

THE DIFFERENCES OF SOME MORPHOLOGICAL CHARACTERISTICS IN THE STUDENTS OF THE UNIVERSITY OF TETOVA

Blerim SULEJMANI, Vullnet AMETI, Astrit ISENI, Kastriot SHAQIRI, Laureta ABAZI

University of Tetovo, Faculty of Physical Education, Republic of North Macedonia

**Corresponding Author: e-mail: sulejmani@unite.edu.mk*

Abstract

The correct reflection of the effects of physical education lessons can only be ascertained if there are objective indicators for this, which can only be obtained through concrete research. From what was said above arises the need and requirements for researching the differences in morphological characteristics among the students of the University of Tetova by comparing the syllabuses of the Sport and Sports Activities subjects in the different study programs of the first year. The purpose of this research is to compare the morphological characteristics of students between 5 different study programs at the University of Tetova. The subjects that will be included in this study are first-year students of the University of Tetova in different fields and study programs. A total of 100 male students were included in the studies who in the first year attend the courses of sports and sports activities. For the evaluation of the morphological characteristics, we used the following variables: body height, right leg length, body weight, thigh circumference, pulp circumference, arm circumference, body mass index, knee diameter, ankle diameter, elbow diameter, body fat arm-triceps, stomach adipose tissue, back adipose tissue, pulp adipose tissue, arm-biceps adipose tissue, thigh adipose tissue and percentage of adipose tissue. Of the 17 morphological variables, there are significant statistical differences between the students of the 5 study programs in only 6 variables, including: the length of the right leg (0.00), the circumference of the leg (0.02), the diameter of the knee joint (0.00), the diameter of the elbow joint (0.00), pulp adipose tissue (0.01) and arm adipose tissue (0.03). The students of all study programs, in terms of physical development, respectively the reports of morphological indicators are at a satisfactory level, while in terms of differences, the students of the food technology program show a better profile, while the students of the program show less satisfactory results English language.

Keywords: morphological characteristics, student, Anova, LSD-test, University of Tetova.

1. Introduction

Today's youth has completely changed their lifestyle. Adapting to the fast and great development of technology, every day more and more young people are getting absorbed in the virtual world. Instead of putting technological achievements at their service, at the service of their professional development and their development in every dimension, on the contrary, more and more, they carry out their daily activity through technology, avoiding physical activities, sports movements and games and recreation (Kureliq et al. 1975).

In our country, we do not have enough research that can give us accurate data on how many of our youth engage in physical activities and different sports. Meanwhile, in developed countries, where technology comes from, they have accurate data on how much time young people of different ages spend sitting on computers, smart phones, television and sitting still (Momirović

et al. 1969). In many countries of the world, now, they are trying to create a youth as healthy as possible, both physically and mentally.

They have begun to implement specialized programs to separate children and young people from the virtual world. Replace the interesting games that are on-line, on the Internet with different games in nature and activate children and young people to realize their activities, games, sports and hobbies as much as possible in the real world, in sports grounds, as well as in various physical activities (Naumovski et al. 1985). Studies say that today's teenagers in the world should practice at least one hour a day of sports (Walhead, T. L., & Nitoumanis, N. 2004). This, not necessarily on the football field or the sports hall, but a light run, a bike ride or swimming in the pool is enough to relax and keep the body in shape. Physical activity has now been proven to help the harmonious development of young people both physically and mentally (Walhead, T., & O'sullivan, M. 2005). Movements and activity are stimulants for the development of the respiratory system, as well as the cardiovascular system in particular.

They strengthen the immune system and make the organism healthier and more resistant to various diseases (Szakaly, Z., & Ihlaz, F. 2011). They increase the abilities of the organism to be better prepared for the advancement of various knowledge for study. They raise the will for various initiatives and for studies, as the organism after systematic movements discharges negative energy, stress from the body and mind, and opportunities for positivism, will and good work are constantly created (Stidder, G. 2012).

During our 15-year work as a teacher and leader of physical culture programs and sports activities at the University of Tetova, we have noticed that in recent years even more students do not like to actively participate in sports subjects. They have expressed a slight refusal not to participate in various sports exercises. A large number of students did not feel comfortable to demonstrate even the most elementary movements in various sports by learning the theory of the subject as much as possible, but not engaging in the gym due to the lack of creating a sports culture.

Meanwhile, what is more worrying is the fact that after the commitment of the students to perform the physical exercises correctly, most of them have encountered physical difficulties with their bodies. Other students have many times found that their colleagues during the simplest exercises were filled with breath and were not able to supply their body with breath in a normal way.

It is known that the correct implementation of physical exercises helps the locomotor apparatus, breathing, blood circulation system, as well as other organs and systems of the human body. The opposite happens when the human body does not engage in regular and systematic activities. The students of the first years of different faculties at the University of Tetova, who are the focus of this research, during our conversations, have answered us that they have not been involved in sports or other recreational activities before. A large number of them have declared that they only took part in sports during the mandatory physical education classes in secondary and primary schools. Only a significant number have affirmed that they developed sports and recreation activities, not regularly, but seasonally or when they were given the opportunity. While a small number of them have expressed that they have practiced in different sports disciplines in clubs.

2. Methods

Sample participants

The sample of the tested consists of first-year male students at the University of Tetova. The total number of test subjects is 100 men, who in the first year follow the subject of sports and physical activities. All subjects were first informed about the study and the purpose of the research was explained to them. Before testing, each student signed a consent form to participate in the study.

Sample variables

The research was carried out respecting the basic rules and principles related to the choice of measuring instruments and measurement with standardized techniques in accordance with the International Biological Program (Lohman, T. G. 1992). A total of 17 variables were used in this study, including: body height, right leg length, body weight, thigh circumference, calf circumference, arm circumference, body mass index, knee joint diameter, ankle diameter of leg, elbow joint diameter, arm-triceps adipose tissue, stomach adipose tissue, back adipose tissue, calf adipose tissue, arm-biceps adipose tissue, thigh adipose tissue and adipose tissue composition. To evaluate the morphological dimensions, the model of the Tanita scale - body fat scale - model BC 418MA was used, while for the measurement of adipose tissue we used calipers of the John Bull British Indicators Ltd model. The Tanita scale, thanks to its mode, enabled the students to closely monitor their body weight, condition and health form with all relevant parameters.

Data processing method

In order to realize the goals and tasks defined in the research as successfully as possible, based on the subject and the hypotheses presented, it is indispensable to impose certain statistical methods. In this sense, for all anthropometric variables applied to all subjects and in each subsample separately, the basic statistical parameters will be calculated, including: the arithmetic mean (X), the minimum (Min) and maximum (max) result, the standard deviation (SD), the coefficient of distribution of the Kurtosis results (KU), the symmetric coefficient of Skewness (SK). To evaluate the differences between students in all the researched faculties, univariate analysis of variance-Anova and multivariate analysis of variance-Manova were used and Post hoc LSD analysis. The statistical processing of the results as a whole will be carried out with the help of the SPSS15 application system for Windows.

3. Results and interpretation

Table 1. Basic statistical parameters of 5 UT faculties of the male gender

Variables	F. of Criminalistics		F. of English Language		F.M.N.S. - Informatics		F.A.S.- Engineering		Civil	F.F.T.
	Mean	St.dev.	Mean	St.dev.	Mean	St.dev.	Mean	St.dev.	Mean	St.dev.
ALT	1.77	0.05	1.78	0.06	1.76	0.07	1.76	0.07	1.75	0.07
AGJKD	108.64	4.71	102.48	4.19	106.14	4.91	107.25	4.49	106.67	6.00
APT	73.09	11.96	75.57	16.61	68.24	12.07	77.35	13.40	68.38	10.19
APK	53.86	5.46	52.62	8.32	53.62	5.07	57.20	5.45	53.14	5.60
APP	36.82	3.57	37.76	4.13	36.24	3.00	36.85	3.57	35.43	2.82

APKR	28.68	2.90	29.05	3.22	27.86	2.73	29.95	3.24	27.00	2.47
IMT	23.37	3.62	23.67	4.66	22.14	3.44	25.01	3.77	22.22	2.22
ADKGJ	9.95	0.58	10.86	1.31	9.86	0.73	9.80	0.89	9.71	0.56
ADKK	7.38	0.34	7.40	0.39	7.20	0.35	7.40	0.73	7.41	0.47
ADKP	7.37	0.35	8.33	1.38	7.22	0.97	7.22	0.75	7.08	0.60
AIDHK	12.09	5.94	13.15	7.25	11.67	6.65	13.60	5.70	8.90	3.32
AIDHS	18.68	10.48	21.95	20.86	15.48	9.87	17.15	7.45	12.10	4.75
AIDHSC	11.55	5.66	12.90	6.36	14.14	6.60	14.40	5.21	10.38	3.29
AIDHP	10.68	5.47	14.57	7.90	12.71	7.21	12.20	4.87	7.67	2.99
AIDHKB	5.23	2.31	9.33	7.25	7.62	6.30	6.15	2.72	5.33	3.72
AIDHKQ	18.45	10.75	19.57	11.46	14.29	9.86	16.00	6.22	11.90	6.16
ABF%	18.23	4.99	19.57	7.05	18.19	6.08	19.35	4.67	15.33	3.72

Based on the results of table no. 1 in which the basic statistical data of the latent morphological space in the male subjects of the University of Tetova are presented, including the 5 Faculties: Faculty of Criminalistics, Faculty of English Language, Faculty of Informatics, Faculty of Construction and Faculty of Technology Food and nutrition, where we presented the arithmetic mean as the main central indicators and the standard deviation as a dispersive indicator. The standard deviation values are at a low level for almost all the variables, which shows that the discriminability is small and it is about results that are homogeneous, or have low variability, except for the variables body weight APT, thigh circumference APC, adipose tissue of the stomach AIDHS and adipose tissue of the thigh AIDHKO, which have higher discriminability and it is about results which are heterogeneous, or have high variability.

Table 2. Multivariate analysis of variance – Manova on morphological measurements in all groups of male subjects

Effect		Value	F	Hypothesisdf	Errordf	Sig.
Intercept	Pillai'sTrace	1.00	224214.523 ^c	17.00	88.00	0.00
	Wilks' Lambda	0.00	224214.523 ^c	17.00	88.00	0.00
	Hotelling'sTrace	43314.17	224214.523 ^c	17.00	88.00	0.00
	Roy's Largest Root	43314.17	224214.523 ^c	17.00	88.00	0.00

Table 3. Univariate analysis of variance – Anova on morphological measurements in all groups of male subjects

	Sum of Squares	Df	Mean Square	F	Sig.		
	ALT	.016	4	0.00	0.97	0.43	
	AGJKD	448.245	4	112.06	4.66	0.00	
Analyzing the data and 3, we can multivariate (MANOVA) and (ANOVA) of the morphological groups of male that in the (MANOVA) in the measurements there statistical significance others with values of	APT	1413.956	4	353.49	2.09	0.09	of table number 2
	APK	263.390	4	65.85	1.77	0.14	conclude that in the
	APP	62.177	4	15.54	1.31	0.27	analysis
	APKR	105.001	4	26.25	3.08	0.02	univariate
	IMT	114.166	4	28.54	2.17	0.08	variance of the
	ADKGJ	18.265	4	4.57	6.21	0.00	measurements in all
	ADKK	.652	4	0.16	0.72	0.58	subjects it results
	ADKP	25.608	4	6.40	5.49	0.00	multivariate space
	AIDHK	280.980	4	70.24	2.00	0.10	morphological
	AIDHS	1130.906	4	282.73	1.96	0.11	are significant
	AIDHSC	244.374	4	61.09	1.98	0.10	differences with
	AIDHP	561.894	4	140.47	3.96	0.01	Sig.=0.00, among
	AIDHKB	256.291	4	64.07	2.70	0.03	Wilks' Lambda 0.00,
AIDHKQ	813.841	4	203.46	2.40	0.06		
ABF	237.929	4	59.48	2.02	0.10		

Pillai's Trace 1.00, Hotelling's Trace 43314.17, Roy's Largest Root 43314.17. While in the univariate analysis of variance (ANOVA) of morphological measurements in all groups of male subjects, we can estimate that out of a total of 17 morphological variables, significant statistical differences are presented in 6 variables and that in: right leg length (AGJKD) sig= 0.00 , arm circumference (APKR) sig= 0.00, knee joint diameter (ADKGJ) sig= 0.00, elbow joint diameter (ADKP) sig= 0.00, subcutaneous adipose tissue in the pulp (AIDHP) sig= 0.01, adipose tissue under the skin on the arm (AIDHKB) sig= 0.03. To verify what are the differences between the groups where statistical differences are presented in the variables in the univariate analysis of variance (ANOVA), the LSD test was performed on those variables in which we are presented with differences statistically significant.

Table 4. LSD – AJKD variable test – Right leg length

Dependent Variable	Mean	Groups	Mean	Mean	Sig.	
				Difference (I-J)		
AGJKD	FJK	FFA	102.4	6.160*	0.00	
	FFA	FJK	108.6	-6.160*	0.00	
		FSHMNI	106.14	-3.667*	0.02	
		FSHZN	107.25	-4.774*	0.00	
		FTUU	106.67	-4.190*	0.01	
	FSH MNI	FFA	102.4	3.667*	0.02	
		FSHZ N	107.25	4.774*	0.00	
	FTUU	106.67	FFA	102.4	4.190*	0.01

From the obtained results of the LSD test which are presented in table number 4 of the variable (AGJKD), the length of the right leg in the anthropometric characteristics in all the male groups taken in the study, we can conclude that significant statistical differences are presented to us in the group of male students of the Faculty of Philology - English language (FFA) compared to other groups, based on the values of the arithmetic mean, it appears that the male students of the Faculty of Philology - English language have lower values compared to the other groups taken in the study . While significant statistical differences between other groups do not exist.

Table 5. LSD - Test of variable APKR - Arm circumference

Dependent Variable	Mean	Groups	Mean	Mean	Sig.
				Difference (I-J)	
APKR	28.68	FTUU	27.00	1.68	0.06

FSHMNI	27.86				
		FSHZN	29.95	-2.093*	0.02
FSHZN	29.95				
		FSHMNI	27.86	2.093*	0.02
		FTUU	27.00	2.950*	0.00
FTUU	27.00				
		FFA	29.05	-2.048*	0.03
		FSHZN	29.95	-2.950*	0.00

From the obtained results of the LSD test which are presented in table number 5, of the variable (APKR), arm circumference in the anthropometric characteristics in all the male groups taken in the study, we can conclude that significant statistical differences are presented to us in the male group of FSHZN compared to the group of FSMHNI $p= 0.02$ and FTUU $p = 0.00$, based on the values of the arithmetic mean and MD, it results that higher values are presented to us in the group of FSHZN compared to the other two groups, while significant statistical differences are also presented in the FTUU group compared to the FFA group, of which higher values in the arm circumference result in the FFA group, while significant statistical differences between the other groups do not exist.

Table 6. LSD - Test of variable ADKGJ - Diameter of the knee joint

Dependent Variable	Mean	Groups	Mean	Mean Difference (I-J)	Sig.
FJK	9.95	FFA			
FFA	10.86	FJK	9.95	.903*	0.00
		FSHMNI	9.86	1.000*	0.00
		FSHZN	9.80	1.057*	0.00
		FTUU	9.71	1.143*	0.00
FSHMNI	9.86				
		FFA	10.86	-1.000*	0.00
FSHZN	9.80				
		FFA	10.86	-1.057*	0.00
FTUU	9.71				
		FFA	10.86	-1.143*	0.00

ADKGJ

From the analysis of the results obtained in the LSD test which are presented in table number 6 of the variable (ADKGJ) Diameter of the knee joint in the anthropometric characteristics in all the male groups taken in the study we can conclude that significant statistical differences are presented to us in the group of male students of the Faculty of Philology - English language (FFA) compared to other groups, based on the values of the arithmetic mean, it appears that the male students of the Faculty of Philology - English language have higher values compared to

other groups of subjects, while significant statistical differences between other groups do not exist.

Table 7. LSD – ADKP variable test – Elbow joint diameter

Dependent Variable	Mean	Groups	Mean	Mean Difference (I-J)	Sig.	
ADKP	FJK	FFA	8.33	-.9604*	0.00	
	FFA	FJK	7.37	.9604*	0.00	
		FSHMNI	7.22	1.1095*	0.00	
		FSHZN	6.92	1.4086*	0.00	
		FTUU	7.08	1.2524*	0.00	
	FSHMNI	7.22	FFA	8.33	-1.1095*	0.00
	FSHZN	6.92	FFA	8.33	-1.4086*	0.00
		FTUU	7.08	FFA	8.33	-1.2524*

From the obtained results of the LSD test which are presented in table number 7 of the variable (ADKP) Diameter of the elbow joint in the anthropometric characteristics in all the male groups taken in the study we can conclude that significant statistical differences are presented to us in the group of men of the Faculty of Philology - English language (FFA) compared to other groups. Based on the values of the arithmetic mean, it appears that the male students of the Faculty of Philology - English language have higher values compared to the other groups taken in the study, while significant statistical differences between the other groups do not exist.

Table 8. LSD – Variable test AIDHP – Subcutaneous fatty tissue in pulp

Dependent Variable	Mean	Groups	Mean	Mean Difference (I-J)	Sig.	
AIDHP	FJK	FFA	14.57	-3.890*	0.03	
	FFA	FJK	10.68	3.890*	0.03	
		FTUU	7.67	6.905*	0.00	
	FSHMNI	12.71	FTUU	7.67	5.048*	0.01
		FSHZN	12.20	FTUU	7.67	4.533*
	FTUU		7.67	FFA	14.57	-6.905*
		FSHMNI	12.71	-5.048*	0.01	
		FSHZN	12.20	-4.533*	0.02	

From the obtained results of the LSD test which are presented in table number 8 of the variable (AIDHP) Fatty tissue under the skin in the calf (calf) in the anthropometric characteristics in all the male groups taken in the study, we can conclude that significant statistical differences are presented to us in the group of men of the Faculty of Philology - English language (FFA) in comparison with the male subjects of the Faculty of Food Technology and Nutrition (FTUU) and students of the Faculty of Law criminalistics program FJK. The subjects taken in the FTUU study show significant statistical differences with the subjects of FSZHN, FSHMN and FFA. Based on the values of the arithmetic mean, we can conclude that less adipose tissue appears in the group of FTUU students compared to other groups, while with the group of students at FJK we have no significant statistical differences.

Table 9. LSD – AIDHKB variable test – Subcutaneous adipose tissue in the arm

Dependent Variable	Mean	Groups	Mean	Mean	Difference	Sig.
				(I-J)		
AIDHKB	FJK	5.23	FFA	9.33	-4.106*	0.01
	FFA	9.33	FJK	5.23	4.106*	0.01
			FSHZN	6.15	3.183*	0.04
			FTUU	5.33	4.000*	0.01
	FSHZN	6.15	FFA	9.33	-3.183*	0.04
			FTUU	5.33	-4.000*	0.01

From the obtained results of the LSD test which are presented in table number 9 of the variable (AIDHKB) Adipose tissue under the skin on the arm (biceps braci) in the anthropometric characteristics in all the male groups taken in the study, we can conclude that there are significant statistical differences are presented to the group of men of the Faculty of English Language (FFA) compared to the male subjects of the Faculty of Food Technology FTUU, Faculty of Applied Sciences Construction FSZHN and students of the Faculty of Law - criminology program FJK. Based on the values of the arithmetic mean, we can conclude that higher values of adipose tissue appear in the group of FFA students compared to other groups, while in the group of FSHMNI students, compared to other groups, they do not appear statistically significant differences.

4. Conclusion

Through the research, it is aimed to verify how much the working conditions and the compiled programs can influence the improvement of the morphological status of the students, who follow the sports course and sports activities at the University of Tetova. Based on the fact that the learning process is a complex phenomenon, which is subject to the great influence of various factors, through this research it was possible to prove what is the effect of different motivational dimensions on the final success in the subject of sports, in the conditions and circumstances in which work is done. The subjects included in this study are first-year students of the University of Tetova in different fields and study programs. A total of 100 students were included in the

study, who in the first year follow the subject of sports and sports activities. After the analysis of the basic statistical parameters, a homogeneity of the majority of the morphological variables was found in the morphological space, except for those of the subcutaneous adipose tissue.

Homogeneity, something greater has been shown by the variables treated in the age group of boys. From the morphological variables, valid statistical correlations have been realized with the longitudinal dimensionality variables, the transverse dimensionality variables of the skeleton with those of the mass and volume of the body. Important correlations with other morphological variables have also been realized by the variable body weight, especially with those of the transverse dimensionality of the skeleton and body volume. Even the variables of the subcutaneous adipose tissue have realized significant correlations with each other with high coefficients. Boys of this age, in terms of physical development, respectively the ratios of anthropometric indicators are at a satisfactory level. The ratio of body mass and height is within the limits of normal development and it is about an optimal mass, the side of subcutaneous fat also has a good ratio with the height which is above average and we can say that they are not at risk of excessive fat (overweight).

In the correlations between the anthropometric indicators, we notice that most of the variables had high and significant correlation values, except for some correlations where their coefficients had low and insignificant values. It is worth noting that all these values of coefficients in anthropometric characteristics have positive signs, which means they have a positive influence on each other. The special practical values of the research will be in the function of the choice of operators and kinesiological stimulators in accordance with the age and orientation for certain sports. The modern education system has imposed new trends of cooperation of different sciences and different scientific disciplines. The very nature of scientific curricula dictates an interdisciplinary collaboration to achieve greater quality and efficiency in a defined objective. The field of Physical Education, Sports and Health links with other curricular science subjects to obtain the best information and achievements to assist professors, coaches and sports workers in their mission to train students and youth for better health. well psycho physical. First, in interaction with the sociological and psychological sciences, experiences are absorbed to build group organizations both in competitive games and in building the spirit of teamwork. Also, these collaborations enable the motivation and persuasion of young people and students to actively participate in sports activities. The results of the research, for teachers and trainers, will present important information on the influence of these anthropometric characteristics in the realization of technical and tactical tasks in order to dose the volume and intensity of loads during sports classes, special classes as well as various sports activities.

References

- [1]. KURELIQ N., MOMIROVIQ K., SHTURM J., RADOJEVIQ\., VISKIQ-SHTALEC N.: Struktura dhe zhvillimi i dimensioneve morfologjike dhe biomotorike të rinisë. Instituti për hulumtime shkencore, Fakulteti për edukim Fizik, Beograd,1975.
- [2]. MOMIROVIQ K., MEDVED R., HORVAT V., PAVISHIC-MEDVED R.: Normativat e kompletit të ndryshoreve antropometrike të rinisë shkollore të dy gjinive të moshës 12 deri 18 vjeçare. Fiziçka kultura, Beograd, 1969,2-3.
- [3]. NAUMOVSKI A., MATOVSKI S., TUFEKÇIEVSKI A.: Lindshmëria e disa ndryshoreve manifeste antropometrike dhe antropomorfe. Fiziçka kultura, Beograd, 1985, 2.

- [4]. Lohman T. G. et al. (1992). Advances in body composition assesment. Human Kinetics Publishers, Inc., Champaign Illinois, pp. 22-30.
- [5]. STIDDER, G. (2012): Training to teach physical education in an opposite-sex secondary school: A qualitative analysis of trainee teachers' experiences. *European Physical Education Review*, 18(3), 346-360.
- [6]. SZAKALY, Z., & IHLÁZ, F. (2011) : Health behavior, body composition and motor performance in female university students. *Annals of Research in Sport and Physical Activity*, 22-31.
- [7]. WALHEAD, T. L., & NITOUUMANIS, N. (2004). : Effects of a sport education intervention on students' motivational responses in physical education. *Journal of teaching in physical education*, 23(1), 4-18.
- [8]. WALHEAD, T., & O'SULLIVAN, M. (2005). : Sport education: Physical education for the new millennium?. *Physical Education and Sport Pedagogy*, 10(2), 181-210.