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THE INFLUENCE OF SOME ANTHROPOMETRIC VARIABLES ON CERTAIN MOTOR VARIABLES THAT DEFINE THE EXPLOSIVE FORCE OF THE LOWER LIMBS IN BASKETBALL PLAYERS AGED 14

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(Original scientific paper)

Branko Krstevski[1], Risto Stamenov[2], Mirjana Krstevska[3], Elena Krstevska[4], Slavica Novacevska[5],Jana Karshakovska Dimitrievska [6] and Sasho Todorovski[7]
[1] Faculty of Physical Education, Sport, and Health, Ss. Cyril and Methodius University, Skopje
[2] Faculty of Physical Education, Sport, and Health, Ss. Cyril and Methodius University, Skopje
[3]SUGS Dimitar Vlahov, Skopje ,

Abstract

The research was conducted on a sample of 111 respondents, aged 14 years, members of the basketball clubs of BC "Balkan Steel", BC "Fersped Rabotnicki", BC "MZT" - Skopje, BC "Centar" and BC "Torus", in order to determine the relationship between some anthropometric variables and the variables that define the explosive force of the lower extremities. The research used a total of 19 variables, of which: 17 anthropometric variables, to assess the morphological status of basketball players and 2 variables to assess the explosive force. The variables for estimating anthropometric dimensions are: 1. (AVIS), 2. (ADNO), 3. (ADRA), 4. (ADST), 5. (ASHRA), 6. (ASHKA), 7. (ADKO), 8 (ADSZ), 9. (AOGK), 10. (AOME), 11. (AONK), 12. (AOPK), 13. (ATEZ), 14. (AKDN), 15. (AKDM), 16. (AKDNK), 17. (AKDPK). The explosive force estimation variables are: (MDSM) and (MSVM). Based on the obtained results and the performed analysis, it was concluded that: the applied anthropometric variables, as a predictor system, have a statistically significant effect on the variables of the criteria: long jump (MDSM), and high jump (MSVM). Respondents who had a larger body, larger chest circumference, lower body weight, smaller pelvic width and smaller knee diameter performed better in the criteria variables - long jump (MDSM) and high jump (MSVM).

Keywords: variables, specific motor, basketball, regression analysis

Introduction

Basketball is a sport that abounds in fast and explosive movements of players. One of the most applied technical elements in the basketball game, both in defense and attack, are the jumps. The jumps are usually performed after a rebound (bounced ball from the board or from the hoop of the basket), during jump-shots, in a jumping ball (at the beginning and during the match), when keeping the opposing player (block), etc.

The team that has players with a good jump and a developed sense of performing it on time (on which the success of the jump depends), will dominate the match for bounced balls under both baskets.

Because of this, it is necessary to train and improve specific basketball movements at an early age. The morphological characteristics of the players have a great influence on the manner and efficiency of performing specific basketball movements with the ball. Because of this, in our research, the influence of some morphological characteristics on the specific movements of basketball, which are performed both in defense and attack, will be of special interest.

Among the authors who have studied this topic or similar, the most important are Biuklic and Vukojevic (1978), B. Dezman (1982), M. Martinovic и and D. Gorgevic (1987), S. Dukovski and M. Naumovski (1990).

The subject of this research are some of the anthropometric and motor variables in 14-year-old basketball players.

The purpose of this study is to determine the relationship between some anthropometric variables and variables for estimating the explosive force of the lower limbs.

Methods

The respondents are basketball players aged 14 years (+/- 6 months), from the cadet basketball schools of BC "Balkan Steel", BC "Fersped Rabotnicki", BC "MZT" - Skopje, BC "Centar" and BC "Torus". The testing was performed on 111 respondents (basketball players).

A total of 19 variables were used in this study, namely: 17 anthropometric variables to assess the morphological status of basketball players and 2 variables to assess the explosive force of the lower extremities.

The variables for estimating anthropometric characteristics, with codes:

1. Body height (AVIS), 2. Length of the leg (ADNO), 3. Length of the arm (ADRA), 4. Length of the foot (ADST), 5. Width of the shoulders (ASHRA), 6. Width of the pelvis (ASKA), 7. Diameter of the knee (ADKO), 8. Diameter of the ankle (ADSZ), 9. Medium circumference of the chest (AOGK), 10. Circumference of the abdomen (AOME), 11. Circumference of the upper leg (AONK) , 12. Circumference of the calf (APK), 13. Body weight (ATEZ), 14. Skin fold of the upper arm (AKDN), 15. Skin fold of the abdomen (AKDM), 16. Skin fold of the upper leg (AKDNK), 17. Skin fold of the calf (AKDPK).

All applied variables are measured according to the International Biological Program.

The explosive force estimation variables, with codes, are: 1. Long jump (MSDM) and 2. High jump (MSDM).

Results and discussion

In order to determine the relationship between the anthropometric manifest variables and the applied variables for estimating the explosive force of the lower limbs, a regression analysis was applied. The predictive system of variables covers all anthropometric variables, and the criteria for estimating the explosive force of the lower limbs are treated as criterion variables.

Tables 1 and 2 show the results of the regression analysis of the applied criterion variables.

Regression analysis of the MSDM variable

Based on the results obtained from the regression analysis (Table 1) it is noted that the manifest anthropometric variables, as a predictor system of variables, statistically significantly affect the criterion variable MSDM (Q = .00).

The multiple correlation coefficient (RO =. 61) is high which indicates that there is a high and significant multiple correlation.

Table 1. Regression analysis of the MSDM variable

Num.	Variables	r	Part -R	BETA	SG	t-test	Q(BETA)
1.	AVIS	.30	.11	.30	.29	1.03	.31
2.	ADNO	.33	-.02	-.05	.20	-.23	.82
3.	ADRA	.30	.08	.17	.23	.76	.45
4.	ADST	.18	-.03	-.03	.13	-.24	.81
5.	ASHRA	.04	-.04	-.05	.14	-.39	.70
6.	ASHKA	-.14	-.21	-.28	.13	-2.10	.04
7.	ADKO	.16	.01	.01	.12	.10	.92
8.	ADSZ	.27	-.02	-.03	.14	.-22	.83
9.	AOGK	.06	.19	.45	.24	1.86	.07
10.	AOME	-.07	-.03	-.05	.18	-.27	.79
11.	AONK	-.01	.13	.28	.22	1.26	.21
12.	AOPK	.05	.20	.40	.20	1.98	.05
13.	ATEZ	.04	-.21	-.67	.32	-2.11	.04
14.	AKDN	-.34	-.14	-.24	.17	-1.40	.16
15.	AKDM	-.29	-.03	-.07	.21	-.32	.75
16.	AKDNK	-.35	-.10	-. 20	.20	-1.00	.32
17.	AKDPK	-.36	-.06	-.09	.17	-.53	.60
DELTA = .37		RO = .61 SIGMA = .79				F = 3.26	Q(F) =. 00

The coefficient of determination (DELTA = .37) is statistically significant, which means that the applied predictor system of variables has a significant impact on the criterion variable MSDM. The remaining 63% of the total variability of the criterion variable MSDM can be attributed to other characteristics and abilities of the respondents that are not subject of our examination.

The individual influence of the predictive anthropometric variables on the criterion variable MSDM have the variables ASHKA (.04), ATEZ (.04). and APOC (.05).

They do not have a statistically significant correlation (r) with the criterion variable MSDM.

The anthropometric variables AOPK (.20), ASHKA (-.21) have the highest and statistically significant partial correlation (Part-r) with the variable of the MSDM criterion, and statistically significant in relation to the performance test (MCDM). Their importance is confirmed by the significant regression (BETA) coefficient and their (t) value, which is statistically significant.

The partial regression coefficients (BETA) of the anthropometric predictor variable AOPC (.40) show a positive value at level Q (BETA) = .05.

The partial regression coefficients (BETA) of the anthropometric predictor variables ATEZ (BETA = -.67) show a high negative value at level Q (BETA) = .04, and the variable ASHKA at level Q (BETA) = .04.

According to the results obtained in this way, greater success in performing the MDSM test will be achieved by the respondents who have a larger calf, lower body weight and a smaller pelvic width.

Regression analysis of the MSVM variable

Based on the results obtained from the regression analysis (Table 2) it is noted that the manifest anthropometric variables, as a predictor system of variables, statistically significant affects the criterion variable MSVM (Q = .00).

The multiple correlation coefficient (RO = .58) is high, which means that there is a high and significant multiple correlation.

Table 2. Regression analysis of the MSVM variable

num.	Variables	r	Part -R	BETA	SG	t-test	Q(BETA)
1.	AVIS	.33	.17	.52	.30	1.71	.09
2.	ADNO	.29	-.07	-.13	.21	-.63	.53
3.	ADRA	.31	-.02	-.04	.24	-.15	.88
4.	ADST	.30	.14	.17	.13	1.32	.19
5.	ASHRA	.20	.02	.02	.14	.15	.88
6.	ASHKA	.07	-.13	-.17	.14	-1.26	.21
7.	ADKO	-.14	-.21	-.26	.13	-2.02	.05
8.	ADSZ	-.02	-.08	-.12	.15	-.82	.42
9.	AOGK	.06	.22	.54	.25	2.13	.04
10.	AOME	-.04	.01	.02	.18	.10	.92
11.	AONK	-.08	.00	.00	.23	.01	1.00
12.	AOPK	.02	.21	.43	.21	2.10	.04
13.	ATEZ	.04	-.21	-.67	.33	-2.02	.05
14.	AKDN	-.28	-.11	-.20	.18	-1.10	.28
15.	AKDM	-.25	-.03	-.06	.21	-.29	.77
16.	AKDNK	-.29	-.13	-.25	.20	-1.23	.22
17.	AKDPK	-.21	.06	.09	.17	.54	.59
DELTA = .36		RO = .58 SIGMA = .80			F = 2.27	Q(F) =. 00	

The coefficient of determination (DELTA = .36) is statistically significant, which means that the applied predictor system of variables has a significant impact on the criterion variable MSDV. The remaining 64% of the total variability of the criterion variable MSDV can be attributed to other characteristics and abilities of the respondents that are not subject to our examination.

The individual influence of the predictive anthropometric variables on the criterion variable MSDV have the variables ADKO (.05), AOGK (.04). and APOC (.04) and ATEZ (.05).

The anthropometric variables AOGK (.22), AOPK (.21), ADCO (-.21) and ATEZ (-.21) have the highest and statistically significant partial correlation (Part-r) with the criterion variable MSVM, which has a statistically significant effect on the performance of the MSVM test. Their importance is confirmed by the significant regression (BETA) coefficient and their (t) value, which is statistically significant.

The partial regression coefficients (BETA) of the anthropometric predictor variables AOGK (.54) and AOPK (.43) show a positive value at level Q (BETA) = .04.

The partial regression coefficients (BETA) of the anthropometric predictor variables ADCO (BETA = -. 26) and ATEZ (BETA = -.67) show a very high and negative value at the level Q (BETA) = .05.

From the review of this table we can conclude that the respondents who have larger chest and calf circumference, as well as lower body weight and knee diameter will achieve better results in performing MSVM tests.

Conclusion

Based on the obtained results and the performed analysis, it can be concluded that:

The applied anthropometric variables as a predictor system have a statistically significant effect on the criterion variables: distance jump in place (MDSM) and jump in height from place (MSVM). Respondents who had a larger calf circumference, larger chest circumference, lower body weight, smaller pelvic width, and smaller knee diameter performed better on the criterion variables. The results should be taken into account when selecting young basketball players.

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