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COMPARING SITUATIONAL AND MOTOR ABILITIES AMONG KOSOVO JUNIOR BASKETBALL PLAYERS IN SUPER AND UNIQUE LEAGUES

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

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Abstract

Study purpose. The aim of this study is to differentiate the situational and motor abilities between two leagues of junior basketball players in Kosovo. A total of 120 players, aged 18, were assessed in this research, with 60 players belonging to the Super League and the remaining 60 players from the Unique League.

Materials and methods. In this research, the measuring instruments employed included a set of 12 basic motor variables and 5 situational motor variables. To ensure precise speed and agility data, electronic sensors in the form of Witty timer (Microgate) were utilized. The statistical analyses conducted involved the application of the t-test to identify significant differences between the leagues for individual variables, while the canonical discriminant analysis was employed to differentiate between the two leagues based on the comprehensive set of measured variables.

Results. Differences were observed in specific variables, favoring the Super League players in areas such as abdominal muscles endurance ($p < 0.05$) and throwing the medicine ball ($p < 0.01$), while the Unique League players excelled in jump height and agility tests. T-test and discriminant analysis confirmed significant distinctions between the leagues ($p < 0.01$). These findings provide valuable insights into the contrasting abilities of players in the two leagues.

Conclusions. This study found significant differences between the Super League and Unique League among U18 basketball players in Kosovo. The Super League players showed superior performance in explosive upper body strength, repetitive strength, and agility, while the Unique League players displayed higher physical preparedness in basic motor skills.

Keywords: basketball players, age U18, situational and motor abilities, differences between leagues.

Introduction

The basketball game consists of intricate motor movements, with fast movements and runs, high explosive jumps, with different duels during contact with the opponent. Basketball by the nature of moves it consists in the group of complex multi-structural sports, consist of cyclic movements (different types and movements of direction and ball direction) not cyclical (with application of tactical elements and tactical) (Šeparović, 2012). The training and refinement of motor features is carried out during the training process so the main task is the physical preparation of the basketball players. In the theory and practice of basketball, the issues of planning and managing the modern training process have not been sufficiently studied and do not have adequate scientific substantiation (Koryahin, Blavt, Doroshenko, Prystynskyi, & Stadnyk, 2020). In team sports is essential to optimize the training program through the study and workload analysis (Altavilla, D'Isanto, Raiola, & D'Elia, 2023). In this context, motor abilities refer to a person's potential movement competency and are described as not being directly observable, but are derived from a set of movement tasks (Machowska Krupa & Cych, 2023). Physical training improves the functional state of the organism and all systems, especially the central nervous system. The influence of motor coordination on performance in sports has already been studied by many researchers in many fields (Mullineaux & Uhl, 2010). Basketball as a collective sport should be geared towards maintaining the high level of basic features so that they can be performed quickly during the game, it is the combination of health and skill related aspects

of physical abilities (Kariyawasam, et al., 2019). Explosive strength, jumping power, speed, and agility are crucial factors that significantly contribute to effective movement both with and without the ball. These abilities considerably influence the proper execution of technical and tactical elements and thus also the playing performance of all types of players (guards, forwards and centres) (Erčulj & Bračič, 2007). On the one hand motor skills are genetic while on the other hand they are mainly acquired through the training process. Specific training methods present opportunities to influence the development of these abilities. Motor skill is the basis for any learning of motor tasks of a given technique, so it can be considered to represent a fundamental value in the total human motor skill space (Pržulj, 2006). Motor abilities play an important role in the selection of young basketball players and the progress in their playing performance (Erculj, Blas & Bračič, 2010). Based (Trninić, 1996) Basketball is a game of moves, mistakes, habits, reflexes, reactions, tasks is a game in which players solve typical and atypical problems in game situations, is a game of cooperation and communication, is a game of centimeters and seconds, is a game of timing and space in certain actions. Basketball is both individual and group play, basketball is a game of psycho-motor skills.

Materials and Methods

Study participants

The samples of the entities tested in this research paper in total are 120 active junior players under the age of 18 divided into two leagues by the Basketball Federation of Kosovo. Superleague with six teams on the level of the best quality players who have been selected 60 players fom the best teams, and Unique League with five teams who also selected the best 60 players of the teams from this league which are the first in their ranking list on the table of the season 2018-2019.

The total number of sample entities tested in this research are 120 active junior players under the age of 18 of Kosovo teams divided into two leagues. Super league is with six teams' 60 players and unique league is with five teams also 60 players who are the first on the table list of the 2018-2019 season.

Study organisation

Super leauge U-18-Basketball Club "Keresan Prishtina" from Pristina, Basketball Club "M-Junior" from Pristina, Basketball Club "Prishtina e re" from Pristina, Basketball Club "Trepça" from Mitrovica, Basketball Club "Borea" from Peja, Basketball Club "Vushtrria basket" from Vushtrri.

Unique leauge U-18-Basketball Club "Z Mobile Prishina" from Pristina, Basketball Club "Penza" from Peja, Basketball Club "Rahoveci" from Rahoveci, Basketball Club "Istogu" from Istog, Basketball Club "Lipjani" from Lipjan.

Variable samples

In this research paper are included in total 17 variables from basic motor space and situational motor skills and those tests are mainly taken from Eurofit.

Electronic sensors were used to obtain the most accurate running speed and agility data "Witty timer" (Microgate).

In basic motor spaces are treated 12 basic motor tests, and 5 situational motor tests.

Samples of basic motor measuring instruments were treated with 12 basic motor tests and 5 situational motor tests.

Basic motor

Explosive leg strength tests

1. Jump length from the place; 2. Jump high above the place; 3. Jump from the place with the step height.

Speed tests

4. Speed running 10 m; 5. Speed running 20 m.

Repetitive force tests

6. Abdominal muscles 30 sec; 7. Arms push up.

Hand strength tests

8. Throwing the medicinball from the chest;

Test of flexibility

9. Profound warp (flexibility);

Agility tests

10. Line agility test; 11. Illinois agility; 12. 6×5 meters running.

Situational motor

1. Dribble ball 20 m with the right hand;
2. Dribble ball 20 m with left hand;
3. Ball dribble between cones (zig-zag);
4. 6 x 5 meters ball dribble;
5. Illinois agility with ball dribble.

Results

Table 1 presents the basic statistical parameters of distribution results of motor and situational variables of U18 basketball players of super league and the unique league.

If we compare the arithmetic averages of basketball players of super league and unique league the values are roughly similar in this area as well, but some of the variables that are in favor of super league basketball players are: MABMU30``– Abdominal muscles 30 sec, for (1.91), MARMPUP – arms push up for (35.33), MMEDCH- Throwing the medicinball from the chest for (48.51 cm). While the tests in favor of basketball players of unique league are: MJHULEP- Jump high above the place for (2.41 cm), MPROAR- Profound warp (flexibility) for (1.32 cm), MLAGILT-line agility test for (0.42 sec), SMIABD – Illinois agility with ball dribble for (0.41 sec).

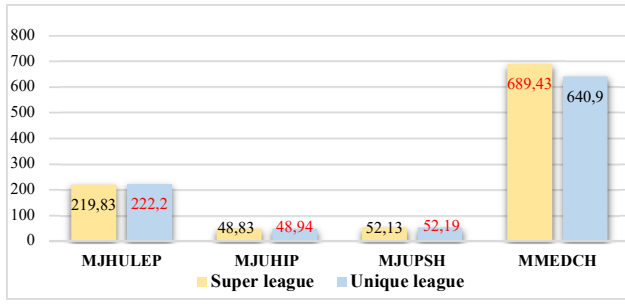

Fig. 1 Evaluation of explosive strength of legs and hands

Table 1. Basic statistical indicators in the motor and situational space of the super league and unique league of basketball players

Variable	Super league, N=60				Unique league, N=60			
	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
MJHULEP	219.83	187.0	291.0	22.766	222.24	183.0	270.0	21.900
MJUHIP	48.83	30.0	76.0	8.669	48.94	32.0	71.5	7.651
MJUPSH	52.13	35.0	76.0	9.062	52.19	35.0	71.5	7.764
MSRU10M	1.99	1.7	2.3	0.128	1.96	1.8	2.2	0.116
MSRU20M	3.38	2.9	3.8	0.200	3.36	3.1	3.8	0.179
MABMU30``	29.46	20.0	43.0	4.307	27.55	18.0	40.0	5.063
MARMPUP	35.33	12.0	59.0	11.029	33.76	18.0	54.0	7.855
MMEDCH	689.43	510.0	914.0	83.387	640.90	480.0	787.0	68.539
MPROAR	11.28	0.0	32.0	7.360	12.60	1.0	30.0	6.822
MLAGILT	11.86	9.7	14.5	1.050	11.44	9.9	13.4	0.995
MILLIAG	16.27	13.2	18.3	0.972	16.58	14.6	18.2	0.789
M6X5MRU	10.04	8.5	11.6	0.620	10.21	9.1	12.0	0.564
SMD20RH	3.60	3.1	4.5	0.238	3.59	3.2	4.5	0.239
SMD20LH	3.60	3.0	4.5	0.267	3.63	3.2	4.6	0.233
SMBDBCZ	5.85	4.7	7.1	0.495	5.64	4.8	6.4	0.376
SM6X5BD	10.45	7.7	12.0	0.689	10.67	9.4	12.2	0.577
SMIABD	17.28	14.6	19.8	1.145	17.69	15.6	19.7	0.9461

Legend: MJHULEP – Jump length from the place; MJUHIP – Jump high above the place Jump; MJUPSH – from the place with the step height; MSRU10M – Speed running 10 m; MSRU20M – Speed running 20; MABMU30`` – Abdominal muscles 30 sec; MARMPUP – Arms push up; MMEDCH – Throwing the medicinball from the chest; MPROAR – Profound warp (flexibility); MLAGILT – Line agility test; MILLIAG – Illinois agility; M6X5MRU – 6×5 meters running; SMD20RH – Dribble ball 20 m with the right hand; SMD20LH – Dribble ball 20 m with left hand; SMBDBCZ – Ball dribble between cones (zig-zag); SM6X5BD – 6×5 meters ball dribble; SMIABD – Illinois agility with ball dribble.

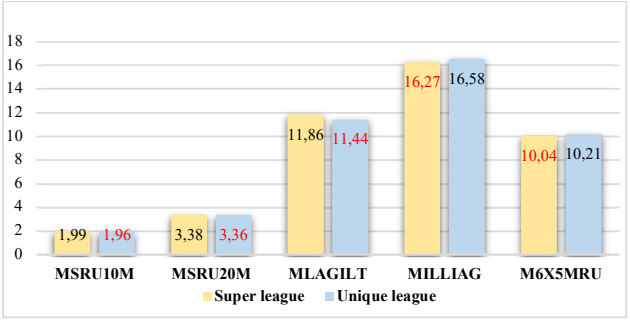

Fig. 2 Evaluation of speed and agility

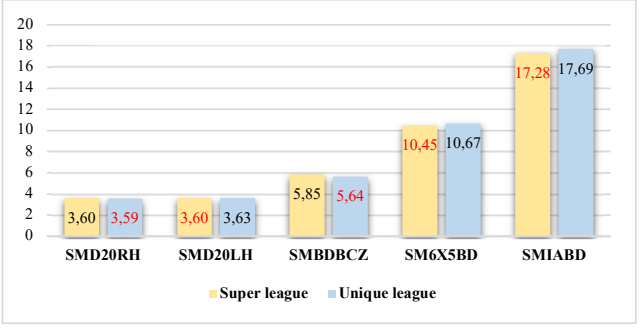

Fig. 4 Evaluation of situational motor skill

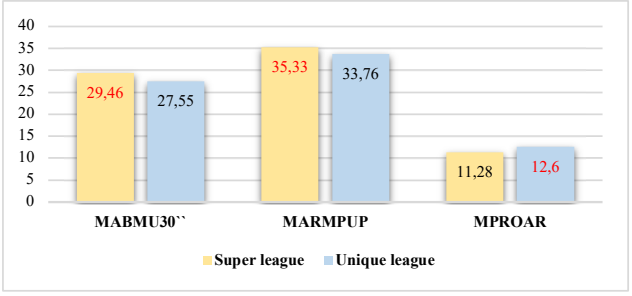

Fig. 3 Evaluation of repetitive force and flexibility

In table 2. Comparisons of arithmetic averages in each variable of the two leagues were made possible by the T-test method. Table 1 gives obtained results for the motor and situational space, by analyzing the obtained values in this table we might see that there are statistically significant differences in the probability level ($P<0.01$). MMEDCH – Throwing the medicine from the chest is the variable 0.001, which is in favor of the unique league. While in the level of probability ($P<0.05$) are these variables MABMU30`` – Abdominal muscles per 30 sec) 0.027, MILLIAG – Illinois agility test 0.026, and MLAGILT – Line agility test 0.056 these variables are in a benefit of super league basketball players.

Table 2. Interpretation of T-test values in the space of motor variables and motor and situational motor of super league and unique league.

Variables motoric	Groups	N	Mean	Std. Dev.	t	df	Sig. (2-tailed)
MJHULEP	Super league	60	219.835	22.7663	-0.590	118	0.557
	Unique league	60	222.240	21.9006	-0.590	117.823	0.557
MJUHIP	Super league	60	48.832	8.6698	-0.078	118	0.938
	Unique league	60	48.948	7.6513	-0.078	116.204	0.938
MJUPSH	Super league	60	52.132	9.0626	-0.040	118	0.968
	Unique league	60	52.193	7.7647	-0.040	115.289	0.968
MSRU10M	Super league	60	1.990	0.128	1.103	118	0.272
	Unique league	60	1.965	0.1168	1.103	117.012	0.272
MSRU20M	Super league	60	3.383	0.2001	.470	118	0.639
	Unique league	60	3.367	0.1798	.470	116.682	0.639
MABMU30``	Super league	60	29.467	4.3079	2.233	118	0.027
	Unique league	60	27.550	5.0637	2.233	115.045	0.027
MARMPUP	Super league	60	35.333	11.0295	.896	118	0.372
	Unique league	60	33.767	7.8554	.896	106.607	0.372
MMEDCH	Super league	60	689.433	83.3877	3.483	118	0.001
	Unique league	60	640.900	68.5397	3.483	113.736	0.001
MPROAR	Super league	60	11.283	7.3608	-1.021	118	0.309
	Unique league	60	12.607	6.8227	-1.021	117.327	0.309
MLAGILT	Super league	60	11.863	1.0502	2.260	118	0.026
	Unique league	60	11.441	0.9954	2.260	117.663	0.026
MILLIAG	Super league	60	16.270	0.9725	-1.926	118	0.056
	Unique league	60	16.581	0.7897	-1.926	113.232	0.057
M6X5MRU	Super league	60	10.043	0.6203	-1.616	118	0.109
	Unique league	60	10.218	0.5649	-1.616	116.984	0.109
SMD20RH	Supper league	60	3.602	0.2382	0.279	118	0.781
	Unique league	60	3.590	0.2397	0.279	117.995	0.781
SMD20LH	Super league	60	3.605	0.2674	-0.681	118	0.498
	Unique league	60	3.636	0.2332	-0.681	115.855	0.498
SMBDBCZ	Super league	60	5.854	0.4956	2.592	118	0.011
	Unique league	60	5.646	0.3769	2.592	110.146	0.011
SM6X5BD	Super league	60	10.456	0.6895	-1.895	118	0.061
	Unique league	60	10.676	0.5776	-1.895	114.485	0.061
SMIABD	Super league	60	17.288	1.1458	-2.096	118	0.038
	Unique league	60	17.690	0.9461	-2.096	113.922	0.038

Table 3. Discriminant analysis of motor basic variables and situational

Function	λ	Rc	Wilks' λ	X^2	df	Sig.
1	0.404	0.537	0.712	37.183	17	.003

Whereas in situational motors with statistically valid values between two leagues in a variable are these variables, SMBDBCZ – Ball dribble between cones zig-zag 0.011, SM6X5BD – 6×5 meters with ball dribble 0.061, SMIABD – Illinois agility with ball dribble 0.038.

Even in table 3. of the discriminant analysis between the two groups of basketball players in the motor and situational space where can be observed differences between the two researched leagues where a discriminatory function is acquired.

The discriminant function between these two groups has the characteristic root value λ = 0.404.

The canonical correlation discrimination coefficient has a Rc value = 0.537.

The criterion for discriminant strength of the anthropometric variables applied is set through Wilks 'lambda' λ = 0.712. Whereas the statistical significance of the discriminant equation was tested with Barlet's test X^2 = 37.183, for df = 17, degree of freedom. The significance level of this function is (Sig. = 0.003), which indicates the statistical validity of this discriminant function, we conclude that basketball players of these two leagues have statistically significant differences in motor and situational variables.

In table 4. Significant correlation with discriminatory function has been realized by the variables that mainly indicate the throwing of two-handed medicine ball from the chest, ball guidance 20m between zig-zag cones, line agility test, abdominal muscles per 30 sec, illinois agility test, 6×5 meters with the dribble ball and 6×5 meters running.

Table 4. Structural matrix

Variables	Function 1
MMEDCH	0.504
SMBDBCZ	0.375
MLAGILT	0.327
MABMU30``	0.323
SMIABD	-0.303
MILLIAG	-0.279
SM6X5BD	-0.274
M6X5MRU	-0.234
MSRU10M	0.160
MPROAR	-0.148
MARMPUP	0.130
SMD20LH	-0.099
MJHULEP	-0.085
MSRU20M	0.068
SMD20RH	0.040
MJUHIP	-0.011
MJUPSH	-0.006

Legend: MJHULEP – Jump length from the place; MJUHIP – Jump high above the place Jump; MJUPSH – from the place with the step height; MSRU10M – Speed running 10 m; MSRU20M – Speed running 20; MABMU30`` – Abdominal muscles 30 sec; MARMPUP – Arms push up; MMEDCH – Throwing the medicinball from the chest; MPROAR – Profound warp (flexibility); MLAGILT – Line agility test; MILLIAG – Illinois agility; M6X5MRU – 6×5 meters running; SMD20RH – Dribble ball 20 m with the right hand; SMD20LH – Dribble ball 20 m with left hand; SMBDBCZ – Ball dribble between cones (zig-zag); SM6X5BD – 6×5 meters ball dribble; SMIABD – Illinois agility with ball dribble.

Table 5. Centroids of basal and situational motor groups

Groups	Function 1
Super League	0.631
Unique League	-0.631

The arithmetic mean of the discriminatory values of the groups represent the centroids of the motor basic and situational motor groups which are given in the table 5 which makes group discrimination better.

In table 5 concentration of group centroids in discriminatory function, divided into two groups, first group Super League of basketball players has a greater centroid value 0.631, while the second group the Unique League of basketball players has the least centroids value of -0.631.

Based on centroid values we can conclude that: Basketball players of Super League have higher values in the explosive force of the hands, agility of ball guidance and ability of agility without ball.

Discussion

The data presented below of arithmetic averages in basic statistical indicators of the basic motor space and situational motor space between super league and unique league, in juniors we might see that the results in the variables of the explosive force (Miftari, Selimi, Badau & Kelmendi, 2021) of legs in small differences dominate basketball players of unique league in addition to variable which estimates the explosive force of the hands that is in favor of junior of super league. If we evaluate basketball players while running at speed and in agility in small differences basketball players of unique league dominate in three variables such as: speed running 10 m, speed running 20 m the line agility test while in two other variables of agility better results have showed super league in variables illinois agility test and 6x5 meters running. In repetitive force, the basketball players of super league are favored, while in flexibility the best result was by the unique league. The results of this research shows that basketball players of super league have jumped from the place at a height of 48.83 cm, while the unique league 48.94 cm, while the performance of the running test at a speed of 20 m, have run in average of 3.38 seconds to super league, while in unique league for 3.67 seconds. According to previous works of other authors, the results of the players included in this research will be compared with the results of players from other European countries, will be observed whether they have equal or better values in favor of the players included in this research. In long jump spot test we see that they showed identical values while in the Illinois agility test our basketball players showed better values in the result when executing this agility test (Asadi, 2016), while in the jump length tests from the place are showed lower values compared to the players from Montenegro (Ljubojević & Nikolić, 2012), while those from Brazil showed lower values with a result of 44 centimeters (Gledson et al., 2018), while our results have a value of 48.83 centimeters for the super league and 48.94 centimeters for unique league. The performance of the running test when it is compared with other basketball players, we might see that we have lower values of results compared to other authors. (Schiltz et al., 2009), while players from Croatia in 3.2 seconds (Milanović, Jukić & Marković, 2004) while players from Montenegro manage to run for 3.24 seconds (Vukasevic, et al., 2019), while players from Kosovo manage to run for 3.63 seconds (Kryeziu & Asllani, 2016) meanwhile from Albania reached values of 3.49 seconds (Spahi, Jarani, Bilali, 2015) and our players we've had in this research have reach running in an average of 3.38 seconds in the Super League and 3.67 seconds in the Unique League. Indictor of repetition strength, abdominal muscles have shown identical values on the results of Slovenian basketball players (Klemenčič, 2010) while other basketball players have shown lower scores (Cheryll, 2008), as well as basketball players from Bosnia and Herzegovina showed the lowest results (Pojskić et al., 2014). The performance of the line agility test has shown similar results to those authors of Finnish basketball league (Stojanovic et al., 2018). From results of basic indicators in situational motor skills at juniors of Super League are favored in three variables: Dribble ball 20 m with left hand, 6×5 meters ball dribble and Illinois agility test while two variables with small differences belong to the Unique League Dribble ball 20 m with the right hand and Ball dribble between cones (zig-zag) (Begu, 2012). Further we will compare and analyze with with previous publications of other authors in motor situational space of the basketball game. We have compared in test dribble ball 20 m with the right hand and dribble ball 20

m with left hand who have succeeded to have better results than basketball players from different European countries (Erčulj et al., 2009), while with other basketball players they have shown higher values of results from this two variables of motor situational (Jakovljević et al., 2017).

Test 6×5 meters ball dribble of Super League have achieved results in 10.45 seconds, while Unique League 10.67 seconds, comparaison of basketball players by authors (Erčulj et al., 2009), which is in a value10.24 seconds we might say that they are approximately the same.

If we compare the Illinois agility test of basketball players of Super League who have achived to realize in time of 16.27 seconds, and the basketball players of Unique League in time of 16.58 and illinois agility with ball dribble of Super League 17.28 while the basketball players of Unique League 17.69 showed that Super League basketball players realized better dribble ball technique compared to basketball players of Unique League.

In this case, if we compare the results with other authors, we might see that the Illinois agility test with dribbling ball showed slightly better result compared to 17-year-old basketball players (Kamandulis et al., 2013). The optimization of basketball training system is a complex problem that requires further research (Koryahin et al., 2016).

Presented results in this research paper of these junior basketball players of two Kosovo leagues can be said they are relatively favorable, taking as a basis basketball players from the region, but in order to achieve higher results with our basketball players in future, it should be started earlier with measurements and tests to select the best players and working in a systematic and professional manner.

Conclusions

In general, the results of this paper shows that the indicators of explosive force in upper extremities, repetitive strength, agility and situational motor skills with the ball have shown significant differences between two leagues, while the indicators of expository strength of the lower extremities and speed, there weren't reported significant differences between Super League and Unique League among Juniors of Kosovo. However, the data presented between the Super League and Unique League in juniors it is seen that the results between average arithmetic in indicators of explosive strength of lower extremities, while the indicators of repetitive strength, explosive strength in upper extremities and agility are in favor of Super League. In general, the results of situational motor indicators have a mix between the two leagues, but most of the treated tests are in favor of Super League. According to this, it is seen that these basketball players of Unique League have higher physical preparation in indicators of basic motor skills, while basketball players of Super League have shown more favorable values in indicators of situational motor skills.

Acknowledgment

We would like to thank coaches and junior basketball players of Kosovo who understood us to carry out the measurements and tests of these basketball players who were always ready for measurements and understood the importance of this study who did not hesitate for their time and training that we have received.

Conflict of interest

The authors declare no conflict of interest.

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ПОРІВНЯННЯ СИТУАТИВНИХ І РУХОВИХ ЗДІБНОСТЕЙ БАСКЕТБОЛІСТІВ-ЮНІОРІВ КОСОВА В СУПЕРЛІЗІ ТА В УНІКАЛЬНІЙ ЛІЗІ

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 8 с., 5 табл., 4 рис., 28 джерел.

Мета дослідження. Метою цього дослідження є встановлення відмінностей у ситуативних і рухових здібностях між двома лігами баскетболістів-юніорів у Косово. Загалом у цьому дослідженні було оцінено 120 гравців віком 18 років, із яких 60 гравців належали до Суперліги, а решта 60 – до Унікальної ліги.

Матеріали та методи. Вимірювальні інструменти, які використовували в цьому дослідженні, включали набір із 12 основних рухових змінних і 5 ситуативних рухових змінних. Для забезпечення точних даних про швидкість і спритність використовували електронні датчики у вигляді таймера Witty (виробництва Microgate). Проведений статистичний аналіз включав застосування t-критерію Стьюдента для визначення статистично значущих відмінностей між лігами для окремих змінних, тоді як для встановлення відмінностей між двома лігами на основі повного набору вимірюваних змінних використовували канонічний дискримінантний аналіз.

Результати. У конкретних змінних спостерігалися відмінності на користь гравців Суперліги в таких областях, як витривалість м'язів живота ($p < 0,05$) і кидок медболу ($p<0,01$), тоді як гравці Унікальної ліги відзначились у тестах на висоту

стрибка та спритність. Т- критерій Стьюдента та дискримінантний аналіз підтвердили статистично значущі відмінності між лігами ($p < 0,01$). Ці одержані результати дають цінне розуміння контрастних здібностей гравців у двох лігах.

Висновки. У цьому дослідженні були виявлені статистично значущі відмінності між Суперлігою та Унікальною лігою серед баскетболістів національної чоловічої баскетбольної команди спортсменів віком до 18 років у Косово. Гравці Суперліги продемонстрували чудові результати у вибуховій силі верхньої частини тіла, силі повторення та спритності, а гравці Унікальної ліги продемонстрували кращу фізичну підготовленість в основних рухових навичках.

Ключові слова: баскетболісти, вік до 18 років, ситуативні та рухові здібності, відмінності між лігами.

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