



Effect of Nutrition Education Program on Anthropometric Measurements of Adolescent Girls (16-19 Years)

KEYWORDS

Adolescent girls, anthropometric measurements, Nutrition Education Program

Sneha Prakash Ambre

Dr Rupali Sengupta

ABSTRACT Nutritional problem in adolescent age is common throughout the India. Poor knowledge on nutrition among adolescent can lead to unhealthy eating practices leading to inappropriate anthropometric measurements and an unhealthy community. The purpose of this study was to assess anthropometric measurement through Nutrition Education Program (NEP) among adolescent girls. 300 adolescent girls were selected through purposive random sampling. The nutrition education was imparted through audio-visual aids for three months in college settings. Before and after imparting nutrition education, anthropometric measurements revealed that most of the samples were below normal standards when compared with ICMR standards.

Introduction

Adolescence is also a period when development of the reproductive system, sexual maturation, formation of identity, and gender roles set in, and issues relating to identity, gender roles, and related problems arise (Nath A, 2008). A study conducted by (PV Kotecha, 2012), regarding identification and ranking of problems among urban adolescents could identify problems broadly into the category of health and nutrition, academic, physical growth, and development.

Obesity may be prevalent not only in the high income groups due to excess consumption of foods but also in the low income group because of intake of high caloric low nutrition foods. The development of healthy eating habits is important as the rapid physical growth in adolescence is associated with increased nutritional needs. Various studies on diet and nutrition intake of adolescents and young adults in the developed world have shown that their diets are often high in fats and refined carbohydrate. Adolescence is also a period of increased vulnerability to obesity. Lack of physical activity and outdoor sports, along with the consumption of fat-rich 'junk' foods, is the major cause of obesity among the affluent population (Choudhary P, 2006).

However, (António Prista, 2003) studied the anthropometric indicators of nutritional status and its implications on fitness, activity and health in children and adolescents. 2316 subjects (1096 males and 1222 females) were taken as samples for the study. Anthropometric variables, physical and metabolic fitness were evaluated.

The anthropometric indicators are considered as good indicators to get an idea of the nutritional status. It gives an idea about the nutritionally at risk children and thus timely treatment can be given.

METHODOLOGY:

Sample size - 300 adolescent girls (16-19 years)

Tools and techniques -

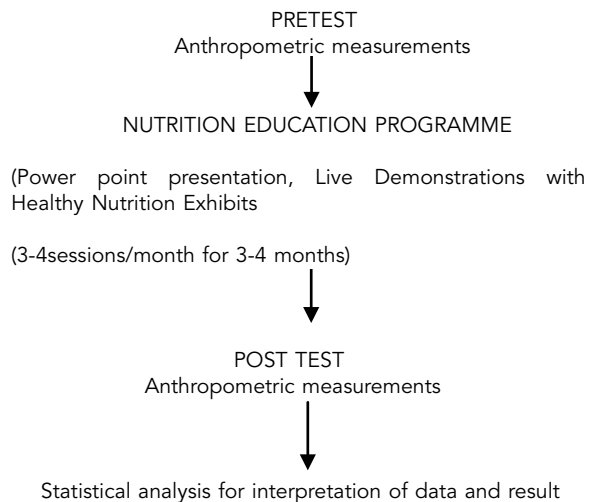
Anthropometry measurements and assessments

- Height
- Weight
- BMI (Body Mass Index)
- Waist circumference
- Hip circumference
- Waist Hip Ratio (WHR)

Nutrition Education Program (NEP)

- Large Group Counselling
- Live Demonstrations with Healthy Nutrition Exhibits

SCHEMATIC REPRESENTATION



Results and discussion:

Out of 300 subjects 30 adolescent girls were pooled for the statistical analysis (t-test) using SPSS package. The 30 subjects belonged to 16, 17 and 18 years of age.

(Jelfie, 1996) defined Nutritional anthropometry as "measurements of the variations of the physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition.

(Jonathan Gorstein, 1988) stated that anthropometry was used for body measurements to assess nutritional and health status of an individual and population groups. Anthropometry although was less accurate than clinical and biochemical techniques but was most convenient, least expensive and could be used when limited resources were available.

	AGE	N	MEAN	STANDARD DEVIATION
HEIGHT (cm)	16	18	155.14	7.000
	17	10	155.90	6.297
	18	2	161.50	12.021
WEIGHT (kg)	16	18	51.63	10.678
	17	10	52.64	10.159
	18	2	57.50	13.435
BMI (kg/m ²)	16	18	21.2028	3.21667
	17	10	21.5560	3.15570
	18	2	21.8450	1.88798
WAWAST (inches)	16	18	29.12	4.423
	17	10	29.60	4.006
	18	2	34.50	0.707
HIP (inches)	16	18	35.83	3.670
	17	10	34.80	5.160
	18	2	39.00	1.414
WHR (waist/hip)	16	18	0.7669	0.18670
	17	10	0.8510	0.4254
	18	2	0.8800	0.1414

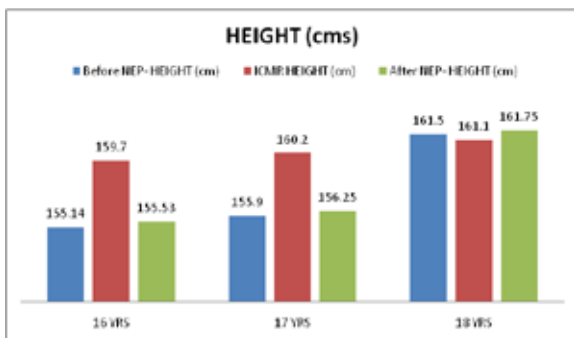
Table no 1: Anthropometric measurements- height, weight, BMI, waist circumference, hip circumference and waist to hip ratio pre NEP.

Anthropometry data after the intervention program of three months:

	AGE	N	MEAN	STANDARD DEVIATION
HEIGHT (cm)	16	18	155.53	6.980
	17	10	156.25	6.290
	18	2	161.75	12.374
WEIGHT (kg)	16	18	52.25	9.621
	17	10	53.00	8.179
	18	2	57.75	11.667
BMI (kg/m ²)	16	18	21.4806	2.67485
	17	10	21.6500	2.31679
	18	2	21.9250	1.09602
WAWAST (inches)	16	18	29.42	4.167
	17	10	29.85	3.772
	18	2	34.50	0.707
HIP (inches)	16	18	35.778	3.4778
	17	10	34.650	4.4475
	18	2	39.000	1.4142
WHR (waist/hip)	16	18	0.8178	0.6975
	17	10	0.8610	0.04254
	18	2	0.8800	0.1414

Table no 2 depicts the anthropometric measurements such as height, weight, BMI, waist circumference, hip circumference and waist to hip ratio post NEP

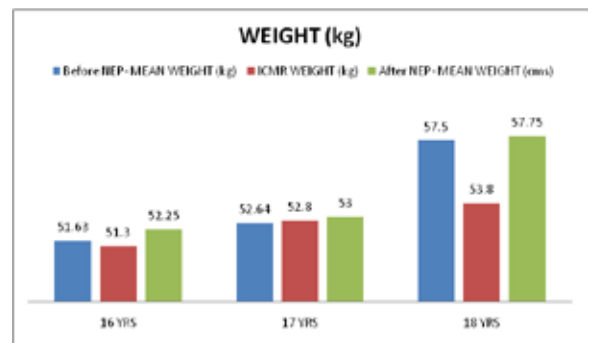
COMPARISON BETWEEN THE ICMR REFERENCE VALUES:



Graph no. 1 Comparison of height (cms) between the mean values and the ICMR values

The mean height of the ages before NEP were at par with each other. However the mean height (cm) of the age 16 yrs was (155.14 ± 7.00), mean height of 17 yrs of adolescent girls was (155.90 ± 6.29) and that of 18 yrs of age was (161.50 ± 12.02). Graph shows a wide difference between the ICMR reference values and the other obtained from mean values of the ages 16, 17 years whereas minimal difference of height was observed when compared with ICMR reference standard in 18 years of age.

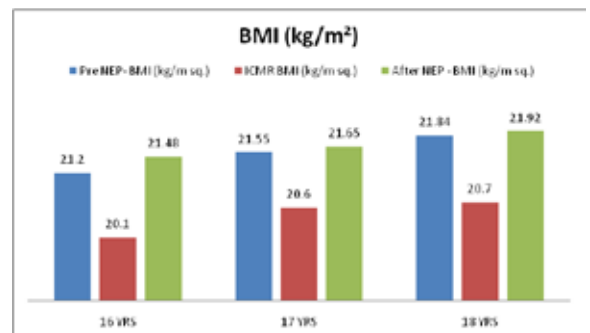
Post NEP mean height (cm) of the age 16 yrs was (155.53 ± 6.98), mean height of 17 yrs of adolescent girls was (156.25 ± 6.29) and that of 18 yrs of age was (161.75 ± 12.37). Graph no 1 states that the mean heights of the age 16 and 17 years was lowered by almost 4cms than the expected height but the mean height of the subjects of 18 years of age was in the expected range.



Graph no 2 Comparison of weight (kg) between mean values and ICMR values

Similarly the mean weight (kg) of the subjects (before NEP) of 16 years was found to be equivalent to that of 17 years of age (51.63 ± 10.67), mean weight of the subjects of 17 years of age was (52.64 ± 10.15) and however in 18 years the mean weight was (57.50 ± 13.43). Graph no 1 shows that there was the minimal difference between the obtained mean weight and the ICMR values between 16 and 17 years of age but the mean weight of the samples of age 18 years was higher than the ICMR reference values.

After NEP the mean weight (kg) of samples of 16 yrs was (52.25± 9.62), mean weight of the samples of 17 yrs of age was (53.00 ± 8.17) and that of 18 yrs was (57.75 ± 11.66). Graph no 2 states that the mean weight of the samples of ages 16 and 17 years was slightly high than the ICMR value which could be negligible but the mean weight of the samples of age 18 years was higher than the expected ICMR values.



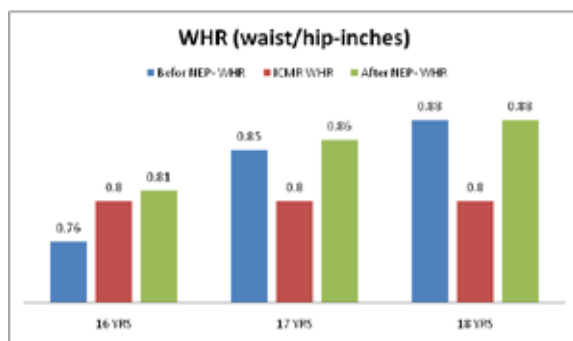
Graph no 3: comparison between the mean BMI values and the ICMR values

BMI is the useful measurement for the classification of weight. The table no 1 clearly states the mean BMI (kg/m²) of the different ages of the adolescent girls from the data collected before NEP. The mean BMI of the ages 16, 17, 18 yrs were (21.2028 ± 3.21), (21.5560 ± 3.15), (21.8450 ± 1.88) respectively. Graph 3 states that the mean BMI values obtained through the data collected was slightly higher than all the three ages as compared to the ICMR recommended values. But still the values were in the normal BMI category.

Table no 2 clearly states the mean BMI (kg/m²) of the different ages of the adolescent girls from the data collected after NEP. The mean BMI of the ages 16, 17, 18 yrs were (21.4806 ± 2.67), (21.6500 ± 2.31), (21.9250 ± 1.09) respectively. Graph 3 states that the mean BMI value of the samples of all the ages was slightly higher than the expected ICMR value. But the obtained mean BMI falls under the normal category of the BMI.

The most suitable anthropometric technique for adults was Body Mass Index (BMI). BMI was a relatively less expensive and easy to assess. BMI can not only be used for nutritional surveillance, regional and ethnic anthropometric differences, differences in anthropometry with time but also for seeing the effectiveness of intervention studies and programmes. (P Shetty, 1994)

BMI indicates long term changes in weight and indicate long term morbidity and mortality risk but cannot assess changes in weight with acute illness. Fat mass may not be accurately assessed especially in elder adults and athletes where it may be underestimated in prior group while overestimated in latter. Distribution of fat whether subcutaneous or visceral could not be assessed using BMI and it was affected with age, gender and with shifts in body fluids. (www.health.qld.gov.)



Graph no: 4 comparisons between the mean WHR and the expected WHR

Table 1 shows the measurements of waist and hip circumference which was required to know the WHR. The expected ratio of WHR should be below 0.80 for females. The mean waist circumference (inches) of the subjects before NEP was 16 yrs, (29.12 ± 4.42) that of 17 yrs was (29.60 ± 4.00) and 18 yrs was (34.50 ± 0.70). The mean hip circumference (inches) of the subjects was (35.83 ± 3.67) in 16 yrs of age group whereas (34.80 ± 5.16) in 17 yrs of age and (39.00 ± 1.41) in 18 yrs of age.

The mean WHR (waist/ hip) before NEP was (0.7669 ± 0.86), (0.8510 ± 0.42) and (0.8800 ± 0.01) of ages 16, 17 and 18 years respectively. Graph 4 states that the mean WHR of the subjects of 16 years of age was in the expected range but the mean WHR of samples of both 17 and 18 years of age was slightly higher than the expected ratio and were in the risk group of developing Cardiovascular disease and Diabetes Mellitus.

According to the table 2, the mean waist circumference (inches) of the subjects after NEP was 16 yrs, (29.42 ± 4.167) that of 17 yrs was (29.85 ± 3.772) and 18 yrs was (34.50 ± 0.707). The mean hip circumference (inches) of the subjects was 35.778 (± 3.4778) of 16 yrs of age, (34.650 ± 4.4475) of 17 yrs of age and (39.00 ± 1.4142) of 18 yrs of age.

The mean WHR (waist/ hip) after NEP was (0.8175 ± 0.6975), (0.8610 ± 0.4254) and (0.8800 ± 0.01414) of ages 16, 17 and 18 years respectively. The mean WHR of the samples of age 16 years was slightly higher than the expected ratio which was 0.80 and was negligible but there was the WHR ratio of the subjects was observed to be slightly higher in age groups of 17 and 18 years which may indicate the possible risk of lifestyle disorder.

(T.S Han, 2011) explained that waist circumference was a good indicator of total body fat and visceral body fat and also a better predictor of cardiovascular health, type 2 diabetes mellitus especially in women.

Conclusion:

Comparison with ICMR reference values showed that there was a significant difference in the height after NEP. Whereas marginal difference was observed in weight, BMI and WHR of the adolescent girls of all ages (16, 17, 18 years).

REFERENCE

- António Prista, J. A. (2003). Anthropometric indicators of nutritional status: implications for fitness, activity, and health in school-age children and adolescents from Maputo, Mozambique. *The American Journal of Clinical Nutrition*, 952-959. |
- Choudhary P, G. S. (2006). Nutrition issues in adolescence. Jaypee brothers Medical Publications. |
- Jelfie. (1996). The assessment of the Nutritional Studies of the Community with special reference to field surveys in developing regions of the World Monager. *Series of world health organ*, 3-271. |
- Jonathan Gorstein, J. A. (1988). The use of anthropometry to assess nutritional status. *World Health Organisation*. |
- Nath A, G. S. (2008). Adolescent friendly health services in India: A need of the hour. *Indian Journal of Medical Science*, 465-472. |
- P Shetty, W. J. (1994). Body mass index- A measure of chronic energy deficiency in adults. *Aberden UK: FAO*. |
- PV Kotecha, S. V. (2012). Reproductive health awareness among urban school going adolescents in Vadodra city. *Indian Journal of Psychiatry*, 344-348. |
- T.S Han, M. L. (2011). Obesity and weight management in elderly. *MAnchester, UK: British Medical Bulletin*. |