

Original Article Research

The Impact of Structured Regular Physical Activity of Individual Motor Skills in School-Aged Children

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Abstract

This research aims to determine the positive impact of regular and structured physical exercise on the development of students' motor skills. The research used was quasi experimental. The sample used in this research was 43 school age children (experimental and control groups). The motor instruments in this study are speed, strength, coordination, and flexibility, which are the seven basic motor abilities of every healthy individual. The collected data were statistically processed in the Microsoft Office Excel 2016. The results obtained in the research were to get an answer to the question whether the experimental group had different anthropological characteristics from the control group respondents in the final measurement compared to the initial measurement, appropriate methods, methods, and workload were applied. By applying the initial and final measurement methods, significant differences were found in the motor skills of children from the experimental group subjects, which basically answered the question about the impact of implementing a structured regular physical activity program on the development of these motor skills. This study has limitations including that the study participants are still in small numbers and researchers cannot fully control because participants are not in quarantine during the experimental program. Contributions to subsequent studies were increasing the number and distribution of participants' locations, providing improved control as a form of intervention during treatment, and adding certain variables.

Keywords: Aged Children, motor skills, physical activity.

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1. INTRODUCTION

Previous research unequivocally indicates that a high level of physical activity of children is closely related to a high level of motor skills (Fisher et al., 2005), but also that insufficient physical activity of children has a negative impact on both motor skills and on the complete motor development of children (Lubans et al., 2010). Physical activity refers to any movement or movement of the body or parts of the body, which is the result of nervous support acting on the locomotor apparatus (bones, joints and muscles). Daily exercise of various forms of physical activity has a positive effect on the growth and development of the organism (Eather et al., 2013; Hennessy et al., 2010). Regular exercise does provide several positive benefits to the growth and development of organisms, both humans and animals. Here are some of the positive effects of regular physical activity among them. Improved heart and blood vessel health, muscle, and bone growth improved mental health, maintenance of a healthy weight, improved cognitive intelligence, improved immune system, improved hormonal balance, improved social skills, prevention of chronic diseases, decreased risk of depression and anxiety (Burhaein, Tarigan, et al., 2021; Demirci & Phytanza, 2021). It is important to note that the type and intensity of exercise must be adapted to the needs and conditions of each organism. It is important to consult with a health professional before starting a new exercise program, especially if there are special health conditions or certain medical considerations.

Motor abilities are latent human abilities that are manifested through movement, and accordingly every person possesses them, but at a certain level. Motor abilities are the possibilities of a person, as a biopsychosocial and cultural being, to achieve success in a certain activity (Пелемиш et al., 2018). Children's motor abilities refer to the development of their physical movement abilities. Motor ability's part two become the main types is fine motor and gross motor (Burns et al., 2017; Phytanza, Burhaein, et al., 2021). Factors such as environment, stimulation, and exercise also play an important role in the development of children's motor skills. Physical activity, playing with toys that require motor skills, as well as support from parents and caregivers can help speed up children's motor development. It's important to note that every child develops in unique ways, and some children may reach developmental milestones at different times. If there are concerns about your child's motor development, consult a health professional or child development professional for more information and appropriate advice.

The level of manifestation of motor skills depends on several factors such as: the general state of health of the organism, heredity, gender, age, training, etc. Physically active children have better results in tests for the assessment of motor skills, a more favorable body mass index and a more positive self-perception of their abilities (Sollerhed et al., 2008). Such scientific research shows that physically active children tend to have better results in motor skill assessment tests compared to children who are less physically active. Physical activity can have a positive impact on the development of many aspects of motor skills, including hand-eye coordination, balance, endurance, and balance (Burhaein, Demirci, et al., 2021; Wrotniak et al., 2006). Physical activity not only provides physical benefits, but also has a positive impact on children's mental well-being and cognitive development. Sports and games can improve children's focus, concentration, and learning ability. It is important to create an environment that supports and encourages children to participate in various physical activities. Support from parents, teachers, and the surrounding environment can help shape active lifestyles and support the development of optimal motor skills

in children.

Collect information about motor skills, and to define their existence, it is necessary to perform a series of measurements of the manifest area of motor skills. This is done by a special testing technique, where metrically tested tests are used as an instrument to obtain data. Most authors agreed that seven motor abilities exist in the latent space, namely: strength, speed, coordination, flexibility, precision, balance, and endurance (Gil Madrona et al., 2014; Lemos et al., 2012; Phytanza et al., 2023). To raise the level of certain or all motor skills to a higher level, it is necessary to be exposed to a certain process of exercising. Using a variety of shaping exercises, physical exercise as a basic means of working in physical culture not only has a positive effect on the general state of health of the individual, but also on increasing the level of motor skills, which was discussed in some of the earlier research according to which the child's development progresses as much and as quickly as in motor skills (Cigrovski et al., 2017)

The subject of this paper is the development of motor skills of a certain number of school-age children, caused by the application of regular and additional physical activities. The problem of the research is to determine whether the applied means, methods and loads in the process of realizing regular physical activities during classes in the subject of physical education and extracurricular activities can significantly influence the development of motor skills at the end of the experimental period (in the final compared to the initial measurement). Based on the subject and problem of the research, the basic and special research objectives were determined.

The main goal of the research is to determine the differences in the level of physical abilities in the final compared to the initial measurement in the experimental group of respondents, included in the regular teaching process of physical education and additional extracurricular activities (performing shaping exercises in free time according to the defined type and schedule). The special goal of the research is to determine the effects (differences) in the level of motor skills between the experimental and control groups of respondents at the final measurement.

2. METHOD

2.1 Participants

The sample of respondents included 43 school-age children from two classes of the 6th grade of the elementary school from the city Nevesinje (experimental and control group). The sample includes children who, in addition to regular physical education classes, have additional activities in the form of training in various sports or other extracurricular activities (country dance, dance school, etc.), and who require additional physical activities (control group).

2.2 Research Design

The method used in this research is the experimental method. Considering the problem and goal of the research, a smaller group of measuring. Instruments was used to assess the level of motor skills. To achieve certain results, bearing in mind the above mentioned, an initial measurement of the state of motor skills was performed in the test subjects of the experimental and control groups, Respondents from the experimental group were given previously defined tasks for performing training exercises in their free time The final state of motor skills of the respondents of the experimental group was determined.

2.3 Instruments

This research instrument uses several tests that are carried out, namely, Long Jump (coordination and strength assessment - LJ), Hand Tapping (speed and coordination assessment - HT), 2x30m running (strength and speed assessment - R2x30m), Bench Flexion (flexibility assessment - BF), Crunch (strength assessment- ABS).

2.4 Procedures

The work plan for improving the motor skills of test respondents from the experimental group was designed in such a way that the shaping exercises were carried out on days when there were no physical education classes at school. Warming movements for the head and neck joints of the spine, shoulder girdle, elbow joints, hip and pelvic girdle, knee joints, ankles and wrists).

After warming up, the exercise is carried out in a standing position, alternately lifting one leg and the other, while simultaneously clapping under the knee of the leg being lifted simultaneously for 5x10 repetitions from the first to the fifth day of training with a break between series of up to 40 seconds. Then practice lifting the torso from a position lying on your back with your knee's half bent (preferably with your feet against furniture or with the help of a parent who holds the soles of your feet tightly resting on the entire surface of the surface) in a series of 5x5-7 repetitions from the first to the fifth exercise with pauses between series up to 60 seconds. Next, lift the torso from a position lying on your stomach with your legs fully extended (preferably with your feet against furniture or with the help of a parent who holds your feet firmly on the floor) sequentially for 5x5-7 repetitions from the first to the fifth exercise with a break between sets until 60 seconds.

Squats in sets of 5x5 repetitions from the first to the fifth exercise with a break between sets of up to 60 seconds. Run in place with a high knee lifting movement (skipping) for 3x10 seconds with a 60 second rest from the first exercise to the fifth exercise. Push-ups in a series of 5x1-5 repetitions from the first to the fifth exercise (with differences in the application of the exercises for men and women) with a break between series of up to 60 seconds. Then in a sitting position on the floor with your legs extended, spread and cross your legs alternately, without lifting them from the floor in a series of 5x10 repetitions from the first to the fifth exercise with a break between sets of 40 seconds, and from a standing position with your feet placed hip-width apart with your toes hands reach toes (without bending knee joints) in sets of 5x10 repetitions from the first to fifth exercise with a break between sets of 40 seconds

2.5 Data Analysis

Bearing in mind the number of respondents, the set goal and task of the work, the collected data were statistically processed in the Microsoft Office Excel 2016 program, standard deviation (St. Dev.), coefficient of variation (Co. Var.), skewness (Skew.) and kurtosis (Kurt.).

3. RESULTS

Analysis of the Table 1 shows basic statistical parameters of the respondent's motor skills of the experimental group at the initial measurement, it can be concluded that by comparing the results (St. Dev) with (Mean) the arithmetic mean as well as with the range of minimum (Min) and maximum (Max) the normal sensitivity of the tests, i.e., the expected values, can be concluded from the results. By calculating the coefficient of variation (Co. Var.) of the measured variables,

the most significant variability (dispersion) of the data was determined in the case of the variable BF (bench flexion). The value of skewness (Skew) shows that the measured variables have a normal distribution, i.e., negligible asymmetry, because the values of the obtained results are around ± 0.5 , except in the case of the variable HT (hand tapping) where slightly larger negative values were determined in relation to other variables. The results of kurtosis (Kurt) for all measured variables range below the value of 3, which indicates a lower roundness (platykurtic) of the data than the normal value.

Table 1

The Basic Results of the Evaluation of Motor Skills of the Experimental Group

Variables	N	MIN	MAX	MEAN	ST.DEV.	CO.VAR.	SKEW	KURT
R2X30m	43	12.88	14.26	13	0.42	3%	0.5	-1.1
HT	43	46	60	55	4.46	8%	-0.8	-0.5
BF	43	8	-8	-3	2.77	-9%	0.6	0.4
LJ	43	125	159	142	8.62	6%	-0.1	-0.6
ABS	43	12	16	14	1.13	8%	0.1	-1

Source: Primary Data

Analysis of the Table 2 shows the basic statistical parameters of the motor skills of the control group at the initial test, it can be concluded that by comparing the results (St. Dev) with the (Mean) arithmetic mean as well as with the range of minimum (Min) and maximum (Max) results, it is possible to conclude normal test sensitivity in most cases. By calculating the coefficient of variation (Co. Var) of the measured variables, the most significant variability (scattering) of the data was determined in the BF variable (bench flexion), as was the case with the experimental group. The value of skewness (Skew) shows that almost all measured variables have a normal distribution, i.e., negligible asymmetry, because the values of the obtained results are around ± 0.5 . In the case of the variable ABS (crunches), a significant asymmetry of distribution was determined, as the values of the obtained results are around ± 1.00 .

The values of kurtosis (Kurt) for most variables indicate less roundness (platykurtic) because the obtained values are below the value of 3, except for the variable BF (bench flexion) where a more pronounced roundness (leptokurtic) was determined because the values of the obtained results are above the value of 3. Furthermore, by comparing the results obtained at the initial measurement in the experimental and control groups, obvious differences in the values of the results for all tested variables were noted.

Table 2.*The Basic Results of the Evaluation of Motor Skills of the Control Group*

Variables	N	MIN	MAX	MEAN	ST.DEV.	CO.VAR.	SKEW	KURT
R2X30m	43	11.09	12.7	12	0.51	4%	0	-1.3
HT	43	59	83	67	6.12	9%	1	1.3
BF	43	-10.0	-19.0	-12.0	2.5	-22%	-1.8	3.5
LJ	43	155	210	177	14	8%	0.7	-0.1
ABS	43	17	21	18	1.14	6%	0.6	-0.1

Source: Primary Data

Analysis of the Table 3 shows the basic statistical parameters of the motor skills of the experimental group at the final measurement, it can be concluded that during the period of 30 days of the additional physical activities, the results of motor skills improved significantly. By comparing the results (St. Dev) with the (Mean) arithmetic mean as well as with the range of minimum (Min) and maximum (Max) results, the normal sensitivity of the tests can be concluded in most cases as it was stated during the initial measurement. By calculating the coefficient of variation (Co. Var.) of the measured variables, the most significant variability (dispersion) of the data is still the most pronounced in the BF variable (bench flexion).

The skewness value (Skew) shows that all measured variables have a normal distribution, i.e., negligible asymmetry, because the values of the obtained results are around +/-0.5. The results of kurtosis (Kurt) for all measured variables are below the value of 3, which makes the distribution less rounded (platykurtic).

Table 3.*The Final Results of the Evaluation of Motor Skills of the Experimental Group*

Variables	N	MIN	MAX	MEAN	ST.DEV.	CO.VAR.	SKEW	KURT
R2X30m	43	12.22	14	13	0.43	3%	0.3	-0.3
HT	43	50	64	57	4.01	7%	-0.3	-1
BF	43	-1	-9	-6	2.19	-12%	0.2	-0.9
LJ	43	128	160	145	8.04	6%	-0.2	-0.5
ABS	43	13	18	15	1.32	9%	0.4	-0.2

Source: Primary Data

4. DISCUSSIONS

Looking at the results obtained, based on descriptive parameters, it was determined that there was a statistically significant difference between the motor skills of respondents in the experimental group and the control group in the initial measurements. By applying appropriate

methods, methods and loads in the final measurement, the difference between the results of the experimental group respondents and the values of the initial measurement results was determined. The results obtained by applying descriptive statistics in this research show (Tables 1 and 3) that in the final, in relation to the initial measurement, under the influence of the program of additional activities, certain changes occurred in terms of the manifestation of motor skills, regardless of the short period of conducting the research.

The positive effects of the additional exercises program in addition to regular physical education classes are also indicated by the results of earlier research (Marković, 2017; Kukolj, 2006; Nešić et al., 2013). Additional exercise programs in the context of regular physical education classes can have a significant positive impact on changes in students' motor skills. Here are some of the possible positive impacts namely improved motor skills, refinement techniques, increased physical endurance, increased leadership and cooperation, increased motivation and engagement, understanding of health and fitness concepts, increased academic achievement, self-development and self-confidence (Ilham et al., 2021; Phytanza, Purwanta, et al., 2021; Weinberg & Gould, 2019). In drawing up an additional exercise program, it is important to pay attention to the needs and skill level of individual students, as well as ensure that the activities are enjoyable and support their physical and psychosocial development.

The results of a scientific research and experience from practice (Armstrong & McManus, 1994; Beets & Pitetti, 2005; Beets et al., 2005; Bavčević et al., 2006) confirmed on a sample of elementary school students that a gradual increase in progressive load for the development of motor and functional abilities is particularly significant in order to the foundations have been built on which complex motor skills will be developed in all aspects, which will enable an easier transition to the specialization phase later on. A similar approach for the development of motor skills with a gradual increase in progressive load was achieved with the respondents in this research by applying a program of additional activities.

In support of the is the fact that the respondents of the experimental group showed a certain degree of improvement in all measured variables at the final measurement, especially in the case of the BF variable (bench flexion), where the greatest improvement was noted. Which is directly related to some of the earlier research, according to which flexibility is subject to changes through the application of a directed training process. Kurtz (1994) according to and is dependent on the training activity. Flexibility is the ability to adapt to changes or environmental demands quickly and effectively. The implementation of a directed training process can help improve the comfort of a person or an organization. Some of the ways in which targeted training can influence desirability are skill improvement, increased knowledge, mental and emotional development, understanding of change, structural flexibility, development of problem-solving abilities, and use of technology. By implementing targeted training processes, individuals and organizations can form a strong foundation to improve their viability and be better prepared for changes in a dynamic work environment.

Using a similar procedure, Sollerhed et al. (2008) set the goal of determining the quantification of the transformations of motor skills in students caused by programmed extracurricular activities, where a statistically significant difference between the two groups of respondents was determined in the final measurement for all set variables. In this regard, the differences between the experimental and control groups at the initial and final measurements, viewed individually by variables, are evident and statistically improved. Regular structured

physical activity has a positive impact on a person's motor. Motor is the body's ability to move and coordinate well. Some of the positive effects of structured physical activity on motor based on previous research include improved balance, development of motor coordination, increased flexibility, muscle strengthening, improved fine motor control, maintenance of brain function, improved mental health (Burhaein, 2022; Burhaein et al., 2022; Catur & Mujiriah, 2021). It is important to note that the type of physical activity and the level of its intensity may vary depending on the physical condition and health of the individual. Before starting a new exercise program, it is best to consult a healthcare professional to ensure safety and suitability for each body's condition.

The established differences show that variables measuring strength (ABS), speed and coordination (HT) and flexibility (BF) contributed to the greatest difference. Smaller differences between the studied samples were found in the variables for the assessment of coordination and strength (LJ), strength and speed (R2x30m), which is in accordance with earlier research that talks about quantitative changes in the area of the basic and situational-motor skills of students caused by additional training (Bajrić et al., 2012; Lima et al., 2017; Radisavljević-Janić & Milanović, 2019; Eather et al., 2013).

Quantitative changes in the basic and situational areas of a student's motor skills caused by additional training may vary depending on a few factors, including the type of training, duration, intensity, and individual characteristics of the student. Here are some possible quantitative changes that can occur: increased speed and precision, improved balance and coordination, increased strength and flexibility, and increased endurance. It is important to note that the results of additional training may vary between individuals and depend on several factors, including the student's level of dedication, quality of training, and genetic factors (Fatoni Yanuar & Budi Sunaryo, 2022; Laishram Santosh Singh, 2022; Mekić et al., 2022). Regular evaluation and measurement of students' motor skills can help quantitatively understand the impact of additional training.

Respondents from the experimental group achieved better results of the measured variables compared to the initial measurement, which can be linked to the results of similar research that showed that physically active children are superior to physically inactive children in almost all motor skills (Bojanić et al., 2018; Ateljević, 2023; Bojanić et al., 2018; Radanović, 2018). A physical activity has many positive benefits for children's development. Some research suggests that physically active children tend to have an advantage over less active children. Some of these potential benefits include physical and mental health, improved motor skills, social development, increased focus and concentration, and emotional education (Irmansyah et al., 2020; Phytanza et al., 2022; Phytanza & BURHAEIN, 2019). While there are many advantages of physical activity, each child is an individual with varying needs and interests. It is important to make sure the physical activity taken matches the child's interests and provides a positive experience. In this case, parental support and a supportive environment play an important role to motivate children to be physically active.

The effects of the application of the program of additional activities unequivocally led to the improvement of the results, some of which were also recorded in other researches (Bajrić et al., 2012; Nešić et al., 2013) Bearing in mind previous similar researches, it can be stated that in this research it was confirmed that there is a great impact of structured regular physical activity on the development of the children motor skills, although in this specific research it is a non-

representative sample of respondents with a short time period of conducting the activity.

5. CONCLUSIONS

The research conclusions unequivocally state that in addition to a marked increase in the level of motor skills, as a real result of applying the method on a relatively small sample over a short period of time, a structured physical activity program is also necessary. can significantly influence the formation of positive attitudes among parents about the importance of regular and continuous physical activity and can also significantly influence the morphological characteristics of school-aged children, especially the prevention of obesity and the occurrence of diabetes in the early stages. body development. This is especially important for physical education teachers as the only educators who can influence the formation of positive attitudes through their work through the physical education teaching process. This study has limitations including that the study participants are still in small numbers and researchers cannot fully control because participants are not in quarantine during the experimental program. Contributions to subsequent studies were increasing the number and distribution of participants' locations, providing improved control as a form of intervention during treatment, and adding certain variables.

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REFERENCES

- Armstrong, & McManus. (1994).). Children's fitness and physical activity – a challenge for physical education. (Fitness and physical activity of children - a challenge for physical education. *British Journal of Physical Education*.
- Ateljević, D. (2023). The impact of structured regular physical activity on the development of individual motor skills in school-aged children Regular physical activity on MOTOR SKIL. *Asian Exercise and Sport Science Journal*, 7(2), 7–14.
- Bajrić, O., Šmigalović, M., Bašina, I., & Bajrić, S. (2012). Globalne kvantitativne promjene bazičnih i situaciono-motoričkih sposobnosti pod uticajem programa odbojke. *Спортске Науке И Здравље - Анеурон*, 3(1), 22–28. <https://doi.org/10.7251/ssh1201022b>
- Bavčević, T., Babin, J., & Prskalo, I. (2006). Complex Group Organizational Forms - an Optimizing Factor in Physical Education Instruction. *Kinesiology*, 38(1), 28–39.
- Beets, M. W., & Pitetti, K. H. (2005). Contribution of physical education and sport to health-related fitness in high school students. *Journal of School Health*, 75(1), 25–30. <https://doi.org/10.1111/j.1746-1561.2005.tb00005.x>
- Bojanić, J., Bojanić, M., Gadžić, A., & Milosavljević, S. (2018). A COMPARATIVE ANALYSIS OF THE MOTOR ABILITIES OF CHILDREN WHO TRAIN APPLIED AIKIDO AND THEIR NON-SPORTING. *SPORT – Science & Practice*, 8, 5–13.
- Burhaein, E. (2022). Is There Student Anxiety in Physical Education Learning during the COVID-

- 19 Pandemic in Indonesia? *JUMORA J. Moderasi Olahraga*, 2(1).
- Burhaein, E., Demirci, N., Lourenço, C. C. V., Németh, Z., & Phytanza, D. T. P. (2021). Coping with the COVID-19 pandemic: the role of physical activity: An international position statement. *International Sports Studies*, 43(1). <https://doi.org/10.30819/iss.43-1.05>
- Burhaein, E., Irfatoni, I., Rozak, R. A., Kusmiati, L., Setiabudi, A., Lourenço, C. C. V., & Basit, M. M. (2022). How to physical fitness intellectual disability by nutritional status during the pandemic? *JPK (Jurnal Pendidikan Khusus)*, 18(1), 9–21. <https://doi.org/10.21831/jpk.v18i1.48354>
- Burhaein, E., Tarigan, B., Budiana, D., Hendrayana, Y., & Phytanza, D. T. P. (2021). Physical Activity Level of Students with Disabilities during COVID-19 Pandemic. *Jurnal Pendidikan Jasmani Dan Olahraga*, 6(2). <https://doi.org/10.17509/jpjo.v6i2.38547>
- Burns, R. D., Fu, Y., Fang, Y., Hannon, J. C., & Brusseau, T. A. (2017). Effect of a 12-Week Physical Activity Program on Gross Motor Skills in Children. *Perceptual and Motor Skills*, 124(6), 1121–1133. <https://doi.org/10.1177/0031512517720566>
- Catur, D., & Mujiriah, B. (2021). Survey of Physical Fitness Levels of Badminton Athletes in Binjai City, Indonesia. *JUMORA: Jurnal Moderasi Olahraga*, 1(2), 84–94.
- Cigrovski, V., Škovran, M., Fang, H., Rupčić, T., & Knjaz, D. (2017). Differences in the level of physical activity during the lockdown due to the COVID–19 pandemic in young adults. *INTERNATIONAL SCIENTIFIC JOURNAL OF KINESIOLOGY*.
- Demirci, N., & Phytanza, P. D. T. (2021). Investigation of Obesity, Physical Activity and Sedentary Behaviors of Individuals with and Without Autism Spectrum Disorder during the Covid-19 Pandemic Process. *JUMORA: Jurnal Moderasi Olahraga*, 1, 45–55.
- Eather, N., Morgan, P. J., & Lubans, D. R. (2013). Improving the fitness and physical activity levels of primary school children: Results of the Fit-4-Fun group randomized controlled trial. *Preventive Medicine*, 56(1), 12–19. <https://doi.org/10.1016/j.ypmed.2012.10.019>
- Fatoni Yanuar, S. S. H. L. S. R., & Budi Sunaryo, A. (2022). The Effect of Agility Drill Training on Agility Dribbling Techniques of Young Female Football Players. *JUMORA: Jurnal Moderasi Olahraga*, 2(2), 174–187.
- Fisher, A., Reilly, J. J., Kelly, L. A., Montgomery, C., Williamson, A., Paton, J. Y., & Grant, S. (2005). Fundamental movement skills and habitual physical activity in young children. *Medicine and Science in Sports and Exercise*, 37(4), 684–688. <https://doi.org/10.1249/01.MSS.0000159138.48107.7D>
- Gil Madrona, P., Roldán Iniesta, J., Isabel García Espinosa, A., & Sánchez Sánchez, J. (2014). Intervention Guidelines on Teaching Social and Motor Skills in Kindergarten. *American Journal of Sports Science and Medicine*, 2(6A), 9–12. <https://doi.org/10.12691/ajssm-2-6A-3>
- Hennessy, E., Hughes, S. O., Goldberg, J. P., Hyatt, R. R., & Economos, C. D. (2010). Parent-child interactions and objectively measured child physical activity: A cross-sectional study. *International Journal of Behavioral Nutrition and Physical Activity*, 7, 1–14. <https://doi.org/10.1186/1479-5868-7-71>

- Ilham, I., Iqroni, D., Karakauki, M., Ali, S. K. S., Kristiyanto, A., Nasrulloh, A., Pratama, K. W., Festiawan, R., Burhaein, E., & Phytanza, D. T. P. (2021). EFFECTS OF RESISTANCE BAND EXERCISE ON STUDENT'S FREESTYLE SWIMMING SKILLS. *Sport Science*, 15(1).
- Irmansyah, J., Lumintuarso, R., Sugiyanto, F. X., & Sukoco, P. (2020). Children's social skills through traditional sport games in primary schools. *Jurnal Cakrawala Pendidikan*, 39(1), 39–53. <https://doi.org/10.21831/cp.v39i1.28210>
- Kukolj. (2006). *Anthropometrics*. Belgrade: Faculty of Sports and Physical Education. University of Belgrade.
- Laishram Santosh Singh, L. P. W. J. S. B. B. E. B. M. Z. (2022). Effect of Skipping Rope Training on Resting Heart Rate and Cardiorespiratory Endurance Among Soccer Players. *JUMORA: Jurnal Moderasi Olahraga*, 2(2), 115–124.
- Lemos, A. G., Avigo, E. L., & Barela, J. A. (2012). Physical Education in Kindergarten Promotes Fundamental Motor Skill Development. *Advances in Physical Education*, 02(01), 17–21. <https://doi.org/10.4236/ape.2012.21003>
- Lima, R. A., Bugge, A., Pfeiffer, K. A., & Andersen, L. B. (2017). Tracking of Gross Motor Coordination From Childhood Into Adolescence. *Research Quarterly for Exercise and Sport*, 88(1), 52–59. <https://doi.org/10.1080/02701367.2016.1264566>
- Lubans, D. R., Morgan, P. J., Cliff, D. P., Barnett, L. M., & Okely, A. D. (2010). Fundamental movement skills in children and adolescents: Review of associated health benefits. *Sports Medicine*, 40(12), 1019–1035. <https://doi.org/10.2165/11536850-000000000-00000>
- Marković. (2017). *Structure of the physical education lesson*. Jagodina: Faculty of Pedagogical Sciences.
- Mekić, A., Nikšić, E., Beganović, E., Merdan, M., & Ramić, H. (2022). The Effects of Increased Intensity and Number of Repetitions of Training on SJFT in Juniors and Cadets. *JUMORA: Jurnal Moderasi Olahraga*, 2(1), 38–52. <https://doi.org/10.53863/mor.v2i1.424>
- Nešić, G., Ilić, D., Majstorović, N., Grbić, V., & Osmankač, N. (2013). Training Effects on General and Specific Motor Skills on Female Volleyball Players 13-14 Years Old. *Sportlogia*, 9(2), 119–127. <https://doi.org/10.5550/sgia.130902.en.007n>
- Phytanza, D. T. P., & BURHAEIN, E. (2019). Aquatic Activities As Play Therapy Children Autism Spectrum Disorder. *International Journal of Disabilities Sports & Health Sciences*, 64–71. <https://doi.org/10.33438/ijds.652086>
- Phytanza, D. T. P., Burhaein, E., Lourenço, C. C. V., Budiman, B., Yusuf, J., Kinasih, A., Gandasari, M. F., & Taroreh, B. S. (2022). Nutritional Status of Children Aged 6-17 Years: The Condition during the COVID-19 Pandemic Reviewing Weight Indexed by Height. *Universal Journal of Public Health*, 10(2), 159–167. <https://doi.org/10.13189/ujph.2022.100202>
- Phytanza, D. T. P., BURHAEIN, E., LOURENÇO, C. C. V., & PAVLOVIC, R. (2023). Physical activity based on manipulative exercise: how it affects the gross motor of children with autism for 12 years old? *International Journal of Disabilities Sports and Health Sciences*, 6(2), 171–180. <https://doi.org/10.33438/ijds.1258177>

- Phytanza, D. T. P., Burhaein, E., & Pavlovic, R. (2021). Gross motor skills levels in children with autism spectrum disorder during the covid-19 pandemic. *International Journal of Human Movement and Sports Sciences*, 9(4). <https://doi.org/10.13189/saj.2021.090418>
- Phytanza, D. T. P., Purwanta, E., Hermanto, H., Burhaein, E., & Demirci, N. (2021). Floortime Approach: Can It Improve The Learning Outcomes of Side-Rolling Exercises for Autism Spectrum Disorder Students? *Sport Science*, 15(1), 141–151.
- Radisavljević-Janić, S., & Milanović, I. (2019). Physical education in the Republic of Serbia. *Fizicka Kultura*, 73(1), 61–71. <https://doi.org/10.5937/fizkul1901061r>
- Sollerhed, A. C., Aritzsch, E., Råstam, L., & Ejlertsson, G. (2008). Factors associated with young children's self-perceived physical competence and self-reported physical activity. *Health Education Research*, 23(1), 125–136. <https://doi.org/10.1093/her/cym010>
- Weinberg, R. S., & Gould, D. (2019). *Foundations of sport and exercise psychology* (7th ed.). Human Kinetics.
- Wrotniak, B. H., Epstein, L. H., Dorn, J. M., Jones, K. E., & Kondilis, V. A. (2006). The Relationship Between Motor Proficiency and Physical Activity in Children. *Pediatrics*, 118(6), e1758–e1765. <https://doi.org/10.1542/peds.2006-0742>
- Пелемиш, М., Митровић, Н., Пелемиш, В., Лалић, Д., Ујсаси, Д., & Бјелица, Б. (2018). Ефекти Програмираног Кинезиолошког Вежбања На Развој Координације И Агилности Ученика Петих Разреда Основне Школе. *Nova Skola*, 8(2), 3–17. <https://doi.org/10.7251/nsk1312001p>