THE ANALYSIS OF THE RESULT DIFFERENCES IN THE TIME SEGMENTS OF A HANDBALL MATCH FOR YOUNG FEMALE HANDBALL PLAYERS

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Original scientific paper

Abstract

The aim of the research has been to establish the differences between the results performed in particular time segments of a handball match (10 minute quarters) by comparing the winning and the losing teams at the 2012 National Championship for young female handball players (under 16). Situational parameters, defined as a partial result increase in particular periods of matches, and the result differences, recorded at the end of each quarter, have been included in the analysis, all being gathered at the final games of the Croatian Championship for young female handball players (under 16) in the 2011/2012 season. Analysis of variance and Mann-Whitney U-test have been applied to determine the differences, and the results of both showed that the winning and the losing team differ in all four observed segments of the handball match, in respect to the partial result increase, as well as regarding the result differences at the end of each quarter.

Key words: handball, female, situational efficiency, match periods, Croatian championship

Introduction

Some objective indicators of the actual quality of the particular male or female players, as well as the handball teams in the whole, may be presented by monitoring and registering the realization of the specific elements of the technique or tactics performed in situational conditions that is, in a handball match. A handball match provides enough spatial and time conditions to show an individual's and a team's overall fitness within the frames of the handball game rules and regulations. The inputpotential, with which opposing teams start their confrontation at a handball game, represents the resultant of the individual's/team's overall status within the field of anthropometric, motor, functional and other components of the anthropologic status. The upgrade is made up of the skills level within the field of the handball technique and tactics, which, connected with finding a solution in the particular segments of a handball game (attack or defence phase and transition from one phase to another) and other possible external factors, finally might be observed through quantitatively measurable indicator i.e. scoring a goal. According to the handball rules "the goal is scored when the entire ball has crossed the goal line completely, provided that no violation of the rules has been committed by the thrower, a teammate or a team official, before or during the throw." This event is caused by the numerous activities of the defending and the attacking players and a goalkeeper at the same time, it is the only event expressed by a numeric change of the result (Rogulj, 2009). A dynamics of the goal scoring at the time of interacting confrontation in a handball match differs from team to team, as it differs regarding the specific segments (periods) of the handball match. In numerous studies, a team situational efficiency is connected to establishing influence/ differences between the teams, in the context of analysing

registered standard situational efficiency parameters (success in shooting from different positions, assisting, technical mistakes, exclusions, blocks and other). The goal scoring, observed partially in specific segments of the handball matches, has, in some earlier research, referred to the dynamics of the goal scoring individually for each (winning/losing) team at the end of the divided time segments (quarters or sixths of the handball match), as well as to the research in question apply to the samples of the top senior male (Rogulj, Vuleta & Milanović, 2002; Vuleta et al., 2005; Gruić, Vuleta % Vrbik, 2007; Foretić, Rogulj & Burger, 2011) and female handball teams (Gruić, Vuleta & Ohnjec, 2006). Situational efficiency in younger age categories of male and female handball players has been significantly less studied in comparison to the senior teams of the different quality levels. The studies are mostly based on the statistic data gained at the top competitions (European and World Championships) for youths (Taborsky, 1999; Sevim, 2001; Krokhin, 2003; Grünanger & Köning, 2005; Hianik, 2007; Eliasz, 2009; Tuma et al., 2011) and for juniors (Taborsky, 1996; 1998; Taborsky et al., 2004, Neukum, 2009; Taskiran et al., 2007). An organised training programme includes as its particular constituent part а number of competitions, as a part of a general development of the young male and female handball players. Milanović, 2010 points out that it is not advisable to overstate with the numerous competitions for younger age groups, thus suggesting the referring value of 70 competitions for the young male and female handball players (18 year-olds). A currently valid competing system for female players under 16 in Croatia applies to the competitions at the national level, as well as to the competitions among counties.

According to the rules and regulations of the Croatian Handball Association in the First Croatian Handball League for girls under 16, the championship is played in two parts: the groups (3 regions: north, west and south) and the final competitions. The teams are classified in the competition finals according to their rank in the preliminary groups. The aim of this paper is to observe the situational effectiveness of the young female handball teams in regard to the goal scoring in particular segments of the match.

Methods

The entity sample has consisted of 74 opponents in 37 matches of the final games at the Croatian Championship for girls under 16 (girls born 1996 and younger) in Čakovec that took place from 29th March to 1st April 2012. There were 38 matches played at the championship, however, considering the win/loss criterion, a tied match has not been included in the further analyses. The tournament was played according to both: a league and a cup system, meaning that the preliminary part was played according to the league system, and then, the teams ranked first and second in every preliminary group crossed-over in the semi-finals, the winning teams going into the finals and the losing one's playing for the third or fourth position. The teams ranked bellow the top two in the preliminary round groups, played one against

Table 1. Descriptive and distribution parameters

another to define the 5th to the 12th ranking position. The variables sample is represent by: a) partial result increase at different periods of the match that is the goals scored in four time periods four handball match 10-minute intervals and b) result difference, in other words, the result between the scored and received goals, recorded at the end of a particular period of the match. The opposing teams in a match have been classified in categories winning or losing teams, according to the success at the end of the game. Central and dispersive parameters of the observed variables have been analysed within the frames of the descriptive statistics. The distribution normality of the specific results in every variable has been assessed by Kolmogorov-Smirnovljev test (K-S max d). The analysis of variance and the Mann-Whitney U-test have been applied to determine the differences in the particular time segments of the match (quarters), comparing the winning and the losing teams. Statistica for Windows/7.0 program has been used to analyse the collected data.

Results

The Table 1 results show the basic descriptive and distribution parameters of the partial increase variables and the result differences, whereas the Tables 2 and 3 show the results of the differences between the winning and the losing teams for the variables observed.

varijabla	N	MEAN	Min	Max	S.D.	a ₃	a 4	KS-d	KS-p
PRIRE 1	74	4,07	0,00	8,00	1,76	0,23	-0,68	0,15	p < ,10
PRIRE 2	74	4,89	1,00	10,00	2,01	0,11	-0,49	0,12	p > .20
PRIRE 3	74	4,84	1,00	9,00	2,13	0,18	-0,91	0,15	p < ,10
PRIRE 4	74	5,20	2,00	9,00	1,91	0,13	-0,63	0,11	p > .20
RAZ 1	74	0,00	-6,00	6,00	2,47	0,00	-0,41	0,14	p < ,10
RAZ 2	74	0,00	-6,00	6,00	2,82	0,00	-0,43	0,08	p > .20
RAZ 3	74	0,00	-6,00	6,00	3,15	0,00	-0,93	0,09	p > .20
RAZ 4	74	0,00	-6,00	6,00	2,44	0,00	-0,12	0,12	p > .20
REZ/RAZ	74	0,00	-14,00	14,00	6,96	0,00	-0,44	0,06	p > .20
GOLOVI	74	19,00	10,00	30,00	4,95	0,46	-0,64	0,14	p < ,10

(N – number of cases; AS – arithmetic mean; Min – minimum; Max – maxmimum; S.D – standard deviation; a₃ – skewness; a₄ – kurtosis; KS-d – maximum distance between the theoretical cumulative relative frequency /normal/ and relative cumulative empirical frequency /obtained by measurement/.; KS-p – value of significance)

Table 2. Analysis of variance and the Mann-Whitney U test regarding the result increase

variable	mean winning	mean losining	F	р	Z	р
PRIRE 1	4,84	3,30	17,30	0,00	3,80	0,00
PRIRE 2	5,43	4,35	5,69	0,02	2,36	0,02
PRIRE 3	5,70	3,97	14,51	0,00	3,63	0,00
PRIRE 4	5,81	4,59	8,26	0,01	2,52	0,01

(AS – arithmetic mean, F- F- value of F-test, p- value of significance threshold of F-test, Z – z value, p – value of significance threshold for z value)

The analysis of variance and Mann-Whitney U test results point at the statistically significant differences between the winning and the losing teams considering the result increase in all four time periods of the match. Table 3 Univariate variable analysis and the Mann-Whitney U test regarding the result differences

Variable	Mean winning	Mean losining	F	р	Z	р
RAZ 1	1,54	-1,54	37,16	0,00	4,97	0,00
RAZ 2	1,08	-1,08	12,62	0,00	3,29	0,00
RAZ 3	1,73	-1,73	31,72	0,00	4,73	0,00
RAZ 4	1,22	-1,22	24,28	0,01	4,26	0,00

(AS – arithmetic mean, F- F- value of F-test, p- value of significance threshold of F-test, Z – z value, p – value of significance threshold for z value)

The analysis of variance and Mann-Whitney U test results point at the statistically significant differences between the winning and the losing teams considering the result differences in all four time periods of the match.

Discussion

At the Croatian Championship for young female handball players aged 14-16, which took place in Čakovec in 2012, there were on the average 38 goals scored per match in total, and there were approximately 8 (8,14) goals scored in the first quarter and about 10 in the second (9,78), third (9,68) and in the last quarter of the match (10,41). From the total number of the goals scored in the complete match, the least were scored in the first, whereas the most in the last ten minutes of the matches. Almost equal realisation efficiency has been recorded at end of the first and at the beginning of the second half of the match.

There were the most goals scored in the last quarters of the matches, probably due to the weakening of the confronting opponents' influence in the later phases of the match (Rogulj, 2009), while there were the least goals scored in the first quarter, because of the possible stress conditions of the competition (opening of the game) as well as the consequence of the strongest confronting opponent in the initial phases of the match. There was almost an equal number of goals scored in the second and third quarter, which might be explained with the adaptation of the organism and the tactics plan to the opponents.



Figure 1 The goals scored in each quarter of the matches

The finals contestants of the young female handball players U16 competition sometimes ended the first quarters without scoring any goals, while there was a minimum of 1 or 2 (Table 1) goals scored in other parts of the match. The inexperience in taking part in the most important competition at the developmental stages of their sport careers, in connection to which there are some other psychological elements (nervousness, insecurity, level of confidence, etc.) of the girls under 16, may be the factors of handball elements performance inefficiency, and thereby of the poor attacking effectiveness. The winning teams of the young female handball players U 16 score on average about 22 goals in the finals of the national championship, whereas the number of goals scored by the losing teams amounts approximately 16 per match. The winning teams score on average approximately 6 goals more than the losing ones.

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An interesting fact has been occurring at the younger age category Croatian handball events: the girls leaving the younger age categories (the girls of 17 and 18), who compete in the next season as seniors, have been scoring the same number of goals in their category in the finals of national championship. The above said the suggests the conclusion that the similar realisation efficiency of the girls U16 and U18 is defined by directing the training process, in the younger age categories, from the technically-tactical operation, towards the trends set by the senior teams. In this connection, it is necessary to point out the respect for the total working load, that is, energetic and informational component of the working load, which differs at the younger and senior age. The other possible factor of the high total result efficiency achieved by the younger categories, might as well be, the approach to, and the idea of the game in the defence phase. Namely, there is the assumption that, in younger age categories, there is no motivation factor and no attention focus factor, that is, there is no concentration on the execution of that specific phase of the handball game, required to improve the execution of the specific defensive elements (individual, collective and group), due to an inadequately developed conscience of the importance of the phase in question. The goal scoring, in other words, being focused on the finalising the attack by a shot at a goal is, nevertheless, an actually materialized, indisputable performance indicator to the players as it is to the other participants of the matches (parents and others). Very often are the team manager's instructions directed exactly on the attacking efficacy, which only supports the hypothesis made earlier.



Figure 2 Goal scoring progression in the quarters of the match by winning and losing teams

The winning teams on average score more goals in every period, where from the partial increase of the result differences in each time segment becomes evident (1,54; 1,08; 1,73; 1,22), and they both represent the final result efficiency factors. There have been noticed the greatest differences between the goals scored in the third quarter, that is, in the first ten minutes of the second halftime of the game, which probably mostly influenced forming of the final result in favour of the winning teams. The final result of the handball matches in the finals of the Croatian National Championship for young female handball players U16 that took place in Čakovec in 2012 is defined by the goal scoring dynamics in every period of the match. Although the majority of the goals were scored in the third time interval of the match, the results of the winning and losing team difference analysis show that the final success was being built up from the beginning, to the end of the game (Gruić, Vuleta and Ohnjec, 2006). In the first period of the match, the winning teams scored more goals than the losing ones. It is possible that in the opening of the match, the greater experience of the winning teams, based on participating in more important contests as well as taking part in senior training and competing process, is reflected on the efficacy itself. At the same time, the positively selected players of the winning teams, evaluated in their clubs as the promising ones and in consistence to the above stated, enter the match with a less competition stress condition effect and complete more effectively the attacking phases of the game. The mentioned conditions are present throughout the match, and they are the most intense at the beginning, but however, diminish as the match progresses. It is possible that the presumed, in combination with the conditioning preparation enable the result control, in other words, the higher/lower level of preparedness, along with greater/smaller adaptation to stress conditions at the competition, generate the result difference between the opposed teams. The winning teams lav the foundations at the beginning of the halftime, which then they follow throughout it till the end; the losing teams follow the same approach, however, the result superiority achieved in the first ten minutes suffices for the final positive results, in favour of the winning teams.

The technically-tactical operation principle of the both teams shows no stronger oscillations, but it continuously follows what was set at the beginning of the match. There have been recorded the areatest differences in the number of the scored goals, between the winning and the losing teams in the resumption of the match (the third period) after a halftime break. On one hand, the break between the halftimes is sufficient for the players of the winning teams to regenerate and recuperate, so they continue their positive goal scoring trend. On the other, the lower level of condition training of the girls under 16 in the losing teams is manifested in the situational effectiveness field. It is necessary to point out that the winning teams have at least 3-4 players in their line-ups who carry the game play, and who can continuously successfully execute the technically-tactical aims set before them, whereas in the losing teams there is only one such player. The strain put on one player only, as a bearer of the team, has not caused any relevant oscillations in the game throughout the first half, but, due to the weariness and the tactic formation of the opposing winning teams, concentrated on stopping that very player, it has eventually led to the more prominent negative realisation.

Till the end of the match (the last ten minutes), both winning and losing teams score the most goals, because of the weakened activity of the opposed team, however, the winning teams only have to keep the advantage they made previously, which proves to be unattainable for the losing teams. The total realisation efficacy has also been defined by a possibly lower level of the goalkeeper's competence. It might be that they, when compared to the field players, stabilise their effectiveness later in their sport careers, and in some clubs, there is lacking an adequate work toward continuous directed specific goalkeeping trainings.

Conclusion

The aim of this paper is to establish the differences between the results of the winning and the losing team in each time segment of a handball match (quarters lasting 10 minutes). Situational parameters defined as a partial result increase in particular periods of matches and the result differences recorded at the end of each period of the match, collected on the games played in the finals of the Croatian Female U16 Championship in 2011/0212 season. The analysis of variant and Mann-Whitney U test results imply the statistically significant differences between the winning and the losing teams in each for time intervals of the game.

The winning teams on average score more goals in every period, where from the partial increase of the result differences in each time segment becomes evident (1,54; 1,08; 1,73; 1,22), and they both represent the final result efficiency factors. The final result of the handball matches in the finals of the Croatian National Championship for girls U16 that took place in Čakovec in 2012 is defined by the goal scoring dynamics in every period of the match. Although the majority of the goals were scored in the third time interval of the match, the results of the winning and losing team difference analysis show that the final success was being built up from the beginning, to the end of the game (Gruić, Vuleta and Ohnjec, 2006). The young male and female handball players, detected and selected timely in the younger age categories, if included in an adequate training processes, might expect the top results in senior categories as well.

The results obtained in this research, with the emphasis on the total goals scored by the both winning and losing teams, and the final results of the individual matches, indicate that the basic working guidelines of the particular clubs follow the modern handball trends in the field of the general realisation efficacy, since the gained values do not differ significantly from the results of the senior female handball players. Simultaneously, the coaches of the younger age categories could use the obtained results as the orientation values, and especially the result values gained for every quarter individually might form the guidelines for the situational- tactic activities, when creating strategy for certain competitions.

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ANALIZA RAZLIKA REZULTATA U VREMENSKIM SEGMENTIMA RUKOMETNE UTAKMICE ZA MLADE RUKOMETAŠICE

Sažetak

Cilj ovog istraživanja bio je utvrditi razlike između rezultata u pojedinim vremenskim segmentima rukometne utakmice (četvrtine trajanja 10 minuta) u odnosu na pobjedničke i poražene ekipe mlađih kadetkinja na rukometnom Prvenstvu Hrvatske 2012. godine. U analizu su uvršteni situacijski parametri definirani kao parcijalni prirast rezultata u pojedinim razdobljima utakmica te rezultatske razlike zabilježene na kraju pojedinih četvrtina, koji su prikupljeni na utakmicama završnice prvenstva Hrvatske za mlađe kadetkinje u natjecateljskoj 2011./2012. godini. Za utvrđivanje razlika primijenjena je analiza varijance i Mann-Whitnijev U-test čiji rezultati su pokazali da se pobjedničke i poražene ekipe razlikuju u sva četiri promatrana segmenta rukometne utakmice i u parcijalnim prirastima rezultata kao i u rezultatskim razlikama na kraju pojedinih četvrtina.

Ključne riječi: rukomet, djevojke, situacijska učinkovitost, periodi utakmice, prvenstvo Hrvatske

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