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Research article

PHYSICAL FITNESS IN CHILDREN AGED 10 AND 11 ACCORDING TO PARTICIPATION IN SPORTS AND FOLKLORE ACTIVITIES

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Abstract. *This study aimed to examine the differences in physical fitness among younger school-age children according to sport participation. The sample consisted of 252 children, categorized into three groups based on their engagement in sports and folklore activities. The variables analyzed include body weight, body height, the toe touch, push-ups, the standing long jump, shuttle run, obstacle course backwards, bent-arm hang, and sit ups. The results indicated significant differences in the standing long jump, push-ups, obstacle course backwards, the 20m run, and bent-arm hang among the groups ($p<0.05$). This study highlighted significant differences in physical fitness among younger school-age children based on their engagement in sports, folklore activities, or inactivity. The findings have implications for educators and coaches in designing appropriate physical education programs for younger school-age children.*

Key words: *morphological characteristics, motor abilities, youth, sports, folklore*

INTRODUCTION

The World Health Organizations issued a statement regarding the recommended physical activities to try to standardize attitudes regarding the type, manner, and amount of daily physical activities for children. According to (Cohen, 2011; Moliner-Urdiales, 2010; Nyberg, 2009) motor abilities among school-age children are obviously decreasing globally. Dance content is identified as something special attention should be paid to for several reasons, and additionally, it has been noted that among kids who participate in extracurricular physical activities but are exempt (increasingly) from elementary and secondary school's required

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physical education, dancing is one of the most popular activities (Angela, Živkov & Markov, 2020). It is reasonable to suppose that greater integration of dance material into physical education lessons might at least partially prevent this occurrence (Djorčić & But, 2013).

Dancing encourages creativity, interaction, and a sense of belonging to a group, in addition to having an effect on the development of motor abilities (Oreb & Relji, 1992). During this time, hand-eye coordination is also still developing, according to Ozer et al. (2004). Unprofessional dancing should be included in the health promotion agenda since studies show that it helps people manage their stress more effectively and improves their mental health, social interactions, and self-esteem (Quiroga Murcia, Kreutz, Clift, & Bongard, 2010). Folk dancing enhances structural qualities including rhythm, balance, and coordination like one of the most relaxing methods to develop children's motor and structural abilities. Lessons are more effective when the folk dance has been developed to complement the game mechanics (Inan, 2004). Numerous studies have shown that dancing improves motor skills as well as other skills, including a sense of rhythm and movement, the aesthetics of executing moves, etc. (Neyzi et al.,1993; Prskalo, 2004; Ilić et al., 2012). Dance and other physical exercises do not affect morphological abilities since they are fundamental; however, changes do occur in abilities that are less basic (Prskalo, 2004). For kids, dancing is an unforgettable experience since it allows them to meet their need for play and movement, develop coordination, develop a sense of beautiful and correct movement and body posture, and the music actually helps the feeling of fun, leisure, and emotional relief (Labudović, 2017). The fact that elementary schools offer the subject of Folk Tradition as an elective subject, where children of younger school ages learn about cultural heritage, customs, etc., is further evidence that the introduction of traditional creativity and traditional values has become important for the educational system (Perić & Niskanović, 2006). Traditional games serve as an archive of humanity's past while also being employed in the present, whether in their original form or one that has been transformed (Mesaroš Živkov, Markov, & Jelić, 2018). Children's motor development benefits from playing traditional games that involve movement and singing (Milanović & Tošić, 2012). The fact that children today accept and preserve the original forms of games that are familiar to them due to growing up in families where traditional culture is encouraged makes it possible to provide a solid foundation for the revival of many traditional children's games (Mesaros Zivkov, Markov, & Jelic, 2018). Through dance, children develop the ability to move naturally by themselves or in groups, which helps them accept their families, understand others, and appreciate the similarities between cultures, languages, genders, nations, socioeconomic classes, and personal abilities (Ladešić & Mrgan, 2007). The selection of appropriate folk dances, the order of training, physical preparation, coordination of movements, and navigation of space are the fundamental requirements for successful interaction with children of certain ages (Knežević, 2005). The case for a more significant involvement of dance in physical education programs has long been recognized by the scientific community in Serbia (Jocić, 1991; Strassel et al., 2011). If maintaining cultural tradition, tying together the content of various subjects within a single subject, and fostering children' intrinsic motivation are some of the stated objectives of the teaching process, this paper will demonstrate that various dance forms are perfect for achieving them (Ozer et al., 2004). The study of physical fitness in 10- and 11-year-old children with regard to their sports participation is a topic of considerable significance and relevance. Children of this age group are at a stage where they are forming habits that can last a lifetime. Understanding how sports participation influences their physical fitness can inform strategies to encourage healthy activity choices. Schools play a

crucial role in promoting physical fitness through physical education programs and extracurricular sports. Understanding the impact of sports participation can help educators tailor physical education curricula to better meet the needs of their students. The purpose of this study is to determine the effects of physical education classes on children' physical abilities, whether the desired level and planned outcomes have been achieved in line with the current children's curriculum, and the contribution of physical education and folk dance classes to changes in the physical development and physical abilities of children in younger elementary school classes. The aim of this study was to find out whether their changes in physical development varied significantly depending on whether they regularly attended class, were excluded from physical education, or participated in additional sports or activities.

METHODS

Sample of Participants

The study was conducted on a sample of 126 boys and 126 girls (age = 10-11 years) including 83 who participated in sports, 16 in folklore activities and 153 who did not participate in either, who were from elementary schools in the city of Užice. All tests were conducted in schools during physical education classes. The research was conducted in accordance with the Declaration of Helsinki (WMA, 2013), and in order for a child to participate in the research, the consent of a parent or guardian was required. The criteria for inclusion in the sample of participants were that the children at the initial and final measurements were in the age range, that all of the battery of tests were completed both at the initial and final measurements, and that they came directly to school on the day.

Testing Procedure

The testing was done in the physical education hall or in the school yard during one school term, one month. This period of time was chosen to correspond with the curriculum of the school. It was observed for a length of time that minimized the transient practice effects and was brief enough to produce systematic changes. Measurements were taken in the morning hours between 9 and 12 during regular classes. At the children's school, all of the exam elements were given in a set order in the gym. The children went through the predefined sequence in small groups as part of the testing protocol. A test item was overseen by the same test administrator for both the first and second test sessions. The test administrators were human movement sciences research assistants who had received training in administering the test battery components.

Anthropometric Characteristics

Martin's anthropometer GPM 101 (GPM GmbH, Switzerland) was used to assess body height with an accuracy of 0.1 cm. The participants stood in an upright position, barefoot on a solid surface, feet together. The measurer made sure that the anthropometer was in a vertical position along the back of the body and then lowered the sliding compass of the anthropometer to the top of the participant’s head. The reading was made on the upper opening along the line that is the reading indicator. A digital scale was used that allows measurement accuracy of 0.1 kg and where measurement accuracy is reliable. The participant stood in the middle of the scale when zeros appeared on the scale and stood still

in an upright position until the value on the scale stopped. When the value on the scale stopped, the result was read with an accuracy of 0.1 kg. The accuracy of the scale was checked after every 10 measurements. The scale had to be placed on a solid horizontal surface.

Physical Fitness

Trunk raising: measured as the number of repetitions

A stopwatch with an accuracy of 1/10s is used. The child lies on his back, knees bent and arms crossed, hands on opposite shoulders. The examiner fixes the child's feet, and the child rises to a sitting position and returns to lying down. The result is the number of correctly performed sit-ups in 60 seconds. The task is repeated twice, with enough time for the child to rest completely. The number of correctly performed sit-ups, no longer than 60 seconds, is evaluated.

Plate tapping with one hand: measured in seconds (s)

It manifests in the quickest possible completion of the longest path. The test lasts for 15 seconds, and the outcome is entered. It is defined as the quantity of successful double hits, with the emphasis that a hit only counts if both plates have been touched by the child (Anselma et al., 2020).

The standing long jump: measured in centimeters (cm)

Explosive strength was assessed with the standing broad jump. Children stand behind a line and are asked to jump forward as far as possible on a foam mat. They are told to swing their arms and flex their knees prior to jumping and to keep both legs close together at takeoff and landing. The best of two trials is recorded. The distance jumped is recorded to the nearest centimeter. An accommodation in the test materials is the use of bright orange-colored tape to indicate the position to jump from. There is no space between the take-off line and the foam mat (Houwen et al., 2006).

The bent-arm hang: measured in seconds (s)

Arm and shoulder muscular endurance were assessed with the bent-arm hang. Each child is requested to maintain a bent arm position while hanging from a bar for as long as possible, chin above the bar. The test ends when the child's eyes go below the bar. Measurements are recorded to the nearest 0.1 s. No accommodations in test materials or execution are made (Houwen et al., 2006).

The 20m run: measured in seconds (s)

Participants start the test from a standing start, where the examiner is standing with a stopwatch. His task is to give a signal to the participant after the signal. Participants are told to hold back from running at top speed throughout the length of the sprint test. To avoid a reduction in sprint speed on the approach to the gate at 20m, a research associate is placed 2m outside the final timing gate and provides verbal reinforcement during each effort. The participants were told to maintain a maximum pace until passing the marker where the examiner stands. The participants performed three repetitions, with the best (fastest) times used for statistical analysis (Fernandez-Santos et al., 2015).

Obstacle course backward test: measured in seconds (s)

Obstacle course backward test is performed for the purpose of assessing coordination. The participant stands in a four-legged position, that is, puts his hands and feet on the floor, with his back facing the obstacles. When the examiner gives the signal, the participant

moves backward. The first barrier must be crawled through, and the second barrier must be pushed through. In this test, while moving backwards, the participant can follow the direction of movement through his legs, but he must not even look to the side; if he does, the task is repeated. The task is also repeated if the participant moves the obstacle. When the participant crosses the finish line with both hands, the task is over. The result is measured with a stopwatch in tenths from the moment the participant starts until he finishes, with the stopwatch running even if the participant makes a mistake. The task can be performed only once (Anselma et al., 2020).

Toe touch (cm)

To perform the test, the participant stands on the 40-cm high box with his or her feet hip-width apart. The participant's legs are straight and feet parallel. The participants are told to bend as far forward as they could while maintaining a fully extended knee, arm, and finger position. For two seconds, the participant held the ultimate place. The scale on the left side of the reach indicator is used to record scores, which are expressed in centimeters to the closest 0.5 cm. The distance between the tip of the toes and the end of the right middle finger is used to calculate the toe touch distance. A negative value was indicated as failure to reach his or her toes (Vrbik et al., 2017).

Data Analysis

Data processing was performed in the IBM SPSS statistics program (version 26.0; Inc., Chicago, IL, USA). The normality of the data distribution was checked by the Kolmogorov-Smirnov test for all independent variables, while the one-factor analysis of variance (ANOVA) was used to determine the differences between the groups of sport, folk dance, and non-physical activity. The statistical level of significance was set at $p < 0.05$.

RESULTS

Table 1 Basic descriptive parameters (means ± SD)

	Sport n=83	Folklore n=16	Without activity n=153
Body weight (kg)	40.51 ± 5.05	41.42 ± 5.28	39.83 ± 6.10
Body height (cm)	149.55 ± 3.52	151.59 ± 3.43	150.22 ± 5.76
BMI (kg/m^2)	18.1 ± 1.3	18.0 ± 1.2	17.7 ± 0.9

Analyzing the results from Table 1, which show the anthropometric characteristics of children, we see that the body mass values of children who took part in folklore are the highest compared to the others, and the lowest values were found for children who did not take part in any physical activity. The body height values of children who practiced folklore were the highest on average, while the lowest were those of children who practiced some sport.

Table 2 Physical fitness parameters (means ± SD)

	Sport n=83	Folklore n=16	Without activity n=153	P-value
Plate tapping (sec)	19.03 ± 2.96	18.29 ± 3.52	18.26 ± 2.80	.145
Toe touch (cm)	37.91 ± 4.83[a]	38.68 ± 6.58[ab]	37.88 ± 5.53[b]	.851
The standing long jump (cm)	107.24 ±19.68[a]	104.95 ±14.28[a]	91.13 ±15.83[b]	.000
Trunk raising (n)	19.93 ± 7.04[a]	18.62 ± 6.59	16.31 ± 7.83[b]	.002
Obstacle course backwards (s)	18.99 ± 4.54[a]	19.76 ± 4.25[ab]	21.40 ± 4.57[b]	.001
The 20m run	4.72 ± 0.23[a]	4.83 ± 0.13[a]	5.40 ± 0.37[b]	.000
Bent-arm hang (s)	13.03 ± 8.49[a]	12.10 ± 7.88[ab]	9.69 ± 6.60[b]	.004

Each subscript letter denotes a subset of groups whose column proportions do not differ significantly from each other at the $p<0.05$ level

The results indicated significant differences in the standing long jump, push-ups, the obstacle course backwards, 20m run, and bent-arm hang among the groups ($p<0.05$). It is interesting to note that those who did not participate in any physical activity were the least successful in any physical fitness parameter. The results of the hand tapping test show that children who did participate in sports and folklore make the most progress on average, while children who did not participate in any physical activities made the least progress. The results for the trunk raising show that there is a statistically significant difference in the repetitive strength of children depending on the student's extracurricular sports activities and/or folklore in favor of children who play sports ($p=0.024$). The results showed significant results in the Sit-and-reach test, Obstacle course backwards and Bent-arm hang tests in the group that participated in sport and the group that had no activity. In the Standing long jump test, there was a significant difference between the group that participated in sport and the group that had no activity, as well as between the group that participated in folklore and the group that had no activity. The results of the trunk raising test showed that there is a significant difference between the group that was involved in sports and the group that was not involved in physical activity. The 20m run showed a statistically significant difference between the group that participated in sport and the group that was not involved in physical activity and the difference between the group that participated in folklore and the group that was not involved in physical activity. Based on the results of the study, it is evident that children who participated in sports and folklore activities achieved better results in various physical fitness parameters compared to those who did not participate in any physical activity. The statistical analysis revealed significant differences in multiple fitness tests. Children in the group that participated in sports and folklore activities performed significantly better in the standing long jump test compared to the group that did not participate in any physical activity. This suggests that participation in sports and folklore positively influenced lower-body strength and explosive power. The results demonstrated a statistically significant difference in repetitive strength between children involved in sports and those that did not participate in physical activity. Children who played sports showed better performance in push-ups, indicating greater upper-body strength. Both the group that participated in sports and the group involved in folklore activities exhibited significant improvements in the obstacle course backward test compared to the group that did not participate in any physical activity. This suggests enhanced agility and coordination among active participants. There was a statistically significant difference in running speed between the group participating in sports and the group involved in folklore activities compared to the group that did not participate in any physical activity.

This implies that engagement in physical activities led to better cardiovascular fitness and speed. The bent-arm hang test also showed significant differences between the group that participated in sports and the group that did not participate in any activity, indicating improved upper-body strength and muscular endurance among active participants.

DISCUSSION

The progress that comes with age is evident, but based on the results, we obtained data that show statistically significant progress in six out of seven fitness variables. The only minimal improvement was observed in the children' flexibility on the toe touch. Similar results were confirmed in two studies (Rodić, 2004; Gajević, 2009), confirms the stagnation and even weaker result of flexibility in fourth-grade children compared to first-grade children, but our participants were on average more successful in explosive power by 5.2 cm and static force by 10 seconds compared to the results he got. Only in the toe touch (flexibility) was stagnation in development confirmed at this age, which coincides with the results of other studies (Ivanić, 1999; Gajević, 2009). The obtained results, which confirmed a statistically significant progress, represent the results of changes not only in natural growth and development but also some other contextual factors, which to a greater or lesser extent influenced the children' achievements on the examined tests. It is interesting to note that those who do not engage in any physical activity were not the most successful in any motor variable. Doing sports and folklore gave the best results because the children are the most physically active (5–6 days a week) since they practice two activities side by side in an organized manner. Such results were confirmed in studies (De Privitellio, Maric, & Mijan, 2006; Bunčić, 2005) that emphasize that the period from the ages of 4 to 12 is favorable for involvement in sports activities and for the development of some motor skills. The connection between playing sports and motor performance was also confirmed in another study (Martinović, 2003) where it was stated that there is a high level of dependence between children' playing sports and motor skills. The author came to the conclusion that there is a difference between those who do sports regularly and those who do them occasionally because the acquisition of motor skills can be improved if children practice outside of physical education classes.

As the children' participation in both sports and folklore gave numerically the best results in 4 fitness parameters, we can state that this is the contribution of the longest physical engagement of children, because they are active on average 5-6 days a week. Playing sports and/or folklore in relation to children who do not play sports is not of crucial importance at this age, but it contributes to creating the foundation for the later development of children's' physical fitness. The results of our study led us to the conclusion that regular physical education classes can be a significant factor in the development of physical fitness. In another study (Labudović, et al., 2018) that aimed to measure certain anthropometric dimensions using standard procedures on a suitable sample and determine the body composition of Latin American dancers of the first federal rank Serbia, the results showed that the dancers are moderately slim and have a balanced physique, that there are certain differences in relation to gender and that there are no statistically significant differences in dimensionality and body structure in relation to age categories in both sexes. Doing sports and folklore gave the best results, because the children were the most physically active since they practice two activities side by side in an organized manner. The results of the study confirmed the statistically

significant relationship between the predictor set (motor and anthropometric dimension) and the criterion set (folk dances), which had previously been demonstrated in other studies (Oreb, 1984; Oreb & Kilibarda, 1996; Srhoj, 2002; Miletić, Srhoj, Sekulić, 2003), all of which took place in the same motor space. The findings suggested that while selecting young children for dancing, particular emphasis should be paid to the motor rhythm ability, coordination, explosive strength, and flexibility. Undoubtedly, a sample of female folk dancers should be used to confirm the findings of the current study, which would give the relationship between anthropometric and motor space and dancing efficiency even more significance. While this study provides valuable insight into the differences in physical fitness abilities among younger school-age children, several limitations should be acknowledged. Firstly, the sample was limited to a specific geographical area, which may limit the generalizability of the findings. Secondly, the study relied on self-reported participation in sports and folklore activities, which could introduce recall bias. Furthermore, there is a difference in the number of children in the groups, with the smallest number of children engaged in folklore Finally, the cross-sectional nature of the study limits our ability to establish causal relationships between engagement in activities and morphological characteristics and motor abilities.

CONCLUSION

This study highlighted significant differences in physical fitness among younger school-age children based on their engagement in sports, folklore activities, or inactivity. The results emphasize the importance of promoting physical activity and diverse physical education programs to enhance the overall development of children. Further research with larger and more diverse samples is needed to confirm and expand upon these findings. By addressing these differences, educators and coaches can foster a positive and inclusive physical education environment that promotes the well-being of all children.

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FIZIČKA SPREMNOST DECE STAROSTI OD 10 I 11 GODINA PREMA UČEŠĆU U SPORTSKIM I FOLKLORNIM AKTIVNOSTIMA

Cilj ovog istraživanja bio je da ispitaju razlike u fizičkoj spremnosti među decom mlađeg školskog uzrasta prema učešću u sportskim aktivnostima. Uzorak je činilo 252 dece kategorisane u tri grupe na prema učešću u sportskim i folklornim aktivnostima. Analizirane varijable uključuju telesnu težinu, telesnu visinu, dodirivanje stopala prstima, sklekove, skok u dalj iz mesta, shuttle trčanje, stazu sa preprekama unazad, vis u zgibu i trbušnjake. Rezultati su ukazali na značajne razlike u skoku u dalj iz mesta, sklekovima, stazi sa preprekama unazad, trčanju na 20 metara i visu u zgibu među grupama ($p<0.05$). Ovo istraživanje istaklo je značajne razlike u fizičkoj spremnosti dece mlađeg školskog uzrasta prema njihovom učešću u sportskim i folklornim aktivnostima ili neaktivnosti. Rezultati imaju implikacije na vaspitače i trenere u osmišljavanju odgovarajućih programa fizičkog vaspitanja za decu mlađeg školskog uzrasta.

Ključne reči: *morfološke karakteristike, motoričke sposobnosti, deca, sport, folklor.*