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THE ANTHROPOMETRIC DATA IMPORTANCE TO KARATE-DO

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Abstract
Purpose. Within our scientific approach, we took into account the most important anthropometric measurements that can influence the strike efficiency in relation to the fighter's stance during a Karate-do competition.
Methods. To perform the anthropometric measurements (age, weight, height, length of the upper and lower limbs), we used the same tools for all the 10 selected subjects, top performance athletes at the national level.
Results. The data collected through anthropometric measurements are better valorized when they are included into different formulae, in order to determine a series of anthropometric indices, such as those related to proportionality, which aim at assessing the growth and development phenomena. We can thus make comparisons among subjects or groups of subjects, relying on some objective criteria. For each of these values, we calculated the following indicators: arithmetical mean, median, standard deviation, mean deviation, dispersion, amplitude, coefficient of variation.
Conclusions. Statistical analyses showed that our sample was homogeneous in relation to the subjects' age, height, length of the upper limb, length of the lower limb and body mass, and relatively homogeneous in relation to the their weight.
Key-words: anthropometric data, Karate-do.

Introduction

In performance sports, the physical development level or the constitutional biotype has always been a parameter to be taken into account when we aim at obtaining the best results. Among the methods used in the sports domain, we can mention somatoscopic examination and anthropometric examination (Mircea, 1989).
Anthropometric examination is a method through which we perform some measurements of the human body that indicate the athlete's physical growth and development (Epuran, 2005).
Among the most usual measurements, we enumerate: body weight, body height, length of the upper limbs, length of the lower limbs, thoracic perimeter (Dragnea, 1984). On the basis of these measurements, we can calculate different anthropometric indices that give us a picture of the growth and development level, respectively the parameters enabling us to make comparisons among the performance athletes and, last but not least, the aspects we are interested in, because they are correlated to our domain specificity (they influence the efficiency of the performed technical elements: strikes, stances etc.).
The Karate-do discipline has characteristics that impose the technical staff to select those human individuals who, from the somatic point of view, fully correspond to the model, respectively to the efforts specific to the discipline.

Methods

The research included three distinct stages: 1st stage: subject selection (based on their performances); 2nd stage: subject measurement; 3rd stage: processing and interpretation of the collected data.
In order to develop our research, we performed the measurements considered by us to be the most important to the Karate-do activity, namely: weight, height, length of the upper limbs, length of the lower limbs and, respectively, the calculation of the following indicators: body mass index, index of proportionality, Quetelet's index, index of proportionality of the upper and lower limbs.
The selected subjects belong to the rural environment and their age is comprised between 21 and 24 years old. They are components of the Suiko Sports Club and practitioners of Karate-do, shito-ryu style. All the 10 tested subjects are champions at different national championships (for children, cadets, juniors or youth).
We mention that all the measurements were performed with the same tools.

Results

After the anthropometric measurements performed on the selected athletes, we calculated, for all the indicators taken into account, the following indicators: arithmetical mean, median, standard deviation, mean deviation, dispersion, amplitude, coefficient of variation.
At the same time, we calculated the following indicators: body mass index, index of proportionality, Quetelet's index, index of proportionality of the upper

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and lower limbs.

Table 1. Subjects of the research

Crt. no.	Surname and name	Age	Weight	Height
1.	M.M.	22 years old	70 kg	1.84 m
2.	B.L.	21 years old	64 kg	1.68 m
3.	V.V.	21 years old	70 kg	1.75 m
4.	V.M.	23 years old	84 kg	1.83 m
5.	M.L.	23 years old	70 kg	1.73 m
6.	Z.V.	24 years old	70 kg	1.73 m
7.	M.N.	23 years old	86 kg	1.78 m
8.	M.S.	23 years old	80 kg	1.83 m
9.	S.V.	23 years old	63 kg	1.68 m
10.	A.M.	21 years old	72 kg	1.76 m

Table 2. Statistical indicators - Weight

WEIGHT	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
Kg		70.00	7.87	6.26	61.88	23.00	10.79%

Table 3. Statistical indicators - Height

HEIGHT	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
cm	1.761	1.755	0.06	0.05	0.003	0.16	3.35%

Table 4. Statistical indicators - Length of the upper limb

LENGTH OF THE UPPER LIMB	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
cm	75.30	76.50	4.99	3.58	24.900	15.00	6.63%

Table 5. Statistical indicators - Length of the lower limb

LENGTH OF THE LOWER LIMB	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
cm	93.40	95.00	7.60	5.80	57.822	24.00	8.14%

Table 6. Statistical indicators - Body mass index

BODY MASS INDEX	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
Kg/m^2	23.47	23.32	1.71	1.14	2.94	6.47	7.31%

Table 7. Statistical indicators - Index of proportionality

INDEX OF PROPORTIO-NALITY	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
cm/kg	2.43	2.47	0.20	0.15	0.04	0.60	8.16%

Table 8. Statistical indicators - Quetelet's index

QUETELET'S INDEX	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
g/cm	413.40	404.62	35.71	27.82	1275.12	108.15	8.64%

Table 9. Statistical indicators - Index of proportionality of the upper limb

INDEX OF PROPORTIONA-LITY OF THE UPPER LIMB	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
%	42.73%	43.53%	1.84%	1.44%	0.03%	5.29%	4.30%

Table 10. Statistical indicators - Index of proportionality of the lower limb

INDEX OF PROPORTIONA-LITY OF THE LOWER LIMB	STATISTICAL INDICATORS						
	Arithmetical mean	Median	Standard deviation	Mean deviation	Dispersion	Amplitude	Coefficient of variation
%	52.98%	53.22%	2.96%	2.13%	0.09%	9.57%	5.58%

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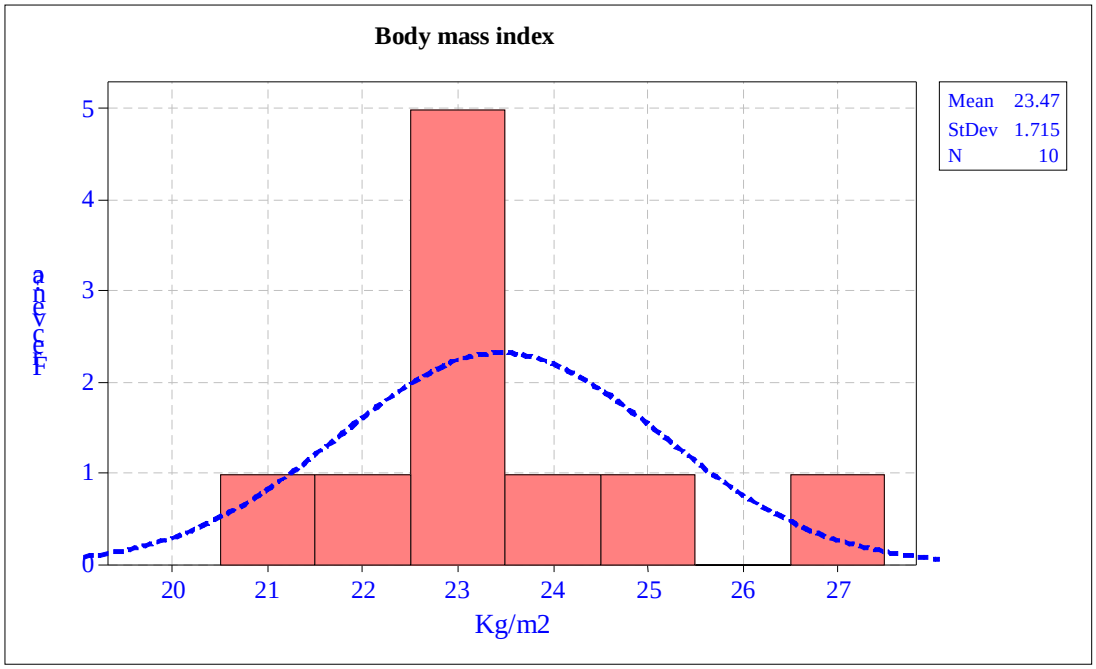

Fig. 1. Graphical interpretation - Body mass index

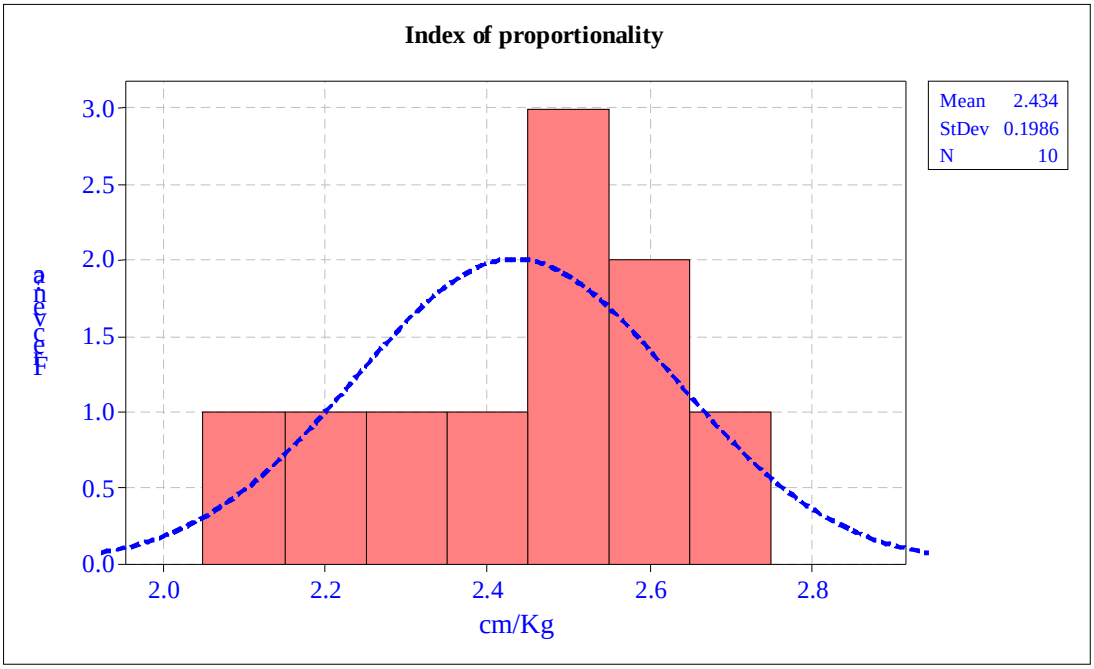

Fig. 2. Graphical interpretation - Index of proportionality

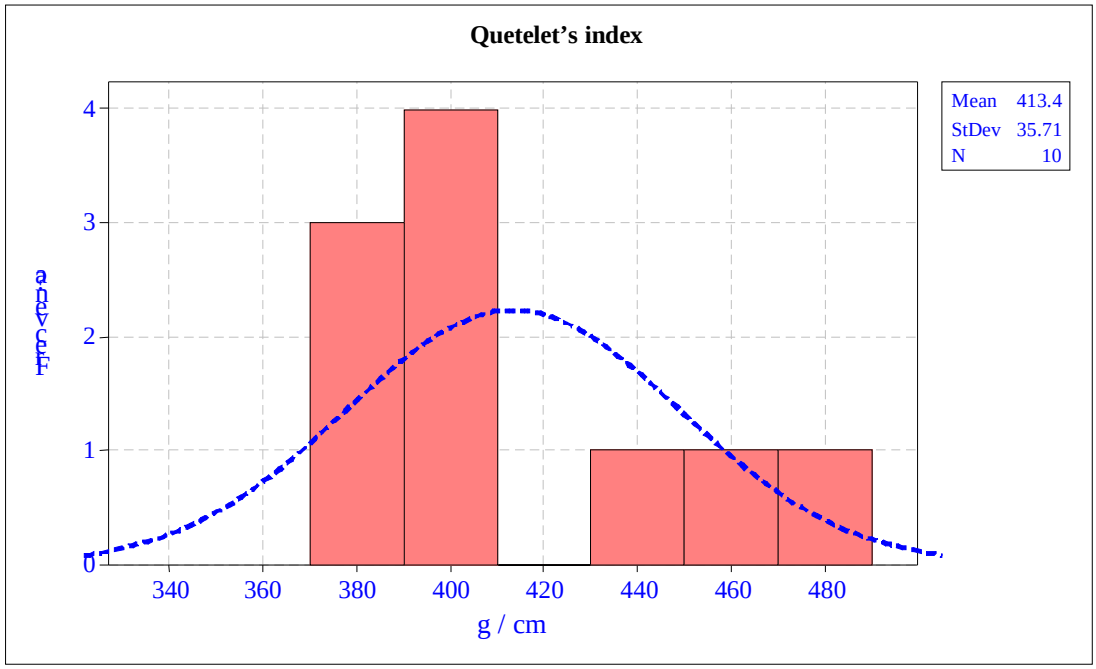

Fig. 3. Graphical interpretation - Quetelet's index

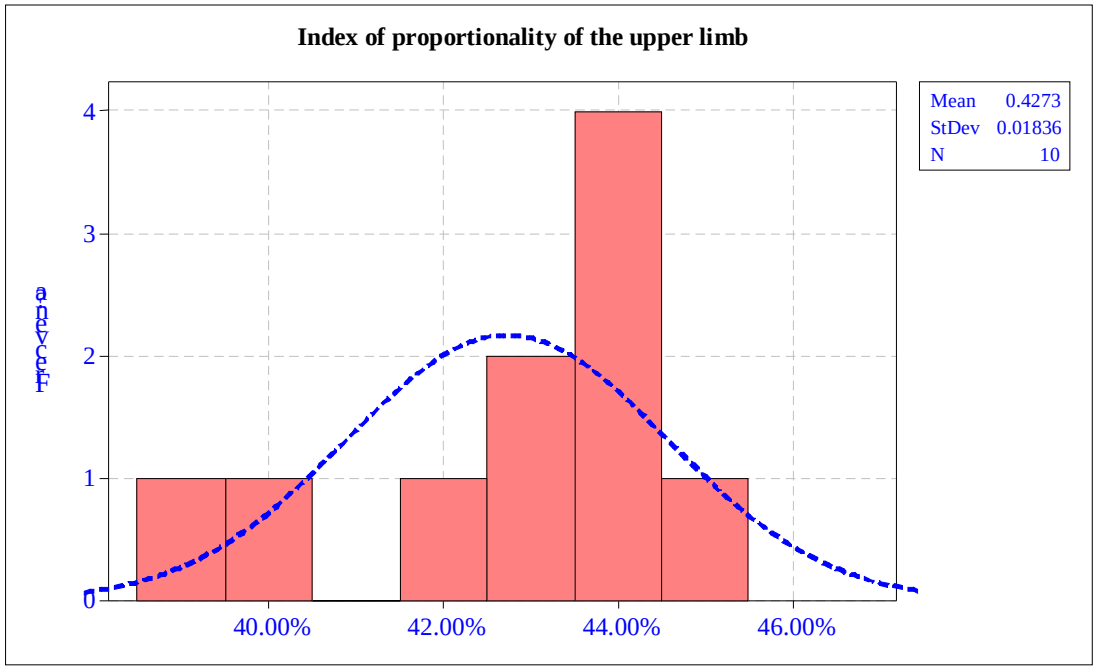

Fig. 4. Graphical interpretation - Index of proportionality of the upper limb

Discussions

Weight: The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 10.79%, which indicates that the sample is relatively homogeneous, this characteristic having values relatively close to the mean.

Height: The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 3.35%, which indicates that the sample is homogeneous, this characteristic having values close to the mean.

Length of the upper limb: The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 6.63%, which indicates that the sample is homogeneous, this characteristic having values close to the mean.

Length of the lower limb: The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 8.14%, which indicates that the sample is homogeneous, this characteristic having values close to the mean.

Body mass index: The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 7.31%, which indicates that the sample is homogeneous, this characteristic having values close to the mean. BODY MASS INDEX – BMI is calculated by dividing the subject's weight in kg to his height expressed in square meters: BMI = W / H^2 in Kg / m^2. BMI assessment scale: below 18.5: thin; 18.5 to 25: normal; 25 to 30: overweight; above 30: obese.Index of proportionality: The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 8.16%, which indicates that the sample is homogeneous, this characteristic having values close to the mean. INDEX OF PROPORTIONALITY – IP is calculated by dividing the subject's height in cm to his weight expressed in kg: IP = H / W in cm / Kg.

Quetelet's index: The mean value of this index includes the group of athletes analyzed in the category of the very corpulent ones or with a corresponding nutritional status. Standard deviation and mean deviation are equal to 35.71, respectively 27.82. The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 8.64%, which indicates that the sample is homogeneous, this characteristic having values close to the mean. QUETELET'S INDEX (nutritional index) – QI is calculated by dividing the subject's weight in grams to his height expressed in centimeters: QI = W / H in g / c. Generally, the adults' nutritional status should correspond to 400 gr /cm. Values below 300 gr / cm indicate low body fatness, therefore an appropriate nutritional status. This is not applicable to the subjects aged 10 to 12 years old, when neither their height nor their weight is completed.

Index of proportionality of the upper limb: The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 4.30%, which indicates that the sample is homogeneous, this characteristic having values close to the mean. INDEX OF PROPORTIONALITY OF THE UPPER LIMB – IPUL is calculated by dividing the length of the upper limb in cm to the subject's height expressed in centimeters. The ratio is multiplied by 100, to be expressed in percents: IPUL = (LUL / H)*100 in %. In men, its values have the following significance: Short arm for an IPUL < 43%, Normally developed arm for an IPUL COMPRISED BETWEEN 43 AND 45.5%, Long arm for an IPMS > 45.5%.Index of proportionality of the lower limb: The values calculated for mean deviation, standard deviation and coefficient of variation are equal to 5.58%, which indicates that the sample is homogeneous, this characteristic having values close to the mean. INDEX OF PROPORTIONALITY OF THE LOWER LIMB – IPLL is calculated by dividing the length of the lower limb in cm to the subject's height expressed in centimeters. The ratio is multiplied by 100, to be expressed in percents: IPLL = (LLL / H)*100 in %. In men, its values have the following significance: Short legs for an IPLL < 51%, Normally developed leg for an IPLL COMPRISED BETWEEN 51 AND 52.5%, Long leg for an IPLL > 52.5% (Petre, 2011).

Conclusion

Statistical analyses for all the discussed parameters show that the sample is homogeneous as to the subjects' age, height, length of the upper limb, length of the lower limb, body mass index, index of proportionality, Quetelet's index, index of proportionality of the upper limb, index of proportionality of the lower limb, and it is relatively homogeneous in relation to their weight.

References

Dragnea, A., 1984, Măsurarea şi evaluarea în educaţie fizică şi sport. Bucureşti, Editura Sport-Turism, 188-191.

Epuran, M., 2005, Metodologia cercetării activităţilor corporale. Exerciţii fizice. Sport. Fitness. Ediţia a 2-a. Bucureşti, Editura FEST, 382-387.

Ifrim, M., 1989, Biotipul constituţional în selecţie. În: Ioan Drăgan (coordonator). Practica medicinii sportive. Bucureşti, Editura Medicală, 100-106.

Petre, R., 2011, Eficienţa loviturilor în raport cu poziţia executantului în timpul luptei la Karate-do. Teză de doctorat. Bucureşti, UNEFS, 184-209.