

Differences in Basic Motor and Situational Motor Abilities of Female Handball Players at Varying Levels of Competition

¹ Faculty of Sport and Physical Education, University of Sarajevo, Bosnia and Herzegovina

Original scientific paper

Abstract

The aim of this study was to confirm the difference in basic motor and situational motor abilities of female handball players. Studies were conducted on 79 adult female handball players playing in the BiH Premier League and the BiH First Federal League. For basic-motor abilities, 18 variables were used which covered factors for estimating segmental speed, flexibility, coordination, power, repetitive power and balance. Situational motor capabilities were tested using five hypothetical latent factors which are responsible for situational efficiency in handball: speed of ball handling, precision, throwing strength, speed without the ball, and ball handling. Independent T-test analysis of quantitative differences showed that statistically significant differences exist between the capabilities of players from the BiH Premier League and the BiH First Federal League. Our results can aid in better understanding, tracking, analyzing and perfecting conditioning and tactical preparation for female handball players at various levels of competition, all in the aim of achieving better quality of competition for senior handball players in BiH

Key words: **differences, basic motor and situational motor abilities, handball**

Sažetak

Osnovni cilj ovog istraživanja bio je utvrditi razlike u bazično motoričkim i situaciono motoričkim sposobnostima rukometašica. Istraživanje je urađeno na 79 rukometašice, seniorskog uzrasta iz Premijer lige BiH i Prve federalne lige BiH. U prostoru bazično-motoričke sposobnosti korišteno je 18 varijabli koje su obuhvatale faktore za procjenu segmentarne brzine, fleksibilnosti, koordinacije, eksplozivne snage, repetitivne snage, ravnoteža. Situaciono-motorički prostor je posmatran i obuhvata pet hipotetskih latentnih faktora koji su odgovorni za situacionu efikasnost u rukometu: Brzina baratanja sa loptom, preciznost, snaga izbačaja lopte, brzina kretanja bez lopte, baratanje loptom.

U analiza kvantitativnih razlika na univarijantnom nivou, T- testom za nezavisne uzorke, između Premijer lige BiH i Prve federalne lige BiH u situaciono-motoričkim i bazično-motoričkim sposobnostima dobili smo da se nivoi takmičenja razlikuju odnosno da postoji statistička značajnost između tretiranih nivoa takmičenja. Dobiveni rezultati mogu doprinijeti boljem razumijevanju praćenja, analiziranja te boljem usavršavanju kondicijske i tehničko-taktičke pripreme rukometašica na različitim nivoima takmičenja, a sve u cilju postizanja većeg kvaliteta takmičenja rukometašica za seniorke u Bosni i Hercegovini.

Ključne riječi: **razlike, bazična motorika i situaciona motorika, rukomet**

Introduction

Modern handball is exceptionally quick and explosive and is made up of varying physically intense movements which require high level motor skills, both basic and specific. (Đug, 2005; Czerwinski, 1995).

Basic motor abilities form the basis for further development of specific motor abilities which are directly responsible for achieving quality results (Brčić et al. 1997; Demir, 2000).

The existence of five latent situational motor dimensions in handball has been confirmed by various authors and they are as follows: accuracy, ball handling, speed of movement with the ball, speed of movement without ball and throwing strength.

Kules and Simenc (1983) researched the impact of basic motor abilities on the success of players in handball, and they found that explosive strength (both horizontal and vertical leaping ability and the type of throw), accuracy, speed of movement (with and without the ball) and co-ordination define the quality of the player.

Handball is increasingly dominated by action and reaction speed, strength, and aggressiveness, as well as the versatility of the player as reflected by how many different positions he/she can play (Rogulj, 2000; Srhoj et al. 2001; Vuleta et al. 2003; Delija et al. 1995).

Players are required to improve their ability to perform elements of technique with maximum intensity and develop their agility and explosive-reactive movement both in offense and defense

Due to the number of powerful shots, attacks on goal, taxing duels between players, and leaps in defence and offense, players consume large amounts of energy during the game. As such, a handball game demands much energy (Vuleta et al. 1999; Mujezinović, 2008;). The aim of this study is to determine the differences and magnitude of differences at different levels of competition based on basic motor and situational motor indicators. The subjects studied were 79 adult female handball players from the BiH Premier League and the BiH First Federal League.

Method

Subject

Studies were conducted on 79 physically fit, adult female handball players. All were players from the BiH Premier League and BiH First Federal League, who were registered with the BiH Handball Federation. Definition of motor model in this study was done in accordance with Kurelic et al (1975).

Source of Variables

To measure basic motor abilities, we used 18 variables. To measure situational motor capabilities we used five variables.

Variables for determining basic motor capabilities

Hand tapping – MSBTAP; leg tapping – MSBTAN; Bend, body twist, touch – MSBPZD; flex movement with a stick – MFLISK; full extensions on a benches – MFDPK; splits – MFSPA; Standing on one leg crosswise on a bench with eyes closed – MRRAV; standing on a turned bench – MRSOK, balancing on a narrow beam– MRSUK; back extensions – MRSIST; 30 second sit ups – MRSD30; push-ups – MRSSK; coordination with pole – MKKOP; slalom with three medicine balls – MKS3M; 20 steps with pole – MK2IP; long jump from stationary position – MESDM; throwing a medicine ball from a lying position – MFEBML; vertical leap – MESVS.

Variables for determining situational motor capabilities

Ball handling in a slalom – SMVLS; shooting at a target – SMGLC; shooting at a distance from a walk – SMSLD; running in a triangle in a basic defensive position – SMTTOS; shooting against a wall for 20 seconds – SMSZ20.

Data processing methods

Differences between Premier League and Federal League players, for each applied variable, were confirmed by a T-test for independent causes.

Results and Discussion

Analysis of the results of basic motor ability tests between female handball players of the Premier and First Federal League.

In Table 1. looking at the arithmetic parameters we can see that players in the Premier League achieved better results in hand tapping, bend, body twist, touch – both of which judge segmented speed – the mechanism for synergistic regulation and regulation of muscle tone duration. Players from the Premier League achieved better results in the full extensions on a bench and splits – both judge flexibility and are also mechanisms for synergistic regulation and regulation of muscle tone duration. Players at the highest level of competition in BiH – in the scope of judging explosive strength and mechanisms for regulating intensity – achieved better results in the long jump from a stationary position and throwing a medicine ball from a lying position. Players from the Premier League showed better results in push-ups, back extensions and 30 second situps – variables that judge explosive strength.

Players of the BiH First Federal League showed better results over Premier League players in foot tapping, which judges segmented speed, and flex movement with a stick pole, which measures flexibility. Players of the First Federal League showed better results in standing on one leg crosswise on a bench with eyes closed, standing on a turned bench, and balancing on a narrow beam, all of which judge balance. Players of the First Federal League BiH showed better results in coordination with pole, slalom with three medicine balls and 20 steps with pole – variables which measure coordination.

Results of the T-test (table 2.) show significant differences for the following variables: hand tapping – MSBTAP, Bend, body twist, touch – MSBPZD, balancing on a narrow beam – MRSUK, 20 steps with pole – MK2IP, throwing medicine ball from a lying position – MFEBML, push-ups – MRSSK.

Analysis of results of situational motor capabilities between players of Premier League and First Federal League.

In table 3. we can see that female handball players of BiH Premier League achieved better results in shooting at a target, a judge of accuracy accuracy. This is of extreme importance because it is responsible for situational precision in shooting at a given target in goal. This aids accuracy in game conditions. Better results in shooting a ball at a distance while walking were achieved by players from the BiH Premier League. Shooting the ball at a distance while walking measures ball throwing strength which is responsible for stationary explosive strength of throwing a ball. Throwing a ball for passing and shooting is one of the most common elements of handball technique. Regarding the relatively small dimensions of handball court, strength of ball throwing comes into account only in the organization

of counter-attacks with long passes and to some extent in quick throwing of balls from one wing to another over the goal-keeper's space. Throwing strength is much more important in shooting on goal. Since shooting on goal is the method by which goals are scored, and subsequently what decides the result of the match, it is obvious that along with accuracy, the strength with which a handball player can throw the ball is very important Lakota (2006). Players of the BiH Premier League showed better results in shooting against a wall for 20 seconds, which judges ball handling. This represents players' abilities to make fine adjustments with the ball while in one spot and in motion. Ball handling ability should be regarded as a basic precondition in achieving desired success in handball.

Players of the BiH First Federal League showed better results in slalom with a ball, which judges the speed of movement of players with the ball and their ability to cover

ground with a ball in attack. Given the fact that ground is won more quickly in attack when the ball is safely passed, the task of handling the ball during the game is restricted, except in situations where for tactical reasons the ball is handled, for example in an individual counter-attack, in a counter-attack in which the attacking side has one more player than the defense, in a breakthrough between two defenders, and in some other attacking combinations. Better results by the players of the Federal League were obtained in running in a triangle in basic defense position, which measures players' speed of movement without the ball. This is a style of movement which is characteristic of the style of play expected by players in defense. In attack this translates to winning territory and running into space while in defense this translates to covering ground in preventing counter-attacks in different ways, including marking and distracting opposing forwards.

Table 1. Difference in variables for basic motor movements between PremierLeague BiH and First Federal League players.

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
MSBTAP	1	43	52,63	6,496	,991
	2	36	41,22	5,189	,865
MSBTAN	1	43	28,67	4,116	,628
	2	36	28,94	4,893	,815
MSBPZD	1	43	21,26	2,896	,442
	2	36	19,89	2,816	,469
MRRAV	1	43	42,23	36,444	5,558
	2	36	44,44	38,782	6,464
MRSUK	1	43	6,72	2,716	,414
	2	36	8,44	3,402	,567
MRSOK	1	43	7,67	3,708	,565
	2	36	8,08	4,500	,750
MFDPK	1	43	30,23	7,419	1,131
	2	36	28,82	5,665	,944
MFSPA	1	43	187,79	15,932	2,430
	2	36	181,72	13,127	2,188
MFLISK	1	43	69,12	14,240	2,172
	2	36	70,14	9,816	1,636
MKS3M	1	43	56,56	8,997	1,372
	2	36	60,42	8,849	1,475
MKKOP	1	43	15,79	4,109	,627
	2	36	16,42	4,225	,704
MK2IP	1	43	12,95	3,512	,536
	2	36	18,14	4,593	,765
MESDM	1	43	179,70	17,346	2,645
	2	36	174,00	14,217	2,369
MFEBML	1	43	8,73	1,424	,217
	2	36	6,89	1,618	,270
MESSVS	1	43	32,56	5,869	,895
	2	36	32,31	6,480	1,080
MRSIST	1	43	25,37	11,052	1,685
	2	36	24,61	10,061	1,677
MRS30	1	43	25,05	4,018	,613
	2	36	24,06	5,188	,865
MRSSK	1	43	18,88	8,048	1,227
	2	36	11,78	6,556	1,093

Table 2. Values of T-test of Premier League and First Federal League:

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
MSBTAP	,830	,365	8,504	77	,000	11,406	1,341	8,735	14,076
			8,674	76,849	,000	11,406	1,315	8,787	14,024
MSBTAN	,669	,416	-2,266	77	,791	-,270	1,013	-2,288	1,748
			-,262	68,668	,794	-,270	1,029	-2,323	1,783
MSBPZD	,086	,771	2,116	77	,038	1,367	,646	,080	2,653
			2,121	75,252	,037	1,367	,644	,083	2,651
MRRAV	,505	,479	-2,261	77	,795	-2,212	8,477	-19,092	14,668
			-,259	72,747	,796	-2,212	8,524	-19,202	14,778
MRSUK	,543	,463	-2,496	77	,015	-1,718	,688	-3,089	-,347
			-2,447	66,534	,017	-1,718	,702	-3,120	-,316
MRSOK	,681	,412	-,443	77	,659	-,409	,923	-2,247	1,430
			-,435	67,834	,665	-,409	,939	-2,283	1,465
MFDPK	3,342	,071	,937	77	,352	1,413	1,509	-1,591	4,418
			,959	76,402	,341	1,413	1,474	-1,521	4,348
MFSPA	,076	,783	1,824	77	,072	6,068	3,326	-,555	12,692
			1,856	76,986	,067	6,068	3,270	-,442	12,579
MFLISK	4,581	,035	-,364	77	,717	-1,023	2,807	-6,612	4,567
			-,376	74,433	,708	-1,023	2,719	-6,439	4,394
MKS3M	,020	,889	-1,915	77	,059	-3,862	2,017	-7,879	,155
			-1,917	74,991	,059	-3,862	2,014	-7,875	,151
MKKOP	,214	,645	-,666	77	,508	-,626	,940	-2,498	1,246
			-,664	73,809	,509	-,626	,943	-2,504	1,252
MK2IP	3,053	,085	-5,683	77	,000	-5,185	,912	-7,002	-3,368
			-5,551	64,723	,000	-5,185	,934	-7,051	-3,320
MESDM	3,286	,074	1,576	77	,119	5,698	3,614	-1,500	12,895
			1,604	76,973	,113	5,698	3,551	-1,374	12,769
MFBML	,318	,574	5,362	77	,000	1,835	,342	1,154	2,517
			5,301	70,416	,000	1,835	,346	1,145	2,526
MESSVS	,022	,883	,182	77	,856	,253	1,390	-2,516	3,021
			,180	71,484	,858	,253	1,403	-2,544	3,049
MRSIST	,344	,559	,317	77	,752	,761	2,397	-4,013	5,535
			,320	76,433	,750	,761	2,377	-3,974	5,496
MRS30	,569	,453	,956	77	,342	,991	1,036	-1,072	3,054
			,935	65,262	,353	,991	1,060	-1,125	3,107
MRSSK	2,231	,139	4,247	77	,000	7,106	1,673	3,774	10,438
			4,324	76,952	,000	7,106	1,643	3,834	10,378

Table 3. Difference in variables of situational motor parameters between BiH Premier League and BiH First Federal League players.

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
SMVLS	1	43	19,47	2,764	,422
	2	36	20,52	3,899	,650
SMGLC	1	43	36,60	5,753	,877
	2	36	38,31	4,335	,722
ŠMLŠD	1	43	24,88	4,150	,633
	2	36	20,95	3,260	,543
SMŠZ20	1	43	19,23	2,428	,370
	2	36	16,33	1,912	,319
SMTTOS	1	43	15,11	1,444	,220
	2	36	16,27	2,080	,347

Results of T-test (table 4.) show significant differences for the following variables: shooting the ball at a distance while walking – SMSLD, running in a triangle in basic defense position – SMTTOS, shooting the ball against wall for 20 seconds – SMSZ20.

Tabel 4.
Values of T-test between players of the BiH Premier League and the BiH First Federal League.

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
SMVLS	7,937	,006	-1,399	77	,166	-1,052	,752	-2,549	,445
			-1,358	61,568	,180	-1,052	,775	-2,600	,497
SMGLC	3,667	,059	-1,460	77	,148	-1,701	1,165	-4,021	,619
			-1,497	76,216	,139	-1,701	1,137	-3,964	,563
ŠMLŠD	2,142	,147	4,612	77	,000	3,930	,852	2,233	5,626
			4,712	76,717	,000	3,930	,834	2,269	5,590
SMŠZ20	1,033	,313	5,810	77	,000	2,899	,499	1,906	3,893
			5,934	76,740	,000	2,899	,489	1,926	3,872
SMTTOS	1,565	,215	-2,907	77	,005	-1,157	,398	-1,949	-,364
			-2,817	60,715	,007	-1,157	,411	-1,978	-,335

Conclusion

Results of this study show that female handball players in different levels of competition differ significantly statistically in basic and situational motor abilities.

The existence of these differences between female handball players of different levels of competition is primarily due to the differences in level of competition. BiH premier league players have significantly more motivation because they have better help and support from RSBiH, and therefore have seriously defined careers. As is recognized, the psychological aspect is very important in sport. Premier League players have a better and more organized system of competition, significantly more league games during the season as well as international matches, while players in the Federal League compete in a lesser level of competition.

The second reason for the existence of these differences can be attributed to the training regime. A third reason for the difference is in the level of mental, physical and technical tactical training of the Premier League players. The obtained results can contribute to better understanding, tracking and analyzing and perfecting conditioning and tactical training in various levels of competition, with the aim of improving the quality of competition in BiH.

References

- Brčić, B., Viskić Štalec, N., & Jaklinović Fressl, Ž. (1997). Predictive value of variables for the evaluation of technical-tactical elements in handball. *Kinesiology, 1*(29), 60–70.
- Czerwinski, J. (1995.). The influence of technical abilities of players on the tactical selection in the handball game. *European Handball, 2*:16-19.
- Delija, K., Šimenc, Z. i Vuleta, D. (1995). Differences in some general and situation tests of motor abilities in handball player and those not play handball. *Kinesiology 27*(1): 57 – 61
- Demir, M. (2000). *Canonic relation between morphological dimensions and situational-motion abilities with young handball players*. Master's thesis, Sarajevo: Faculty of Sport and Physical Education.
- Đug, M. (2005). *Efficiency of different methods for improvement of handball players jumping ability*. Master thesis, Tuzla: Faculty of physical education and sport.
- Kuleš, B. & Šimenc, Z. (1983). Relationship between different motor abilities and efficiency in handball. *Kinesiology, 15* (2): 153-163

Kurelić N., Momirović K., Stojanović M., Šturm J., Radojević., Viskić-Štalec N. (1975). The Structure and Evolution of Morphological and Motor Dimensions of youngs. Institute for Scientific Research, Faculty of Physical Education of the University of Belgrade.

Lakota, R. (2006). *Effects of programmed work on transformation of basic-motor and situationalmotor abilities of handball players*. Master thesis, Sarajevo: Faculty of Sport and Physical Education

Mujezinović, M. (2008). *Effects of programmed training on special and basic motor abilities in handball*. Master thesis, Sarajevo: Faculty of sport and physical education

Rogulj, N. (2000). Differences in situation-related indicators of the handball game in relation to the achieved competitive results of teams at 1999 World Championship in Egypt. *Kinesiology*, 32 (2), 63-74.

Srhoj,V., Rogulj, N. Padovan, M., Katić R. (2001). Influence of the attack end conduction on match result in handball. *Collegium antropologicum*, 25(2):611-617

Vuleta, D., Milanović, D., Sertić, H. (1999). Latent structure of the spatial, phasic, positional and movement characteristics of the handball game. *Kinesiology*, 31(1), 37-53.

Vuleta, D., Milanović, D., Sertić, H. (2003). Relations among variables of shooting for a goal and outcomes of the 2000 Men's European Handball Championship matches. *Kinesiology*, 35(2), 168-183.

Submitted: May 25, 2013

Accepted: June 18, 2013

Correspondence to:

Srdjan Pavlović, MA

Faculty of Sport and Physical Education, University of Sarajevo

Patriotske lige 41, 71 000 Sarajevo

Bosnia and Herzegovina

Phone: +38765 646-163

E-mail: srdjan@greenvisions.ba