Bulgarian Academy of Sciences

Acta cytobiologica et morphologica, 2
Sofia • 1992

Age changes in weight and skinfolds in women, aged from 21 to 30

E. Lazarova, A. Nacheva

Institute of Cell Biology and Morphology, Bulgarian Academy of Sciences, Sofia

211 women, divided into 5 age groups are investigated: I (21-22), II (23-24), III (25-26), IV (27-28), and V (29-30). The weight and six standard skinfolds (four measured bilaterally) are studied. The results show that subcutaneous fat tissue give us an important information about specific changes in organism, characterizing separate age groups in the period from 21 to 30 years.

Key words: anthropology, fat patternings, skinfolds, age changes.

The age of 21 to 30 is determined, according to the common anthropological classification, as an entire ontogenesis period, named first maturity [7]. However, it is known that a large number of anthropometric features, displaying sex dimorphism, manifest specific interage differences [5, 9]. The differences are mainly related to female's reproductive function and often characterize the quality changes in her organism. That provides the reason for more profound and purposive investigations of interage differences, searching for additional criteria for detailing and enrichment of the periodization of ontogenetic development of female organism. Information of that kind could be received from the features of body fatness as: weight and skinfolds, both strongly depending on sex, age and way of living and laboring of person [3, 4, 6, 8, 9].

The purpose of the present work is to investigate the changes of weight and skinfolds in women aged from 21 to 30. The period is chosen to include the time before, during and after the average age of maternity of the Bulgarian woman (24,0 years at 1979-1980), according to the data given in Statistic Annual of Bulgaria, 1981.

Materials and methods

The data for 211 women, random excerpt from complex anthropological-ergonomic investigation of the Bulgarian population, are studied. The contingent is divided in 5 age groups: I (21-22), II (23-24), III (25-26), IV (27-28), and V

(29-30). All the women studied prefer to manipulate with right hand, that is showing dextral functional asymmetry. The following features are studied: weight, skinfold-triceps, skinfold-biceps, skinfold-forearm, subscapular skinfold (all right and left measures), and skinfolds at the X-th rib and at the abdomen (right only measured). The measurements are done with Harpenden caliper. The metric data of the features studied are variation-statistically computed.

The metric change of each feature in the separate age groups is calculated in reference to its value in the first age group (21-22).

Nacheva's method [2, 3] for anthropometric evaluation of body asymmetry is employed to examine the bilateral differences in skinfolds. The relative indices of asymmetry, named Units of Asymmetry, are calculated, their positive values showing rightside and negative values – leftside metric domination.

Results and discussion

Body weight, being integral characteristic of all body components, including the most mobile – subcutaneous fat tissue, shows differences with the age, represented clearly by the formula I<III<V<II<IV (Tables 1 and 2). The weight is highest at 27-28 and smallest – at 21-22. For the rest age groups the weight is relatively equal. The wave type of age differences shows, that the studies age period (21-30) is not homogeneous concerning the body weight and gives an idea of some phasing in its age changes.

The thicknesses of the studied skinfolds show greater lack of homogeneity in that period, each of them having specific age changes. The specificity is underlined by the unchanged female's type of fatness of the body during the whole period. That could be illustrated by the formulae for arranging the skinfolds according to their thicknesses. The skinfolds at the abdomen and at the triceps are thickest, and those at the forearm are thinnest in all the age groups. However, on that common

Table 1. Mean values of the investigated features and their age changes compared to the I age group

Features	Laterality	Mean values					Relatively age changes (%)			
		I***	II	III	IV	V	II/I	III/I	IV/I	V/I
		n=55	n=24	n=34	n=56	n=42				
Weight		59,0	60,8	60,6	61,2	60,7	3,1	2,7	3,7	2,9
Skinfolds										
triceps	r*	18,6	18,0	18,2	18,9	20,8	−3,2	−2,2	1,6	11,8
	l**	18,5	18,3	18,4	19,4	20,7	−1,1	−0,5	4,9	11,8
biceps	r	9,6	10,5	9,4	10,0	11,3	9,4	−2,1	4,2	17,7
	l	9,7	10,8	9,9	10,4	11,5	11,3	2,1	7,2	18,6
forearm	r	8,3	8,0	8,2	8,3	9,2	−3,6	−1,2	0,0	10,8
	l	8,9	8,6	8,6	9,4	10,0	−3,4	−3,4	5,6	12,4
subscapular	r	16,7	17,1	17,1	19,0	19,5	2,4	2,4	13,8	16,8
	l	17,2	17,4	18,1	19,9	20,2	1,2	5,2	15,7	17,4
X rib	r	13,8	14,7	14,6	15,8	16,1	6,5	5,8	14,5	16,7
abdomen	r	21,9	22,2	21,6	23,5	24,1	1,4	−1,4	7,3	10,0

* r – right;
** l – left;
*** I–V – age groups.

Table 2. Formulae of metric domination of subcutaneous fat-thickness in the investigated skinfolds according to the age

Weight		I	<	III	<	V	<	II	<	IV
Skinfolds										
triceps	r	II	<	III	<	I	<	IV	<	V
	l	II	<	III	<	I	<	IV	<	V
biceps	r	III	<	I	<	IV	<	II	<	V
	l	I	<	III	<	IV	<	II	<	V
forearm	r	II	<	III	<	I	=	IV	<	V
	l	II	=	III	<	I	<	IV	<	V
subscapular	r	I	<	II	<	III	<	IV	<	V
	l	I	<	II	<	III	<	IV	<	V
X rib	r	I	<	III	<	II	<	IV	<	V
abdomen	r	III	<	I	<	II	<	IV	<	V

Indications as on Table 1.

Table 3. Units of asymmetry in bilaterally measured skinfolds

Skinfolds	Units of asymmetry				
	I*	II	III	IV	V
Triceps	0,5	−1,6	−1,1	−2,6	0,5
Biceps	−1,0	−2,8	−5,1	−3,8	−1,7
Forearm	−6,7	−7,0	−4,7	−11,7	−8,0
Subscapular	−2,9	−1,7	−5,5	−4,5	−3,5

* I-V – age groups.

Table 4. Formuale of metric domination of subcutaneous fat-thickness according to location of measurements

I (21-22)	→	4r	<	4l	<	3r	<	3l	<	6	<	5r	<	5l	<	2l	<	2r	<	7
II (23-24)	→	4r	<	4l	<	3r	<	3l	<	6	<	5r	<	5l	<	2r	<	2l	<	7
III (25-26)	→	4r	<	4l	<	3r	<	3l	<	6	<	5r	<	5l	<	2r	<	2l	<	7
IV (27-28)	→	4r	<	4l	<	3r	<	3l	<	6	<	2r	<	5r	<	2l	<	5l	<	7
V (29-30)	→	4r	<	4l	<	3r	<	3l	<	6	<	5r	<	5l	<	2l	<	2r	<	7

Indications as on Table 1.

ground, skinfolds at different body parts and areas reveal different dynamics of age changes:

– Skinfolds at the triceps and at the forearm change their thickness in the same way with the age. The thickness is decreasing in II and III groups, and after 27 is increasing significantly;

– Subscapular skinfold and the skinfold at the X-th rib increase successively with age, but according to their relative differences, the increase is more significant (about 3-4 times greater) after 27 years too;

– Skinfolds at the abdomen and at the biceps show interage differences with two modifying moments. The thickness of skinfolds decreases in the period 25-26, and after 27 increases again (5 times for the abdomen skinfold and 2 times for the biceps skinfold).

The data about the bilateral differences in subcutaneous fat thicknesses at the pair body parts and areas underline even more distinctly the age differences in subcutaneous fat distribution (Tables 3 and 4; Fig. 1). All the skinfolds, with

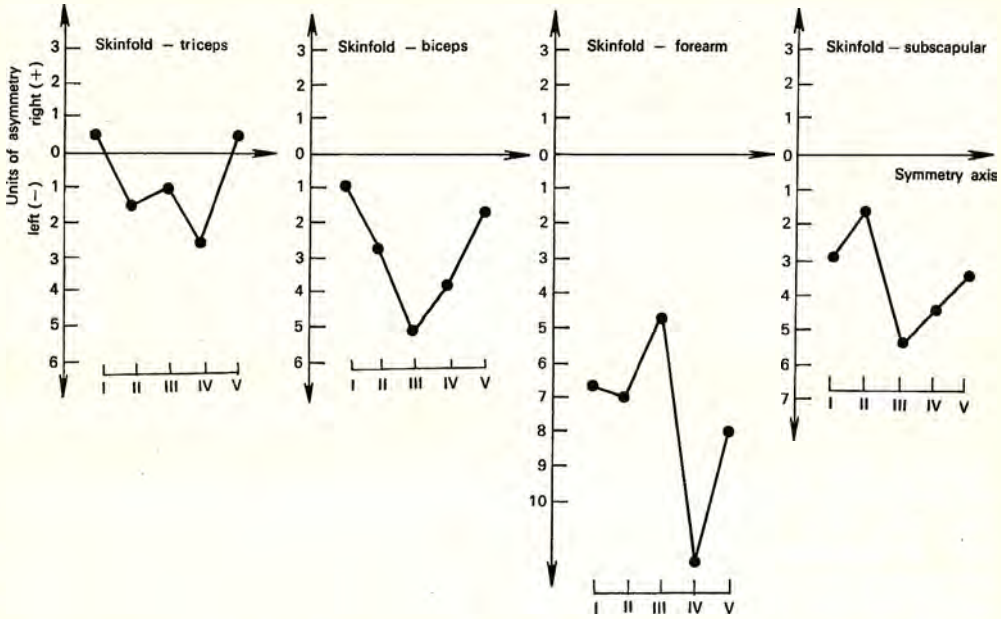

Fig. 1. Manifestation of asymmetry in bilaterally measured skinfolds I-V – age groups

negligible exceptions, are with leftside domination in the period studied. This type of metric asymmetry reflects the dextral functional asymmetry, when the greater physical engagement of the right upper limb, and the connected with it thoracal muscles, leads to changes in muscles/fat ratio, in favour of the actively working muscles. The different grades of functional engagement of muscles in the areas of skinfolds studied, anyway, lead up to metric differences in age changes of the asymmetry shown by them:

– Skinfold at the triceps comes up to be the feature with greatest ecosensitivity, revealing the great functional engagement of the muscles of that area. The asymmetry from slight rightside dominant, in I age group, turns to left side dominant in II, III and IV groups (most strongly expressed in IV group), and then in V group the laterality of asymmetry changes again in rightside dominant. That determines the age of 27-28 as a specific quality stage in sensitivity of subcutaneous fat tissue in the area of triceps;

– The asymmetry of skinfold at the forearm shows that the subcutaneous fat tissue of the forearm has highest ecosensitivity in the V-th age group too;

– The changes in the character of manifestation of asymmetry for subscapular skinfold and skinfold at the biceps occur earlier – in III age group, as leftside asymmetry increases up to 25-26 years and after that consecutively decreases significantly.

Conclusions

From the results obtained we could generalize that the age changes in the thickness of skinfolds are different from those of body weight in the women studied, aged 21-30.

It is established, that the period, in which the subcutaneous fat tissue shows greatest ecosensitivity, coincides with the period after the average maternity age of Bulgarian women. Most probably, the higher ecosensitivity is a reflexion of the changes, taking place in women's organism during and after the active reproductive phase.

These data give the ground to accept that, after purposeful and representative investigations, the subcutaneous fat tissue provides important information on specific changes taking place in female's organism, characterizing different age subintervals in the period of 21-30 years.

References

1. Behnke, A. R. Anthropometric evaluation of body composition through life. – Ann. N. Y. Acad. Sci., **110**, 1963, 450-464.
2. Nacheva, A. Method of anthropometric evaluation of body asymmetry as a form of organism changeability. – Compt. Rend. Bulg. Sci., **38**, 1985, No 2, 275-278.
3. Nacheva, A. Influence of the occupation on the type of body fatness. – Compt. Rend. Acad. Bulg. Sci., **39**, 1986, No 9, 125-127.
4. Petrasek, R., K. Hajnis, J. Loubova. Die beziehung zwischen dem somatotyp und der korperfettmenge bei 18–33 jahre alten personen der tschechischen population. – Anthropologie, **15**, 1977, No 1, 81–84.
5. Куршакова, Ю. С., Т. Н. Дунаевская, А. Л. Пурунджан и др. Изменчивость морфологических и физиологических признаков у мужчин и женщин. М., Наука, 1982. 136 с.
6. Милев, Н. Хранене, физическо развитие и някои конституционално-биологични особености при репрезентативно население у нас. Канд. дис., С. МА, 1971. 225 с.
7. Никитюк, Б. А., В. П. Чтецов. Морфология человека. М., МГУ, 1983. 320 с.
8. Пурунджан, А. Л. О характере различий в морфологии подкожного жира в мужской и женской группах. – Вопр. антроп., вып. 52, 1976, 94–100.
9. Эльцина, А. М. Биометрическое исследование возрастной изменчивости кожно-жировых складок. – Вопр. антроп., вып. 7., 1982, 121–125.