Fat deposition variation between Urban and Rural Meitei women inhabiting the valley districts of Manipur, India

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Citation

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Abstract

This paper aims at finding out the variations if there be any in the skinfold thickness taken at various body sites between urban and rural Meitei women inhabiting in four valley districts of Manipur. Cross sectional data on 400 women ranging in age from 20 to 79 years were collected. The comparisons were made separately for twelve different age groups having an equal class interval of five years each. All the skinfold thickness taken at six different body sites as well as the grand mean thickness of all skinfolds were found to be higher among urban women indicating higher body fat composition among this group of women. The results indicate that, exposure to different environment has effect on body fat composition.

INTRODUCTION

Fat distribution pattern of an individual is always found to be different from others. The most cheapest and reliable way of studying fat patterning is the measurement of skinfold thickness. Skinfold thickness constitutes compressed skin and adipose tissue which consists of fat, water, connective tissues, blood vessels and nerves. The percent fat content of adipose tissue is greater in the obese ([9],[4] and [7]) and it increases with age ([2]). Compressed adipose tissue is a major contributor to skinfold thickness which are measured with the help of calipers. Body fat distribution patterning is an important marker in anthropological and epidemiological studies of nutrition and chronic diseases ([6], [10]). Skinfold thickness is frequently used as an estimator of total body fat ([5], [8]). The pattern of fat distribution in people with varying levels of physical activity would be indicative of the manner in which fat is deposited or removed from various sites of the body.

In the present work, an attempt has been made to find out if there is any variation in skinfold thickness of different sites, in between urban and rural women of the Meitei community, living in different work environment. Meiteis are the dominant caste group of people inhabiting mainly in the four valley districts of Manipur, India.

MATERIALS AND METHODS

The sample for the present study comprises of 400 normal women (200 each from urban and rural area) belonging to same community, i.e Meitei. Rural women are mainly engaged in agricultural works while urban women, in majority are housewives and a few working women. Age of the subjects ranges from 20-79 years. As stated, the subjects are normal and not suffering from any kind of diseases as reported by them at the time of data collection. All the skinfold thickness are measured by using Harpenden skinfold caliper applying standard techniques ([11]).

Each group of women is divided into 12 age groups keeping a class interval of five years each. Mean and standard deviations of each skinfold thickness is calculated for every age group and rural-urban variation is tested by using Student ‘t' test of significance.

RESULTS

The mean and standard deviations of the skinfold thickness measurements

(Table 1) reveals that triceps skinfold thickness is higher among urban women for all the age groups although significant difference is found only for the age group 45 - 49 years. When the comparison is made for total urban and total rural, significant difference is observed (t=5.07) in triceps skinfold thickness. Subscapular skinfold thickness is also found to be greater among urban women in all the age groups except that of 30 - 34 years (Table 2). Age group wise comparison on the other hand reveals significant variation only in three age groups viz. 40-44 (t=2.70), 45-49 (t= 2.47) and 55-59 (t=2.40). However, significant difference

has been found at the population level (t=3.67). Abdominal skinfold thickness is also higher among urban women in all the age groups (Table 3), though significant difference is observed only in the age groups 40 - 44, 45 - 49 and 55 - 59 years. Statistically significant difference is observed (t=5.52) when the two populations are compared for abdominal skinfold thickness. As indicated by table 4, it has been found that supra iliac skinfold thickness does not show any clear cut and sharp difference in between urban and rural women. However, on an average supra iliac skinfold thickness is higher among urban women. Statistically significant difference is observed between urban and rural women in the age groups 35-39 and 40 - 44 years. But statistically no significant difference (t=0.09) is observed when populations are compared for supra iliac skinfold thickness. Thigh skinfold thickness is greater among urban women in all the age groups (Table 5). Statistically significant differences have been observed in the age groups 20 - 24, 25 - 29, 40 - 44, 45 - 49, 55 - 59 and 75 - 79 years. Highly significant difference is observed (t= 6.22) when the two populations are compared for the thigh skinfold thickness. It has also been observed that calf medial skinfold thickness (Table 6) is higher among urban women in all the age groups showing statistically significant differences in the age groups 20 - 24, 40 - 44, 45 - 49 and 70-74 years. Highly significant difference is observed (t= 4.21) when the whole population of urban and rural are compared for calf medial skinfold thickness. Grand mean thickness of all the skinfolds (shown in table 7, Fig 1) reveals that grand mean thickness of skinfolds is higher among urban women in all the age groups and as well as in the whole population. However, statistically significant difference is observed in the age groups 40 - 44 and 45 - 49 years. Statistically significant difference is observed at the population level (t=5.38).

Figure 1

Table 1: Mean and Standard Deviation of Triceps Skinfold thickness (mm) for Urban and Rural Women

Age groups	Urban			Rural			't' value
	f	Mean	SD	f	Mean	SD	
20-24	20	16.09±0.85	3.81±0.60	21	14.14±0.89	4.11±0.63	1.57
25-29	25	14.94±0.87	4.35±0.61	22	12.79±1.15	5.42±0.81	1.48
30-34	17	14.61±1.17	4.85±0.83	24	13.45±5.94	3.12±0.45	0.86
35-39	21	16.50±1.30	5.96±0.91	21	14.44±0.93	4.28±0.66	1.28
40-44	21	15.63±1.21	5.57±0.85	18	13.27±0.84	3.58±0.59	1.59
45-49	17	17.80±1.03	4.26±0.73	23	12.84±1.01	4.87±0.71	3.42*
50-54	23	16.12±1.28	6.16±0.90	18	13.63±1.21	5.14±0.85	1.41
55-59	15	15.78±1.42	5.51±1.00	14	14.19±1.64	6.17±1.16	0.73
60-64	12	16.52±1.88	6.53±1.33	12	12.50±1.42	4.92±1.00	1.70
65-69	11	14.64±1.52	5.05±1.07	12	11.55±1.26	4.39±0.86	1.55
70-74	10	14.00±1.14	3.62±0.80	6	11.11±1.50	3.68±1.06	1.53
75-79	8	12.53±1.79	5.07±1.26	9	10.61±1.29	3.87±0.91	0.86
Total	**200**	**15.64±0.36**	**5.14±0.25**	**200**	**13.17±0.32**	**4.58±0.22**	**5.07***

* Significant Difference

Figure 2

Table 2: Mean and Standard Deviation of Sub-scapular Skinfold thickness (cm) for Urban and Rural Women

Age groups	Urban			Rural			't' value
	f	Mean	SD	f	Mean	SD	
20-24	20	14.21±1.10	4.93±0.77	21	13.43±1.19	5.48±0.84	0.47
25-29	25	16.07±1.36	6.84±0.96	22	14.11±1.62	7.60±1.14	0.82
30-34	17	14.88±1.52	6.29±1.07	24	16.71±1.33	6.54±0.94	0.90
35-39	21	19.01±1.56	7.15±1.10	21	18.22±1.66	7.63±1.17	0.34
40-44	21	20.46±1.71	7.85±1.21	18	14.90±1.13	4.81±0.80	2.70*
45-49	17	23.28±1.68	6.94±1.19	23	17.33±1.72	8.25±1.21	2.47*
50-54	23	20.94±1.54	7.41±1.09	18	18.65±2.25	9.55±1.59	0.83
55-59	15	20.48±1.50	5.81±1.06	14	15.00±1.71	6.41±1.21	2.40*
60-64	12	19.45±2.34	8.14±1.66	12	15.20±2.47	8.57±1.74	1.24
65-69	11	17.71±2.12	7.04±1.50	12	12.37±1.89	6.56±1.33	1.87
70-74	10	15.3±1.75	5.56±1.24	6	14.75±2.34	5.75±1.65	0.18
75-79	8	14.32±2.13	6.05±1.51	9	11.74±2.36	7.10±1.67	0.80
Total	**200**	**18.24±0.50**	**7.21±0.36**	**200**	**15.57±0.51**	**7.31±0.36**	**3.67***

* Significant Difference

Figure 3

Table 3: Mean and Standard Deviation of Abdominal Skinfold (mm) for Urban and Rural Women

Age groups	f	Urban Mean	SD	f	Rural Mean	SD	't' value
20-24	20	22.47±1.27	5.68±0.89	21	18.42±1.66	7.61±1.17	1.93
25-29	25	21.42±1.22	6.10±0.86	22	18.04±1.73	8.14±1.22	1.59
30-34	17	20.68±1.42	5.89±1.01	24	19.14±1.41	6.95±1.00	0.76
35-39	21	22.18±1.57	7.21±1.11	21	20.60±1.49	6.85±1.05	0.72
40-44	21	25.90±1.02	4.70±0.72	18	18.5±1.49	6.36±1.06	4.07*
45-49	17	27.51±1.43	5.92±1.01	23	22.31±1.80	8.67±1.27	2.25*
50-54	23	26.54±1.41	6.77±0.99	18	21.16±2.36	10.03±1.67	1.95
55-59	15	27.87±1.55	6.03±1.10	14	22.0±2.19	8.20±1.54	2.18*
60-64	12	26.65±2.40	8.34±1.70	12	18.75±3.14	11.83±2.41	1.89
65-69	11	25.81±2.40	7.97±1.69	12	18.26±3.59	12.44±2.53	1.74
70-74	10	24.49±2.04	6.46±1.44	6	20.41±3.24	7.96±2.29	1.16
75-79	8	18.93±2.89	8.19±2.04	9	21.66±3.26	9.79±2.30	0.62
Total	**200**	**24.23±0.48**	**6.87 ±0.34**	**200**	**19.95±0.60**	**8.50 ±0.42**	**5.52***

* Significant Difference

Figure 4

Table 4: Mean ± Standard Errors and Standard Deviation ± Standard Errors of Supra Iliac Skinfold thickness (mm) for Urban and Rural Women

Age groups	Urban			Rural			't' value
	f	Mean	SD	f	Mean	SD	
20-24	20	12.99±1.10	4.96±0.78	21	13.44±1.42	6.58±1.02	0.24
25-29	25	12.08±0.86	4.34±0.61	22	12.42±1.47	6.91±1.04	0.19
30-34	17	12.12±1.58	6.55±1.12	24	15.37±1.48	7.28±1.05	1.49
35-39	21	19.88±1.05	4.83±0.74	21	17.29±1.67	7.67±1.18	2.22*
40-44	21	15.85±1.12	5.14±0.79	18	11.70±1.13	4.83±0.81	2.59*
45-49	17	19.89±1.82	7.51±1.28	23	16.45±1.76	8.47±1.25	1.35
50-54	23	17.29±1.49	7.19±1.06	18	17.49±2.24	9.53±1.59	0.07
55-59	15	16.83±1.51	5.87±1.07	14	15.54±2.10	7.86±1.19	0.49
60-64	12	15.04±1.95	6.78±1.28	12	15.53±2.43	10.17±2.08	0.13
65-69	11	15.37±2.29	7.62±1.62	12	12.19±2.15	7.47±1.52	1.00
70-74	10	16.47±2.23	7.08±1.58	6	13.5±1.94	4.69±1.35	1.00
75-79	8	11.72±1.95	5.52±1.38	9	8.27±2.19	6.59±1.55	1.17
Total	**200**	**14.84±0.45**	**6.38±0.31**	**200**	**14.77±0.53**	**7.62±0.38**	**0.09**

* Significant Difference

Figure 5

Table 5: Mean and Standard Deviation of Thigh Skinfold thickness (mm) for Urban and Rural Women.

Age groups	Urban			Rural			't' value
	f	Mean	SD	f	Mean	SD	
20-24	20	23.75 ±1.34	6.02 ±0.95	21	18.29 ±1.82	8.37 ±1.29	2.40*
25-29	25	22.25 ±1.27	6.35 ±0.89	22	17.50 ±1.13	5.32 ±0.80	2.78*
30-34	17	23.07 ±1.30	5.38 ±0.92	24	19.58 ±1.40	6.90 ±0.99	1.81
35-39	21	22.75 ±1.65	7.58 ±1.16	21	18.80 ±1.41	6.49 ±1.00	1.81
40-44	21	24.12 ±1.54	7.09 ±1.09	18	17.14 ±1.86	7.91 ±1.31	2.88*
45-49	17	24.12 ±1.54	6.38 ±1.09	23	18.38 ±1.83	8.80 ±1.29	2.39*
50-54	23	21.34 ±1.30	6.25 ±0.92	18	17.10 ±1.91	8.11 ±1.35	1.83
55-59	15	20.04 ±1.54	5.99 ±1.09	14	14.19 ±2.07	7.75 ±1.46	2.26*
60-64	12	17.45 ±1.86	6.47 ±1.32	12	12.95 ±1.40	4.88 ±0.99	1.92
65-69	11	17.83 ±2.07	6.89 ±1.46	12	12.20 ±2.75	9.54 ±1.94	1.63
70-74	10	15.53 ±2.68	8.48 ±1.89	6	12.2 ±3.89	9.54 ±2.75	0.70
75-79	8	20.19 ±2.18	6.19 ±1.54	9	13.44 ±2.12	6.37 ±1.50	2.21*
Total	**200**	**21.82 ±0.48**	**6.83 ±0.34**	**200**	**17.40 ±0.36**	**7.37 ±0.36**	**6.22***

* Significant Difference

Figure 6

Table 6: Mean and Standard Deviation of Calf Skinfold thickness (mm) for Urban and Rural Women.

Age groups	Urban			Rural			't' value
	f	Mean	SD	f	Mean	SD	
20-24	20	19.22±1.08	4.84±0.76	21	12.45±1.11	5.12±0.79	1.43
25-29	25	13.31±1.18	5.91±0.83	22	11.64±1.12	6.51±0.98	1.28
30-34	17	14.50±1.16	4.79±0.82	24	11.97±0.96	5.14±0.74	0.60
35-39	21	14.89±1.70	7.83±1.20	21	11.89±1.12	5.66±0.87	0.50
40-44	21	16.88±1.40	6.4±0.99	18	11.30±1.13	3.98±0.66	3.50
45-49	17	17.63±1.47	6.10±1.04	23	11.51±1.25	6.60±0.97	2.99
50-54	23	14.33±1.14	5.47±0.80	18	13.02±1.45	7.51±1.25	1.15
55-59	15	15.90±1.64	6.39±1.16	14	11.95±1.80	6.60±1.24	1.75
60-64	12	14.37±2.04	7.10±1.44	12	10.80±1.34	7.31±1.49	1.56
65-69	11	11.25±1.67	5.56±1.18	12	9.69±1.49	6.34±1.29	1.71
70-74	10	13.05±1.67	5.30±1.18	6	8.16±1.55	5.21±1.50	1.51
75-79	8	11.87±2.17	6.15±1.53	9	10.02±1.46	5.53±1.30	0.18
Total	**200**	**14.63±0.43**	**6.11 ±0.30**	**200**	**11.55±0.37**	**5.98 ±0.29**	**4.21***

* Significant Difference

Figure 7

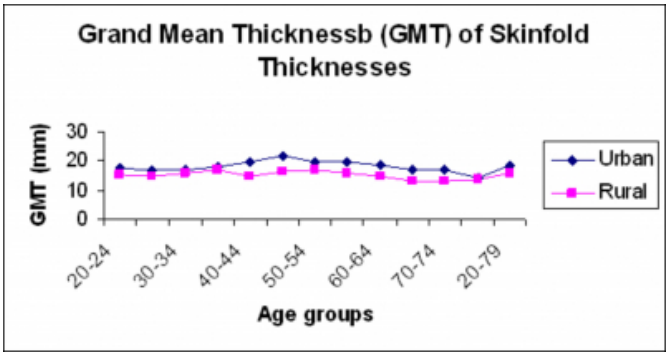
Table 7: Mean and Standard Deviation of Grand Mean Thickness of all Skinfolds (mm) for Urban and Rural Women.

Age groups	Urban			Rural			't' value
	f	Mean	SD	f	Mean	SD	
20-24	20	17.32±0.08	3.61±0.57	21	15.34±1.11	5.09±0.78	4.36*
25-29	25	16.63±0.91	4.58±0.64	22	14.55±1.38	5.29±0.79	1.02
30-34	17	16.64±1.18	4.87±0.83	24	15.69±1.23	4.75±0.68	0.67
35-39	21	18.03±1.25	5.74±0.88	21	17.14±1.23	5.17±0.79	1.46
40-44	21	19.81±1.09	5.04±0.77	18	14.74±0.93	4.83±0.80	3.09*
45-49	17	21.07±1.18	4.90±0.84	23	16.26±1.37	6.03±0.88	3.15*
50-54	23	19.43±1.04	5.00±0.73	18	17.06±1.77	6.19±1.03	0.70
55-59	15	19.70±1.19	4.62±0.84	14	15.96±1.76	6.75±1.27	1.61
60-64	12	18.68±1.64	5.71±1.16	12	14.50±2.11	7.66±0.95	1.45
65-69	11	17.04±1.63	5.43±1.15	12	12.84±1.83	5.17±1.05	0.69
70-74	10	16.92±1.02	3.24±0.72	6	13.35±2.12	3.80±1.09	2.14*
75-79	8	14.19±2.11	6.06±1.51	9	13.67±1.84	4.39±1.03	0.70
Total	**200**	**18.23±0.35**	**5.08 ±0.24**	**200**	**15.98±0.42**	**5.26 ±0.36**	**5.38***

* Significant Difference

Figure 8

Figure 1: Grand Mean Thickness of all Skinfolds taken at various sites of Urban and Rural Meitei Women of Manipur.



DISCUSSION

Skin fold thickness at all the sites has been found to be greater among the urban women. At the same time, grand mean thickness of the skin folds has also been found to be higher among urban women. These findings have shown that body fat composition is higher among urban women in all the age groups. The reason behind the greater amount of body fat composition among urban women can be attributed to regular consumption of fat rich food coupled with less physical activities among them. Researchers ($_3$) also found that the most physically active group of females show the smallest value of skinfold thickness at all the sites thereby indicating the role of physical activity in reducing fat content. Another reason may also be that the rural women, who are regularly engaged cultivation activities, are in majority from low socio-economic status families, and as a result they might be suffering from under nutrition.

However, a further in depth investigation at micro level in this regard is very much essential to prove it, and to take up necessary steps from Public Health point of view in order to maintain a sound public health so that the people can possess a sound mind.

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