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Measurement of body composition by upper arm anthropometry.

Kankana De

Vidyasagar University, West Bengal, India.

Abstract

Background: Body composition is most commonly assessed by anthropometry like body Mass index, 60 % of human body weight is composed of water, rest 40% of body is composed of protein, fat and minerals and body composition between skinfold. Body weight is determined by leanness. Human body composition can be divided into the following major components: Fat mass (FM) and fat free mass (FFM). FM is the absolute amount of body fat, including all extractable lipids from adipose and other tissues. The FFM consists of all residual chemicals.

Methods: The anthropometric measurements of height, weight, MUAC and TSF were recorded using standard procedures .Height is measured by anthropometer rod it is measured distance from floor to vertex. The participants were requested to remove their shoes prior to their measurement and wear minimum light clothing when they were on the weighing machine. The weighing machine was checked from time to time to set zero. The MUAC was taken at the point midway between the acromion and the radiale of the upper-arm using a plastic coated non-stretchable measuring tape on the left side to the nearest 0.10 cm. Standing behind the subject the triceps skinfold was picked up with thumb and index figure. Approximately 1 cm proximal to marked level and jaws of caliper were applied to skinfold at previously marked level and measurement was taken. To analyse data spsss20 was used.

Results: In present study mid upper arm circumference is increased by age which is shown in one way ANOVA. F=193.45 which shows significant relation in frequency of UMA, UFE, UME. It was also represented that age wise change in UMA, UME which represents that growth spurts in 10-18 years.

Conclusion: Upper arm measurement, Upper arm fat area, MUAC are increases with age, this study is on adolescence girls, in every human life cycle adolescence is that when growth spurt occurs so result that study is also representing it. This study shows girls are malnourished, need nutritional supplement to improve their health.

Keywords: Mid upper arm circumferences, Triceps, Upper arm muscle area, Upper arm muscle estimation.

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Abbreviations: UFA: Upper Arm Fat Area; AFI: Arm Fat Index; UFE: Upper Arm Fat Area Estimate; UME: Upper Arm Muscle Area Estimate

Introduction

Body composition is most commonly assessed by anthropometry like body Mass index; 60% of human body weight is composed of water, rest 40% of body is composed of protein, fat and minerals and body composition and between skinfold. Body weight is determined by leanness. Human body composition can be divided into the following major components: Fat mass (FM) and fat free mass (FFM) [1-5]. FM is the absolute amount of body fat; it includes all extractable lipids from adipose and other tissues. The FFM consists of all residual chemicals and tissues including water, muscle, bone, connective tissues, and internal organs [6-10]. The upper arm is to take several assessments. Poor body composition and nutritional status can lead to increased morbidity, poor physical activity and performances. The upper arm composition has received consideration in few decades. With help of MUAC and triceps estimation of upper arm Muscle area, Upper arm fat area, Upper muscle area estimation can be done and it will help in adiposity measure [11-24].

Materials and Method

For this study data is collected from Anwesha Clinic which adolescent is counselling centre which is situated in Salboni Rural Hospital, this hospital is in Salboni block which is in Paschim Medinipur, WestBengal, India.

The anthropometric measurements of height, weight, MUAC and TSF were recorded using standard procedures. Height is measured by anthropometer rod which measures distance from floor to vertex. The participants were requested to remove their shoes prior to their measurement and wear minimum light clothing when they were on the weighing machine. The weighing machine was checked from time to time to set zero. The MUAC was taken at the point midway between the acromion and the radiale of the upper-arm using a plastic coated non-stretchable measuring tape on the left side to the nearest 0.10 cm. Standing behind the subject the triceps skinfold was picked up with thumb and index figure. Approximately 1 cm proximal to marked level and jaws of caliper was applied to skinfold at previously marked level and measurement was taken through standard deviation.to analyse data SPSS 20 was used.

Sample size for these study 1009 girls are interviewed through schedule questionnaires, age range of this study 10-19 years old adolescents, 100 girls in every age.

Statistical Analysis

Age wise ANOVA, different descriptive statistical tool help to complete this study.

Results

In present study mid upper arm circumference is increased by age which is shown in one way ANOVA F=193.45 which again has shown significant relation in Table 1 and Table 2 represents frequency of UMA, UFE, UME, Table 3 represents that age wise change in UMA,UME which represents that growth spurt in 10-18 years.

Discussion

They have also advocated that these measures are very useful to monitor body-composition on, nutritional status and for evaluating the effects of target specific intervention on supplementary programmes.

This study helps to estimate nutritional status of adolescent other than BMI, by estimating nutritional status it shows present scenario of under nutrition. Body composition is an important indicator of health status in children and adolescents because maintaining a healthy body composition prevents the onset of obesity which is associated with the risk of cardiovascular diseases, diabetes and stroke. This study is done on adolescent counselling centre where counsellor provides counselling on nutrition, reproductive health, by this study under nutrient girls get support of counsellors get nutrition supplement example iron folic acid supplement, even it shown that under nutrient girls experience delayed menarche; those girls are found obese and they get suggestions on how they manage their weight and get knowledge of bad effect of obesity. Insen study girls' thinness is 21.3% in respect of upper anthropometry, Taylor et al.'s [2] study found that in compare to late adolescence young adults have higher

Table 1. *Represents frequency of UMA, UFE, UME of present study*

Mean		21.975	0.972	119.2984
Median		22.44	0.98	126.5625
Mode		22.83	0	132.25
Standard Deviation		10.13	0.308	34.14
Variance		102.748	0.095	1165.622
Percentiles	50	22.449	0.984	126.5625
	75	23.543	1.16	139.24
	95	24.867	1.5	155.0025

Table 2. *Represents frequency of TUA, UFA, AFI*

	TUA	**UFA**	**AFI**
Mean	21.71	30.11	56.98
Median	19.36	39.69	65.48
Std. Deviation	21.2		121.23
5 Percentiles-50	19.36	39.69	65.48
Percentiles-75	26.01	57.77	72.95
Percentiles-95	40.96	102. 17	81.543

Table 3. *Age wise change in UFE, UMA, UME, UFA, AFI*

Anthropometric data	**10 year**	**11 year**	**12 year**	**13 year**	**14 year**	**15 year**	**16 year**	**17 year**	**18 year**	**F**
UFE	0.547 (0.098)	0.799 (0.23)	0.854 (1.74)	0.924 (0.188)	1 (0.195)	1.10 (0.244)	1.106 (0.244)	1.13 (0.27)	1.18 (0.22)	11.93
UMA	16.20 (1.32)	19.25 (2.42)	20.55 (2.44)	21.52 (1.89)	22.38 (1.22)	22.76 (1.17)	23.07 (1.32)	23.19 (1.53)	23.45 (1.53)	82.03
UME	66.51 (10.86)	95.29 (29.1)	107.7 (23.78)	117.32 (19.75)	126.32 (13.57)	130.64 (13.48)	134.44 (15.48)	135.82 (19.80)	139.10 (18.06)	118.69
UFA	20.64 (12.43)	35.98 (18.90)	34.45 (16.36)	37.51 (20.17)	42.72 (25.77)	47.41 (25.10)	51.26 (31.14)	54.97 (35.42)	58.87 (31.44)	2.43
AFI	50.07 (21.07)	59.88 (15.78)	58.93 (14.33)	59.036 (14.88)	60.09 (16.51)	61.90 (20.41)	62.37 (19.46)	63.05 (19.2)	66.84 (14.94)	0.853

regional adiposity, total body fat is higher in compare to males it had shown in African adolescent.

Conclusion

This study upper arm shows that measurement, upper arm fat area, Muac increase with age, this study is adolescence girls, in every human life cycle adolescence is that when growth spurt occurs the result is this study girls are malnourished need nutritional supplement to improve their health.

Declaration

Ethics approval and consent to participate: subjects gave verbal consent in respect to measurement and general information.

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Correspondence to:

Kankana De,
Vidyasagar University,
West Bengal,
India.
Tel: +919474714273
E-mail: dekankana@mail.vidyasagar.ac.in