UDC: 796.431-055.1/.3-057.874(496.534)
Original scientific paper

A COMPARISON STUDY IN CHILDREN BY GENDER FOR COORDINATION ABILITY IN ELEMENTARY SCHOOL LEVEL IN TIRANA

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Abstract

The aim of this study was to compare the current level of coordination ability in elementary school children by gender in Tirana. In total participated 510 children in elementary school (253 boys and 257 girls) where by grade participated (1st= 128, 2nd = 137, 3rd =117, 4th =70 and 5th = 58) living in Tirana, Albania. The level of coordination ability for lower limbs was assessed using jumping sideways test (JS) part of Körperkoordinations Test für Kinder (KTK) battery test: jumping bilaterally as many times as possible over a wooden rod (60 cm x 4cm x 2 cm) in 15 seconds. The number of jumps over two trials was summed. Data analysed by gender in elementary school children in Tirana show no statistical significance F=0.135 and Sig= 0.714 (boys=50.5 jumping and girls 49 jumping). Also data analysed by gender and for each grade in elementary school children in Tirana show no statistical significance. In conclusion data results from this study show that there is no difference by gender in the coordination of lower limbs in elementary school children.

Keywords: jumping, elementary school, gender, KTK

1. Introduction

Physical education has an important role in maintaining our health. Involvement in physical condition can be achieved through continuous and regular participation in various physical activities. Motor skills in children are usually of the general type (Bala, 1981; Nicin, Kalajdzic, & Bala, 1996). They are influenced in the preschool period, between the ages of 4 and 7 (Bala, Kis & Popovic, 1996; Lubans, et al., 2010).

How, the formation of motor habits can be influenced in the preschool period, which depends on the morphological characteristics that are based on their active activity in sports, sports recreation or simply for the equipment of adequate capacities for various activities in adulthood (Bala, 2004).

Looking at the statistical significance of the differences between the sexes, it seems that girls have achieved better results in flexibility and this is confirmed by previous studies (Van Slooten, 1973, Frederick, 1977, according to Gallahue & Ozmun, 1998; Peric, 1991; Gallahue & Ozmun, 1998; Kulic 2005; Bala, et al., 2006; Jankovic, 2014). Girls more often practice games that require less dynamic movement, more precise, higher concentration to understand, greater amplitude of movement (flexibility).

In different gender literature, motor skills are often in focus. In general, is said boys perform better than girls in gross motor skills (Freitas, Vasconcelos, & Botelho, 2014; Jelovčan & Zurc, 2016; Ruiz, Graupera, Gutiérrez, & Miyahara, 2003; Valtr, Psotta Abdollahipour, 2016) and girls perform better than boys in fine

motor skills (Kita, Suzuki, Hirata, Sakihara, Inagaki, & Nakai, 2016; Kokštejn, Musálek, & Tufano, 2017; Mathisen, 2016).

However, these conclusions drawn are not in response with some other related research (Giagazoglou, Kabitsis, Kokaridas, Zaragas, Katartzi, & Kabitsis, 2011; Hermundur & Rostoft, 2003) which are not these changes in these results.

Numerous studies in developed countries show that physical activity is declining among children of all age groups (L. Basterfield, et al., 2012; M.W Beets, et al., 2010). In the middle age group (6-9 years) and in the age group (10-13 years) better motor coordination can increase children's participation in many physical activities and games (D.F. Stodden, J.D. Goodway et al., 2008).

Children who have better motor coordination may be physically stronger throughout life than those children with poorer motor coordination (B.H. Wrotniak, et al., 2006). At school, when we have a large participation in the physical education class through various fun activities, we can develop children's motor coordination skills (R. Chaves, et al., 2015). Active transport (walking and cycling) to school was also positively associated with total physical activity in boys (S. Schoeppe, M.J. Duncan, et al., 2014).

Motor coordination has an inverse relationship with body mass index (R. Chaves, et al., 2015). Since motor coordination is associated with high physical activity, boys have been suggested to have a better level than girls. (I. Ružbarská, 2016 & F. Walfin, et al., 2016).

A study done by (B. Vandorpe, et al., 2011) and (Ruzbarska, et al., 2016) showed that there is a reduction of coordination in gross motor in both sexes, both boys and girls. Neither group had better motor coordination ("good" and "high").

Motor coordination according to (L.E. Robinson, et al., 2015). is a predictor of the level of physical activity in children, where the best levels of motor coordination will be those children who have high levels of physical activity.

2. Methodology

In this study, the KTK test was used for children's measurements. In total participated 510 children in elementary school (253 boys and 257 girls) where by grade participated (1st= 128, 2nd = 137, 3rd =117, 4th =70 and 5th = 58) living in Tirana, Albania.

The "KTK" test includes the four components of motor coordination (MC) and consists of:

1. The 20-second side-to-side platform traversal test with a wooden plank, which targets organization and orientation in space and time, speed, agility and coordination of the lower and upper limbs.

2. One-legged high jump test (Hooping High HH), which targets dynamic strength and coordination of the lower limbs.

3. Walking balance test on balance beams of different widths: 6.0, 4.5 and 3.0 cm, aimed at stability of balance while walking.

4. The lateral jump test with both legs side to side for 15 seconds aims to assess the speed and responsiveness of the lower limbs.

Protocol of the test

The level of coordination ability for lower limbs was assessed using jumping sideways test (JS) part of Körperkoordinations Test für Kinder (KTK) battery test: jumping bilaterally as many times as possible over a wooden rod (60 cm x 4cm x 2 cm) in 15 seconds. The number of jumps over two trials was summed. The Lateral Jump Test evaluates the speed and reaction of the lower limbs. The student jumps sideways as far as possible on a wooden beam in 15 seconds. The number of jumps for two tests is totaled. Between the two tests, there is a break of 1 minute or more until the student calms down to normal breathing.

3. Results

In the end of the lateral jumping (LJ) performance tests using the protocol of "KTK" test in the 8 elementary schools in Tirana, we obtained different results that we will present below. In separate tables we will show lateral jumping (LJ) performance test for boys and girls from the First Grade to the Fifth Grade.

Table 1 Descriptive Statistics

	N	Mean	Std. Deviation
Lateral Jumping Attemps1	510	23.876	7.5154
Lateral Jumping Attemps2	510	25.878	7.6537
Lateral Jumping Total	510	49.755	14.7169
Valid N (listwise)	510		

The results in the first table show the descriptive data for the lateral jump. This table shows the average data for the 510 students who participated in this test. In the first test we see an average of 23.8 jumps. The second test is seen to have a small increase, where the average is 25.8 jumps. The total of 510 students shows an average of 49.7 jumps.

Table 2

Gender		N	Mean	Std. Deviation
Boys	Lateral_Jumping_Attemps1	253	24.281	7.6072
	Lateral_Jumping_Attemps2	253	26.241	7.6101
	Lateral_Jumping_Total	253	50.522	14.7136
	Valid N (listwise)	253		
Girls	Lateral_Jumping_Attemps1	257	23.479	7.4173
	Lateral_Jumping_Attemps2	257	25.521	7.6944
	Lateral_Jumping_Total	257	49.000	14.7097
	Valid N (listwise)	257		

Descriptive Statistics

The results from the second table show the descriptive data for the 253 boys and 257 girls, in the two tests in lateral jump (LJ). Boys had shown an average of 24.2 LJ in the first test, while girls have an average of 23.4 LJ. In the second test, the boys averaged 26.2 LJ and the girls averaged 25.5 LJ. The total mean achieved by the boys is 50.5 LJ and the girls in 49 LJ.

The results in the third table show the descriptive data for the 5 classes that participated in the testing.

The 128 students of the first grade achieved an average of 39.4 LJ and SD ± 13.2; the 137 students of the second grade achieve an average of 49.4 LJ and SD ± 12.8; the 117 students of the third grade achieve an average of 51.6 LJ and SD ± 12.6; the 70 students of the fourth grade achieved an average of 57.1 LJ and SD ± 11.7, the 58 students of the fifth grade achieved an average of 60.4 LJ and SD ± 15.

Table 3 Descriptive Statistics

Grade		N	Mean	Std. Deviation
1	Lateral_Jumping_Attemps1	128	19.086	6.8929
	Lateral_Jumping_Attemps2	128	20.391	6.8093
	Lateral_Jumping_Total	128	39.477	13.2106
	Valid N (listwise)	128		
2	Lateral_Jumping_Attemps1	137	23.956	6.4282
	Lateral_Jumping_Attemps2	137	25.460	6.9091
	Lateral_Jumping_Total	137	49.416	12.8936
	Valid N (listwise)	137		
3	Lateral_Jumping_Attemps1	117	24.624	6.7104
	Lateral_Jumping_Attemps2	117	27.051	6.4991
	Lateral_Jumping_Total	117	51.675	12.6538
	Valid N (listwise)	117		
4	Lateral_Jumping_Attemps1	70	27.000	6.3748
	Lateral_Jumping_Attemps2	70	30.143	5.8812
	Lateral_Jumping_Total	70	57.143	11.7674
	Valid N (listwise)	70		
5	Lateral_Jumping_Attemps1	58	28.983	8.2387
	Lateral_Jumping_Attemps2	58	31.466	7.2867
	Lateral_Jumping_Total	58	60.448	15.0545
	Valid N (listwise)	58		

Table 4 Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Lateral_Jumping_Total	Boys	253	50.522	14.7136	.9250
	Girls	257	49.000	14.7097	.9176

The results in table 4 an 5 show, data analysed by gender in elementary school children in Tirana. Those data show no statistical significance F=0.135 and Sig=0.714 (boys=50.5 LJ and girls 49 LJ).

Table 5 Independent T test for lateral jumping

Independent Samples Test								
		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
Lateral Jumping Total	Equal variances assumed	0.135	0.714	1.168	508	0.243	1.5217	1.3029

In table number 5, we have the comparative results between boys and girls according to classes. In the first class, 70 boys and 58 girls took part in the measurements. Boys' mean was 41 LJ and SD ± 13.4, while girls had a mean of 37.6 LJ and SD ± 12.7. 66 boys and 71 girls participated in the second class. The mean achieved by the boys was 51 LJ and SD ± 13.5, while the girls had a mean of 47.9 LJ and SD ± 12.1. 51 boys and 66 girls participate in the third class. Boys' mean was 52.4 LJ and SD ± 12.7, girls' mean was 51 LJ and SD ± 12.6. 37 boys and 33 girls participated in the fourth grade. Boys' mean was 58.3 LJ and SD ± 13, while girls' mean was 55.8 LJ and SD ± 10.1. 29 boys and 29 girls participate in the fifth grade. Boys' mean was 58.8 LJ and SD ± 13.2, while girls' mean was 62 LJ and SD ± 16.7.

Table 6 Group Statistics

Grade		Gender	N	Mean	Std. Deviation	Std. Error Mean
1	Lateral_Jumping_Total	Boys	70	41.014	13.4902	1.6124
		Girls	58	37.621	12.7332	1.6720
2	Lateral_Jumping_Total	Boys	66	51.030	13.5544	1.6684
		Girls	71	47.915	12.1511	1.4421
3	Lateral_Jumping_Total	Boys	51	52.490	12.7630	1.7872
		Girls	66	51.045	12.6302	1.5547
4	Lateral_Jumping_Total	Boys	37	58.324	13.0980	2.1533
		Girls	33	55.818	10.1071	1.7594
5	Lateral_Jumping_Total	Boys	29	58.897	13.2378	2.4582
		Girls	29	62.000	16.7673	3.1136

Results from the table 6 show no statistics difference for each class by gender for lateral jumping test.

Table 7 Independent T test for lateral jumping total by class

Independent Samples Test								
Grade		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
1	Lateral Jumping Total	0.008	0.928	1.453	126	0.149	3.3936	2.3355
2	Lateral Jumping Total	0.362	0.548	1.418	135	0.158	3.1148	2.1965
3	Lateral Jumping Total	0.329	0.567	0.611	115	0.543	1.4447	2.3656
4	Lateral Jumping Total	2.011	0.161	0.888	68	0.378	2.5061	2.8219
5	Lateral Jumping Total	2.123	0.151	-0.782	56	0.437	-3.1034	3.967

4. Discussion

In this study, we aimed to compare according to gender, the actuality of coordination skills in primary school children. The test used in this study was lateral jumping (LJ), followed by the I Körperkoordinations Test für Kinder (KTK) protocol. This test is very preferred, it needs more strength and durability (B. Pratorius & T.L. Milani, 2004). The expectations were that the boys would show a better performance than the girls, since compared to the study of (B. Vandorpe, et al., 2011) and Rusbarkas (Ruzbarska, et al., 2016) in motor coordination ability, the boys did better than the girls.

Our study showed that the current level I, where boys and girls of primary schools are compared, has no significant statistical differences. In the study by (L. Robinson et al., 2015), he shows that the predictor of the level of physical activity of primary school children is motor coordination, since children who present a high level of physical activity performance will also have a better level of motor coordination. It is suggested that the teachers or trainers who work with children of these age groups, draw up the specified plan, where the children are divided into groups according to the levels of coordination skills that the children show in the lessons or training. The ability of children in primary schools is recommended to be viewed by a group of experts who monitor and evaluate the ability proces (M. Polimac et al., 2013).

We recommend that other studies have higher participation numbers and include more assessment tests as well as laboratory tests. The impact of children's BMI on their scores and performance in motor competence assessments, such as the Körperkoordinationstest für Kinder (KTK), is an area that warrants further investigation. A previous study conducted by (D'Hondt et al., 2011) found a negative influence of overweight in childhood on KTK performance. However, it's important to note that this is just one study, and additional research is needed to better understand the relationship between BMI and motor competence as measured by the KTK.

While the KTK demonstrates a sound factorial structure, it is essential to consider that this does not necessarily imply a comprehensive assessment of motor competence from a conceptual standpoint. To enhance the robustness of the motor competence construct, some researchers have suggested combining the KTK with the Test of Gross Motor Development-2 (TGMD-2), as proposed by (Rudd et al., 2016). By integrating these assessments, it may be possible to obtain a more comprehensive and reliable measure of motor competence.

It is worth mentioning that these suggestions for combining assessments are theoretical in nature and require empirical validation through further research. By exploring the potential integration of the KTK and TGMD-2, researchers can work towards developing a more holistic and improved motor competence assessment tool.

5. Conclusion

The number of jumps over two trials was summed. Data analyzed by gender in elementary school children in Tirana show no statistical significance F=0.135 and Sig= 0.714 (The average of boys was 50.5 jumping, and girls 49 jumping). Also, data analyzed by gender and for each grade in elementary school children in Tirana show no statistical significance. The averages obtained from the classes were: grade 1 = 39.4, jumping; grade 2 = 49.4 jumping, grade 3 = 51.6 jumping; grade 4 = 57,1 jumping; grade 5 = 60.4 jumping

In conclusion data results from this study show that there are no differences by gender for coordination of lower limbs in elementary school children. In order to extend the use of the Körperkoordinationstest für Kinder (KTK) in Albania, it is crucial to establish normative values specific to the country. These reference scores should take into account the geographic, cultural, and social realities of the Albanian population. By deriving norms that are representative of the local context, the KTK can be effectively utilized as a motor competence assessment tool for children and adolescents in Albania.

While the KTK has been primarily utilized in scientific research, it is equally important to disseminate this information to physical education teachers and sports coaches. By providing them with access to the test and its reference scores, they can be equipped to administer the KTK in real-world settings. The obtained results from these assessments can then be utilized to inform the development and implementation of programs aimed at enhancing motor skills in children and adolescents.

By bridging the gap between scientific research and practical application, physical education teachers and sports coaches can utilize the KTK as a valuable tool for evaluating and monitoring motor competence. This knowledge empowers them to design targeted interventions and programs tailored to the specific needs of their students or athletes. The integration of the KTK into these programs can contribute to the overall development and improvement of motor skills in children and adolescents, ultimately promoting healthier and more active lifestyles.

On an international scale, (Rudd et al., 2016) conducted a study with Australian children. Similar to the study by Ribeiro et al., they employed factorial analysis to explore the factorial structure of the test in question, known as KTK (Körperkoordinationstest für Kinder). The researchers aimed to determine whether the tasks within the test were effectively measuring the latent motor coordination (MC) variable.

The findings of Rudd et al.'s study indicated that the data obtained from the factorial analysis supported a model in which the four tasks of the KTK test strongly influenced the underlying motor coordination variable. In other words, the tasks within the test were deemed to be valid measures of motor coordination based on their significant impact on the latent MC variable.

These two studies, conducted in different countries (Brazil and Australia), both recognized the importance of examining the factorial structure of the KTK test and validating its use in their respective contexts. While (Ribeiro et al., 2012) emphasized the need for validation in Brazil, (Rudd et al., 2016) demonstrated that the test's tasks effectively measured motor coordination in Australian children.

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