THE ANALYSIS OF SHOT ACCURACY ACROSS DIFFERENT COMPETITION LEVELS IN FEMALE BASKETBALL PLAYERS

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ABSTRACT

Shooting accuracy can be a strong predictor of winning in a basketball game. The aim of this research was to determine the differences in shooting accuracy tests between basketball teams at different levels of competition. The subject of the research is the shooting accuracy of female basketball players. The object of the research is the differences in shooting accuracy across different competition levels in female basketball. The sample of participants consisted of 24 female basketball players from teams in Serbia. The respondents were divided into two groups of twelve female basketball players from the first league (n=12) and the second league (n=12). The main method of the study are: thorough review and analysis of the specialized literature and tests to assess accuracy. Six measuring tests were used to assess the accuracy (2-points and 3-points). All tests were done indoors, in one day, and with the same ball. The results of the testing were processed by: T-test. Data processing was performed with the SPSS statistics program. T-test was used to determine differences between groups. The results showed that the team from the higher competitive level did not achieve statistically significant better results ($p > 0.05$) on the accuracy tests for 2-points compared to the team from the lower competitive level. However, the shooting test of 45˚ for 3 (both sides) points was significantly different ($p < 0.05$) than second league basketball players. Our results indicate the importance of 3-point shooting practice.

Keywords*: team sport, difference, precision, shot, female*

АНАЛИЗ НА ТОЧНОСТТА НА СТРЕЛБАТА В РАЗЛИЧНИТЕ СЪСТЕЗАТЕЛНИ НИВА ПРИ БАСКЕТБОЛИСТКИ

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РЕЗЮМЕ

Точността на стрелбата, може да бъде предпоставка за победа в баскетболната среща. Целта на това изследване е да се определят разликите от тестовете за точност

на стрелбата между баскетболни отбори на различно състезателно ниво. Предмет на изследване е точността на стрелбата при баскетболистките. Обект на изследването са разликите в точността на стрелбата, при различно състезателно ниво в женския баскетбол. Извадката от участници се състои от 24 баскетболистки от отбори в Сърбия. Участниците са разделени в две групи от по дванадесет баскетболистки от първа лига и от втора лига. Основните методи на изследване са: задълбочен преглед и анализ на специализираната литература и тестове за оценка на точността. За оценка на точността са използвани шест измервателни теста (за 2-точки и за 3-точки). Всички тестове са направени на закрито, в един ден и с една и съща топка. Резултатите от тестирането са обработени чрез: Т-тест. Обработката на данните е извършена със статистическата програма SPSS. Т-тестът е използван за определяне на разликите между групите. Резултатите показват, че отборът от по-високото състезателно ниво не е постигнал знамими статистически по-добри резултати ($p > 0,05$) на тестовете за точност за 2 точки в сравнение с отбора от по-ниското състезателно ниво. Въпреки това, тестът за стрелба от 45˚ за 3 точки (от двете страни) е значително различен ($p <0,05$) от този при баскетболистите от втора лига. Нашите резултати показват значимостта на тренировките за стрелба от 3-те точки.

Ключови думи: *отборен спорт, разлика, прецизност, женски баскетбол*

INTRODUCTION

Basketball is a complex sport involving various motor abilities where shooting is one of the most important (Okazaki, Rodacki, 2012). Moreover, shooting accuracy is strongly correlated with winning the basketball game (Garcia et al., 2013). To maintain good shooting accuracy, basketball players need to be physically fit by maintaining optimal explosive power, anaerobic power, and anaerobic capacity (Castagna et al. 2009). Besides the high level of physical fitness, the athlete needs to have proper shooting technique (Apostolidis et al., 2004) to shoot the ball in the basket in high percentages.

In basketball, shooting accuracy from different shooting positions is also important (Zhen et al. 2015). (Erčulj & Štrumbelj, 2015) investigated different shot types and shot success among male basketball players. Certain differences, such as tactical and technical skills are presented between genders in jump shot accuracy in basketball (Argiriou et al., 2014). The male basketball population is mostly involved in the studies, where researchers focus on physical fitness, shooting technique, and accuracy differences and improvements (Miller, Bartlett, 1996; Chiang, Liu, 2006; Wang et al., 2021). Basketball accuracy also depends on the player's position on the court (Miller, Bartlett, 1996). Different positions tend to have higher shooting accuracy than the others (point guards and shooting guards are better than center positions). The physical performance of the players between lower and higher competitive levels is known

(Ferioli et al., 2018; Tiwari et al., 2012). However, to the authors' knowledge, shooting accuracy between higher and lower competitive levels among female basketball players is unknown.

Different competition levels define the quality of the game and the athlete itself. The area of female basketball is not investigated by as male population, therefore, the aim of this research is to examine shot accuracy among different competition levels in female basketball players.

METHODOLOGY

The aim of this research was to determine the differences in shooting accuracy tests between basketball teams at different levels of competition.

The subject of the research is the shooting accuracy of female basketball players.

The object of the research is the differences in shooting accuracy across different competition levels in female basketball.

The sample of participants in this research consisted of 24 female senior basketball players, 12 female basketball players from the "Student" basketball club (first league) (n=12), and 12 female basketball players from the "Paraćin" basketball club (second league) (n=12). The female basketball players of the "Student" basketball club competed in the First Women's League of Serbia in the 2021/2022 season, while the female basketball players of the "Paraćin" basketball club competed in the Serbian League Group South in the 2021/2022 season.

Respondents, experts in the field of sports, parents, and club administrations were familiar with the method and rules of testing, and consent was sought from parents and clubs that the data obtained from testing can be used for scientific purposes. All participants had 10 minutes warm-up routine (5 minutes low intensity running and 5 minutes dynamic stretch exercises)

The main method of the study are: thorough review and analysis of the specialized literature and tests to assess accuracy.

The following tests were used to assess accuracy: Jump shot from the left 45˚ spot from a middle distance (Left45˚M) with use of the board; jump shot from the right 45˚ spot from a middle distance (Right45˚M) with use of the board; jump shot from the central position (Central45˚M) from middle distance; Three-point shot at an angle of 45˚ (Right45˚3pt) from the right side; three-point shot at an angle of 45˚ from the left side (Left45˚3pt); three-point shot from the central position (Central3pt). All tests were performed with 10 shots in 3 sets.

The results of the testing were processed by: T-test.The data was analyzed using the SPSS statistics program. The primary central and dispersion parameters are arithmetic mean and standard deviation (SD) were calculated. The normality of the distribution of variables was tested with the Kolmogorov-Smirnov test. A T-test for independent samples was used to determine differences in accuracy between female basketball players of different levels of competition (statistical level of significance is $p < 0.05$).

RESULTS

Prior to assessing potential differences in accuracy tests between players of two competitive teams, descriptive statistics were calculated for both groups. Table 1 shows the normal distribution of the data. In Table 2 results are shown for shooting accuracy differences among first and second league female basketball players.

Table 1. *Kolmogorov-Smirnov test*

Variables	Statistic	df	p
Left45˚M	.29	24	.15
Right45˚M	.19	24	.20
Central45˚M	.22	24	.13
Right45˚3pt	.35	24	.09
Left45˚3pt	.22	24	.20
Central3pt	.26	24	.12

df - total number of respondents; p - significance of the results; M – middle distance; pt - point

Table 2. *Differences between the first and second league in shooting tests*

Variables	**Level**	**N**	**M**	**SD**	**P**
Left45˚M	1. league	12	8.17	1.34	.57
	2. league	12	7.83	1.14	
Right45˚M	1. league	12	6.67	1.44	.26
	2. league	12	5.55	2.19	
Central45˚M	1. league	12	5.33	1.77	.16
	2. league	12	4.25	1.91	
Right45˚3pt	1. league	12	4.92	1.62	**.05**
	2. league	12	3.67	1.97	
Left45˚3pt	1. league	12	5.33	1.78	.15
	2. league	12	4.33	1.50	
Central3pt	1. league	12	7.08	0.90	**.00**
	2. league	12	4.38	2.38	

N-number of respondents; SD- standard deviation, p - significance of results; M – middle distance; pt – point

DISCUSSION

The purpose of this research was to determine the differences in shooting accuracy tests between female basketball teams at different levels of competition. Based on the obtained results, we can conclude that the female players of the team that performs in a higher category did not achieve statistically significant results compared to the team from the lower category of the competition in middle distance shooting. However, the 3-point shooting (right and central) position yielded significant results and differences between first and second league female players. Moreover, mean values for the first league female players are higher in every test compared to second league players.

The players from a higher rank train more than players from a lower rank, which could be an indicator of these results (Petway et al., 2020). Furthermore, motivation can be an important factor in this research, and we assume that the team from the lower level of the competition had a greater motivation through this research. When we comment on accuracy in basketball, the biggest impact is the accuracy of shooting the ball into the basket. In addition to this characteristic, precision has a much broader significance. Every element of the basketball game (both in attack and defense) is greatly influenced by precision. Passing the ball, dribbling, and movement in the basketball stance are just some of the elements of the basketball game where precision has multiple importance. Shooting accuracy is highly influenced by fatigue (Mulazimoglu et al., 2017). A higher heart rate can decrease shooting accuracy. Increasing the shooting distance decreases shooting accuracy since it demands greater vertical jump, increased elbow amplitude, greater wrist flexion, etc. (Okazaki & Rodacki, 2012). This also indicates that first league female basketball players are potentially well physically prepared and that coaches need to improve physical fitness to lower competitive level players.

However, this study has limitations. Factors beyond the competition level, such as playing position and psychological pressure during game situations, may also influence shooting accuracy. Moreover, the shooting accuracy was done in one day. Conducting the same tests the next day would present more valid and reliable results. Future research should explore these additional variables to provide a more comprehensive picture of how shooting performance varies across competition levels in female basketball. Also, this research can be conducted to basketball players from other countries and with a larger sample size to confirm and strengthen our results.

CONCLUSION

The present study showed that female basketball players from the first and second league in Serbia showed similar results in the middle shooting accuracy. However, 3 point shooting accuracy was higher in the first league female players. Our findings can assist coaches in improving their programs and concentrating on specific skills, such as three-point shooting drills, especially at lower competitive levels.

REFERENCES

Apostolidis, N., Nassis, G.P., Bolatoglou, T., & Geladas, N.D. (2004). Physiological and technical characteristics of elite young basketball players. *Journal of Sports Medicine and Physical Fitness*, 44, 157-163.

Argiriou, M., Rousanoglou, E., Boudolos, K., & Bolatoglou, T. (2014). The role of preceding technical and tactical skills on jump shot accuracy in male and female basketball players. *J Athl Enhancement* 3, 4, 2.

Castagna, C., Chaouachi, A., Rampinini, E., Chamari, K., & Impellizzeri, F. (2009). Aerobic and explosive power performance of elite Italian regional-level basketball players. *Journal of Strength and Conditioning Research*, 23,1982-1987.

Chiang, H. Y., & Liu, Y. T. (2006). Coordination of basketball shooting movement of different skill level players. In ISBS-Conference Proceedings Archive.

Erčulj, F., & Štrumbelj, E. (2015). Basketball shot types and shot success in different levels of competitive basketball. *PloS one*, 10(6), e0128885.

Ferioli, D., Rampinini, E., Bosio, A., La Torre, A., Azzolini, M., & Coutts, A. J. (2018). The physical profile of adult male basketball players: Differences between competitive levels and playing positions. *Journal of sports sciences*, 36(22), 2567-2574.

García J., Ibáñez S. J., De Santos R. M., Leite N., Sampaio J. (2013). Identifying basketball performance indicators in regular season and playoff games. *J. Hum. Kinet*. 36, 161–168. doi:10.2478/hukin-2013-0016

Miller, S., & Bartlett, R. (1996). The relationship between basketball shooting kinematics, distance and playing position. *Journal of sports sciences*, 14(3), 243-253.

Miller, S., & Bartlett, R. (1996). The relationship between basketball shooting kinematics, distance and playing position. *Journal of sports sciences*, 14(3), 243-253.

Mulazimoglu, O., Yanar, S., Tunca Evcil, A., & Duvan, A. (2017). Examining the effect of fatigue on shooting accuracy in young basketball players. *The Anthropologist*, 27(1-3), 77-80.

Okazaki V. H. A., Rodacki A. L. F. (2012). Increased distance of shooting on basketball jump shot. *J. Sports Sci. Med*. 11, 231–237.

Petway, A. J., Freitas, T. T., Calleja-González, J., Medina Leal, D., & Alcaraz, P. E. (2020). Training load and match-play demands in basketball based on competition level: A systematic review. *PloS one*, 15(3), e0229212. Tiwari, L. M., Singh, M., & Singh, B. (2012). Comparative study of selected physical and physiological variables of male basketball players at different levels of competition. *Asian Review of Social Sciences*, 1(1), 42-46.

Wang, Y., Sun, M., & Liu, L. (2021). Basketball shooting angle calculation and analysis by deeply-learned vision model. Future Generation Computer Systems, 125, 949-953.

Zhen, L., Wang, L., & Hao, Z. (2015). A biomechanical analysis of basketball shooting. *International Journal of Simulation Systems, Science & Technology*, 16, 1-1.

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