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A STUDY OF ANTHROPOMETRIC MEASUREMENTS IN TEENAGED GIRLS IN RELATION TO SOCIO- ECONOMIC STATUS OF PUNJAB

Dr. Charan Singh, Assistant Professor
Ms. Manjit Kaur, Resaerch Scholar
Guru Kashi University Guru Kashi University Punjab.

Abtract

The Purpose of the present study to anthropometric measurements (growth related) in teenage girls in relation to socio- economic status of Punjab. The subjects selected at random were teenaged girls (14 years to 18 years) studying in meritorious school of Punjab. studying in the following five selected schools (meritorious school Amritsar, Bathinda , jalandher, Patiala, sangurar) seven selected following districts of Punjab coming under the west zone of Punjab (Bathinda, Barnala, Faridkot, Fazilka, Mansa, Moga, Sri Muktsar Sahib). The measurement of 420 subjects (15 subject's form each selected age group. The four selected age groups (Groups –I: (14-15 years), Groups –II: (15-16 years), Groups -III (16-17 years), Groups -IV (17-18 years).The 7 selected following districts of Punjab. from each age category irrespective of their socio-economic status) selected at random, was recorded on all the selected growth related fitness variables.

Key words: Socio-Economic, Teenaged, Growth and Anthropometric measurements.

Introduction

Anthropometry is a branch of ergonomics that connects particularly with the estimation of individuals, especially with estimations of body measure, shape, strength and working limit. This estimation information is used to depict or illustrate the client population for a definite measure of the body. By applying anthropometry, we try to plan the workplace around the person, as opposed to putting constraints on them as they need to adjust to what is given. On the off chance that anthropometric elements are contemplated when items are outlined, the result is probably going to be expanded acceptability, improved straightforwardness and efficiency of utilization and in this manner more important operational security and cost viability. While thinking about the sketch and utilization of gear, the term 'normal individual' is frequently referred to and utilized. In any case, not very many people would really fit such an example. The body is made up anthropometrically of a few valuable parts, for example, sitting tallness, forward hold achieve, midsection stature and head side-line. Stature is regularly utilized as a plan base, yet a 'tall' individual can either have a long or small body and long or short legs. So, although numerous individuals will fit standard articles of clothing (utilizing apparel for instance), and pieces of clothing can be measured to increase the probability of a sensible fit, the efficiency of the article of garments or troupe might be bargained, particularly when free movement is additionally affected by, for example, wearing breathing device as an outfit. At the point when items are outlined around the 'normal individual', a substantial lot of the population is avoided from utilizing them, as they fall well outside of this normal. Alterations in body

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measurements mirror the general health and well-being of individuals and populations. Anthropometry is utilized to review and forecast performance, health and survival of individuals and to mirror the financial and social wealth of populations. Anthropometry is a generally utilized, sensible and non obtrusive measure of the general wholesome position of an individual or a population the ring. Late studies have exhibited the utilizations of anthropometry to include the expectation of who will profit by interventions, recognizing social and financial in equity and assessing reactions to interventions. Anthropometry can be used for different purposes, conditional upon the anthropometric pointers. For instance, weight-for-stature (squandering) is valuable for viewing kids in danger and for estimating here and now alterations in nutritious status. Not with standing, weight-for-tallness isn't appropriate for assessing changes in a population over longer eras. A sensible comprehension of the diverse uses and appreciative view of each anthropometric marker will decide the most appropriate indicator (s) for program assessment. For more point by point explanations of age and sex particular fitting anthropometric employments terms are set apart in the lexicon.

Methodology

Again before initiating data collection process [questionnaire distribution, for classifying subjects into three selected socio-economic status and administration of various tests, for recording measurement of selected anthropometric measurements (growth related)] in the meritorious school of Punjab.

A socio-economic status scale (Standardized questionnaire) developed by Prof. Ashok .K. Kalia and Mr. Sudhir Sahu was distribution to teenaged girls studying in the meritorious school of Punjab to ascertain and assess socio-economic status of the subjects and classify them in the following selected socio-economic status : 1.High socio- economic status, 2. Medium socio- economic status, 3. Low socio-economic status. The four selected age groups for the present study were Age Groups –I: (15 years), Groups –II: (16 years), Groups -III (17 years), Groups -IV (18 years).

The date of birth given by the subjects in the questionnaire was consider the basis to categorize them into four selects age groups. Since the study deals with growth related parameters, which were highly influenced by the menstruation of a teenaged girl, great care was taken that each selected subject must have attained her menstruation. Finally after scrutinizing menarche age and date of birth as declared by the subjects in the questionnaire, one hundred five girls against each of the four selected age groups at each of the three selected socio-economic status were taken.

Selection of Variables

Selection of Anthropometric Measurements (Growth Related)

Keeping under consideration the available literature, administrative feasibility, modern trends and advices of the experts in the field, the following anthropometric measurements (growth related) were selected Body weight (kg), Height (cm), Skeletal diameters (cm), Circumferences (cm) (upper and lower extremities) and Skin folds girths (mm)

Keeping in view the requirement of the study, the socio-economic status scale developed by Prof. Ashok K. Kalia and Mr. Sudhir Sahu was used. This is a standardized, valid, reliable and objective test/ scale. This has been widely used in our country. The major reason for choosing this questionnaire was that Prof. Ashok K. Kalia and Mr. Sudhir Sahuhas computed norms for the Indian population about education,

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occupation, income, cultural living or cultural standards and participation.

Results

TABLE –1
TWO –WAY ANALYSIS OF VARIANCE OF BODY WEIGHT (KG) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO-ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	73.233	3	24.411	0.510	0.675
SES	79.300	2	39.650	0.829	0.437
Age * SES	255.253	6	42.542	0.890	0.503

Significant at 0.05 levels

The findings regarding two –way analysis of variance of body weight (kg) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table – 1. The teenaged girls, irrespective of socio- economic status differed non-significantly when comparison of body weight (kg) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F-Ratio (.510) was much lower than the required value (.675) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of body weight (kg) was made among three selected socio- economic status(viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (.829) was much higher than the required value (.437) at 0.05 level of significance. The body weight (kg) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.890) was much higher than the required value (.503) at 0.05 level of significance.

TABLE –2
TWO –WAY ANALYSIS OF VARIANCE OF SITTING HEIGHT (CM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO-ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	33.155	3	11.052	0.249	0.862
SES	195.150	2	97.575	2.201	0.112
Age * SES	189.304	6	31.551	0.712	0.640

Significant at 0.05 levels

The findings regarding two –way analysis of variance of sitting height (cm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table -2. The teenaged girls, irrespective of socio- economic status differed non-significantly when comparison of sitting height (cm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F-Ratio (.249) was much lower than the required value (.862) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of sitting height (cm) was made among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (2.201) was much higher than the required value (.112) at 0.05 level of significance. The sitting height (cm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.712) was much higher than the required value (.640) at 0.05 level of significant.

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TABLE – 3
TWO –WAY ANALYSIS OF VARIANCE OF STANDING HEIGHT (CM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO-ECONOMIC STATUS ACROSSFOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	149.855	3	49.952	1.521	.209
SES	353.956	2	176.978	5.389	.005
Age * SES	228.321	6	38.053	1.159	.328

Significant at 0.05 levels

The findings regarding two –way analysis of variance of standing height (cm) of teenaged girls belonging to three selected socio-economic status across four selected age groups are presented in Table – 3. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of standing height (cm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (1.521) was much greater than the required value (.209) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of standing height (cm) was made among three selected socio- economic status(viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (5.389) was much higher than the required value (.005) at 0.05 level of significance. The standing height (cm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (1.159) was much higher than the required value (.328) at 0.05 level of significance.

TABLE– 4
TWO –WAY ANALYSIS OF VARIANCE OF HUMERUS BI CONDYLAR DIAMETER (CM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO-ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	26.309	3	8.770	1.254	.290
SES	60.061	2	30.030	4.295	.014
Age * SES	43.392	6	7.232	1.034	.403

Significant at 0.05 levels

The findings regarding two –way analysis of variance of humerus_bi condylar diameter(cm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table -4. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of humerus_bi condylar diameter(cm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (1.254) was much higher than the required value (.290) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of humerus_bi condylar diameter(cm) was made among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (4.295) was much higher than the required value (.014) at 0.05 level of significance. The humerus_bi condylar diameter(cm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (1.034) was much higher than the required value (.403) at 0.05 level of significance.

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TABLE – 5
TWO –WAY ANALYSIS OF VARIANCE OF FEMUR BI CONDYLAR DIAMETER (CM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO- ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	1.384	3	.461	2.984	.031
SES	.194	2	.097	.628	.534
Age * SES	.406	6	.068	.437	.854

Significant at 0.05 levels

The findings regarding two –way analysis of variance of femur_bi condylar diameter (cm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table – 5. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of femur_bi condylar diameter (cm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (2.984) was much higher than the required value (.031) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of femur_bi condylar diameter (cm) was made among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (.628) was much higher than the required value (.534) at 0.05 level of significance. The femur_bi condylar diameter (cm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.437) was much higher than the required value (.854) at 0.05 level of significance.

TABLE – 6
TWO –WAY ANALYSIS OF VARIANCE OF UPPER ARM CIRCUMFERENCE (CM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO- ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	6.504	3	2.168	.370	.775
SES	15.662	2	7.831	1.335	.264
Age * SES	25.323	6	4.220	.720	.634

Significant at 0.05 levels

The findings regarding two –way analysis of variance of upper arm circumference (cm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table – 6. The teenaged girls, irrespective of socio- economic status differed non-significantly when comparison of upper arm circumference (cm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (.370) was much lower than the required value (.775) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of upper arm circumference (cm) was made among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (1.335) was much higher than the required value (.264) at 0.05 level of significance. The upper arm circumference (cm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.720) was much higher than the required value (.634) at 0.05 level of significance.

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TABLE – 7
TWO –WAY ANALYSIS OF VARIANCE OF FOREARM CIRCUMFERENCE (CM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO- ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	61.180	3	20.393	1.467	.223
SES	72.452	2	36.226	2.606	.075
Age * SES	104.860	6	17.477	1.257	.277

Significant at 0.05 levels

The findings regarding two –way analysis of variance of forearm circumference (cm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table – 7. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of forearm circumference (cm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (1.467) was much higher than the required value (.223) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of forearm circumference (cm) was made among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (2.606) was much higher than the required value (.075) at 0.05 level of significance. The forearm circumference (cm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (1.257) was much higher than the required value (.277) at 0.05 level of significance.

TABLE – 8
TWO –WAY ANALYSIS OF VARIANCE OF THIGH CIRCUMFERENCE (CM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO- ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	66.522	3	22.174	.870	.457
SES	8.711	2	4.356	.171	.843
Age * SES	69.585	6	11.597	.455	.841

Significant at 0.05 levels

The findings regarding two –way analysis of variance of thigh circumference (cm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table - 8 It demonstrates that:

The teenaged girls, irrespective of socio-economic status differed non-significantly when comparison of thigh circumference (cm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (.870) was much higher than the required value (.457) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be non-significantly different when comparison of thigh circumference (cm) was made among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (.171) was much lower than the required value (.843) at 0.05 level of significance. The thigh circumference (cm) of teenaged girls was found to be statistically in non-significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.455) was much lower than the required value (.841) at 0.05 level of significance.

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TABLE – 9
TWO –WAY ANALYSIS OF VARIANCE OF CALF CIRCUMFERENCE (CM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO- ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	51.423	3	17.141	1.031	.379
SES	95.863	2	47.931	2.883	.057
Age * SES	73.137	6	12.190	.733	.623

Significant at 0.05 levels

The findings regarding two –way analysis of variance of calf circumference (cm) of teenaged girls belonging to three selected socio-economic status across four selected age groups are presented in Table – 9. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of calf circumference (cm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (1.031) was much higher than the required value (.379) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of calf circumference (cm) was made among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (2.883) was much higher than the required value (.057) at 0.05 level of significance. The calf circumference (cm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.733) was much higher than the required value (.623) at 0.05 level of significance.

TABLE – 10
TWO –WAY ANALYSIS OF VARIANCE OF BICEPS SKINFOLD (MM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO-ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	10.016	3	3.339	.574	.632
SES	4.886	2	2.443	.420	.657
Age * SES	45.646	6	7.608	1.308	.252

Significant at 0.05 levels

The findings regarding two –way analysis of variance of biceps skinfold (mm) of teenaged girls belonging to three selected socio-economic status across four selected age groups are presented in Table – 10. The teenaged girls, irrespective of socio- economic status differed non-significantly when comparison of biceps skinfold (mm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (.574) was much lower than the required value (.632) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be non-significantly different when comparison of biceps skinfold (mm) was made among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (.420) was much lower than the required value (.657) at 0.05 level of significance. The biceps skinfold (mm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (1.308) was much higher than the required value (.252) at 0.05 level of significance.

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TABLE – 11
TWO –WAY ANALYSIS OF VARIANCE OF TRICEPS SKINFOLD (MM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO-ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	356.934	3	118.978	5.901	.001
SES	77.459	2	38.729	1.921	.148
Age * SES	97.821	6	16.304	.809	.564

Significant at 0.05 levels

The findings regarding two –way analysis of variance of triceps skinfold (mm) of teenaged girls belonging to three selected socio-economic status across four selected age groups are presented in Table – 11. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of triceps skinfold (mm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (5.901) was much higher than the required value (.001) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of triceps skinfold (mm) was made among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (1.921) was much higher than the required value (.148) at 0.05 level of significance. The triceps skinfold (mm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.809) was much higher than the required value (.564) at 0.05 level of significance.

TABLE – 12
TWO –WAY ANALYSIS OF VARIANCE OF SUB-SCAPULAR SKINFOLD (MM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO- ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	168.007	3	56.002	3.115	.026
SES	25.785	2	12.893	.717	.489
Age * SES	100.655	6	16.776	.933	.471

Significant at 0.05 levels

The findings regarding two –way analysis of variance of sub-scapular skinfold (mm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table – 12. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of sub-scapular skinfold (mm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (3.115) was much higher than the required value (.026) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of sub-scapular skinfold (mm) was made among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (.717) was much higher than the required value (.489) at 0.05 level of significance. The sub-scapular skinfold (mm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.933) was much higher than the required value (.471) at 0.05 level of significance.

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TABLE – 13
TWO –WAY ANALYSIS OF VARIANCE OF SUPRAILIAC SKINFOLD (MM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO- ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	109.559	3	36.520	2.466	.062
SES	35.135	2	17.567	1.186	.307
Age * SES	64.490	6	10.748	.726	.629

Significant at 0.05 levels

The findings regarding two –way analysis of variance of suprailiac skinfold (mm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table – 13. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of suprailiac skinfold (mm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (2.466) was much higher than the required value (.062) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of suprailiac skinfold (mm) was made among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (1.186) was much higher than the required value (.307) at 0.05 level of significance. The suprailiac skinfold (mm) of teenaged girls was found to be statistically in significant at 0.05 level of significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.726) was much higher than the required value (.629) at 0.05 level of significance.

TABLE – 14
TWO –WAY ANALYSIS OF VARIANCE OF THIGH SKINFOLD (MM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO-ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	1038.067	3	346.022	7.923	.000
SES	96.874	2	48.437	1.109	.331
Age * SES	42.207	6	7.034	.161	.987

Significant at 0.05 levels.

The findings regarding two –way analysis of variance of thigh skinfold (mm) of teenaged girls belonging to three selected socio-economic status across four selected age groups are presented in Table – 14. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of thigh skinfold (mm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F- Ratio (7.923) was much higher than the required value (.000) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of thigh skinfold (mm) was made among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (1.109) was much higher than the required value (.331) at 0.05 level of significance. The thigh skinfold (mm) of teenaged girls was found to be statistically in significant at 0.05 level of non-significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.161) was much lower than the required value (.987) at 0.05 level of significance.

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TABLE – 15
TWO –WAY ANALYSIS OF VARIANCE OF CALF SKINFOLD (MM) OF TEENAGED GIRLS BELONGING TO THREE SELECTED SOCIO-ECONOMIC STATUS ACROSS FOUR SELECTED AGE GROUPS

Source	Sum of Squares	df	Mean Square	F	Sig.
Age	87.497	3	29.166	1.472	.222
SES	107.691	2	53.846	2.717	.067
Age * SES	19.846	6	3.308	.167	.985

Significant at 0.05 levels

The findings regarding two –way analysis of variance of calf skinfold (mm) of teenaged girls belonging to three selected socio- economic status across four selected age groups are presented in Table – 15. The teenaged girls, irrespective of socio- economic status differed significantly when comparison of calf skinfold (mm) was made among four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) as the obtained F-Ratio (1.472) was much higher than the required value (.222) at 0.05 level of significance. The teenaged girls, irrespective of age groups were found to be significantly different when comparison of calf skinfold (mm) was made among three selected socio-economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) as the obtained F- Ratio (2.717) was much higher than the required value (.067) at 0.05 level of significance. The calf skinfold (mm) of teenaged girls was found to be statistically in significant at 0.05 level of non-significance when interaction comparison among three selected socio- economic status (viz. L.S.E.S, M.S.E.S and H.S.E.S.) and four selected age groups (viz. Age Groups-I, Age Groups-II, Age Groups-III and Groups-IV) was made, as the obtained F-Ratio (.167) was much lower than the required value (.985) at 0.05 level of significance.

Discussion of Finding

On the basis of comparative analysis i.e. two – way analysis of variance, the findings revealed that there was significant difference on all the selected growth parameters viz. body weight, sitting height, standing height, humerus bi-condylar diameter, femur bi-condylar diameter, upper arm circumference, forearm circumference ,thigh circumference, calf-circumference, biceps skinfold, triceps skinfold, thigh skinfold, calf skinfold, sub-scapular skinfold and supra-iliac skinfold when the inter socio-economic status comparison(irrespective of age groups) of teenaged girls belonging to three selected socio-economic status(namely, low socio-economic status, medium socio-economic status and high socio-economic status) was made.

The attributing factors for significant difference among low, medium and high socio-economic status teenaged girls and for obvious better growth of high socio-economic status teenaged girls than medium socio-economic status and low socio-economic status : and comparatively better growth of medium socio-economic status teenaged girls than low socio-economic status teenaged girls for all the selected growth parameters could be good nutritious diet, high parental education, small family size, high standard of living , more access to amenities and health awareness etc. among middle and high socio-economic status teenaged girls.

Conclusions

The high socio-economic status and medium socio-economic status teenaged girls (all age groups combined) were significantly different from each other on the selected growth parameters viz. sitting height, standing height, humerus bi-condylar diameter, femur bi-condylar diameter, foream circumference, thigh circumference, calf circumference, triceps

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skinfold thigh skinfold, calf skinfold, sub-scapular skinfold and supra-iliac skinfold whereas they varied insignificantly on the selected growth parameters viz. weight, upper arm circumference and biceps skinfold. The high socio-economic status and low socio-economic status teenaged girls(all age groups combined) were significantly different from each other on all the selected growth parameters namely , sitting height,standing height, humerus bi-condylar diameter, femur bi-condylar diameter, forearm circumference, calf circumference, triceps skinfold, thigh skinfold , calf skinfold, sub-scapular skinfold and supra-iliac skinfold. The difference between medium socio-economic status and low socio-economic status teenaged girls (all age groups combined) was significant on all the selected growth parameters namely,sitting height, standing height, humerusbicondylar diameter, femur bi-condylar diameter, foream circumference, calf circumference, triceps skinfold, thigh skinfold, calf skinfold, sub-scapular skinfold and supra-iliac skinfod. The teenaged girls irrespective of age groups, belonging to high socio-economic status weretalller in standing height, had more sitting height, (longer torso), wider humerus bi-condylar and femur bi-condylar diameters(skeletal diameters), had more forearm , thigh and calf circumferences and more skinfold thickness at triceps , thigh, calf, sub-scapular and suprailiacreions in comparison to medium socio-economic status and low socio-economic status. The teenaged girls irrespective of age groups, belonging to medium socio-economic status were heavier in body weight, taller in standing height, had more sittting height(longer torso), wider humerus bi-condylar and femur bi-condylar diameters(skeletal diameters), had more forearm, calf circumferences and more skinfold thickness at thigh, calf, sub-scapular and supra-iliac regions in comparison to low socio-economic status.

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