers, it is essential for the college-going girls to maintain the proper nutritional status. Body Mass Index (BMI) and anemia are the major determinants of nutritional status of young women.

Anemia is a common and major public health problem affecting the quality of life and work capacity of a large population throughout the world[1].

According to WHO, the prevalence of anemia is highest in South Asia, and India has the maximum prevalence of anemia among the South Asian countries. Studies conducted in different regions of India showed that the prevalence of anemia was

52.5% in Madhya Pradesh, 37% in Gujarat, 41.1% in Karnataka, 85.4% in Maharashtra, 21.5% in Shimla, 56.3% in Uttar Pradesh, 77.33% in Andhra Pradesh, and 58.4% in Tamilnadu as well as in Kerala[2].

In India, anemia affects an estimated 50% of the population. The problem becomes more intense as more women are affected when it is compared to men. It is estimated that about 20% to 40% of maternal deaths in India are due to anemia, and one in every two Indian women (56%) suffers from some form of anemia. Studies have shown that majority of university students, especially female, were anemic that might be aggravated by wrong food habit and lack of awareness[3].

Underweight and obesity are the common health conditions in developed as well as in developing countries. In 2016, more than 1.9 billion adults (18 years and older) were overweight. Of these, over 650 million were obese. About 39% of adults aged 18 years and over were overweight, and 13% were obese[4].

The body mass index (BMI) is the most well-established anthropometric indicator used for the assessment of adult nutritional status. It is also a simple index of weight-for-height that is commonly used to classify underweight, overweight, and obesity. BMI values are age-independent and same for both sexes. BMI categorization by World Health Organization is given below, which is also being used as the reference in the present study: Less than 16kg/m^2 - Severe underweight, 16-16.9 kg/m^2 - moderate underweight, 17- 18.49 kg/m^2 - mild underweight 18.5- 24.9 kg/m^2 - normal weight, 25- 29.9 kg/m^2 – Overweight , above 30 kg/m^2 – Obese.

Inadequate intake, excessive losses, malabsorption, increased requirement, body image and self-esteem level lead to underweight. Many factors facilitate progression to obesity such as sedentary lifestyle, increased junk food consumption, decreased physical activity, high use of smart gadgets, improper diet habits, and improper sleep patterns[5].

A recent study conducted by Saiprasanna Narasimmal et al. in 2016 among college students in Trichy, Tamilnadu revealed that 21.2% (N=106) were underweight, 45.8 % (N=229) were normal, 23.4% (N=117) were overweight, and 9.6 % (N= 48) were obese[6]. Another study done by Geetha Mani et al. in 2014 among undergraduate medical students in Tamilnadu showed that only 56.7% were in the normal BMI range, fifteen students (10%) were underweight, thirty-six students (24%) were overweight, and fourteen students (9.3%) were obese[7].

Poor eating habits are a major public health concern among college students who experience transition into university life, during which they are exposed to stress and lack of time[8]. The selection of unhealthy food, high cost of healthy food, and the ease of availability of fast foods may have a negative impact on university students eating behaviors[9].

Future of the society depends on these young people as they form a great human resource for the society. Nutritional and health needs of the young people are also more because of excess requirements for growth spurt and increase in physical activity. Thus, it is high time to assess the nutritional status of the college girls with respect to BMI and anemia.

Materials and Methods

The study was conducted among 500 female students from Government Arts and Science College of North Chennai. Participants were selected using purposive random method. Written, informed consent from participants to participate in the study and permission from the college authority to conduct the study were obtained prior to the study. The subjects were briefed out regarding the purpose of the study. Interview schedule was used to elicit the information regarding the general profile and dietary habits of the participants. Anthropometeric measurements such as height and weight were obtained from the participants. Height and weight were measured using stadiometer and bathroom scale,

respectively. Broka's Index formula was used to calculate BMI (Weight in kilogram in Height in meter square). The hemoglobin estimation was performed using Drabkin method. Blood was drawn from the participants under a sterile condition by a qualified biochemist. The results were interpreted as per WHO criteria.

A standardized bathroom scale was used to measure weight. The participants were instructed to remove footwears. The weight of each participant was recorded to the nearest 0.5 kg. Participants were instructed to stand erect with their back against the rod and to look straight ahead, with heels together standing on a level surface without footwear. The height was measured to the nearest 0.1 cm.

After obtaining the anthropometeric and general information, the data are subjected to statistical analysis using SPSS 18 software.

Results and Discussion

Table-1: General profile of the subjects

General Profile		Number	Percentage
Age	19	186	37.2
	20	172	34.4
	21	89	17.8
	22	53	10.6
Educational qualification	B.Sc	151	30.2
	B.Com	116	23.2
	B.A	140	28
	Post graduation	93	18.6
Type of living	Hostel	67	13.4
	Parents	407	81.4
	Relatives	26	5.2
	Friends	0	0

In the present study, the maximum number of college girls (37.2%) were in the age group of 19 years followed by 34.4% in 20 years, 17.8% in 21 years, and 10.6 % in 22 years. The Table 1 represents that about 30.2% participants belong to B.Sc stream, followed by 23.2% from B.Com Stream, and 28% from B.A stream (81.4% under graduation). About 18.6% are currently pursuing postgraduation. It is also interesting to note that none of the participants stayed with friends. Majority of the participants (81.4%) resided with the parents. About 13.4% were hostel dwellers, and only 5.2% resided with relatives.

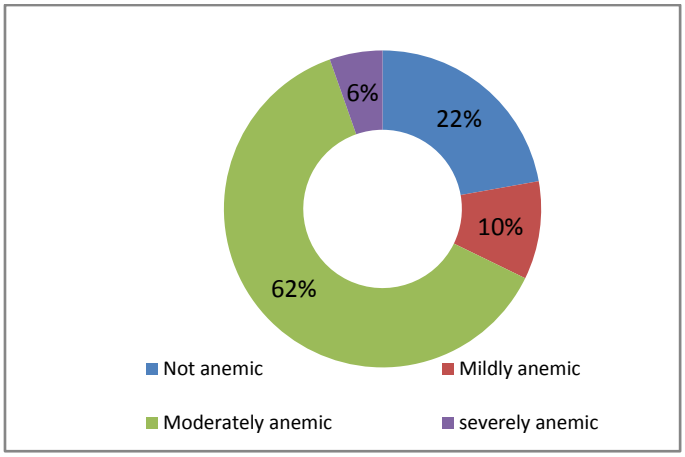
Table-2 Food habits of the respondents

Food Habits		Number	Percentage
Type of diet	Vegetarian	83	16.6
	Mixed diet	409	81.8
	Ova vegetarian	8	1.6
Food to college	South Indian tiffen item	86	17.2
	North Indian tiffen item	19	3.8
	Meals	0	0
	Variety rice	192	38.4
	Noodles	0	0
	From canteen	58	11.6
	Do not bring anything	145	29

The Table-3 depicts the type of diet and food brought to college. As the table indicates that majority of the students (81.8%) consume mixed diet, about 16.6% consume vegetarian diet, and only 1.6% were vegetarians. It was also observed from the current study that the most of the participants (38.4%) bring variety rice to the college, about 17.2% bring South Indian tiffin items, and 3.8% consume North Indian tiffin items. The Table also indicates that about 11.6% of them consume canteen foods for lunch, and about 29% of the study population did not bring anything to college. It is also noted that none of them carry noodles and meals for lunch to the college.

Table-3: Hemoglobin level of the subjects

Prevalence of anemia as per WHO criteria (Hemoglobin level in gram/dl)	Number (Percentage)
Not Anemic (> 12)	111 (22.2)
Mildly anemic (11-11.9)	50 (10)
Moderately anemic (8-10.9)	312 (62.4)
Severely anemic (<8)	27 (5.4)



Findings related to prevalence of anemia indicated that among the total selected population, only 22.2% had normal hemoglobin. It is very pathetic to know that huge sum of female population were anemic (about 77.8%). On the basis of the severity of the anemia, about 10% were mildly anemic, approximately 62.4% were moderately anemic, and 5.4% were severely anemic.

In a study conducted by Babitha et al. in 2014, among the nursing students in Punjab, the prevalence of anemia was 94%[10]. A lower prevalence of 19% was also reported in Government Medical college female students in Kerala[11]. Another study reported that 44.8% were mildly anemic, 13.9% were moderately anemic, and 2.67% were severely anaemic[12].

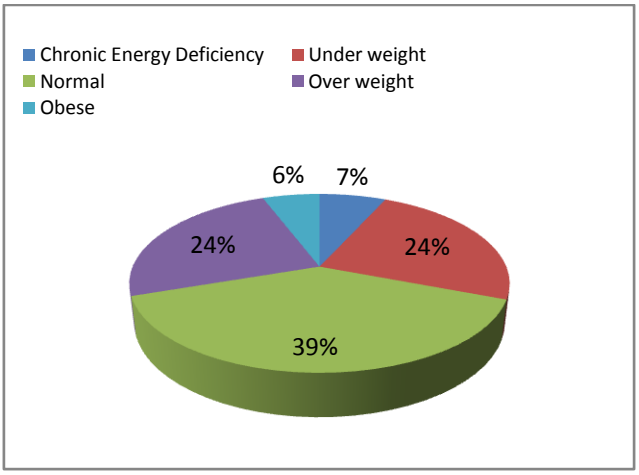
Table-4: Mean Hemoglobin of the participant

Hemoglobin Mean ±SD	10.40±1.49

The mean Hemoglobin of the participants was 10.4 grams/dl. A similar study suggested the mean hemoglobin of the study population was 11.9gm/dl[13].

Table-5: Prevalence of Undernutrition and Overnutrition

BMI Categorization	Number (Percentage)
Chronic Energy Deficiency	34 (6.8)
Underweight	120 (24)
Normal	195 (39)
Overweight	122 (24.4)
Obese	29 (5.8)



The above Table-5 illustrates the combined prevalence of overweight and underweight among the study group. It is very sad to note that less than 40% of the total populations were normal and the remaining 60% had abnormal BMI (either underweight or over weight). Only about 39% had normal BMI. Chronic energy deficiency (<16kg/m^2) is reported among 6.8% of the participants. About 24% were underweight. In our study, about 24.4% and 5.8% were overweight and obese, respectively.

Table-6: Mean measurements of the subjects

Anthropometeric measurements	Mean± SD
Height	151.82 ± 7.33
Weight	48.38 ± 10.91
BMI	21.34 ± 4.6

The mean height (cm) and weight (kg) of the females were 151±7 and 48±10, respectively. The mean BMI of the respondents was 21kg/m^2.

Table-7: Reasons for poor eating habits

Reasons For Poor Eating Habits	Number	Percentage
Lack of time	300	60
Lack of money	120	24
Taste	80	16

When the reasons for the poor eating habits were analyzed, the majority of the participants (60%) mentioned lack of time, 24% and 16% mentioned lack of money and lack of taste, respectively.

Conclusion

This study clearly highlighted the prevalence of anemia, underweight, and overweight among the college girls in North Chennai. It is highly disheartening to note that only 39% had normal BMI. About 30.8% subjects were underweight and 30.2% were overweight. Our study also showed a clear picture of prevalence of anemia among the college girls. It is very pathetic to know that only 22% were nonanemic and the remaining 78% were anemic irrespective of the severity.

Over and underweight is an important public health implication for the burden of diseases associated with both extremes of physical status. Young age is the period where the girls should shape themselves in the aspect of physical health and mental wellbeing for the future life.

Health professionals should take up the role in preventive management of nutritional deficiencies. Nutrition education program can be conducted among the college students to create awareness about healthy eating habit, self hygiene and physical activity. India is a country which has more number of anemic women. Healthy cooking practices help prevent micronutrients deficiency. Initiation of kitchen garden at home and inclusion of iron and other micronutrients-rich foods should be encouraged. In order to prevent such deficiencies, it is necessary to take a combined action by Government and college authorities. Government should start providing nutritious foods fortified with iron and other micro nutrients from high school stage to all the students so that they face a healthy adulthood. College authorities should conduct frequent health and nutrition workshop or screening camps. Younger populations are the future pillars who would help to promote growth and development of our country. Thus, it is essential to maintain the health of the young girls in terms of nutrition.

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