

Results of Croatian preschool children in athletic disciplines at the “Olympic Festival of Kindergartens: I want to be an Olympian”

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Abstract

Introduction: This article presents the Olympic Kindergarten Festival "I Want to Be an Olympian" (Festival) organised by the Croatian Olympic Committee. The concept of the competition is similar to that of the Olympic Games. In parallel with the preparations for the competition, children are taught about the Olympic movement and Olympic values. The Olympic Festival includes athletics competitions in four disciplines adapted to pre-school age: 50m sprint (T50m), 4x25m relay (R4x25m), ball throw (BLD) and standing long jump (SDM). Each participant can only take part in one sport or exercise. **Purpose:** The purpose of this study was to 1. present the quantitative values of preschool children in 4 athletics disciplines 2. determine whether there are significant differences between the participating preschool boys and girls in the 4 athletics disciplines of the festival programme and whether there are significant differences in terms of competition level (city and county). **Results:** **The sample** for this study consisted of subsamples of 1625 girls and 1668 boys in the softball long throw, 1659 girls and 1599 boys in the standing long jump, 1492 girls and 1564 boys in the 50 m sprint, and 832 girls' and 804 boys' teams in the 4x25 m relay, attending older kindergarten groups in the Republic of Croatia. Descriptive statistics were compiled for all variables analysed. Differences between the counties and between genders and their mutual interaction were tested using a two-factorial analysis of variance (ANOVA) with interaction for all analysed variables. The mean values of the boys were higher (cm)/better (sec.) than those of the girls for all variables. The figures show that there are gender differences in all counties for all observed variables. We find that the effects of the interaction between county and level of competition are statistically significant for all observed variables. **Conclusion:** After analysing and comparing the results with those of the 2007 Festival on a representative number of participants, we find that there is a decline in motor skills at pre-school age in all observed disciplines.

Key Words: sport participation, motor development, differences between participants

Introduction

Motor skills play an important role in the development of children. The ideal time to teach and develop motor skills is in the preschool years. Skills such as running, jumping, throwing and hopping, as well as other basic life skills, play a key role in learning new skills and are a prerequisite for participation in more complex games, sports, dance skills or other physical activities (PA) later in life (Nikolić et al. 2016). When we promote motor development from an early age, we also improve other areas of children's development (Ali et al. 2017, Tepe et al., 2020). Barnett et al. (2009) categorised children's motor skills into basic movement skills, divided into locomotor skills (running, hopping and jumping) and object control (throwing, catching and kicking), which are considered fundamental for future movement and participation in PA in later life. Williams et al. (2008) found that older children with better motor skills were more likely to participate in PA than children with less well-developed motor skills.

The same group of authors found that performance level of motor skills may be an important factor in promoting a PA lifestyle in preschool children: Children with better-developed motor skills spent significantly more time engaged in moderate and vigorous PA and less time engaged in sedentary behaviour than children with less well-developed motor skills. Although some assume that young children are very active throughout the day, the studies by Goodway et al. (2005) and O' Connor and Tample (2005) have shown that they spend most of the day sitting and <5% of the day in moderate physical activity.

The prevalence of obesity is increasing, even among very young children. According to the Croatian Institute of Public Health, Croatia, together with Hungary and Turkey, is at the top of the list of countries where 19% of children between the ages of 5 and 19 are expected to suffer from obesity in 2030. Numerous studies

emphasise the importance of regular and supervised exercise at pre-school age as part of various organised programmes: at home, in kindergarten or in sports clubs (Šalaj et al., 2016). Nikolić et al. (2016) reported that organised PA during physical education classes in kindergartens is the most important place where preschool children can be sure that they can have the right experiences for the development of their motor skills.

Most educators recognise the importance of early childhood PA promotion, but there are numerous factors that limit PA promotion in early childhood education, such as the lack of specific training for educators, lack of knowledge about policies and procedures, and safety concerns (Coleman & Dymont, 2013., Iveković, 2019). In the Republic of Croatia, there are a limited number of looking at preschool children's participation in organised sport and the differences between boys and girls in motor development (Iveković, 2019).

Logan et al., 2011, following Šalaj et al. 2016, explain that basic motor skills need to be learnt, practised and consolidated through motor interventions consisting of planned movement activities suitable for preschool children. According to Tepe (2020), children aged 4-6 years acquire certain skills such as running, jumping and hopping. Gallahue et al., (2012) emphasise the importance of children receiving additional education when acquiring these skills. These skills are used throughout life and play a key role in physical education, providing more opportunities for choice and participation in various sporting activities. Ali et al., (2017) pointed out that the acquisition of gross motor skills in early childhood may be a better predictor of cognitive performance in school and suggested that teachers should promote the development of gross motor skills in early childhood programmes.

For all these reasons, we have decided to present a model of organised sports activities offered in collaboration between governmental and non-governmental bodies (organisations) responsible for sport at different levels and kindergartens, which promote sport, Olympic values and sports culture, as well as children's development (motor and cognitive), teamwork and a healthy lifestyle. This article introduces the "Olympic Festival of Kindergartens: I Want to Be an Olympian" which has been organised by the Croatian Olympic Committee in cooperation with the regional and local community since 2002 and is aimed at pre-school children. With this project, all kindergartens interested in participating can achieve the following: children's motor development, time they spend in the PA, as well as improving teachers' knowledge of the Olympic Games (OG) and the values and practical knowledge of the basic techniques of athletic disciplines and sports games (football or handball). The concept of the competition is similar to that of the OG and in parallel with the preparations for the competition, the children are taught about the Olympic Movement (about the OG, the anthem, the flag, the flame and the medals).

In addition to education, the focus is on promoting sports culture and educational values such as respect for the rules of the game and other participants, respect for the officials responsible for enforcing the rules, fair play, teamwork and violence prevention. In the practical part of the organisation, the Festival begins with a ceremonial parade in which all kindergartens take part with their teams, accompanied by teachers and other officials, depending on the agreement between the kindergarten and the person responsible for the competition.

The last team in the parade is the host team. At the head of the column, each kindergarten carries a banner with the name of the kindergarten instead of a flag. At the opening ceremony, a group of eight children bring the Festival flag into the stadium to the pole where the flag is hoisted. As the number of participating kindergartens is limited, qualifying competitions are organised at municipal, city or county level. Each kindergarten takes part in an athletics competition and a futsal competition. Competitions in other sports (e.g. kindergarten handball) can also be organised at the discretion of the organisers.

The athletics competitions are held in four disciplines adapted to pre-school age: 50m sprint (T50m), 4x25m relay (R4x25m), ball throw (BLD) and standing long jump (SDM). Each participant can only take part in one sport or exercise. In kindergartens with fewer children, a participant may take part in several disciplines with the organiser's consent. The competition team of a kindergarten consists of a maximum of 40 participants, of which 20 girls and 20 boys, but depending on the number of children in the kindergarten, fewer participants are also possible.

The aim of this study was 1. to present the quantitative values of preschool children in 4 athletics disciplines 2. to determine whether there are significant differences between the participating preschool boys and girls in the 4 athletics disciplines of the Festival programme and whether there are significant differences in terms of competition level (city and county). Considering the results of the studies by Babić et al. (2008) presented for the participants of the 2007 Festival (512 girls and 548 boys), it can be assumed that they will achieve the same or lower results in the athletics observation disciplines a decade later.

Material & methods

Participants

Boys and girls, on average six years old, from kindergartens all over Croatia took part in this study. They took part in competitions at local and regional level in the athletics disciplines of standing long jump (SDM), 50 m sprint (T50m), 4x25 m relay (R4x25m) and ball throw (softball) (BLD) as part of the Olympic Festival of Kindergartens in 2018. The sample for this study consisted of subsamples of 1625 girls and 1668

boys in the softball long throw, 1659 girls and 1599 boys in the long jump, 1492 girls and 1564 boys in the 50m sprint and 832 girls' and 804 boys' teams in the 4x25m relay attending older kindergarten groups in the Republic of Croatia.

Procedure and discipline description

Brief description of the disciplines adapted to pre-school age: 1. T50m: A high start is required for both girls and boys. Two girls and two boys compete for each kindergarten. The timekeepers use a stopwatch to measure the results (sec.), which are recorded on the score sheet. The organiser must prepare the appropriate number of starting places, mark out the playing field and set up measuring sticks and recorders at the finish line. The referee supervises the competition. 2. R4x25m: A high start is required for both girls and boys. Four girls and four boys compete for each kindergarten. The participants line up in a lane 25 metres apart. The first runner hands the baton to the second runner, who waits for him in his place.

The moment he receives the baton, he runs to the third team member and so on. The timekeepers use a stopwatch to measure the results, which are recorded on the result sheet (sec.). 3. BLD: It is carried away from the court. A tennis ball is thrown. Mainly girls and boys compete, two girls and two boys per kindergarten. Each participant throws the ball in two attempts (one after the other) and the better result is recorded on the scoreboard. The results, which are entered in the record, are measured by the measurers using a measuring device (cm). The organiser must prepare the pitches for throwing the ball, fence them off and set up the measuring devices and scorers next to the pitch. The referee supervises the competition. The results are measured by the measurers with a measuring device and entered in the protocol (cm). The organiser must prepare a suitable area for the landing (sand), fence off the pitch and set up the measuring devices and counters next to the pitch. The referee supervises the competition.

Statistical analysis

Descriptive statistics were compiled for all variables analysed. Differences between the counties and between the genders and their mutual interaction as well as between the counties and the competition level (city/county) and their interaction were tested using a two-factor analysis of variance (ANOVA) with interaction for all analysed variables (T50m, BLD, SDM, R4x25m). A significance level of 5% was considered statistically significant. All statistical analyses were conducted using the SAS9.4 statistical package.

Results

We have compiled the results of the 2018 Festival organizers from 20 Croatian counties. Based on the competition proposal for the Festival, we can see that in Croatian counties, boys and girls, who are on average six years old, are equally represented in terms of sports disciplines and the number of participants by gender. The number of boys compared to girls (Table 1.) was higher in the disciplines: T50m and BLD, but the number of girls participating in SDM and the number of girls' team for R4x25m is higher than that of boys. Most participants come from Istria (866 boys and 852 girls) and Primorsko-goranska County (639 boys and 640 girls), compared to the capital Zagreb, the county where we had 120 boys and 127 girls. Zagreb, the capital of Croatia and the county of Zagreb, has the fewest participants compared to 18 other counties.

The basic descriptive parameters for the discipline of Festival athletics by gender and level of competition are described in Table 1. The average values for boys were higher (cm)/better (sec.) than for girls in all variables (Table 2). As in the study by Babić et al., (2008), we observed a wide range of minimum to maximum result values, which could be due to many factors: the number of children in the kindergarten, the practical preparation of the children, the motivation of the kindergarten teachers as well as their previous experience in sports and with this event and the available sports infrastructure for the preparation for the festival. In the same table we see descriptive parameters by competition level, where the results are better at higher competition level, at county level for T50m, SDM and BLD, but not for R4x25m.

Although we would expect participants at county level to perform better on all observed variables because they have more practise and previous experience in kindergartens or at city level, we must take into account that kindergartens in different counties involve children and teachers to varying degrees in the practical preparation of the Festival, partly due to the lack of adequate sports infrastructure.

The ANOVA results in Table 2 show that there is a statistically significant difference by gender for all disciplines. Boys have significantly better results. There is also a statistically significant difference between counties. The only interaction that is statistically significant is for the T50m discipline, which indicates that the T50m results for both genders do not behave the same by counties for both sexes (Fig.2).

The descriptive analysis showed that in 13 counties the participants were equal in terms of gender, in 5 districts there were small differences and in 2 counties (Karlovačka: 42 more girls and in Varaždinska 67 more boys) participated in the Festival at different competition levels. The majority of pre-school boys, the Festival participants, performed better than girls in throwing, running and long jump in all counties (Figure 1.- 4.).

Table 1. Descriptive statistics for the Festival athletics discipline by gender and competition level

	Gender						girls					
	boys											
	N	Min	Median	Max	Mean	Std	N	Min	Median	Max	Mean	Std
T50m	1564	7.18	10.34	27.19	10.51	1.73	1492	7.92	10.67	34.76	10.79	1.71
BLD	1668	1.09	12.86	28.15	13.14	4.63	1625	0.62	8.41	22.00	8.53	2.78
SDM	1599	0.40	1.28	1.75	1.26	0.21	1659	0.40	1.23	1.91	1.20	0.22
R4x25m	804	18.66	24.44	43.88	24.89	3.10	832	16.10	25.02	43.87	25.55	3.19

COMPETITION LEVEL OF OLYMPIC FESTIVAL												
CITY							COUNTY					
	N	Min	Median	Max	Mean	Std	N	Min	Median	Max	Mean	Std
T50m	1596	7.18	10.60	34.76	10.89	1.83	1460	4.66	10.36	19.11	10.37	1.56
BLD	1801	0.62	9.75	28.15	10.48	4.45	1493	0.65	10.51	26.94	11.33	4.44
SDM	1776	0.40	1.24	1.75	1.22	0.23	1482	0.40	1.26	1.91	1.25	0.21
R4x25m	894	16.10	24.67	43.88	25.14	3.04	742	18.44	24.81	43.87	25.33	3.30

Table 2. Results of two-way ANOVA with interaction for the effects of county, gender and the interaction between them for 4 athletic disciplines

	T50m			BLD		SDM		R4x25m	
Variable	DF	F Value	Pr > F	F Value	Pr > F	F Value	Pr > F	F Value	Pr > F
County	19	62.61	<0.001	14.34	<0.001	21.35	<0.001	36.22	<0.001
Gender	1	3.63	0.057	559.65	<0.001	34.74	<0.001	14.81	<0.001
County*Gender	19	5.57	<0.001	1.26	0.198	1.23	0.220	1.36	0.143

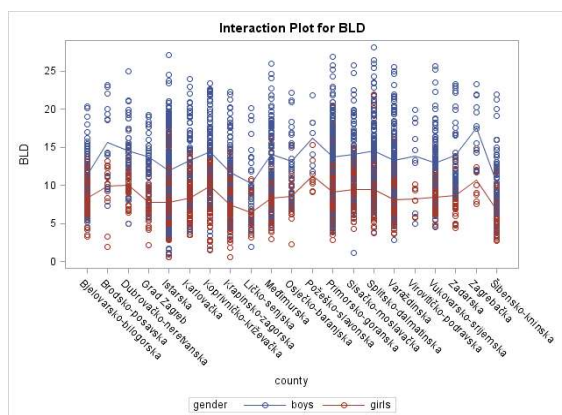


Figure 1. Interaction for the effects of county and gender for the variable BLD

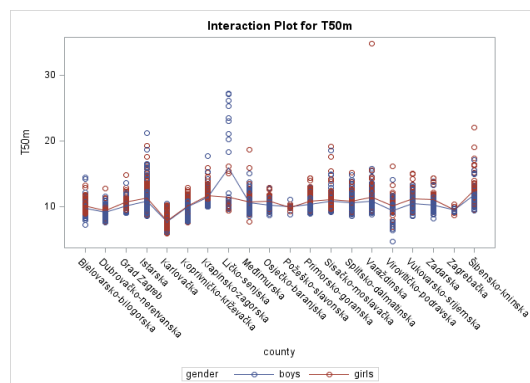


Figure 2. Interaction for the effects of gender for the variable T50m

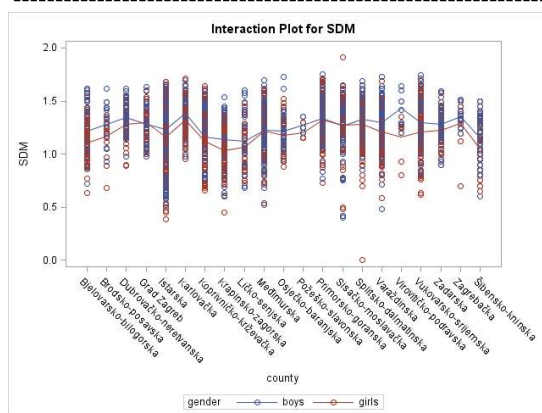


Figure 4. Interaction for the effects of county and gender for the variable SDM

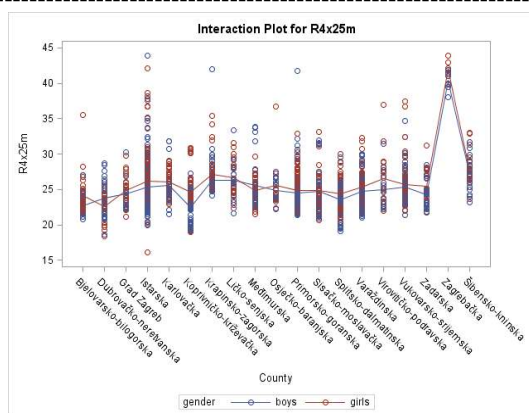


Figure 4. Interaction for the effects of gender for the variable R4x25m

In this study, the results of the relay race (R4x25m) for boys and girls were analysed for the first time, in which the practical preparation of pre-school children is very important: the first runner hands over the baton to the second runner, who waits for him in his place, and so on. Lack of preparation and knowledge of the kindergarten teachers to teach the children can have a strong impact on the results (in Fig. 4. kindergarten from Zagreb County, rural area). On the other hand, this discipline is very attractive and promotes teamwork and learning some running techniques and tactics for preschool children and contributes to a better understanding of this discipline in athletics competitions. It is also important that the children get to know and understand the Olympic Torch Relay as an iconic part of the Games.

The ANOVA results for counties and competition level in Table 3 show that there is a statistically significant difference in competition level (city/county) for all observed disciplines, which is also evident from Table 1, and that the interactions between county and competition level are also statistically significant for all disciplines.

Statistically significant interactions tell us that the results of all observed disciplines by county for the type of competition level (city/county) do not behave approximately the same, which can also be seen in Fig. 5-8. In Figure 8 we see that the worst results were achieved at county level in Zagreb County and for Istria at city level. For the T50m (Fig.5.), we can see lower results at city level for preschool children from 3 counties (Istarska, Ličko-senjska and Šibensko-kninska). In BLD, a more complex discipline, as well as SDM we see equal improvements in results at both competition levels (Fig. 6. and 7).

Table 3. Results of two way ANOVA with interaction for effects of county, level of competitions and interaction between them for disciplines: T50m, BLD, SDM and R4x25m

Variable	T50m			BLD			SDM			R4x25m		
	DF	F Value	Pr > F	DF	F Value	Pr > F	DF	F Value	Pr > F	DF	F Value	Pr > F
County	19	68.01	<0.001	20	12.64	<0.001	20	21.73	<0.001	18	36.19	<0.001
Competition level	1	220.52	<0.001	1	85.35	<0.001	1	50.99	<0.001	1	19.17	<0.001
County*Competition level	6	41.99	<0.001	6	3.92	0.001	6	9.56	<0.001	5	3.89	0.002

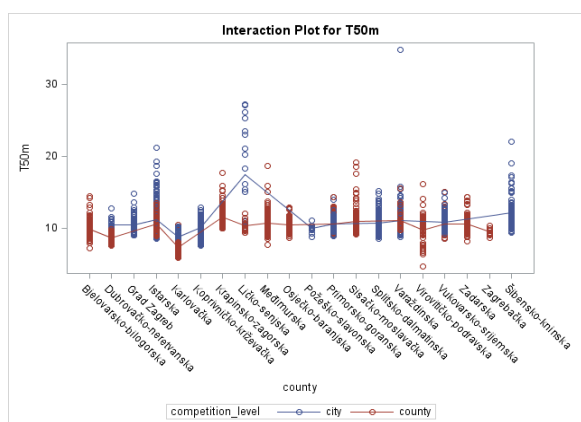


Figure 5. Interaction for the effects of county and competition level for the variable T50m

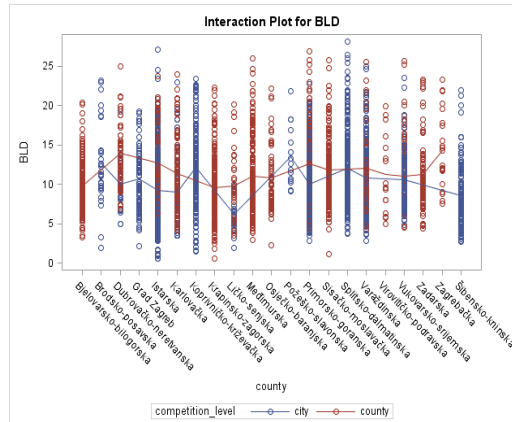


Figure 6. Interaction for the effects of county and competition level for the variable BLD

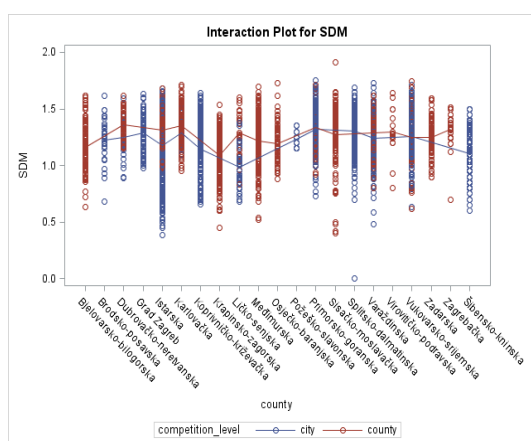


Figure 7. Interaction for the effects of county and competition level for the variable SDM

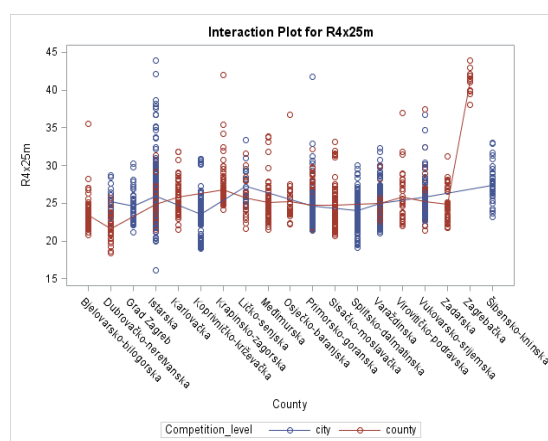


Figure 8. Interaction for the effects of county and competition level for the variable R4x25m

Discussion

The authors of the reviews (Iveković, 2019, Ali et al., 2017) found a lack of studies in preschool children (up to 3 years of age) that examined motor and functional skills and participation in specific sports or sports programmes. This study provides the results of the analysed 4 athletics variables – the Olympic festival disciplines: running (2 disciplines: sprint 50m and relay 4x25m), ball throw and standing long jump, tested by gender, by state and by level of competition, as well as interactions between them for all observed variables. The majority of preschool children at the Festival come from the rural part of Croatia.

A study by Tomišić Humer et al., (2016) found that preschool children in rural areas of Croatia participate significantly less in organised sports activities than children in urban areas. Children from urban areas participate more in sports because they have more opportunities in their environment (Jenko Miholić et al., 2015). With this statement, we can explain why the number of participants from the capital Zagreb, which is considered an urban county is low compared to the other counties with a more rural environment.

In addition to the venue, the teachers also play an important role in preparing the children for successful participation in the Festival. The most important prerequisites are the co-operation of the kindergarten with a local or regional sports association (member of CRO OC) and the kindergarten teacher's interest in participating in an educational workshop. One of the main goals of Physical Education in kindergarten is to help children acquire the motor skills that will later enable them to participate in a variety of sporting activities. After the preparations for the Festival, boys and girls have the same opportunity to practise and learn the basic skills in the athletics disciplines and to feel the Olympic spirit, the Olympic values and the experience of competing at different levels. Looking at the results obtained according to the level of competition, slightly better results can be observed for 3 variables (T50m, SDM and BLD) at county level, while slightly better results were obtained for R4x25m (Table1) at city level.

The most important question we want to know is: “What happened to the results in the observed variables of Festival after the decade?” If we compare the results in the three observed variables (T50m, BLD and SDM) published by Babić et al. (2007) as a preliminary assessment of children's competitive performance in

the same disciplines and under the same conditions, we can see that the participants (pre-school boys and girls) who participated in 2007 achieved better results in all disciplines than the participants in 2018.

The average results for boys in 2007 are: T50m 9.80sec, SDM 1.42m and BLD 16.48m, while in 2018 they are: T50m 10.51sec. (+0.71sec.), SDM 1.26m (-16cm) and BLD 13.14. (-3.08m). Compared to 2007, we also found the worst performances among the girls in 2018: T50m=10.14, while 2018 was 10.79 (+0.65); for BLD=10.44m, while 2018 was 8.53m (-1.91m) and for SDM=1.33m, while 2018 was 1.20m (-13cm). The average results of participants at the 2018 Festival confirmed the differences between genders, with boys performing better on all observed variables (Figure 1.- 4).

The study by Lattore–Roman et al., (2017) showed that performance in the 20m sprint test differs between boys and girls; boys are faster than girls at the age of 3 to 5 years, but no significant differences were found at the age of 6. The results are also in line with previous publications (Babić et al. 2008, Nikolić et al., 2016) and previous findings on the differences in dynamic strength (De Privitellio et al., 2006, Tepe, 2020). Numerous studies emphasise the importance of regular and guided PA at the preschool age, especially today when the prevalence of obesity at this age is increasing. According to paediatricians Jovančević et al. (2015), preschool institutions have an important educational role in promoting healthy lifestyles for children and raising awareness of PA among children and their parents through regular Physical Education and extracurricular sports programmes.

Conclusions

We wanted to present the Olympic Festival for kindergartens as an effective model that ensures children's motor development and knowledge through sport, where children can learn about sports culture and Olympic values. In addition, the children can gradually feel the atmosphere at different competition levels and improve their basic motor skills (running, throwing and long jump). The strengths of this study include a large number of children and the ability to compare these results with the results of the same Festival disciplines a decade ago. The main limitation of this study is the design, which is determined by the Festival proposals and the organisers for the different levels of competition. From a practical point of view and considering the lack of studies conducted on a large number of Croatian preschool children, this study could have implications for future Festival competitions with the aim of collecting data for longitudinal studies. According to these results and in comparison with the results of the 2007 festival on a representative number of participants, we found that there is a decline in motor skills at pre-school age in the disciplines observed. Preschool children should have enough free time to play, but at the same time they need to participate in physical education in kindergarten or an extracurricular sports programme to have a real effect on their growth and development.

Further studies on a national basis are needed to investigate how the motor skills and motor development of children in kindergartens can be improved through physical education and extracurricular sports programmes, especially for children in rural areas.

Conflicts of interest The authors have not declared any conflicts of interest.

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