ANTHROPOLOGICAL TESTS OF THE BULGARIAN POPULATION

Angelova Veneta*, Magdalena Pirinska – Apostolu

Sofia University „St. Kliment Ohridski", Faculty of Biology, Department of Zoology and Anthropology
e-mei: vangelova@biofac.uni-sofia.bg

ABSTRACT. In the recent years when accomplishing anthropological investigations, some complementary anthropological test are included for a better characterization of a population. For the aims of the present investigation there have been used the following: Hand clasping, Arm folding, Leg folding, leading hand. The purpose of the study is to be discovered anthropological differences concerning age or sex in the examined population, and to be detected possible changes occurring in dependence of age.

In respect of the hand clasping the right hand type predominates over the left, the opposite is noted about arm folding. As a whole right leading hand type dominates over left in the examined population. Total domination of the left or right hand type occurs rarely, in comparison with the mixed type.

KEY WORDS. hand clasping, arm folding, leg folding, leading hand

INTRODUCTION

In the recent years when accomplishing anthropological investigations, some complementary anthropological test are included for a better characterization of a population. Some authors consider, that these tests are of hereditary nature, and can be accomplished to established to establish age or sex differences in a human population [4] [5] [6]. For the aims of the present investigation there have been used the following: Hand clasping, Arm folding, Leg folding, leading hand. The purpose of the study is to be discovered anthropological differences concerning age or sex in the examined population, and to be detected possible changes occurring in dependence of age.

MATERIAL AND METHODS

The present investigation has been carried out on the basis of the examination of 1834 individuals (863 males and 971 females) applying the methods described by Leguebe [3] and Collins [2]. The received data has a been treated in refer to possible sex or age differences, and also in refer to the leading hand – right or left by the means of nonparametric and correlation analysis. The examined sample has been divided into age groups according the classification for age distribution (Moscwa, 1965).

RESULTS AND DISCUSSION

According to the feature Hand clasping, the major part of the examined sample shows the right hand type (59%) dominated upon the left hand type (41%). The former within the male group has been calculated to be 60.95% whereas within the female group this is 41.74% (fig. 1). On the other side, left hand type predominates upon right hand within the examined groups in respect to the feature Arm folding (51.13% and 44.87% respectively)(fig. 2).
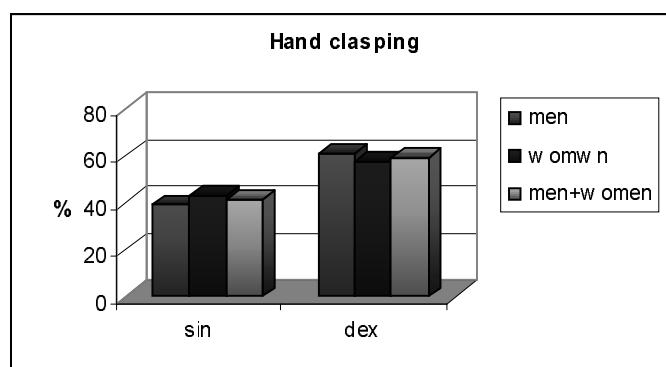

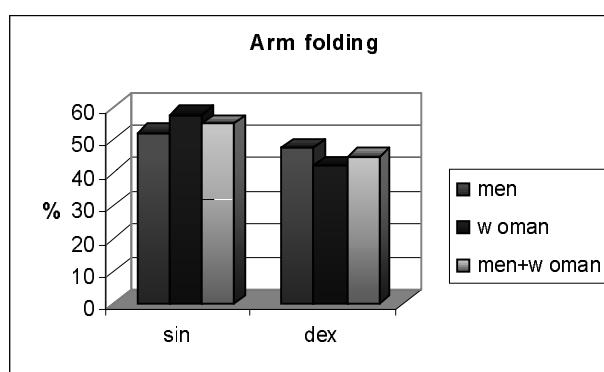**Fig 1.** *Frequency of the trait Hand clasping of Bulgarian people in view to sex (%)*

Fig. 2. *Frequency of the trait Arm folding of Bulgarian people in view to sex (%)*

Higher frequency of the right leg type in comparison with the left leg type is characteristic for the trait leg folding (74.70% and 25.30% respectively). In view of the sex affiliation the same tendency has been preserved (71.61% of the males and 77.45%of the females are of the right type). The left type shows a lower overlapping (28.39% and 22.55% respectively) (fig. 3).
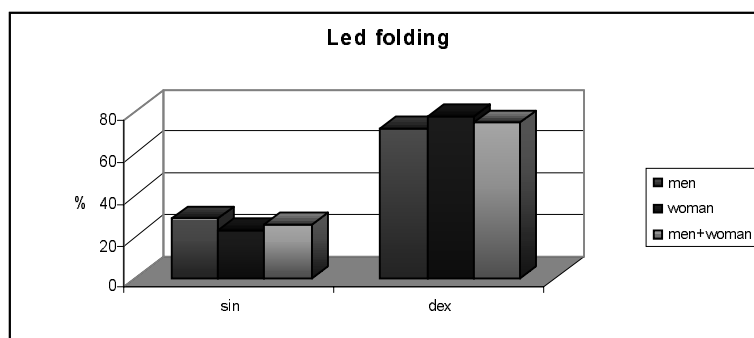
Fig. 3. *Frequency of the trait Leg folding of Bulgarian people in view to sex (%)*

After comparing both sexes in view to the examined features significant differences have not been established. Many authors accomplished the some kind of anthropological investigations before, came to the same conclusions [1] [7]. In age aspect higher frequency of right hand type in addition to left haft has been discovered for the trait hand clasping. Among the 19 years old group males, the left type (53.33%) predominates upon the right type (46.67%). In the remaining age male and female groups the right type is more frequent than the left one (fig. 4).
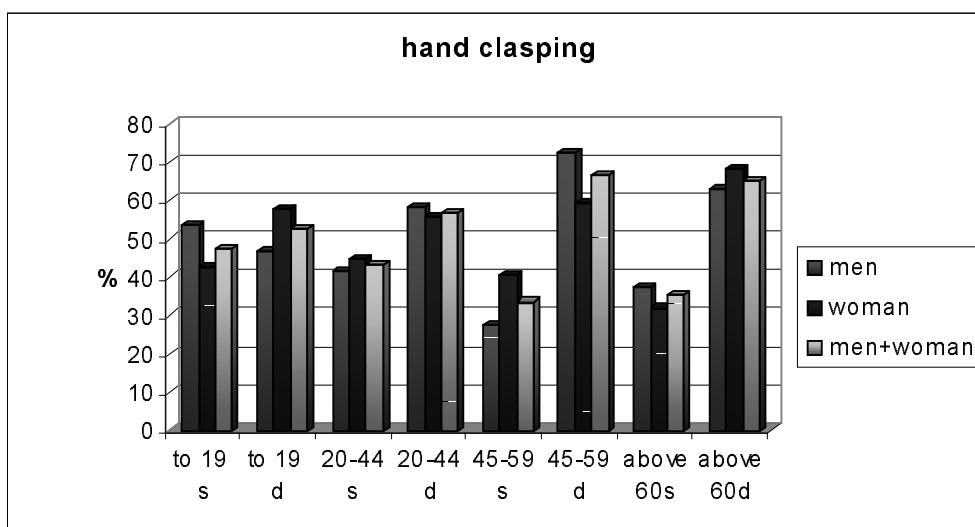
Fig. 4. *Frequency of the trait Hand clasping of Bulgarian people in view to age (%)*

Within the groups of up to 19 yean old and 20-44 years old, more frequent is the left type. In the groups of 44-59 and above 60 years old, the right type predominates. This tendency is characteristic of both male and female groups. The only exception has in view to the 45-59 year old women, where both types are represented by almost the some percent (49.37% left and 50.63% right) (fig. 5).

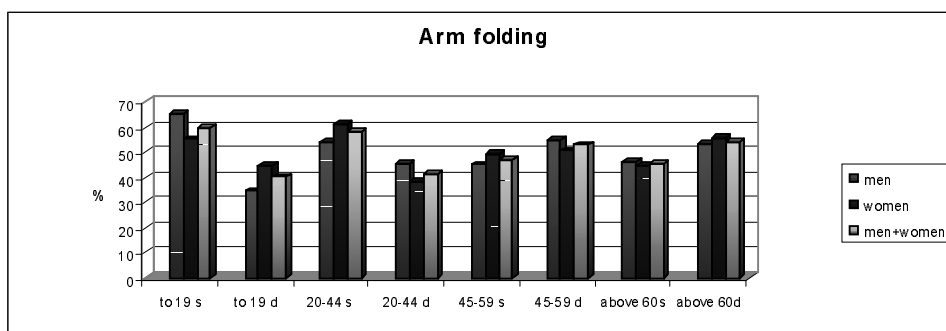**Fig. 5.** *Frequency of the trait Arm folding of Bulgarian people in view to leading hand (%)*

According to age aspect the right led type is more often than the left one in all the examined groups (fig. 6).
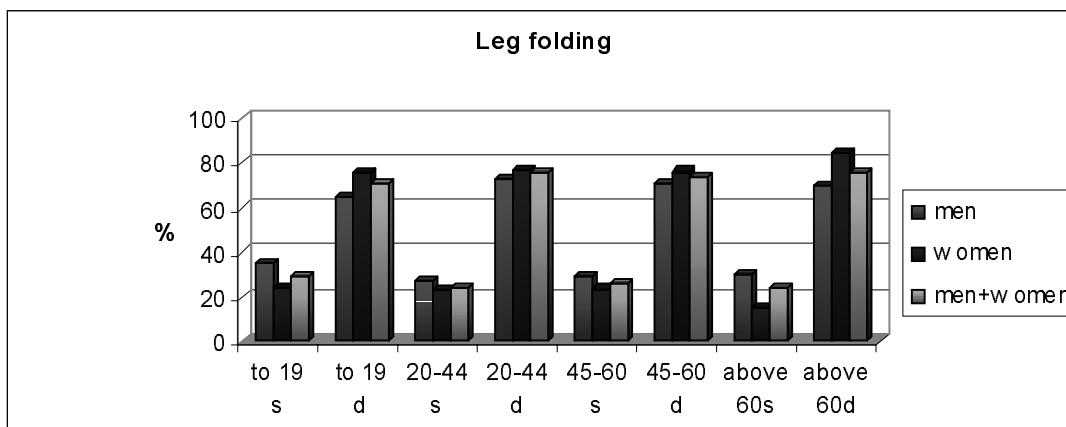

Fig. 6. *Frequency of the trait Leg folding of Bulgarian people in view to age (%)*

Statistically significant differences in age aspect have been noted in the studied sample in refer to traits hand clasping, arm folding, as if no for leg folding, they are non significant.

Domination of leading right hand (94.1%) over of left hand (5.99%) has been proved in the examined population (fig. 7). In age aspect, an increasing left handed type is present, in males whereas in females an opposite tendency has been found out (table 1).

In females with leading right hand the percentage of right type increases accordingly to age (table 1).

Table 1. Frequency of the leading hand (%)

age	n %	men		women		men+women	
		sin	dex	sin	dex	sin	dex
up to 19 years old.	n	2	73	8	84	10	157
	%	2.67	97.33	8.70	91.30	5.99	94.01
20-44	n	31	458	47	600	78	1058
	%	6.34	93.66	7.26	92.87	6.87	93.13
45-59	n	14	175	5	155	19	330
	%	7.41	92.59	3.13	96.87	5.44	94.56
above 60 years old.	n	1	109	0	72	1	181
	%	0.91	99.09	0	100	0.55	99.45

Leading hand and its correlation with the other three anthropological tests:

In view to the test hand clasping, there higher frequency of performance of the according type (right or left) depended of the leading hard has been established (table 2).

Table 2. Correlation between Hand clasping and leading hand according to sex (%)

sex	leading hand	n / %	Hand clasping		Total
			sin	dex	
men	sin	n	27	21	48
		%	56.25	43.75	
	dex	n	310	505	815
		%	38.04	61.96	
women	sin	n	35	25	60
		%	58.33	41.67	
	dex	n	380	531	911
		%	41.71	58.29	
men+women	sin	n	62	46	108
		%	57.41	42.59	
	dex	n	690	1036	1726
		%	39.98	60.02	

Significant differences in the correlation between leading hand and the test arm folding have not been discovered. Domination of the left type is proven independently of the leading hand (table 3).

Table 3. Correlation between Arm folding and leading hand according to sex (%)

sex	leading hand	n / %	Arm folding		Total
			sin	dex	
men	sin	n	29	19	48
		%	60,42	39,58	
	dex	n	422	393	815
		%	51,78	48,22	
women	sin	n	33	27	60
		%	55,00	45,00	
	dex	n	527	384	911
		%	57,85	42,15	
men+women	sin	n	62	46	108
		%	57,41	42,59	
	dex	n	949	777	1723
		%	54,98	45,02	

Within the group characterized by left leading hand the possibility for presence of the right or left hand type is almost the same. The group with right leading hand has an expressed ability for performance of the right type test (table 4).

Table 4. Correlation between Leg folding and leading hand according to sex (%)

sex	leading hand	n / %	Leg folding sin	Leg folding dex	Total
men	sin	n	24	24	48
		%	50	50	
	dex	n	221	594	815
		%	27,12	72,88	
women	sin	n	29	31	60
		%	48,33	51,67	
	dex	n	190	721	911
		%	20,86	79,14	
men+women	sin	n	53	55	108
		%	49,07	50,93	
	dex	n	411	1315	1726
		%	23,81	76,19	

Total domination of one type is comparatively rare. In the present study such a domination of the right type has a percentage of 23.06%, left type is absent, and mixed type is 68.60%. According to sex the distribution of the of the right type (females - 21.63%, males -24.68%) and mixed type (females - 69.52%, males - 67.55%) domination is with nonsignificant differences. Low values concerning the hidden left domination 0.76% and higher ones concerning the right 7.58% have been observed. Differences in view to this trait between both sex groups have not been detected (table 5).

Table 5. Frequency of the total and hidden predomination and leading hand (%)

leading hand	Hand clasping	Arm folding	Leg folding	men n	men %	women n	women %	men+women n	men+women %
dex	dex	dex	dex	213	24.68	210	21.63	423	23.06
dex	sin	sin	sin	61	7.07	78	8.03	139	5.58
sin	dex	dex	dex	6	0.7	8	0.82	14	0.76
sin	sin	sin	sin	0	0	0	0	0	0
mixed type				583	67.55	675	69.52	1258	68.60

On the other hand the estimation of the correlation between leading hand and hand clasping showed significant differences.

The highest correlation has been proved to exist between the leading hand and leg folding test (0.118). Negative correlation occurs between leading hand and arm folding (table 6).

Table 6. Correlation between leading hand and anthropological tests

indexes	women		men	
	r_A	x^2	r_A	x^2
leading hand - Hand clasping	0.081	6.53	0.087	6.37
leading hand - Arm folding	- 0.018	1.38	0.04	0.31
leading hand - Leg folding	0.157	12.02	0.118	23.93

On the basis of the performed investigation, the following conclusions can be formed:

1. In respect of the hand clasping test the right hand type predominates over the left.
2. In respect of the arm folding test the left hand type predominates according to sex and to age when age increases.
3. High frequencies of right type in respect of the led folding test have been established for both groups, examined in order of sex or age. When age increases, the relative part of left hand type decreases accordingly in account of the right hand type.
4. Right leading hand type dominates over left in the limits of the investigated group. In order of age increasing of the left handed in the male group and opposite tendency in the female group has been found out.
5. Total domination of the lift or right type occurs more rarely in comparison with the mixed type.
6. The higher correlation value is calculated between hand clasping and leg folding and the leading hand, whereas between arm folding and leading hand such does not exist for both sexes.

REFERENCE

1. BOEV, P., V. TODOROV. 1973. Hand clasping bei den Bulgaren. Anthropologie, 11, N 1, 2, 91-93

2. COLLINS, E. 1961. The concept of relative limb dimance. Human Biology, 33, 293-319

3. LEGUEBE, A. 1967. Hand clasping: Etude anthropologique et genetique. Bull. Soc. Roy. Belge Anthrop. Prehist., 78, 81-107

4. SARNA, J., A. SINIARSKA, A. WOKROJ. 1980. Hand clasping, arm and leg folding in populations of Poland and other countries. Collegium antropologicum, vol 4, N1, 37-44

5. PONS, J. 1961. Hand clasping (Spanish data). Ann. Human Genetic, 25, 141-144

6. FILCHEVA, ZL. 2003. Functional Asymmetry of the Upper Limbs in Bulgarians from North Bulgatia.Acta morphologica et anthropologica, 8, 115-121.

7. ДВИРЪНИЙ, А. 1975. Сравнительная характеристика антропофизиологических признаков латеральности у русских и украинцив. Вопросы антропологии. 51, 96-100