

Original Article

Longitudinal study on the effectiveness of the game action in woman's handball top competition (2004-2016)

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Abstract: Keeping up with the evolution trends of handball supposes periodical analyses of the top competitions, and the conclusions obtained can make proposals to optimize the game and training models by adapting to the new requirements competition and the required changes in game rules. To meet these requirements in the current handball, players must meet the new requirements of physical, technical and tactical components demanded by the rapid and sustained pace of the game. This study may lead to the identification of elements that indicate trends of female handball for the period 2004-2016, thus creating the conditions for determining the principles for achieving training and participation in high level competitions. This study brings together the other three that were made previously for each competition: E.C. - 5 editions in the period 2006-2014, W.C. - 6 editions in the period 2005-2015 and J.O. - 4 editions in the period 2004-2016. With these data there should be reconsidered the efficiency limits for backcourt shots downward by 5% as in any category it didn't reach the minimal requirement and monitor the efficiency for wing shots, 7m shots and goalkeepers where only the first 4 or 8 (12) ranked fulfilled the minimum benchmark. For 6m shots the minimum level should be increased by 5% because in almost all categories the upper margins are exceeded. Determination of the efficiency of the game actions of the participating teams at female handball competitions may be a reference to the revaluation model in play game at senior level high performance handball. At the indicators that did not reach the minimum level recommended in the training there must be used more often playing practical situations to be resolved and focus on increasing the shots efficiency. In addition they should work in conditions of fatigue and participate in friendly competitions that have a way similar to the official ones. The degree of fulfilment of these requirements should be visible at the following competitions that will require a reassessment and to check later the indicators monitored.

Keywords: efficiency, action games, competitions, female

Introduction

Increasing the number of scored goals is a consequence of increasing attacks number as a result of shortening the attack time and marking goals on fast break; these are supported by dynamic and speed up game principles. To meet these requirements in the current handball, players must meet the new requirements of physical, technical and tactical components required by the rapid and sustained pace of the game (Sevim Y., 2008, p. 1-3, 31).

Keeping up with the evolution trends of handball supposes periodical analyses of the top competitions, and the conclusions obtained can make proposals to optimize the game and training models by adapting to the new requirements competition and the required changes in game rules.

In this study we quantified data collected from the most important competitions in women's handball at national team level: European Championships, World Championships and Olympic Games.

The format of these three competitions has changed as the number of teams participating, number of games, and currently final tournament at the European Championships (E.C.) participating 16 teams, at the World Championships (W.C.) 24 teams and at the Olympic games (O.G.) 12 teams.

The first edition of the European Championships took place in 1994, being organized every two years; World Championships are held in the current period every two years, and the first edition took place in 1957 (indoor handball); first presence at the Olympic Games held in 1976, which remained constant in the Olympic program, the competition taking place every 4 years.

The teams go through qualifiers in order to be present in the final phase. At European Championship 2016, the qualifiers phase involved 32 teams and at the final tournament 16 teams qualified.

Material and methods

Determination of the efficiency of the game actions of the participating teams at female handball competitions may be a reference for the revaluation of the game model at senior level high performance handball.

This study may lead to the identification of elements that indicate trends of female handball for the period 2004-2016, thus creating the conditions for determining the principles for achieving training and participation in high level competitions. This study brings together the other three that were made previously for each competition: E.C. - 5 editions in the period 2006-2014, W.C. - 6 editions in the period 2005-2015 and J.O. - 4 editions in the period 2004-2016.

In carrying out the study the main methods used were bibliography and statistics. Bibliographic method was used by studying the analyses conducted after competitions. Statistical method was used to process the data supplied by IHF and EHF after competition, game actions being quantified and used in the study.

Results and Discussions

The game actions that provided the statistical analysis are: shots efficiency (6m, wings, 9m, 7m, fast break), goalkeepers efficiency, interception and blocked shots. For these actions the analysis was performed as follows: for all the participating teams (24), places 1-4, places 1-8 (E.C., O.G.), places 1-12 (W.C.) (tables 1-3).

Table 1 Game actions efficiency averages for teams participating at European Championships

Statistical parameter / Game actions	Shots efficiency (%)			Shots efficiency (%)	7m shots efficiency (%)	Fast break efficiency (%)	Attack efficiency (%)	Goalkeepers efficiency (%)	Interceptions (no.)	Blocked shots (no.)
	6m	wing	Backcourt							
X±S (1-16)	66,55 ±3,17	49,28± 2,79	34,18± 2,11	51,55 ±1,77	74,63 ±2,46	72,81± 2,44	41,85± 2,42	33,74± 1,62	28,73± 3,33	17,63 ±2,09
X±S (1-4)	69,50 ±3,75	51,65± 6,23	37,20± 3,21	55,60 ±2,00	75,30 ±5,22	74,90± 1,55	45,55± 2,07	37,65± 3,05	45,50± 9,25	26,90 ±5,78
X±S (1-8)	67,35 ±3,47	51,68± 3,36	36,33± 3,01	54,48 ±2,03	76,55 ±4,40	73,33± 2,55	44,48± 2,35	35,93± 2,45	37,68± 6,21	22,98 ±3,83

Table 2 Game actions efficiency averages for teams participating at World Championships

Statistical parameter / Game actions	Shots efficiency (%)			Shots efficiency (%)	7m shots efficiency (%)	Shots Fast break efficiency (%)	Goalkeepers efficiency (%)	Interceptions (no.)	Blocked shots (no.)
	6m	wing	backcourt						
X±S (1-24)	59,68± 3,33	50,45± 1,07	34,82± 1,53	53,99± 2,69	72,54± 2,96	73,61± 3,60	31,91± 0,84	39,38± 0,75	23,22± 5,03
X±S (1-4)	64,83± 4,71	53,54± 2,19	38,92± 3,09	58,63± 1,45	75,21± 5,45	77,13± 5,29	38,21± 1,56	50,96± 14,46	42,46± 9,20
X±S (1-12)	63,39± 3,90	54,58± 1,92	39,00± 1,77	58,33± 2,36	76,13± 2,92	76,18± 4,42	35,60± 0,98	45,49± 13,84	31,07± 5,55

Table 3 Game actions efficiency averages for teams participating at Olympic Games

Statistical parameter / Game actions	Shots efficiency (%)			Shots efficiency (%)	7m shots efficiency (%)	Fast break efficiency (%)	Goalkeepers efficiency (%)	Interceptions (no.)	Blocked shots (no.)
	6m	wing	backcourt						
X±S (1-12)	65,56± 4,90	51,73 ±2,03	34,18± 1,12	54,10± 1,60	72,80± 3,41	71,75± 4,70	32,67± 1,25	32,83± 13,72	17,17± 4,56
X±S (1-4)	67,06± 1,81	56,69 ±2,68	35,94± 3,30	56,69± 1,66	72,50± 4,56	71,06± 2,63	35,63± 1,38	39,63± 15,10	22,75± 4,86
X±S (1-8)	66,90± 3,95	53,95 ±2,31	34,45± 2,89	56,50± 2,41	74,85± 3,94	74,00± 3,56	34,90± 1,74	41,60± 15,54	20,18± 4,63

At the 6m shots for all teams the average at E.C. was 66.55%, at the W.C. 59.68% and at the O.G. 65.56%. In the case of the first 4 ranked teams there were recorded the best averages: E.C. - 69.50%; W.C. - 64.83%; O.G. - 67.06%, while the teams ranked 1-8(12) places obtained the following averages: E.C. - 67.35%; W.C. - 63.39%; O.G. - 66.90% (figure 1).

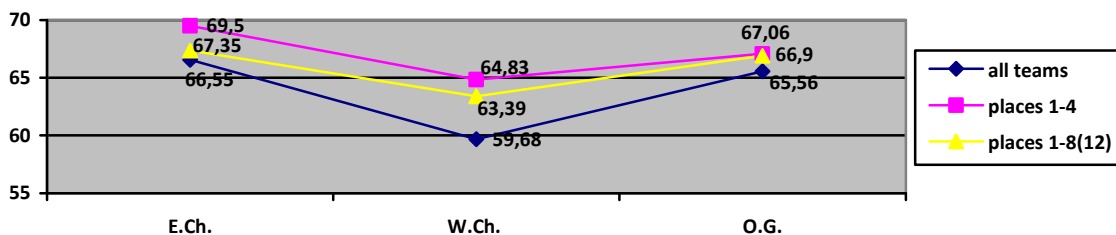


Figure 1 6m shots efficiency

In case of wings shots the efficiency for all participating teams was 49.28% at E.C., 50.45% at W.C. and 51.73% at O.G. For the first 4 ranked the average was 51.65% at E.C., 53.54% at W.C. and 56.69% at O.G. For places 1-8(12) at the E.C. the average was 51.68%, at W.C. - 54.58% and at O.G. - 53.95% (figure 2).

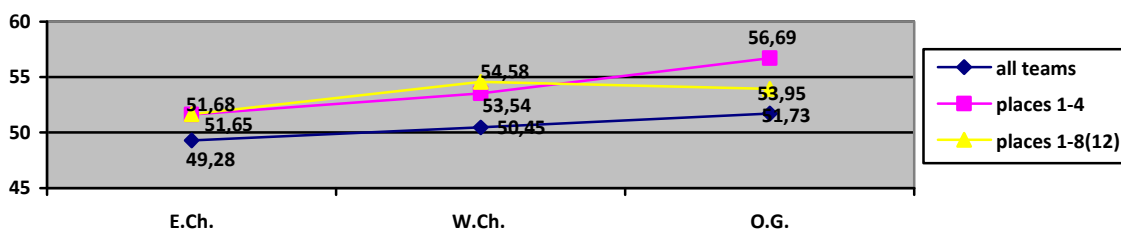


Figure 2 Wings shots efficiency

The average of backcourt shots for all teams at E.C. was 34.18%, at W.C. - 34.82%, at O.G. - 34.18%. For 1-4 places the average at E.C. was 37.20%, at W.C. - 38.92%, at O.G. - 35.94%. At places 1-8(12) the best average was obtained at W.C. - 39%, then at E.C. - 36.33% and finally at O.G. - 34.45% (figure 3).

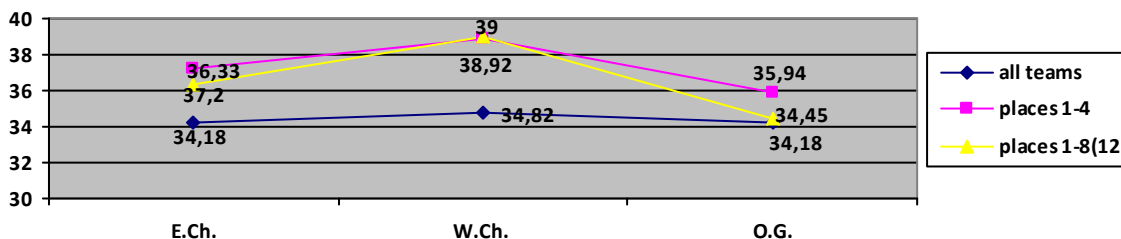


Figure 3 Backcourt shots efficiency

At 7m shots, from all teams, the best efficiency was recorded at E.C. - 74.63%, then at the O.G. - 72.80% and 72.54% at the W.C. The first 4 ranked teams at E.C. gave the best efficiency (75.30%), followed by C.M. (75.21%) and O.G. (72.50%). For teams located in the first half of the ranking there was achieved an efficiency of 76.55% at E.C., 76.13% at W.C. and 74.85% at O.G. (figure 4).

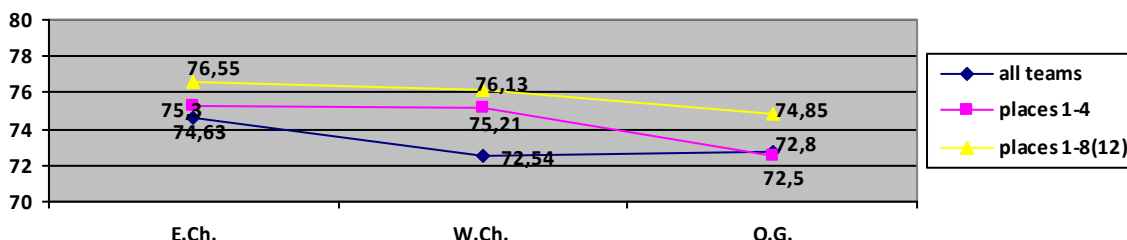


Figure 4 7m shots efficiency

Fast break efficiency was 72.81% at E.C., 73.61% at W.C. and 71.75% to O.G. for all teams. Places 1-4 obtained the following averages: E.C. - 74.90%; W.C. - 77.13%, O.G. - 71.06%. For places 1-8(12) the average results were as follows: 73.33% at E.C., 76.18% at W.C., 74% at O.G. (figure 5).

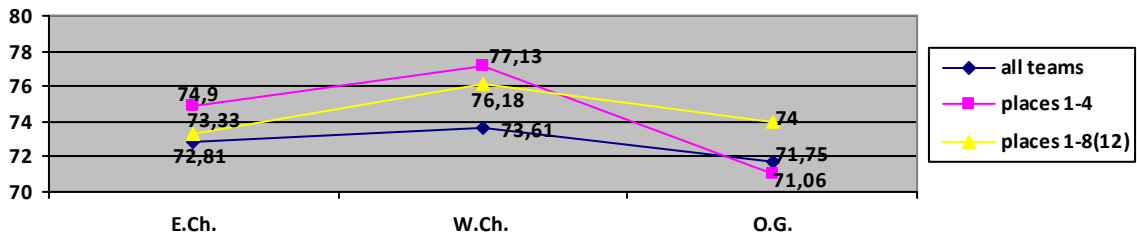


Figure 5 Fast break shots efficiency

The overall efficiency of shots had the best value for all teams at O.G. (54.10%), then at W.C. (53.99%) and at E.C. (51.55%). For places 1-4 the best result was obtained at W.C. (58.63%), then at O.G. (56.69%) and in the final at E.C. (55.60%). For places 1-8(12) the best efficiency was obtained at W.C. (58.33%), then at O.G. (56.50%) and at E.C. (54.48%) (figure 6).

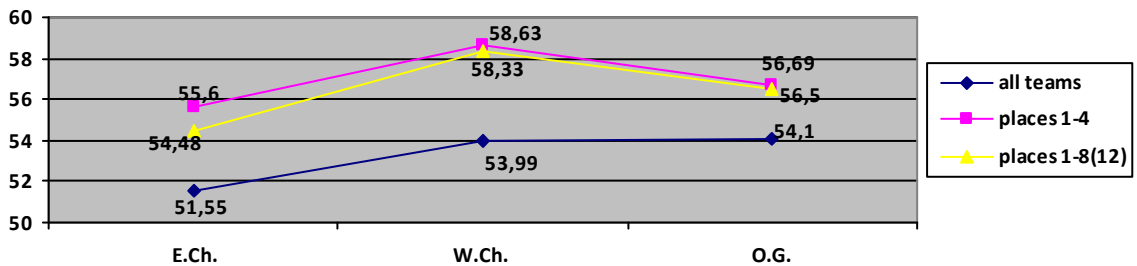


Figure 6 Shots efficiency

Goalkeeper's efficiency is a closely related parameter to the shots efficiency, and for all participating teams the best efficiency was obtained from E.C. (33.74%), then at O.G. (32.67%) and W.C. (31.91%). At first 4 ranked the highest efficiency was of teams participating in W.C. (38.21%), then at E.C. (37.65%) and those from O.G. (35.63%). Places 1-8(12) at E.C. gave the best efficiency - 35.93%, then at W.C. - 35.60% and at O.G. - 34.90% (figure 7).

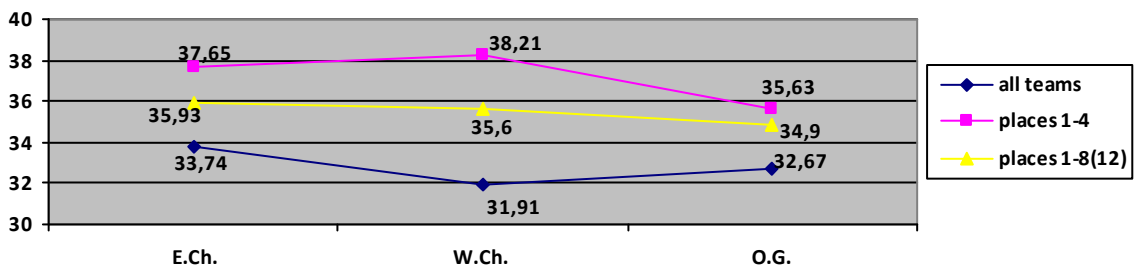


Figure 7 Goalkeepers efficiency

The average number of interception made by a team is an indicator of offensive trend, also having the biggest swings from one edition to another. The average for all teams was 28.73 interceptions at E.C., 39.38 at W.C. and 32.83 at O.G. At teams finishing 1-4 places the best average was recorded at W.C. (50.96 interception), E.C. (45.50), O.G. (39.63). For places 1-8(12) at E.C. it was obtained an average of 37.68 interceptions, at W.C. - 45.49 and at O.G. - 41.60 (figure 8).

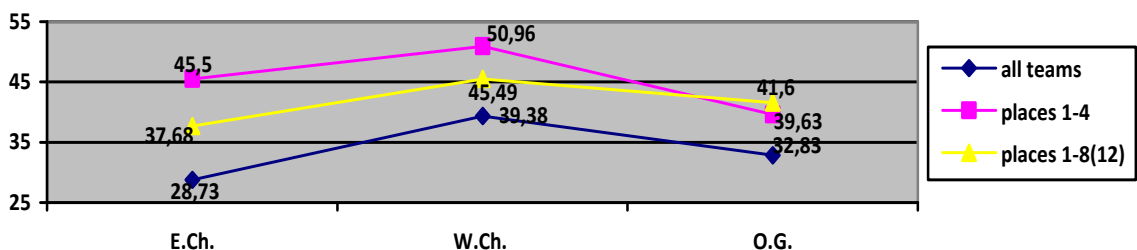


Figure 8 Number of interceptions

Blocked shots showed the best average for all teams at W.C. - 23.22, then at E.C. - 17.63 and at O.G. – 17.17 blocked shots by team. For first 4 ranked the best average was obtained at W.C. (42.46), then at E.C. (26,90) and at O.G. (22.75). For places 1-8(12) the average was 22.98 at E.C., 31.07 at W.C. and 20.18 at O.G. (figure 9).

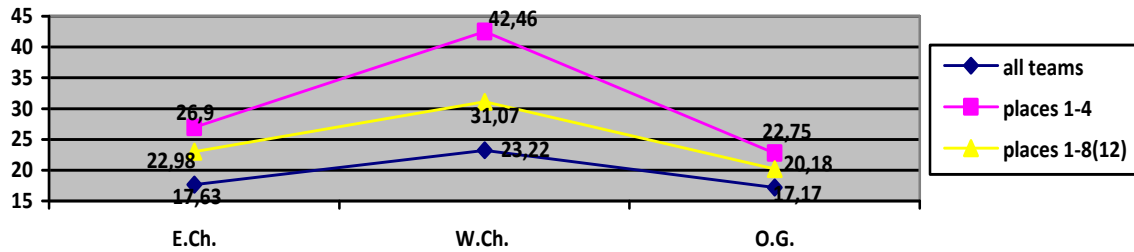


Figure 9 Number of blocked shots

These last two indicators (interception, blocked shots) are influenced by the number of games that dispute each team participating in the 3 competitions analysed. At E.C., the participating teams play 3 to 8 games, at W.C. between 6 and 9 games, and at O.G. 5 to 8 games.

Conclusions

The obtained data were compared with those in the special literature on the minimum efficiency of game action based on the position of ranking: places 1-4, places 1-8(12), all teams (table 4) (F. Taborsky, 2001 p. 26).

Table 4 Game actions efficiency in our study compared with those in scientific literature

Game actions efficiency	Efficiency (Taborsky F., 2001)	Efficiency for all participant (our study)			Efficiency for places 1-4 (our study)			Efficiency for places 1-8 (our study)		
		E.C.	W.C.	O.G.	E.C.	W.C.	O.G.	E.C.	W.C.	O.G.
backcourt shots	40 – 45%	34,18%	34,82%	34,18%	37,20%	38,92%	35,94%	36,33%	39%	34,45%
wing shots	55 – 60%	49,28%	50,45%	51,73%	51,65%	53,54%	56,69%	51,68%	54,58%	53,95%
6 m shots	60 – 65%	66,55%	59,68%	65,56%	69,50%	64,83%	67,06%	67,35%	63,39%	66,90%
fastbreak shots	70 – 75%	72,81%	73,61%	71,75%	74,90%	77,13%	71,06%	73,33%	76,18%	74%
7 m shots	75 – 80%	74,63%	72,54%	72,80%	75,30%	75,21%	72,50%	76,55%	76,13%	74,85%
attacks without shots	15 – 20%									
goalkeepers	35 – 40%	33,74%	31,91%	32,67%	37,65%	38,21%	35,63%	35,93%	35,60%	34,90%

Comparing the data with minimal recommendations we should note that there are situations in which an indicator in any category did not reach the minimal requirement, as is the case of backcourt shots. The situation is similar in the case of wings shots where only teams ranked 1-4 places at O.G. meet the minimum and at the other 8 categories is below the minimum. At 6m shots in 8 of 9 situations minimum requirements are fulfilled and for 7 of 8 cases it is exceeded the maximum level recommended. Fast break shots efficiency in all categories exceeded the minimum level. For 7m shots just in 4 of 9 cases there were above the minimum level, the situation is identical in the case goalkeeper’s efficiency. Regarding the partial fulfilments of the minimum requirements, these were generally reached by the teams ranked first 4 places, and places 1-8(12). The poor efficiencies were obtained when the analysis included all participating teams (table 4) (Leuciuc, Pricop, Grosu and Păcuraru, 2015; Leuciuc and Pricop, 2016; Leuciuc, 2017).

With these data there should be reconsidered the efficiency limits for backcourt shots downward by 5% as in any category did not reach the minimal requirement and monitor the efficiency for wing shots, 7m shots and goalkeepers where only the first 4 or 8 (12) ranked fulfilled the minimum benchmark. For 6m shots the minimum level should be increased by 5% because in almost all categories the upper margin are exceeded.

Some of these issues were noticed in another studies, but for good results there are needed cooperation between all players of the team and tactical discipline to meet the requirements of the performance for top level competitions in male handball (Eftene, Acsinte and Mihăilă, 2009; Dumitru, 2010; Almasalmah, 2012; Melnyk, Pasichnyk, Levkiv and Kovtsun, 2016; Vurgun, Dorak, Ozsaker and Uludag, 2016)

At the indicators that did not reach the minimum level recommended in the training, there must be used more often playing practical situations to be resolved and focus on increasing the shots efficiency. In addition they should work in conditions of fatigue and participate in friendly competitions that have a way similar to the official ones. The degree of fulfilment of these requirements should be visible at the following competitions that will require a reassessment and to check later the indicators monitored.

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