MORPHOLOGICAL AND MOTOR DIMENSIONS OF YOUNG BASKETBALL PLAYERS

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Abstract

Among modern team sports, basketball is one the most popular sports in the world, but in nowadays it is getting to be popular even in our country. By considering the dynamics of the game and being aware of the obstacles that the basketball players can face, it will require a proper motive for a physical and tactical preparation. Performing the experimental results with a certain number of variables, it will provide us with data, which will define the anthropological status of young people. In such sense, by means of set of variables, using factor analysis, we have isolated two motor and three morphological factors described as: 1) complex motor factor, 2) explosiveness of upper part of body, and 1) general factor of growth, 2) longitudinal growth, 3) physical body capacity. We realize presumption that this information could be used for aims of selection and transformation processes programming with young sportsman.

Key words: *basketball, motor dimensions, morphology*

Introduction and aim

Among modern team sports, basketball is one of the most popular sports in the world, but in nowadays it is getting to be popular even in our country. Considering the dynamics of the game and being aware of the obstacles that the basketball players can face, it will require a proper motive for physical and tactical preparation. Realizing the experimental results with a certain number of variables, it will provide us with data, which will define the anthropological status of young people.

The aim of this experiment is revealing some relevant morphological, motor and specific characteristics among young basketball players. In other words, the objective of this study can be defined as verifying the values of some morphological characteristics and at the same time verifying some motor and specific characteristic among young basketball players.

Methods

The experiment covers 66 entities of young males, approximately 16 years old, who have been practicing basketball in the city of Pristine. The testing was conducted during November and December of 2009. Furthermore, the morphological tests were conducted during the morning hours, whereas the motor tests were conducted during the basketball practice time. The author of this study should be able to demonstrate appropriately in order to make sure that students understand the tests in the best way. All tests were conducted in the sports center and included all primary schools in Pristine. Considering the previous studies, the actual hypotheses is based on the existence of factors and its connections at the morphological, motor, basic and specific level among young basketball players in morphological and motor area.

Variable and Data processing

In order to set the morphological field, 10 tests were applied as follows: BOWE - body weight BOHE - body height, HALE - hand length, LELE - leg length, FOLE - foot length, PALE - palm length, PAWI - palm width, ARPE - arm perimeter, THIPE - thigh perimeter, FEPE - femur perimeter. In the motor field, 10 tests were applied, five of them were basic tests and the other five situation tests as follows: JFMSPD - The jump from the spot to a distance, JFMSH - The jump from the spot to a highness, 20 MRU - The 20 meters running, TFPHSSM - The test for the physical strength of the stomach muscles, THMBD - Throwing the medicine ball in a distance, DBHC - Dribble by hitting in the cage, FRHI - Free hitting, HICWJ - Hitting the cage with a jump, THBID - Throwing the ball in a distance, GOCOD – dribbling back and forth. The results are elaborated in SPSS version 16,0 with the factorization.

Results

Morphology field

Table. 1. Relevant eigen values

No.	Eigen	%	% cum
1	5.155	51.55	51.552
2	1.673	16.73	68.283

Table 2. Principal components and communalities

	1	2	H^2
BOHE	.87	-.32	.85
BOWE	.87	.25	.81
HALE	.77	-.39	.75
LELE	.79	-.36	.75
FOLE	.62	-.40	.54
PALE	.53	-.25	.35
PAWI	.72	-.11	.53
ARPE	.60	.61	.73
THIPE	.62	.64	.80
FEPE	.72	.46	.73

Table 3. Parallel projections

	1	2
BOHE	.88	.08
BOWE	.41	.65
HALE	.88	-.03
LELE	.87	.00
FOLE	.77	-.11
PALE	.59	-.01
PAWI	.61	.22
ARPE	-.08	.89
THIPE	-.09	.92
FEPE	.14	.79

Table 4. The matrix of the orthogonal projections

	1	2
BOHE	.92	.45
BOWE	.68	.82
HALE	.87	.33
LELE	.87	.36
FOLE	.73	.21
PALE	.59	.24
PAWI	.70	.47
ARPE	.29	.85
THIPE	.30	.89
FEPE	.46	.85

Table 5. Correlations between factors

	1	2
1	1.00	
2	.41	1.00

Motor area

Table. 6. Relevant eigen values

No.	*Eigen*	%	% cum
1	3.46	34.56	34.56
2	1.45	14.45	49.01
3	1.05	10.54	59.56

Table 7. Principal components and communalities

	1	2	3	H^2
JFMSPD	.74	-.22	-.10	.61
JFMSH	.76	-.06	-.22	.64
20 MRU	-.63	.49	.21	.68
TFPHSSM	.48	.70	-.02	.72
THMBD	.39	.74	-.11	.71
DBHC	.68	-.16	-.05	.50
FRHI	-.69	.08	.09	.49
HICWJ	.26	.02	.77	.66
THBID	.40	-.19	.55	.50
GOCOD	-.62	-.21	-.17	.46

Table 8. Parallel projections

	1	2	3
JFMSPD	.76	.01	.05
JFMSH	.75	.19	-.08
20 MRU	-.86	.28	.07
TFPHSSM	.03	.84	.02
THMBD	-.01	.86	-.09
DBHC	.66	.05	.09
FRHI	-.64	-.14	-.04
HICWJ	-.15	.04	.84
THBID	.17	-.11	.65
GOCOD	-.32	-.38	-.27

Table 9. The matrix of the orthogonal projections

	1	2	3
JFMSPD	.78	.20	.26
JFMSH	.77	.36	.15
20 MRU	-.78	.08	-.13
TFPHSSM	.24	.85	.15
THMBD	.16	.84	.02
DBHC	.70	.22	.28
FRHI	-.69	-.30	-.24
HICWJ	.09	.12	.80
THBID	.33	.02	.68
GOCOD	-.49	-.50	-.42

Table 10. Correlations between factors

	1	2	3
1	1.00		
2	.24	1.00	
3	.28	.14	1.00

Discussion and conclusion

As far as the 6th table is concerned, there are obvious LAMBDA radixes and partial % and cumulative % contribution for the explanation of the variability in general. By choosing the correlative matrix, we win 10 characteristic radixes and the same number of characteristic vectors which, according to Hotelling method and GK criteria, are presented as three motor and latent dimensions which explains the 6% variability in general. Considering the first and statistic matrix of the factorization of the motor tests, we can notice that the first characteristic radix with the value L=3.456, explains 34.5% of the variability in general, and the second characteristic radix for the system with the value L=1.445 and explains the 14.4% of the variability in general. The third characteristic radix for the system with the value L=1. 054 and explains the 10.5% of the variability in general. Through the table 7, it contains the matrix of the main components with three factors and communalities. In the first component were projected variables which test the explosive strength of the lower body part such as, jumping from a certain place to a distance, jumping from a spot to a highness, and the 20 meter running with coefficient from .63 - .76.

Then, we conducted tests that show repetitive strength with coefficient .68, and tests that show specific speed during the basketball play. After that applied the dribble with hitting the cage and dribbling back and forth, the tests which show resistance in the speed with coefficient that have value from -.62 to -.69. On the second component the tests are projected, which show the explosive strength of the upper part of the body by throwing medicine ball and throwing the basketball to a distance with a coefficient from .70 to 7.4. On the third component, the projections are realized through the tests, which show accuracy in the area of free hitting and hitting through the jump with the coefficient from .55 to 77. Collectiveness towards all tests have the coefficient with the value .46 to .72, but how much qualitative information will bring each variables, it depends on the volume of collectiveness. In the structure of the motor areas, the main components are projected in the inclined solutions, rotations, and according to the normalization of the criteria (Kaiser-it) and these transformations came up with three matrixes:

- The matrix of the parallel projections, which shows parallel projections of the variable vectors to factors.
- The matrix of the orthogonal projections, which shows the correlative and orthogonal projections between variable vectors and factors.

The correlation matrix of isolated factors is interesting. As presented in table 8, there is matrix of parallel projections, which covers the parallel projection of the motor variables. By observing this matrix we notice that high projections on the first factor have realized the following tests, jumping from a certain place to a distance, jumping from a certain place to a highness, the 20 meter running, which show the explosive strength of the lower part of the body with coefficient starting from .75 to .86. Moreover, we have the tests NTKMB and the dribble with hitting the cage which shows the specific speed during the basketball game with coefficient that has the value starting from -.64 to .66. According to these projections, the first motor factor can be defined as a **complex and motor factor.**

On the second component, the high projections have been realized by the tests, which show explosive strength of the upper part of the body such as, throwing the medicinal ball, throwing the ball in a distance with coefficient from .83-.85. According to the projections presented here, the second factor could be defined as a **factor with an explosive force of the upper part of the body.** On the third component, high projections have realized the tests which are as a pointer of the preciseness such as, free hitting, hitting through jumping with coefficient that has the value .65 to .84. According to these projections, the third factor can be defined as a motor and situated factor of the variability –very typical for the basketball game.

Concerning the table 9, the orthogonal projections are presented, which contain orthogonal projections of the manifest - motor tests, and as a result, we have three factors. According to all predictions, the structure of this matrix does not change from the parallel projections.

On the table 10, it is shown the correlative matrix of the motor factors and we can notice that the correlation of the factors is with coefficient from .14 to .28. According to this correlation, we can conclude that motor factors depend on each other.

In the first table are exposed the characteristic radixes LAMDA and the partial % and cumulative % contribution for explaining the differences in general. The characteristic radixes are ranked according to the size, which in other words shows the ranking of the latent aspect. According to Hotelling and Kaiser, it has been extracted two latent dimensions, which explain the 68% of the general variable. The first characteristic radix explains the 51% of the general variable and the second radix of the system explains the 17% of the general variable. In the second table, it is presented the matrix of main components with two factors and the communalities of the morphological tests. In the first main component, all morphological tests have realized projections with high value from .53-.86, so the body weight and height realize projections with higher value than .86. The first component with 51% of the general variable system includes the characteristics of the **general factor for growing and developing** normally as far as youth is concerned. On the second component with characteristic radixes like, L= 1. 673 and partial contribution of 17%, we have relevant projections with bipolar character, especially the tests which show us the length such as, body height, hand length, leg length, foot length, and palm length. All these can be projected in the positive pole with coefficient value of .24 to .40. The test that measures the circulative dimensions such as, the arm, thigh and cartilage perimeter, will project in the negative pole with coefficient from .47 to .64. Moreover, the communalities have the value for the all tests with coefficient from .52 to .85, where each variable depends on the communality size and how it will present valuable information.

The major significance for the right interpretation of the factors it is up to the matrix of the parallel projections. In table 3, it can be noticed that high projections have realized tests, which define the **longitudinal growth** of the skeleton such as, the body height, hand length, palm length, leg length, foot length, and palm width with coefficient starting from .59-.88. Otherwise, this factor can be defined as the factor of longitudinal and transversal dimension of the human skeleton. Concerning the third factor, high projections have been realized by the tests, which measure the circular dimension such as, the arm perimeter, thigh perimeter, cartilage perimeter, and body weight with coefficient starting from .65.

Differently, this factor can be defined as, **the factor of body weight and capacity.** As far as the forth table is concerned, the matrix of the orthogonal projections includes orthogonal projection of the morphological tests and as a result we have two factors. The structure of this matrix does not differ that much from the parallel projections. According to the inter correlation of the latent factors, the first factor with the second factor have important correlation with coefficient .41, which results in a way that we can conclude the presence of the general factor for the development and growth of the youth.

The main components serve mostly as a coordinative system for the vectors of the correlative matrix of the variables because usually it happens for them not to be interpreted as they really are. Therefore, in order to explain clearly the latent aspect, the main components transform in the aslant solutions and as a result, we have three matrixes. Taking into consideration this experiment, there are two hypotheses: The first hypothesis is realized completely and according to the results, there have been extracted two latent and morphological dimensions. The second hypothesis is also realized completely, where according to the results, there have been extracted three latent dimensions in the specific, basic and motor area. According to the 66 entities, of 16 years old males, it has been realized the morphological aspect of consisting 10 tests, and the motor aspect consisting 10 tests.

Based on the factorial procedure, all morphological, motor and specific tests were applied and as a result, we got five latent dimensions: factor of the transversal dimensionality, capacity and volume of the skeleton, factor of the explosive force and longitudinal dimensionality of the skeleton. In motor area: factor of accuracy and specific speed, complex, motor, situated and typical factor of the basketball game, factor of the speed and explosive strength of the upper extremities. The interference or mixing of factors can be excused because of the age we consider since it is the age of puberty where nothing is determined on the level of morphology or motor dimensions. The function of the result is about: Securing the information about the youth and their development of the morphological and motor characteristics. The aim is to expose the values of the educational process during the teaching process concerning the physical education and sport. The number of the practice classes should be increased and compensated for other motor activities. This should help selection and orientation of the youth in different sport activities as well as application of the new concepts in terms of scientific and professional bases of the program, methodology and adequate evaluation.

On the bases of realizing the results and values, there is the need for further research and discovery of other relevant factors, which will directly influence this experiment and will serve for the best of the society. This experiment opens new perspectives in the future.

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MORFOLOŠKE I MOTORIČKE DIMENZIJE MLADIH KOŠARKAŠA

Sažetak

Među modernim sportskim igrama, košarka je jedan od najpopularnijih sportova u cijelom svijetu, ali danas postaje sve popularnija i u našim krajevima. Uvažavajući dinamiku igre i ometanje s kojim se igrač može susretsti u igri, zahtijeva se odgovarajući motiv za kondicijsku i taktičku pripremu. Istražujući rezultate eksperimentalnog programa uz pomoć brojnih varijabli koje su nam osigurale informacije, moguće je definirati dio antropološkog statusa mladih sportaša. U tom smislu, u skupu varijabli, faktorskom analizom, izolirana su dva motorička i tri morfološka faktora opisana kao: 1) složeni motorički faktor, 2) eksplozivnost ruku i ramenog pojasa, te 1) opći faktor rasta, 2) longitudinalni rast, i 3) tjelesni morfološki kapacitet. Pretpostavljeno je da ove informacije mogu poslužiti u svrhu selekcije i programiranja transformacijskih procesa s mladima.

Ključne riječi: *košarka, motoričke dimenzije, morfologija*

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