FACTOR STRUCTURE AND BASIC FACTORS OF THE SPORTS PREPAREDNESS OF 15-16 YEARS OLD NATIONAL BASKETBALL COMPETITORS

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Introduction

It is often needed in the basketball practice to evaluate the stage of the young basketball players' preparedness. In this way the necessary information is received which serves as a landmark about the level of their development – whether they have the necessary physical qualities and basketball skills, whether they go forward within the educational and training process and whether there is a perspective for their development as highly qualified competitors in the future (Karalejič M., Jakovljevič S. 2001).

The complex development of the motive qualities sets up the issue about the evaluation and control on the specific functional preparation of the competitors. For this purpose many researchers are developing specific basketball tests and indicators (Giosheva, K., K. Tzarov, R. Tzarovaa, 1990, Gigova, V., 2002, Dasheva, D., 1991, Zhelyazkov, Tz., 1978, Zhelyazkov, Tz., Koyle, V., 1993, Coysi, B., Power, F., 1975, Wilkes, G., 1968, Borukova, M., 2014).

It is indisputable that one of the main factors of the game effectiveness is the skill of the competitors to materialize their motor potential into rational technical and tactical activities. The studies in that field cover huge factual material (Auerbach, R., 1978, Wilkes, G., 1968, Tzarov, Kr., 2001, Tzarov, Kr., 2008, Tzarova, R., 2013, Coysi, B., Power, F. 1983, Bompa, O. T. 2000).

The contribution of each of the indicators under study to the sport result of a given person or totality depends to the greatest degree on 3-4 basic factors. The disclosure of the factor structure of the physical development and the specific workability of growing up basketball players has high informative value for the optimization of the educational and training process (Tzarova, R., Borukova, M. 2012).

Depending on the importance of the separate indicators for the sports achievement, their factor weights represent greater or smaller significance for the optimization of the training from strategic aspect. The evaluation of the results by normative tables provides the possibility for tactical (current) optimization of the training depending on the moment development level of each of the competitive effectiveness symptoms (Dasheva, D., 1991, Tzarov, Kr., 2001, Tzarova, R., 2013).

It is established during studies executed in the sports schools (Borukova, M., 2014). that for the 15-16 years old pupils practicing basketball in these schools, the high effectiveness of the speed shooting while moving, the explosive strength of the lower limbs, the speed endurance and the skill of managing the ball while standing have the greatest contribution to the general physical and technical-tactical preparedness of the players.

Key words: growing up basketball players, optimization, educational and training process

The purpose of the study is the optimization of the education-training process for coming up basketball players by revealing the factor structure and identifying the basic factors of the sports preparedness during the age range of 15-16 years old players..

Subject of the study is the sports preparedness of coming up basketball players.

Object of the study are the symptoms of the physical development, the special physical and specific technical-tactical preparedness of the players.

The contingent of the study are 125 basketball players (of 15-16 years of age) entered in the national team of Bulgaria during the period 2009-2016.

The following methods of study are applied for executing the research: review study and theoretical analysis of the specialized literature, anthropometric and sports-pedagogical tests.

The tests entered into the test lot are distributed into 3 groups:

- *for physical development - 6 indicators;*
- *for specific physical preparedness - 8 indicators;*
- *for specific technical-tactical preparedness - 8 indicators.*

The following methods are applied for the needs of the study: mathematical-statistical methods, variation, alternative and factor analysis and the index method.

Analysis of the results:

The basic research task relates to the disclosure of the factor structure of the sports preparedness and the identification of the basic factors establishing that structure.

It is known from the factor analysis Borukova, M., (2014), theory that the dispersion of a mass of indicators can be explained by a more limited number of latent symptoms, called factors (Tzarova, R., Borukova, M. 2012) too. They are taken to the front on the base of the general, similar characteristics,

which to a certain degree exist objectively between the indicators under study related to a certain ability (quality) of the object (here the totality of the best 15-16 years old Bulgarian basketball players).

The disclosure of the factor structure and the identification of the basic factors of the individual competitive effectiveness is an important strategic task of our study.

Table 1 presents the results of the initial data processing.

Table 1.**Factor structure of the sports preparedness**

№	I	II	III	IV	V	VI	VII	VIII	h ²	1 - h ²
1.	0,894	0,182	0,130	-0,038	0,064	0,107	-0,081	-0,022	0,873	0,127
2.	0,894	0,158	0,186	0,027	0,094	0,083	-0,045	0,014	0,878	0,122
3.	0,175	0,027	0,879	-0,125	-0,037	0,101	-0,018	-0,168	0,860	0,140
4.	0,164	-0,063	-0,333	0,116	0,054	0,008	-0,165	0,657	0,617	0,383
5.	0,602	0,158	0,729	0,034	0,128	0,106	-0,065	-0,011	0,952	0,048
6.	0,043	0,050	0,927	0,107	0,134	0,048	-0,005	0,010	0,895	0,105
7.	-0,054	0,204	0,050	-0,801	0,058	-0,045	-0,115	-0,088	0,714	0,286
8.	0,308	0,860	0,039	-0,077	0,035	-0,071	-0,085	0,203	0,896	0,104
9.	0,182	-0,230	0,045	0,593	0,006	-0,160	0,011	0,392	0,619	0,381
10.	0,047	-0,691	-0,209	0,188	-0,158	-0,020	0,057	0,299	0,676	0,324
11.	0,328	-0,267	0,175	0,395	0,172	0,104	0,286	-0,410	0,656	0,344
12.	0,077	-0,151	-0,012	-0,022	-0,310	-0,478	0,465	-0,029	0,572	0,428
13.	0,078	-0,150	0,129	-0,797	0,149	0,131	-0,188	0,097	0,765	0,235
14.	-0,177	0,239	0,163	0,635	-0,109	0,052	-0,199	-0,088	0,581	0,419
15.	-0,362	-0,060	-0,002	0,174	0,041	-0,410	0,349	-0,021	0,456	0,544
16.	0,291	0,774	0,115	-0,079	0,003	0,410	0,059	0,147	0,896	0,104
17.	0,147	0,136	0,168	-0,017	-0,017	0,843	0,152	-0,002	0,803	0,197
18.	0,029	0,694	-0,097	0,357	0,151	0,171	-0,038	-0,037	0,674	0,326
19.	0,192	0,130	0,058	-0,068	0,781	0,026	0,127	-0,100	0,698	0,302
20.	-0,006	0,064	0,068	-0,131	0,805	0,007	-0,096	0,031	0,684	0,316
21.	-0,135	-0,024	-0,037	0,096	0,052	0,087	0,807	-0,021	0,691	0,309
22.	-0,358	0,154	0,184	-0,079	-0,141	0,119	0,231	0,572	0,607	0,393
Σα	12,39 %	12,37 %	11,56 %	11,25 %	7,03 %	6,52 %	5,99 %	5,91 %		

The analysis of the table shows that the factor structure of the sports preparedness of the best 15-16 years old Bulgarian basketball players is established by 8 factors which explain comparatively high percentage of the initial dispersion of the phenomenon under study – 73,02 %.

The table and figure 1 show as well that the first four factors have neighboring relative shares – the difference in percentage of the dispersion explained by the first and fourth factor is hardly 1,14 %. The same dependence is observed for the other four factors – the difference of the dispersion explained by the fifth and the eighth factors is 1,12 %.

Fig. 1 Relative shares of the initial dispersion of sports preparedness explained by each factor

The graphs presented in figure 1 allow getting an idea about those symptoms, which have the highest factor weights and define the essence of the first two factors.

The first factor explains the highest percent of the initial dispersion of the phenomenon under study (the sports preparedness) – 12,39 %. Here indicators 1, 2 and 5 (respectively height, stretch and weight) which bear information about the physical development of the basketball players under study are of highest factor weights. That gives the reason to identify the factor as a “morphological factor showing the high importance predominantly of the linear sizes of the body”.

The second factor is very close to the first one by the percent of the explained dispersion. It is related to both the special physical preparedness and the specific basketball skills of the competitors. It can be defined as “specific skill for moving along the playground both in attack (without and with a ball) and in defense which depends on the development level of the lower limbs explosive strength at horizontal muscle efforts”.

Fig. 2 Factor structure of the sports preparedness I-st and II-nd factors

Third factor (11,56 %) – It is again a morphological factor but it defines the place of the *body mass* and the *degree of fat in the body* (figure 3) in the factor structure.

The forth factor (11,25 %) – As it can be seen in figure 3, all the four indicators which high factor weights here relate to the physical preparedness of the players. That gives the reason to identify that factor as “basketball athleticism”.

Fig. 3 Factor structure of the sports preparedness III-rd and IV-th factors

The coming four factors relate to the specific skills of the basketball players.

The fifth factor (7,03 %) can be identified as “effectiveness of the speedy shot while moving” (figure 4).

The sixth factor (6,52 %) shows the importance of “the skill to lead the ball with high speed” (figure 4).

The seventh factor (5,99 %) defines the place of the “effectiveness of the shot from middle distance after the ball is received by a partner” (figure 4) in the factor structure of the 15-16 years old basketball players.

The eighth factor (5,91 %) can be identified as “functional capacity of the chest” which is an important prerequisite for the effective execution of free throws which usually are executed in a state of fatigue (figure 4).

Fig. 4 Factor structure of the sports preparedness – V-th, VI-th, VII-th, VIII-th factors

According to Tsarova, R. (2013) the results of the factor analysis can serve as an individual criterion for the optimization. This means that the symptoms of low level of development for each competitor be rearranged depending on each symptom read according to the place of that symptom in the integral factor structure of the sports preparedness.

Conclusions and recommendations

The analysis of the results and the general view on the factor structure of the physical development and the specific workability of 15-16 years old basketball players give us the reason to formulate the following **conclusions**:

1. The so-called morphological factor, showing the high importance predominantly of the linear sizes of the body is the most important about the general preparedness of the 15-16 years old basketball players.
2. The second factor can be defined as : specific skill for moving along the playground both in attack (without and with a ball) and in defense which depends on the level of development of the lower limbs explosive strength at horizontal muscle efforts.
3. The body mass and the degree of the body fat are defined as the third factor in the factor structure of the 15-16 years old basketball players.
4. The indicators related to the physical preparedness of the competitors identify the forth factor as the so-called “basketball athleticism”.
5. The rest four factors are complimentary and relate to the specific skills of the basketball players.

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