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Comparison of Skinfold Thickness Across Various Age Groups in Women

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Abstract:

Body fat measurement using skinfold thickness is a widely used anthropometric method that provides valuable insights into the body composition of individuals. This research paper aims to compare the skinfold measurements among females of different age groups to understand how body fat distribution changes with age. The study will analyze data from diverse age groups and explore potential implications for health and wellness.

Introduction:

Body fat plays a crucial role in maintaining overall health and has been associated with various chronic conditions. Skinfold measurement, a non-invasive and easily accessible technique, estimates subcutaneous fat, which constitutes a significant portion of total body fat. The distribution of body fat can vary with age, and understanding these age-related differences is important in designing effective nutrition and fitness interventions. This research aims to investigate the variations in skinfold thickness among females across different age groups. A complex, multifactorial condition called obesity is created when a person's genotype and environment interact. Previous studies on obesity in India have indicated that women and people from wealthier socioeconomic backgrounds are more likely to be obese. India's National Family Health Survey-2 & 3 reveals that from 15 to 49 years of age, the prevalence of both overweight and obesity rises in each age group. According to the National Family Health Survey-3, among Indian girls aged 15 to 49, the prevalence of overweight (BMI 25 kg/m2) and obesity (BMI 30 kg/m2) was estimated to be 12.6% and 2.8%, respectively. 55 percent of women aged 25 to 64 who participated in the Indian Women's Health Study16 had central obesity overall. Significant risk factors for central obesity were discovered to include BMI, a sedentary lifestyle, and a family history of excessive fat consumption. Skinfold is a straightforward technique for determining the quantitative amount of body fat that may be utilised in field research as well as clinical settings like hospitals and labs. It is an easy, affordable, portable, and non-invasive approach for determining the amount of body fat. The author of this study analysed the skinfolds of females of various ages and discovered a tendency for fat accumulation in various age groups.

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Objective of the study

To compare the selected skinfolds of females in various age groups.

Study Design:

This study was cross-sectional, involving the assessment of skinfold thickness in females from various age groups.

Sample Selection:

A stratified random sampling method was employed to recruit participants from different age groups to ensure a representative sample.

The subjects selected for this study were Three hundred females. Subject were selected from the Kasganj district in U.P. For the purpose of the study, the subjects were considered as the true representative of the entire population.

Variables

Following anthropometric variables were selected for this study:

- Seven site skinfold

1. Bicep
2. Tricep
3. Subscapular
4. Midaxillary
5. Suprailliac
6. Thigh
7. Calf

Age Categories

They were between the ages of twenty and fifty. Three age groups were used to divide the subjects: (A) 21–30 years, (B) 31–40 years, and (C) 41–50 years.

Statistical Analysis

Analysis of variance was used with a 0.05 level of significance to compare the girls in various age groups on their chosen skinfold. The statistical software for social science (SPSS) was used to calculate the mean, S.D., and analysis of variance (ANOVA).

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Finding and Conclusions

Table–1
Mean and Standard Deviation of Skinfolds in all Age Groups

Skinfolds		21-30 yrs	31-40 yrs.	41-50 yrs.
Suprailliac	M SD	22.29 9.4	28.50 7.02	28.07 6.80
Midaxillary	M SD	18.85 6.02	23.21 5.22	22.64 5.52
Subscapular	M SD	15.67 3.85	19.55 5.14	19.41 4.68
Tricep	M SD	12.89 3.05	16.86 4.27	16.32 4.72
Bicep	M SD	10.13 3.68	14.96 4.62	14.64 5.07
Thigh	M SD	30.87 9.11	39.10 6.44	40.18 8.60
Calf	M SD	25.06 7.40	30.31 5.60	31.29 6.72

***Significant at 0.05 level of confidence M=Mean SD=Standard Deviation**

When the data were compared on the basis of mean and standard deviation, **Table-1** clearly revealed that the 31-40 yrs age group of female were having little more tendency to fat deposition in the Suprailliac (28.50±7.02), Midaxillary (23.21±5.22), Subscapular (19.55±5.14), Tricep (16.86±4.27), Bicep (14.96±4.62), Thigh (39.10±6.44) and Calf (30.31±5.60) in comparison to 41-50 yrs. age group females i.e. Suprailliac (28.07±6.80), Midaxillary (22.64±5.52), Subscapular (19.41±4.68), Tricep (16.32±4.72), Bicep (14.64±5.07), Thigh (40.18±8.60) and Calf (31.29±6.72). The last youngest group ie; 21-30 yrs. Age group were below in average to other groups i.e. Suprailliac (22.29±9.40), Midaxillary (18.85±6.02), Subscapular (15.67±3.85), Tricep (12.89±3.05), Bicep (10.13±3.68), Thigh (30.87±9.11) and Calf (25.06±7.40).

Table-2
Analysis of Variance of the Mean of the Different Age Group Females in Skinfold

		Sum of Squares	df	Mean Square	F
Suprailliac	Between Groups	3844.485	2	1922.243	31.096*
	Within Groups	29486.399	477	61.816	
	Total	33330.884	479		
Midaxillary	Between Groups	1800.950	2	900.475	28.678*
	Within Groups	14977.714	477	31.400	

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	Total	16778.664	479		
Subscapular	Between Groups	1553.510	2	776.755	36.799*
	Within Groups	10068.496	477	21.108	
	Total	11622.006	479		
Tricep	Between Groups	1486.907	2	743.454	44.756*
	Within Groups	7923.557	477	16.611	
	Total	9410.464	479		
Bicep	Between Groups	2330.613	2	1165.306	57.535*
	Within Groups	9661.167	477	20.254	
	Total	11991.780	479		
Thigh	Between Groups	8303.033	2	4151.516	62.696*
	Within Groups	31585.430	477	66.217	
	Total	39888.462	479		
Calf	Between Groups	3589.712	2	1794.856	40.956*
	Within Groups	20904.134	477	43.824	
	Total	24493.846	479		

***Significant at .05 level**
F 0.05 (3, 477) = 3.01

Table-2 showed the analysis of variance skinfolds of different age group females. Difference between the skinfold was significant in case of suprailliac as obtained F-ratio of 31.096 was greater than the F-value of 3.01 needed for significance at 0.05 level. In case of midaxillary the obtained F-ratio of 28.678 was greater than the F-value of 3.01, needed for significance at 0.05 level. In case of Subscapular the obtained F-ratio of 36.799 was greater than the F-value of 3.01, needed for significance at 0.05 level. In case of Tricep the obtained F-ratio of 44.756 was greater than the F-value of 3.01, needed for significance at 0.05 level. In case of Bicep the obtained F-ratio of 57.535 was greater than the F-value of 3.01, needed for significance at 0.05 level. In case of Thigh the obtained F-ratio of 62.696 was greater than the F-value of 3.01, needed for significance at 0.05 level as obtained F-ratio of 40.956 was greater than the F-value of 3.01, needed for significance at 0.05 level

Table-3
Paired Adjusted Final Means and Difference between Means for the Three Age Groups in suprailliac skinfold

Means			Mean Difference	Critical Difference
Group 1	Group 2	Group3		
22,29	28.50		6.20*	1.72
22,29		28.07	5.78*	
	28.50	28.07	0.43	

***Significant at 0.05 level**

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Table-3 showed suprailliac, critical difference (CD) showed the mean difference (MD) of group 1 & group 2 and group1 & group3 was found to be significant at 0.05 level of significance. The mean difference of group2 & group3 was not found to be significant at 0.05 level of significance.

Table-4
Paired Adjusted Final Means and Difference between Means for the Three Age Groups in Midaxillary skinfold

Means			Mean Difference	Critical Difference
Group 1	Group 2	Group3		
18.85	23.21		4.36*	1.23
18.85		22.64	3.79*	
	23.21	22.64	0.57	

* **Significant at 0.05 level**

In **table-4** Mid-axillary, critical difference (CD) showed the mean difference (MD) of group 1 & group 2 and group1 & group3 was found to be significant at 0.05 level of significance. The mean difference of group2 & group3 was not found to be significant at 0.05 level of significance.

Table-5
Paired Adjusted Final Means and Difference between Means for the Three Age Groups in Subscapular skinfold

Means			Mean Difference	Critical Difference
Group 1	Group 2	Group3		
15.67	19.55		3.88*	1.01
15.67		19.41	3.74*	
	19.55	19.41	0.14	

* **Significant at 0.05 level**

Table-5 showed Subscapular critical difference (CD) showed the mean difference (MD) of group 1 & group 2 and group1 & group3 was found to be significant at 0.05 level of significance. The mean difference of group2 & group3 was not found to be significant at 0.05 level of significance.

Table-6
Paired Adjusted Final Means and Difference between Means for the Three Age Groups in Tricep skinfold

Means			Mean Difference	Critical Difference
Group 1	Group 2	Group3		
12.89	16.86		3.97*	

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12.89		16.32	3.43*	0.89
	16.86	16.32	0.54	

* **Significant at 0.05 level**

Table-6 showed Tricep critical difference (CD) showed the mean difference (MD) of group 1 & group 2 and group1 & group3 was found to be significant at 0.05 level of significance. The mean difference of group2 & group3 was not found to be significant at 0.05 level of significance.

Table-7
Paired Adjusted Final Means and Difference between Means for the Three Age Groups in Bicep skinfold

Means			Mean Difference	Critical Difference
Group 1	Group 2	Group3		
10.13	14.96		4.80*	1.04
10.13		14.64	4.50*	
	14.96	14.64	0.31	

* **Significant at 0.05 level**

Table-7 showed Bicep critical difference (CD) showed the mean difference (MD) of group 1 & group 2 and group1 & group3 was found to be significant at 0.05 level of significance. The mean difference of group2 & group3 was not found to be significant at 0.05 level of significance.

Table-8
Paired Adjusted Final Means and Difference between Means for the Three Age Groups in Thigh skinfold

Means			Mean Difference	Critical Difference
Group 1	Group 2	Group3		
30.87	39.10		8.23*	1.78
30.87		40.18	9.31*	
	39.10	40.18	1.08	

* **Significant at 0.05 level**

Table-8 showed Thigh critical difference (CD) showed the mean difference (MD) of group 1 & group 2 and group 1 & group 3 was found to be significant at 0.05 level of significance. The mean difference of group 2 & group 3 was not found to be significant at 0.05 level of significance.

Table-9
Paired Adjusted Final Means and Difference between Means for the Three Age Groups in Calf skinfold

Means			Mean Difference	Critical Difference
Group 1	Group 2	Group3		

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25.06	30.31		5.26*	1.48
25.06		31.29	6.20*	
	30.31	31.29	0.99	

* **Significant at 0.05 level**

Table-9 showed Calf, critical difference (CD) showed the mean difference (MD) of group 1 & group 2 and group1 & group3 was found to be significant at 0.05 level of significance. The mean difference of group2 & group3 was not found to be significant at 0.05 level of significance.

Discussion

The study's findings make it abundantly evident that there were no significant differences in skinfolds amongst females of different age groups. The majority of women in the first age group, 21 to 30 years old, engaged in moderate physical activity but infrequently participated in any kind of physical fitness programme. As a result of these physiological changes, fat begins to accumulate in the lower belly and hip areas. By using an equation based on skinfold thickness and circumference, Karl E. Friedle and colleagues (2001) compared the results. Second age group (31–40 years): Most of the women in this age group were housewives, led sedentary lifestyles, and carried out domestic tasks; as a result, they had thicker skinfolds than the first age group. From the skinfold, Durnin and Rahaman (1967) calculated the fat percentage. Given that the majority of women in this age group are menopausal, hormonal changes that affect fat percentage also affect skinfold thickness, making the third age group, 41 to 50 years old, have thicker skinfolds than the other groups, is fairly normal.

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