

The Influence of Two Models of Physical Education Programme Realization on Anthropometric Characteristics of Female Students

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Summary: *The goal of this research was to determine the influence of two models of physical education programme realization on anthropometric characteristics of secondary school female students. 92 female students were included into this research – experimental treatment and they were divided into two sub samples – according to the criterion of physical education realization: experimental group with 50 female examinees with continuous realization and control group with 42 female examinees with concentrated realization of physical education programme contents. Five anthropometric characteristics were applied in this research for monitoring of two basic dimensions: longitudinal dimension of the skeleton and circular dimension. Multivariate analysis of variance indicates that there is no statistically significant difference between experimental and control group of female examinees on initial and final measure, in relation to five researched anthropometric characteristics. The results are logical, because the group was formed by random choice and all female examinees were of the same age. The differences are more the result of coincidence and constitutional differences which are provoked by different environmental factors.*

Key words: *Influence, model, programme, physical education, anthropometric characteristics*

INTRODUCTION

Anthropometrics is a study of measure of anthropometric dimension of human body, as well as processing and study of these measures.

Momirovic and associates (1969) defined four anthropometric factors marked as latent morphological dimensions: longitudinal dimension of skeleton; body volume and body radius and subcutaneous fat tissue /4/. International biological programme contains standardized list of 39 anthropometric measures which are realized by uniform procedure. Methods of index and standard are most often used for the realization of analysis and marking of anthropometric measures. Index method is determined for the determination of ideal proportions of adult bodies. Method of standards is of great importance for the determination of constitutional types for certain sport event.

The knowledge of anthropometric characteristics is essential for the physical education planning, choice of methods and organizational types of work and in the choice of exercises. The choice of these characteristics was influenced by thinking and belief that experimental treatment would provoke the largest growth in this field.

THE SUBJECT AND GOAL OF RESEARCH

The subject of this research is anthropometric characteristics of secondary school female students.

The goal of research of this research was to determine the influence of two models of physical education programme realization on anthropometric characteristics of secondary school female students.

METHODOLOGY OF WORK

This was empirical research with experimental character. It was realized in Agricultural-veterinary school with boarding school "Svilajnac" in Svilajnac, Republic of Serbia.

92 female examinees were included into this research and they were divided into two sub samples – according to the criterion of realization of physical education: experimental group with 50 female examinees with continuous realization and control group with 42 female examinees with concentrated realization of physical education programme contents.

The following five anthropometric characteristics were applied in this research: body height- represents longitudinal dimension of skeleton, body weight-represents volume and body mass, anthropometric radius of stretched forearm- represents circular dimension, anthropometric radius of stretched upper arm- represents circular dimension and anthropometric radius of lower leg – represents circular dimension. Anthropometric characteristics were measured by International biological programme.

Mathematical and statistical data processing

The data were processed by proper mathematical-statistical procedures. Multivariant analysis of variance and descriptive statistics were applied .

RESEARCH RESULTS

Table 1. indicates that anthropometric characteristics of female examinees in experimental and control group are in expected limits. The biggest difference from the middle value, which is indicated by the variation coefficient with the value 18.40 in experimental and 19.64 in control group and standard deviation with the value 107.18 in experimental and 116.79 in control group , is for body weight. Judging by the values of scunis it can be seen that the results are evenly distributed.

Table 1

Central and dispersive parameters of the state of anthropometric characteristics of experimental and control group of female examinees on intial measure

Vari.	M	SD	Err.	Min	Max	CV	Int.	Surf.	Sku.	Kur.	KS-p
TLVS-1	1634.30	56.60	8.00	1495.00	1760.00	3.46	1618.21	1650.39	-.09	-.00	.998
TLVS -2	1625.83	64.58	9.96	1500.00	1780.00	3.97	1605.70	1645.96	.45	-.39	.746
TLTZ-1	582.50	107.18	15.16	440.00	900.00	18.40	552.03	612.97	.89	.58	.894
TLTZ-2	594.64	116.79	18.02	425.00	1040.00	19.64	558.24	631.05	1.41	3.27	.931
AOP-1	230.40	15.61	2.21	204.00	260.00	6.78	225.96	234.84	.11	-.69	.994
AOP-2	230.95	19.00	2.93	198.00	276.00	8.22	225.03	236.87	.14	-.67	1.000
AOON-1	252.36	29.51	4.17	208.00	327.00	11.69	243.97	260.75	.58	-.30	.996
AOON-2	254.10	33.43	5.16	204.00	353.00	13.16	243.68	264.51	.50	.16	.996
AOPK-1	357.32	32.40	4.58	308.00	458.00	9.07	348.11	366.53	1.15	1.44	.983
AOPK-2	361.33	33.59	5.18	302.00	433.00	9.29	350.86	371.80	-.14	-.78	.997

Scunis has a negative sign for body height in experimental group and radius of lower leg for control group, which indicates a greater number of good results. The values of kurtosis indicate that the results of all five anthropometric characteristics are homogenous with leptokurtic curve.

The values of Kolmogor's-Smirnoff's test indicate that the distribution of values is within normal distribution for all five variables.

Table 2
Central and dispersive parameters of the state of anthropometric characteristics for experimental and control group of female examinees on final measure

Varia.	M	SD	Err.	Min	Max	CV	Int.	Sur.	Scu.	Kur.	KS-p
TLVS-1	1644.50	58.44	8.27	1500.00	1770.00	3.55	1627.89	1661.11	-.17	.01	.999
TLVS-2	1634.52	65.13	10.05	1510.00	1800.00	3.98	1614.22	1654.83	.52	-.27	.601
TLTZ-1	593.30	113.15	16.00	435.00	880.00	19.07	561.13	625.47	.79	.08	.648
TLTZ-2	600.00	116.86	18.03	420.00	1090.00	19.48	563.58	636.42	1.87	5.63	.987
AOP-1	234.44	15.57	2.20	205.00	270.00	6.64	230.01	238.87	.21	-.52	1.000
AOP-2	230.00	37.95	5.86	220.00	295.00	16.50	218.17	241.83	-3.89	19.85	.456
AOON-1	255.70	30.83	4.36	208.00	330.00	12.06	246.94	264.46	.57	-.26	1.000
AOON-2	262.29	38.24	5.90	211.00	398.00	14.58	250.37	274.20	1.16	2.31	1.000
AOPK-1	363.98	33.12	4.68	311.00	456.00	9.10	354.56	373.56	.64	.10	.757
AOPK-2	366.26	33.35	5.15	302.00	445.00	9.11	355.87	376.66	-.12	-.61	1.000

In Table 2. it can be seen that the biggest difference from the middle value, which is indicated variation coefficient with the value 19.07 for experimental and 19.48 for control group, is for body weight.

Judging by the values of scunis it can be seen that empirical results are normally distributed. Scunis has negative sign for body height in experimental group and for radius of stretched forearm and radius of lower leg for control group, which indicates larger number of good results.

The values of kurtosis for control group indicate that the results of the radius of stretched forearm and body weight are heterogeneous with platikurtic curve.

The values of Kolmogor's-Smirnoff's test indicate that the distribution of values is in the frame of normal distribution for all five variables.

The analysis of differences between experimental and control group of female examinees in relation to the state of anthropometric characteristics

In further analysis I wanted to study, apart from numeric differences of the average results, if there are statistically significant differences between experimental and control group of female examinees in relation to five anthropometric characteristics on initial and final measure.

Table 3
The significance of differences between experimental and control group of female examinees on initial and final measure in relation to the state of anthropometric characteristics

Analysis	n	F	p
Manova-i	5	.619	.686
Manova-f	5	.885	.495

Multivariant analysis of the variance indicates that there is no statistically significant difference between experimental group and control group of female examinees on final measure, in relation to five anthropometric characteristics, because the level of statistical significance is $p = .495$.

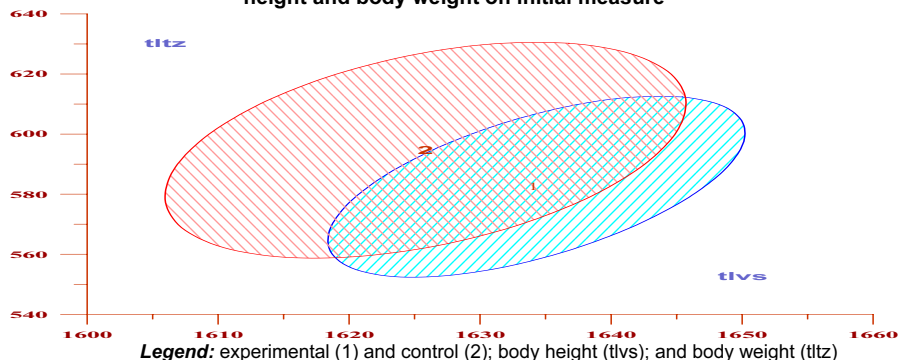
There is no statistically significant difference on initial measure between experimental and control group in relation to five variables, because the level of statistical difference is $p = .686$.

Table 4
Homogeneity of experimental and control group of female examinees on initial and final measure in relation to the state of anthropometric characteristics

Groups	m/n	%
Experimental-i	27/50	54.00
Control-i	26/42	61.90
Experimental-f	34/50	68.00
Control-f	21/42	50.00

Homogeneity of control group female examinees on initial measure is bigger and it is 61.90%. Homogeneity of experimental group on final measure is bigger and it is 68.00%. 34 female examinees have defined characteristics of their group while 16 examinees have other characteristics. 21 female examinees from the control group have defined characteristics, homogeneity is 50.00%. It means that 21 female examinees have different characteristics and not the characteristics of their group. Homogeneity of experimental group increased on final measure.

Graph 1. Ellipses (interval of trust) of experimental and control group of examinees for body height and body weight on initial measure



On Graph 1. body height of female examinees was represented on abscis, while body weight was represented on ordinate. On the basis of this graph results of position and characteristics of anthropometric characteristics of experimental and control group of female examinees in relation to two most discriminative indicators it can be seen that control group of female examinees has the lowest, while experimental group has the highest value of body height, in relation to body weight, where experimental group has the lowest and control group has the highest value of body weight.

CONCLUSION

Anthropometric characteristics of experimental and control group of female examinees on initial measure are in relatively possible and expected limits and they are almost the same. /1, 2, 3/.

Multivariate analysis of variance, with the level of statistical significance $p=0.686$, indicates that there is no statistically significant difference between experimental and control group of female examinees on initial measure, in anthropometric variables. The results are statistically irrelevant, because they are the examinees of the same population, of the same age and sex. Homogeneity is higher in control group of female examinees.

All increases of researched anthropometric characteristics of examinees on final measure cannot be attributed to the effects of experimental or control treatment. At this

age the biggest contribution in changes of anthropometric characteristics belongs to natural growth and development. In longer period of action the treatment effects would be irrelevant.

Multivariant analysis of variance with the level of statistical significance $p=0.634$, indicates that there is no statistically significant difference between experimental and control group of female examinees on final measure, in relation to five anthropometric characteristics. Homogeneity is higher in experimental group.

LITERATURE

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Докладът е рецензиран.