Int. J. Morphol.,
41(1):156-163, 2023.

Morphological Characteristics and Pulmonary Function of Naval Saboteurs and Ground Special Forces of the Armed Forces of Montenegro

Características Morfológicas y Función Pulmonar de Saboteadores Navales y Fuerzas Especiales Terrestres de las Fuerzas Armadas de Montenegro

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YAPICI, A.; BANJEVIC, B.; MASANOVIC, B. Morphological characteristics and pulmonary function of naval saboteurs and ground special forces of the armed forces of Montenegro. *Int. J. Morphol., 41(1)*:156-163, 2023.

SUMMARY: The results of numerous medical and kinesiological studies indicate the existence of differences in pulmonary function in relation to age, body height, and the relationship between certain parameters of body composition. The aim of this study was to determine the state of morphological characteristics and pulmonary function of naval saboteurs and ground Special Forces of the Armed Forces of Montenegro. The sample of participants included 30 naval saboteurs aged 30.3±6 years and 30 members of the ground special forces aged 25.6±5 years. The sample of measuring instruments included 4 indicators each for the evaluation of longitudinal dimensionality, transversal dimensionality, mass and body volume, subcutaneous fat, body composition, and pulmonary function. The central and dispersion parameters of the variables were calculated. The specificities of body composition of the naval saboteurs and members of the ground Special Forces of the AF of Montenegro were determined, while the parameters of lung volume and capacity and the parameters of airway flow indicated an excellent state of their respiratory function. Furthermore, it was determined that the studied members of the armed forces had no individual health risks in the sense of the onset of obesity or obstructive ventilatory defects. The results obtained indicate the need for further studies which would predominantly focus on the impact of individual morphological measurements and parameters of body composition on pulmonary function. This would provide important data both for the armed forces in the sense of improving the training system and the realization of specific tasks, as well as for kinesiology as a science from the aspect of determining certain regularities in the functioning of the human body in specific living and working conditions in the armed forces.

KEY WORDS: Morphological Characteristics; Pulmonary Function; Soldiers; Montenegro.

INTRODUCTION

Anthropometric measurements represent important human characteristics whose development is influenced by external factors, the territorial and geographical location of a particular population, as well as internal genetic factors (Popovic, 2017). Lung volume and capacity, as segments of the functional abilities of the human body, have a considerable impact on a series of significant successively related processes, including: lung ventilation, gas diffusion and distribution, exchange of gasses between the blood and tissue, and cellular oxygen uptake and CO_2 discharge (Davidovic *et al*., 1975).

When selecting recruits and potential cadets, as well as during training, the analysis of their morphological status tells us that the problem with overweight and excess fat tissue is quite current (Crawford *et al*., 2011). Such a state of the manpower in a morphological sense, based on studies the world over, is a direct consequence of inadequate food and insufficient physical activity, which will in the future affect functional abilities, and during later stages of life severely threaten the health status of individuals (Kyröläinen, 2008). Functional diagnostics provides insight into certain physiological and biochemical characteristics of the human body. To evaluate the structurally-functional characteristics of the respiratory system, spirometry tests are used (Jukic *et al*., 2008). Pulmonary Function Tests (PFTs) are usually used to evaluate respiratory status and have become part of the routine health evaluation in

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Received: 2022-10-11 Accepted: 2022-11-21

respiratory, occupational, and sports medicine (Kaur *et al*., 2015).

The health status of members of the ground Special Forces of the AF of Montenegro and their professional abilities must be at the highest level. In order to declare a soldier-member of the Special Forces healthy, based on the criterion of the absence of illness, is negligent and irresponsible. No individual can be considered healthy if they are unable to, thanks to their anthropological abilities and characteristics, perform every day or special tasks under increased load and greater demands on the complete anthropological status of the human body. The health of pilots should be defined both by a high and optimum state of functional and motor skills, as well as desirable morphological proportions of body composition (Banjevic, 2012).

In his diachronic research, John Hutchinson (the inventor of the spirometer) determined that age and height are the most important determinants of pulmonary function, and since then numerous studies have confirmed that pulmonary function increases with height and decreases with age (American Thoracic Society, 1991). Ageing results in decreased pulmonary function and increased body fat (Wiswell *et al*., 2001). Some studies have analyzed the extent or regional distribution of FM (fat mass) and FFM (fat free or lean mass) in relation to pulmonary function. In terms of size, for FM it was noted that it is negatively associated with pulmonary function, especially among considerably obese individuals, while there is a positive association with FFM (De Lorenzo *et al*., 2001). In terms of distribution for the central or upper part of the body, it was noted that FM has a negative association with pulmonary function among the elderly. In addition, the results have shown that FVC (forced vital capacity) and FEV1 (forced expiratory volume in 1 second) have significantly lower values among individuals with waist to hip (W/H) ratio greater than or equal to 0.95 (that is, FM distribution of the upper body), compared to individuals with a W/H ratio of less than 0.95 (the FM distribution of the lower body) (Collins *et al*., 1995). Harik-Khan *et al*. (2001) studied the impact of the W/H ratio on FEV 1 and FVC in a study which included a larger population (approximately 1500 participants). After taking into consideration the BMI and other variables, they confirmed a strong inverse relationship between the W/H ratio and FEV1 in the case of men, but not in the case of women. Additionally, it was determined that a greater W/H ratio is linked to greater reductions in FVC among men compared to women. Thus, the direct effects of the distribution of body fat on pulmonary function seems to be more pronounced among men. FM stored in the abdominal cavity most likely directly prevents the lowering of the diaphragm, increasing the pressure on the walls of the chest cavity, and leading to restrictive lung disease, as stated in this study. These deficits are a significant limiting factor for members of the armed forces in the sense of the efficient performance of professional skills, which depend on numerous external factors (Wiswell *et al*., 2001). Similar changes are found in other segments of body composition and are the result of not only the impact of the specific nature of the demanding vocation of being a soldier, but first and foremost the physiological and morphological changes linked to biological ageing (Sharp *et al*., 2008).

Based on the aforementioned studies, it was determined that certain idiosyncrasies emerge in the morphological characteristics and lung volume and capacity in the case of individuals of both genders and various ages. The fact that Special Forces represent a special system affected by the activities of a broad spectrum of various factors also helped to determine the aim of this study: the determination of the state of morphological characteristics and pulmonary function of naval saboteurs and ground Special Forces of the AF of Montenegro. The realization of the set aim will help identify possible specificities, and in a practical sense, provide feedback which is relevant from the aspect of designing effective training-transformational processes.

MATERIAL AND METHOD

In terms of the time span, this study is of a transversal character, and consists of a one-time measurement of the appropriate morphological indicators and parameters of pulmonary function of naval saboteurs and ground special forces of the AF of Montenegro.

The sample of participants included 30 naval saboteurs aged 30.3±6 years and 30 members of the ground special forces aged 25.6±5 years.

The evaluation of the morphological characteristics was carried out based on the measurements, calculations, and analysis of the following anthropometric indicators: body height, arm length, leg length, foot length, shoulder width, hip width, foot width, knee diameter, body mass, thoracic circumference, waist circumference, hip circumference, upper arm skinfolds, abdominal skinfolds, thoracic skinfolds, upper leg skinfolds, the body mass index, body density, percentage of body fat, and the waist/hip ratio coefficient ratio. Measurements of the morphological characteristics were carried out in accordance with the Protocol for the morphological diagnostics of soldiers (Jukic *et al*., 2008), while the calculation of the parameters of body composition was

carried out according to the protocols given in the Handbook of physical fitness related to health (Kaminsky, 2013).

The evaluation of pulmonary function was carried out based on the analysis of spirometry indicators: forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), the relationship between forced expiratory volume in 1 second and forced vital capacity (FEV1/FVC), and peak expiratory flow (PEF). Spirometry testing was carried out in accordance with the Protocol for the functional diagnostics of soldiers (Jukic *et al*., 2008). To measure the parameters of pulmonary function, the Spirometrics SMI 3 spirometer was used with the accompanying QUARK b^2 program for support.

The obtained results were first coded, and then statistically processed on a PC using the SPSS 20.0 statistical package. For all the applied indicators of morphological status and pulmonary function, the descriptive statistical parameters of central tendency and measures of variability were calculated: arithmetic mean, standard deviation, minimum results, maximum results, variation width, coefficient of variation, and the standard error. Testing the normality of the distribution of the applied variables was carried out using the standardized coefficient of skewness and standardized coefficient of kurtosis.

RESULTS

Table I shows the basic statistical descriptive parameters of the morphological characteristics and pulmonary functions of naval saboteurs of the AF of Montenegro.

By analyzing Table I, we gain insight into the skewness (Sk), which allows us to test the empirical data against the theoretical Gaussian probability distribution, it was noted that most values are lower than the maximum critical values. A detailed analysis of the numerical values of these statistical parameters yielded deviations that are evident in the column of asymmetry coefficients for four values with signs of a negative asymmetry: shoulder width, knee diameter, average thoracic circumference, and the relationship between forced expiratory volume in 1 second and forced vital capacity. These coefficient sizes which are used to evaluate the distribution curve indicate that these are measures with a greater frequency of numerically greater values. By analyzing the kurtosis, it was possible to note a proximity to the modality of a normal distribution for most variables. It is only for the variable of the relationship between forced expiratory volume in 1 second

Table I. The central and dispersion parameters of the variables of morphological characteristics and pulmonary function of naval saboteurs of the AF of Montenegro.

Variables	Min	Max	VW	M	Se	SD	CV	Sk	Ku
Body height	170.4	193.4	23.	181.4	1.15	6.33	0.03	.06	-.59
Arm length	74.2	88.4	14.	80.5	.674	3.69	0.04	-.02	-.67
Leg length	96.9	113.0	16.	104.6	.821	4.50	0.04	.04	-.74
Foot length	24.3	30.5	6.2	27.0	.280	1.53	0.05	.41	-.19
Shoulder width	37.0	47.6	10.	44.4	.436	2.39	0.05	-1.52	2.79
Hip width	29.6	35.9	6.3	32.5	.288	1.58	0.04	.06	-.67
Foot width	8.7	10.6	1.9	9.7	.080	.441	0.04	-.29	.15
Knee diameter	8.0	10.7	2.7	9.8	.105	.576	0.05	-1.17	2.25
Body mass	68.6	104.9	36.	86.0	1.60	8.77	0.10	.00	-.35
Waist circumference	77.0	99.5	22.	90.0	1.26	6.92	0.07	-.12	-1.34
Hip circumference	83.0	100.0	17.	89.0	.818	4.48	0.05	.65	-.18
Thoracic circumference	82.0	112.0	30.	101.8	1.04	5.73	0.05	-1.15	3.95
Abdominal skinfold	6	30	24	16.4	1.27	6.96	0.45	.44	-.73
Thoracic skinfold	2	6	4	4.2	.169	.925	0.22	-.14	.05
Upper leg skinfold	4	10	6	6.5	.361	1.97	0.30	.65	-.90
Upper arm skinfold	3	11	8	6.6	.382	2.09	0.31	.40	-.23
Body mass index	21.88	30.40	8.5	26.17	.393	2.15	0.08	.12	-.84
Body density	1.07	1.09	.02	1.07	.001	.006	0.05	.29	-.55
Percentage of body fat	2.55	12.54	9.9	7.66	.553	3.02	0.39	.11	-1.09
Waist to hip ratio	.92	1.12	.20	1.00	.009	.049	0.04	.52	.31
FVC	4.37	7.38	3.0	5.68	.157	.860	0.15	.29	-.90
FEV1	3.05	6.35	3.3	4.63	.131	.718	0.15	.03	.10
FEF	49.7	95.9	46.	82.02	1.58	8.70	0.10	-1.59	5.75
PEF	6.2	12.5	6.3	9.41	.422	2.31	0.24	.39	-1.35

Legend: Min – minimum result; Max – maximum result; VW – variation width; M – arithmetic mean; Se – standard error; SD – standard deviation; CV – coefficient of variation; Sk – Skewness; Ku – Kurtosis; FVC – forced vital capacity; FEV1 – forced expiratory volume in 1 second; FEF – the relationship between forced expiratory volume in 1 second and forced vital capacity; PEF – peak expiratory flow.

and forced vital capacity (Ku=5.75) that leptokursis emerges with the resulting homogeneity. The variation width (VW) of the statistical series, as an absolute measure of dispersion, indicates, considering the scope of the determined number of standard deviations, a smaller dispersion of the obtained anthropometric indicators. The standard deviation (SD) indicates negligible average deviations from the mean. What falls outside the scope of this conclusion are the values for the abdominal skinfolds and the percentage of body fat, for which the numerical values of the standard deviations are greater than one-third of the values of the mean. The values of the coefficient of variation (CV) in most cases indicate numerical values close to the zone of considerable group homogeneity. The values obtained for the standard error showed minimal dispersions, since, compared to their relationship with compatible standard deviations, they are low. Therefore, the value of the arithmetic mean of the sample is expected to accurately reflect the population.

Table II shows the basic statistical descriptive parameters of morphological characteristics and pulmonary function of the ground special forces of the AM of Montenegro.

By analyzing the data in Table II, we gain insight into the skewness (Sk) values, which allows us to note that most of the values of morphological and functional indicators are far from the critical value. A negligible positive asymmetry was noted for three variables (abdominal skinfolds, upper knee skinfolds, and percentage of body fat) where sub-average results are predominant. In the case of one variable (the relationship between forced expiratory volume in 1 second and forced vital capacity), a negative asymmetry with the better results was noted. For one variable, the value of the kurtosis (Ku) indicates a leptokurtic distribution, with homogeneity of the results in the narrow space around the arithmetic mean. This was the variable of the relationship between forced expiratory volume in 1 second and forced vital capacity (Ku=5.34). The remaining values are outside the level of statistical significance. As standard deviations have low values in the case of most morphological and functional indicators, this also means that there are smaller average deviations of the accidental variable from the mean. It can be concluded that a lower variability, but greater grouping density was noted around the mean, and a greater similarity among the results. Only the measure of subcutaneous fat of the abdominal skinfold is not included in this conclusion, which is confirmed not

able II. The central and dispersion parameters of the variables of morphological characteristics of pulmonary function of the ground special forces of the AF of Montenegro.

Variables	Min	Max	VW	M	Se	SD	CV	Sk	Ku
Body height	170.3	192.0	21.7	179.6	1.01	5.53	0.03	.41	-.37
Arm length	72.5	87.5	15.0	78.9	.663	3.63	0.04	.51	-.12
Leg length	95.4	110.1	14.7	102.7	.627	3.43	0.03	.18	-.46
Foot length	23.9	30.2	6.3	26.6	.275	1.51	0.05	.35	.41
Shoulder width	40.9	50.1	9.2	44.7	.444	2.43	0.05	.17	-.35
Hip width	27.3	34.5	7.2	31.2	.344	1.88	0.06	-.14	-.25
Foot width	8.7	10.6	1.9	9.5	.090	.496	0.05	.18	-.47
Knee diameter	8.3	11.6	3.3	9.9	.138	.755	0.07	-.06	-.04
Body mass	63.9	107.2	43.3	83.2	2.44	13.40	0.16	.25	-1.12
Waist circumference	72.1	111.2	39.1	87.7	1.65	9.05	0.10	.17	.06
Hip circumference	76.2	100.5	24.3	86.4	1.25	6.85	0.07	.29	-1.07
Thoracic circumference	85.3	118.1	32.8	99.8	1.57	8.63	0.08	.33	-.94
Abdominal skinfold	2	42	40	15.3	1.69	9.27	0.60	1.37	1.84
Thoracic skinfold	3	7	4	4.4	.238	1.30	0.29	.58	-.53
Upper leg skinfold	3	9	6	5.2	.287	1.57	0.30	1.00	.49
Upper arm skinfold	3	11	8	6.0	.415	2.27	0.37	.86	-.39
Body mass index	20.78	32.22	11.44	25.75	.608	3.33	0.12	.20	-1.10
Body density	1.06	1.09	.03	1.07	.001	.008	0.07	-.88	.84
Percentage of body fat	1.99	15.59	13.60	6.88	.626	3.43	0.49	1.24	1.56
Waist to hip ratio	.91	1.10	.19	.99	.008	.045	0.04	.25	.38
FVC	3.98	6.64	2.66	5.22	.116	.639	0.12	.21	-.24
FEV1	1.88	5.57	3.69	4.18	.166	.911	0.21	-.69	.14
FEF	6.2	98.6	92.4	76.71	3.51	19.25	0.25	-2.05	5.34
PEF	1.8	12.5	10.7	7.35	.589	3.22	0.43	.24	-.71

Legend: Min – minimum result; Max – maximum result; VW – variation width; M – arithmetic mean; Se – standard error; SD – standard deviation; CV – coefficient of variation; Sk – Skewness; Ku – Kurtosis; FVC – forced vital capacity; FEV1 – forced expiratory volume in 1 second; FEF – the relationship between forced expiratory volume in 1 second and forced vital capacity; PEF – peak expiratory flow.

only by the increased values of the standard deviation, but also by the remaining relevant indicators. The values of the coefficient of variation (CV) led to the conclusion that this subsample of participants showed a very high group homogeneity for most variables. Only in the case of the abdominal skinfolds was there a greater coefficient of variation CV=0.45, which represents an average homogenous group. Based on the obtained values of the statistical indicators of the standard error (Se), the value of the arithmetic mean of the sample is expected to accurately reflect the population, since the standard errors are very low compared to the standard deviations.

DISCUSSION

Naval saboteurs, with an average age 30.3 years, compared to the average body height of 181.4 cm, according to the current norms for the AF in Montenegro (General Staff of the Yugoslav Army, 1995), are below the upper limit set for body weight by 4.0 kg. A comparison of the individual morphological characteristics and parameters of pulmonary function of the naval saboteurs of the AF of Montenegro and the military divers of the AF of Croatia (Sekulic & Tocilj, 2006) is shown in Table III.

Table III. A comparison of the morphological characteristics and indicators of pulmonary function of naval saboteurs of the AF of Montenegro and AF of Croatia.

Morphological characteristics and indicators of pulmonary function	Naval saboteurs AFM	Divers AFC	Difference/ In favor
Body height	181.4	182.9	1.5/AFC
Body mass	86.00	83.11	2.89/AFM
FVC	5.68	5.71	0.03/AFC
FEV1	4.63	5.10	0.47/AFC
FEF	82.02	89.03	7.01/AFC
PEF	9.41	10.70	1.29/AFC

The comparison with the military divers of the AF of Croatia was realized primarily due to the similarity of the ethnographic areas, but also due to the fact that most of the naval saboteurs of the AF of Montenegro have a training course that includes diving. There are several types of diving; however, military diving is the most demanding. As such, it requires the military divers to possess special psychophysical features, especially those which refer to the indicators of pulmonary function (Sekulic & Tocilj, 2006). By analyzing Table III, we can note differences in the basic morphological indicators, but also in the parameters of pulmonary function. The only similarity was noted for forced vital capacity; however, the divers of the AF of Croatia displayed a higher level of forced expiratory volume in 1 second, and a better Tifany index (by 7.01 %). Therefore, it can be concluded that they have better pulmonary function than the naval saboteurs of the AF of Montenegro. In addition, the state of their airways is better, considering the better values of expiratory air flow. This difference can be explained by the fact that the dominant activity of the naval saboteurs of the AF of Montenegro is not only diving, as it is for the divers of the AF of Croatia. Specifically, during a dive, pulmonary vasculature directs the blood flow to the alveoli which are well ventilated by the reactions to local partial pressures of the metabolic air in the blood and alveoli, equalizing the blood flow and ventilation. When the concentration of carbon dioxide rises in the alveoli, the bronchioles which lead to them expand, enabling more efficient ventilation. Then, due to a greater ventilation in the pulmonary capillaries, there is an increase in the oxygen concentration, which pushes the arterioles of those capillaries into vasodilatation, increasing blood supply. What is clear from this is that due to greater respiratory activity, the lungs are provided with much more blood, which increases the return of venous blood to the heart by the greater stretching of the heart muscle fibers, which mechanically increases the volume and strength of the contraction and therefore increases the heart rate (Sherwood, 2016). Still, it could be concluded that the noted parameters indicate an excellent state of the pulmonary function and airflow of the naval saboteurs of the AF of Montenegro, despite them not have activities related solely to diving in their training, and instead relying on the performance of complex tasks on land. Considering that naval saboteurs have very well-developed functional abilities of the complete musculature, both due to specific physical training and performing tasks on land, it could be concluded that their bodies exhibit a very high level of aerobic potential. This is why we assume that their maximum oxygen uptake (VO_2 max) is at a very high level.

When it comes to the individual health risks among naval saboteurs of the AF of Montenegro, according to the studied frequencies of the variables of waist circumference and the relationship between forced expiratory volume in 1 second and forced vital capacity, and based on the classification of the health risk (Kaminsky, 2013), data were obtained that are shown in Table IV.

As can be seen from the table, naval saboteurs do not have any health risks when it comes to the onset of obesity or obstructive ventilatory defects. Along with the optimum state of the segments of their anthropological status (determined by various forms of diagnostics: evaluations of physical abilities, psychological evaluations, health check-

Table IV. The individual health risks among naval saboteurs of the AF of Montenegro.

Waist circumference (AOSTR)				Relationship FEV1/FVC			
Risk of obesity				Obstructive ventilatory defects			
Elevated	High	Very high	Extremely high	Mild	Moderate	Severe	Very severe
-	-	-	-	-	-	-	-

ups, the barometric chamber, etc.), this is a very significant indicator that we are dealing with individuals who can, without any danger to their health, effectively perform multi-purpose tasks at sea, under water, and on land.

Ground Special Forces, aged 25.6 years, compared to the average body height of 179.6 cm, and based on the current norms of the AF of Montenegro (General Staff of the Yugoslav Army, 1995), are below the upper threshold for allowed body weight by 1.8 kg. If we were to compare the morphological parameters of the ground special forces of the AF of Montenegro with those of their colleagues from the AF of Croatia (Jukic *et al*., 2008), a significant match could be seen in the presented values, as shown in Table V.

Table V. A comparison of the morphological characteristics of members of the ground special forces of the AF of Montenegro and the special forces of the AF of Croatia.

Morphological characteristics	Ground special forces AFM	Special forces AFC	Difference/ In favor
Body height	179.6	178.6	1.0/AFM
Body mass	83.2	82.5	0.7/AFM
Knee diameter	9.9	9.8	0.1/AFM
Thoracic circumference	99.8	98.1	1.7/AFM
Waist circumference	87.7	88.1	0.4/AFC
Abdominal skinfold	15.3	16.2	0.9/AFC
Upper leg skinfold	5.2	8.8	3.6/AFC

This kind of similar profile model of the displayed morphological parameters is primarily the result of the very specific nature of the Special Forces in the sense of candidate selection, and the performance of special tasks. The selection process also enables the evaluation of potential candidates for military specialties (in particular for special units), by analyzing the similarities between the anthropological profiles of the candidates and dimensions which are found in the hierarchical structure of the specification equation for particular units, as well as the level of fulfilment of explicitly determined model characteristics for each participant individually (Aracic, 2005). In addition, these units perform tasks which require special motor and morphological profiles, which require considerable performance efficiency. They carry out special reconnaissance missions which are used to obtain information of great importance; they perform direct activities (liberation from enemy capture, neutralizing enemy forces, thedestruction of military infrastructure, etc.); they also provide personal protection for people with VIP status; perform search and rescue missions; evacuate citizens following immediate enemy-related hostilities; fight against state coups and terrorism; provide support for regular armed forces during risky operations (Eisinger *et al*., 2006). In the case of these soldiers, what is evident is an equilibrium between morphological characteristics and the parameters of body composition, since compared to the prescribed norms (General Staff of the Yugoslav Army, 1995) which indicate ideal body composition, there are no significant deviations. The indicators of pulmonary function show it to be in excellent shape, which implies that both the cardio-respiratory and other functional systems are operating at a high level. When it comes to individual health risks among ground Special Forces of the AF of Montenegro, based on the studied frequencies of waist circumference and the relationship between forced expiratory volume in 1 second and forced vital capacity, and based on the classification of health risks (Kaminsky, 2013), the data in Table VI were obtained.

An exceptionally small percentage of this subsample of participants (0.06 %) has a mild health risk based on the aforementioned parameters. Accordingly, it is clear that these are healthy individuals, who will, after a certain period of time, due to the effects of various factors (ageing, changes in the morphological and motor profile, burnout from a high-risk profession, etc.) find a place in the other structures of the AF of Montenegro.

Table VI. Individual health risks among ground special forces of the AF of Montenegro.

Waist circumference (AOSTR)				Relationship FEV1/FVC			
Risk of obesity				obstructive ventilatory defects			
Elevated	High	Very high	Extremely high	Mild	Moderate	Severe	Very severe
1	-	-	-	1	-	-	-

In accordance with the obtained results, it was possible to draw the following conclusions: The determined body composition features of naval saboteurs and the ground special forces of the AF of Montenegro are a very important precondition for the efficient and safe performance of specific multi-purpose tasks at sea, under water, and on land; the parameters of pulmonary function in the case of both groups indicate an excellent state of respiratory function, and considering the cause and effect relationship between the complete functional capacities of the human body, it leads us to conclude that they are all functioning at a high level; the findings have determined that the studied soldiers are almost without any individual health risks in the sense of the onset of obesity or obstructive ventilatory defects. This has undoubtedly confirmed the effects of numerous specific factors of the training system and the realization of specific tasks of the ground special forces of the AF of Montenegro.

The results of this study contribute to the understanding of the state of the morphological characteristics and pulmonary function of ground special forces of the AF of Montenegro. It would be important to carry out a more extensive study which would focus on the morphological characteristics and the parameters of pulmonary function among all the branches of the special forces of the AF of Montenegro, as well as their mutual dependence with age. The particular impact of this paper lies the nature of the studied sample, which could in a way refer to the limitations of the study, in the sense of the broader applicability of the results. Still, bearing in mind the considerable importance of the armed forces as a special part of society, the theoretical and practical value of this study are evident.

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RESUMEN: Los resultados de numerosos estudios médicos y kinesiológicos indican la existencia de diferencias en la función pulmonar en relación con la edad, la altura corporal y la relación entre determinados parámetros de la composición corporal. El objetivo de este estudio fue determinar el estado de las características morfológicas y la función pulmonar de los saboteadores navales y de las Fuerzas Especiales terrestres de las Fuerzas Armadas de Montenegro. La muestra de participantes incluyó a 30 saboteadores navales de 30,3±6 años de edad y 30 miembros de las fuerzas especiales terrestres de 25,6±5 años. La muestra de instrumentos de medición incluyó 4 indicadores cada uno para la evaluación de dimensionalidad longitudinal, dimensionalidad transversal, masa y volumen corporal, grasa subcutánea, composición corporal y función pulmonar. Se calcularon los parámetros centrales y de dispersión de las variables. Se determinaron las especificidades de la composición corporal de los saboteadores navales y miembros de las Fuerzas Especiales terrestres de la FA de Montenegro, mientras que los parámetros de volumen y capacidad pulmonar y los parámetros de flujo de las vías respiratorias indicaron un excelente estado de su función respiratoria. Además, se determinó que los miembros de las fuerzas armadas estudiados no tenían riesgos individuales de salud en el sentido de la obesidad o defectos ventilatorios obstructivos. Los resultados obtenidos indican la necesidad de más estudios que se centren predominantemente en el impacto de las medidas morfológicas individuales y los parámetros de composición corporal en la función pulmonar. Esto proporcionaría datos importantes tanto para las fuerzas armadas en el sentido de mejorar el sistema de entrenamiento y la realización de tareas específicas, como para la kinesiología como ciencia desde el aspecto de determinar ciertas regularidades en el funcionamiento del cuerpo humano en situaciones específicas de vida. y condiciones de trabajo en las fuerzas armadas.

PALABRAS CLAVE: Características morfológicas; Función pulmonar; Soldados; Montenegro.

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