

National Sports Academy "VASSIL LEVSKI"

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ABSTRACT

**INFLUENCE OF THE MEANS OF THE ADAPTED ADAPTED PHYSICAL
ACTIVITY ON THE PHYSICAL CAPACITY OF CHILDREN WITH
SPECIAL NEEDS**

Sofia` 2021

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Department of Basketball, Volleyball, Handball

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**of dissertation for awarding the educational and scientific degree
"Doctor"
in section 7.6. Sports,
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Supervisor: Prof. Rositsa Tsarova, Ph.D.

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The dissertation contains 161 standard pages. It is illustrated with 10 tables, 70 figures and a list of references. The bibliography contains 132 sources, of which 92 are in Cyrillic and 40 in Latin alphabet.

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INTRODUCTION

Disability is a physical or mental factor that affects people's abilities. Everyone can have some kind of disability - an eye problem, spinal curvature, a motor problem that imposes a limitation on the amplitude or speed of movement, etc. However, this does not make him disabled. Only when the disability is serious enough and affects the lifestyle of that person can he or she be considered a "person with a disability."

Statistics in the Republic of Turkey show that 12.29% of the country's population has a disability, which is about 8 million and 500,000 people. The social protection of this group of people is guaranteed by the Decree on People with Disabilities adopted in 1997, as well as by the Law on People with Disabilities of 2005.

In most cases, intellectual disabilities affect the development of the musculoskeletal system and physical capacity, which leads to more difficult social and professional adaptation.

In recent years, more and more individualized activities and a wider choice of physical and sports activities have been offered worldwide. The focus is more on the interests and needs of the individual, although the full participation of people with disabilities in various spheres of social activities is still far from reality, but in general, the general trend of inclusion and acceptance in the community is progressive.

Physical activity, regular activities with adapted physical exercises and adapted sports, holding a number of specialized sports events within the school, together with children without problems, are among the most effective ways to maintain good physical and mental shape, to fight overweight. and obesity and the prevention of related conditions in children with special educational needs.

I. PROBLEM STATEMENT

I.1. Characteristics of mental disabilities

In 1987, the International Commission on Diseases (ICD) defined mental retardation as "a state of delayed or incomplete development of the intellect, characterized by impaired skills that arise in the process of development and contribute to the formation of the general level of intelligence, i.e. cognitive, speech, motor and social skills ". It is characterized by the fact that the intellectual abilities of the individual are significantly below average. It manifests itself with concomitant limitations in two or more of the following adaptive skills: communication, self-care, everyday skills, using society for one's own purposes, self-directedness, health and safety, cognitive knowledge and skills, etc. " (Denev, S., 2014; Aleksieva, M., Denev, S., 2015; Belomazheva - Dimitrova, S. et al., 2016).

Mental retardation is not identified with a specific disease. It is a condition from which the child's ability to master the knowledge provided in the curriculum is judged. In recent years, the concept of intellectual disability has emerged, which is equivalent to the concept of mental retardation (Dobrev, Z., 1992, 2002).

According to Ya. Andreev (1991), intellectual insufficiency is a deviation from normal mental development and is expressed in complete underdevelopment of the personality, in which there is an underdevelopment of the mind, intellect. The main signs of intellectual disability are: the limited nature of brain damage and the irreversibility of impaired cognitive activity. Intellectual disability is damage to the brain that is subject to development.

Disability to a greater or lesser extent leads to dysfunction of the body as a whole, and significant impairment of motor coordination, which reduces opportunities for social contacts, causes feelings of anxiety, low self-esteem and suppression of self-esteem. dignity (Dzhobova, S., 2013).

The following groups are identified as people with intellectual disabilities (Konstantinova, K., 2001; Tumanova, B., 2010):

- persons demonstrating learning delays;
- persons with limited learning capacity;

- people suffering from Down syndrome (one in 800-1000 children);
- people with autism (one in 500 children).

According to B. Ivkov (2013), intellectual disabilities can be classified according to the type of etopathogenic feature and can be endogenous (hereditary pathology) and exogenous (determined by external factors).

Regarding the factors related to the time of occurrence of mental disabilities (chronogenic trait), D. Kaloyanova (2020) points out 3 main periods:

- before birth (prenatal period);
- during childbirth (perinatal);
- at birth (postnatal).

According to V. Alexandrova (2021), the reasons for the occurrence of mental disabilities are many and among them and those that are unknown until now. In the most general form they can be summarized as follows:

- oxygen deficiency (hypoxemic factor);
- occurrence of metabolic disorders leading to poisoning of the body (toxic factor);
- inflammation of the brain and meninges of the child (encephalitis and meningitis), rubella from the mother, toxoplasmosis, etc. similar (inflammatory factor);
- Accidents, brain injuries, etc. (traumatic factor);
- manifestation of Down syndrome, etc. similar (chromosomal genetic factor);
- hormonal disorders (hormonal factor);
- infantile sclerosis, the presence of tumors and other degenerative disorders (degenerative factor).

According to S. Denev (2014), the reasons that lead to intellectual disability are:

- brain damage that occurred during fetal development;

- brain injuries received during the womb, birth and after;
- brain damage that occurred during the first three years of the child's life;
- intellectual disability with unfavorable heredity.

Some authors (Yordanov, B., Ivanev, V., 1985; Kyuchukov, M., Stankushev, T., 1992) believe that the degrees of intellectual disability are three: stupidity, imbecility and idiocy.

The International Commission on Diseases sets the limit values of the so-called IQ, according to which people with intellectual disabilities can be assigned to one of the 4 levels of the developed scale:

- IQ between 50 and 69% in older individuals is evidence of mild mental retardation;
- IQ between 35 and 49% has moderate mental retardation;
- with IQ between 20 and 34% - severe mental retardation;
- IQ below 20% - deep mental retardation.

People with disabilities, including those with mental disabilities, make up the world's largest minority group and have specific characteristics that set them apart from the rest of society and accepted norms of behavior. It is often said that the civilization of a society is judged by its attitude towards the elderly, children, and people with disabilities. Neglect, prejudice, discrimination, and fear are social factors that have isolated them and slowed their development throughout human history (Demirci, P., 2019).

I. 2. Influence of physical activities and adapted sports on the development of children with mental disabilities

One of the most important aspects in the field of work with children with intellectual disabilities is to develop radically different attitudes towards them, to look for options for biological and social impact for development and strengthening the resources of people with disabilities, spiritual development, socialization and integration into society (Alexandrova, V., 2021).

Participation in adapted motor activities and adapted sports provides opportunities for learning, mastering motor skills and habits, education of valuable moral and ethical qualities, spiritual development, socialization and integration into society (Nikolova, M., 2006).

The benefits of physical activity and adapted sports are indisputable for people with intellectual disabilities (Djobova, S., 2013; Stankova, V., 2007).

Physical activity, and sports in particular, is an important means of reducing the effects of disability. Through physical exercise, people with disabilities become more independent and independent, join a certain individual or group activity, increase their social activity and commitment and restore their faith in life. Exercise and sports are extremely important and natural means of supportive rehabilitation. From a biological point of view, physical activity stabilizes and strengthens the residual vital forces of people with disabilities, creating the conditions for possible additional complications. Exercise is extremely necessary for the adaptation of people with intellectual disabilities to life (Aladzhov, K., 2010).

As an integral part of the system of cultural, educational and social development, sport is becoming a benchmark for the overall expression of the individual. In competitive sports, in contrast to rehabilitation and entertainment, there is a desire to improve and enhance sports achievement and victory over the opponent. Motivation for an active, active and healthy regime, systematic activities and a better quality of life has also been strengthened. The opportunities that sport reveals to the individual, such as behavior and relationships that take place under strict and clearly regulated rules and requirements, are unparalleled. Sport is part of the social policy of each country, an element for integration and inclusion in society of people with various disabilities, helping to positively change the public consciousness (Tumanova, B., 2013).

Adapted physical activity and the practice of adapted sports, with their specific tools and methods, provide wonderful opportunities for the integration of people with special needs. They can help to strengthen them physically, to restore the lost and develop new skills, to compensate for disability and return to life. They can help people with disabilities to overcome the mental barrier, strengthen their self-esteem and their ability to overcome difficulties (Djobova, S., 2013). The implementation of motor activities (rehabilitation and sports) is not limited to their isolated practice in the respective group, but is realized in conditions of integration, with similarity and equality of opportunities for people with disabilities.

Children and young people with mental disabilities who are subject to education lag behind in their motor development by 2-4 years. It has been found that basic motor skills such as endurance, strength, speed, balance and mobility are much less developed in people with mental disabilities (Bruinings, Rh. Et al., 1974; Kioumourtzoglou, 1994).

Physical education and sports for healthy individuals are extremely important for their healthy lifestyle, while such activities for people with mental disabilities aim to provide opportunities for longer life. For this reason, the levels of physical capacity of people with mental disabilities need to be constantly maintained and developed. The most effective way to do this is to engage in physical education and sports, starting from an early age. The levels of physical capacity of people with mental disabilities are low, precisely because of their insufficient participation in physical activities. However, with systematic training and education, the level of development of the main features of physical capacity in people with disabilities could exceed that of people without disabilities. (Damentko, M., 2002).

There is a lot of research on the physical, physiological and motor qualities of people with mental disabilities who are subject to training. It has been established that systematic training and sports activities have an impact on the development of certain motor skills and cause changes in the behavior of people with mental disabilities. (Chasey, W., Wyrick, W., 1971; Gencoz, F., 1997; Ün, 2001).

During the game, children forget their weaknesses and reveal their true nature and knowledge. This enables teachers, through games, to get to know their students down to the smallest detail.

Childhood is the period in which the basic motor skills are mastered, such as running, jumping, hunting, kicking the ball and more. similar (Özer, D., 2001). During this period, multifunctional motor skills should be applied among children. It should not be forgotten that mobile games play a very important role in the development of coordination skills (Mengutay, S., 2005).

It is known that the activities of children with special educational needs (SEN) are specific and complicated. There are a number of difficulties that pose serious obstacles and hinder the normal conduct of a specialized process for the impact and cooperation, recovery and socialization of these children. Most often they are associated with inadequate usloviya charter pabota,

nedostatachno patsionalno izpolzване na nalichnite matepialno-tehnicheski saopazheniya, lipsata na motivatsiya, nedostigat na tepeni and Teams, negativnite tendentsii in zhivota na podpastvashtite, niskata uppavlenska angazhipanost and obshtestvenata nebpezhnost, nedostatachnite finansovi spedstva and forms for performances, as well as the insufficient opportunities for increasing the qualification of the sports educators working in the field of adapted physical activity (Aleksieva, M., 2012).

I.3. Curricula and adapted methods for working with children with mental disabilities

Despite the number of difficulties faced by children with mental disabilities, a large number of educators and specialists in the field of AFAS, based on their extensive professional experience and knowledge, make great efforts to develop and propose for implementation in practice a number of adapted methodologies, curricula and algorithms, as well as normative bases for control and assessment of physical development, physical capacity and specific skills of children with different specific educational needs.

Regular participation of children with intellectual disabilities in various adapted programs for physical activity and sports leads to an increase in their physical endurance and performance (Balik, M., Mateos, E., Blasco, C., 2000; Wind, W., Schwend, R., Larson, J., 2004), body balance (Bezdičkova, M., Machková, I., Válková, H., 2001), as well as to significantly improve motor skills and their adaptive behavior (Block, M. , Conatser, P., Montgomery, R., Flynn, L., Munson, D., Dease, R., 2001).

In order for a program to be effective and efficient, it must have both adequate individual goals that are consistent with the level of capabilities of those involved and a well-planned training process (Rimmer, J., Kelly, L., 1991; Mavrudieva, N., Aleksandrova, V., 2014; Aleksandrova, V., Bahchevanski, S., Kornatovska, Z., 2017; Kirilova, I., Dzhobova, S., 2018).

Lack of physical activity is known to cause a number of harms, including increased levels of overweight and obesity. Studies of children show that lack of physical activity is a major factor in the accumulation of fat. Most children, incl. and those with mental deficits start as active

children, but by the time they reach high school age, about half of girls and a quarter of boys lack routine physical activity (Gunesh, S., 2013).

Therefore, according to the famous Bulgarian nutritionist D. Baykova (2003), a critical moment in the weight loss of children is the stimulation of physical activity. The implementation of physical activities in physical education classes, as well as during extracurricular activities, has an extremely multifaceted impact on the child's body.

We developed (Gunesh, Sh., 2013) and implemented in practice specialized program for adapted physical activity of obese children, which involved 20 girls aged 7-8 years, visiting a sports and recreation center in Turkey, distributed on a random basis of two groups - experimental and control, proved that as a result of the applied training effect with the help of AFAS, as well as the special diet, during the experiment in the children of the experimental group there were significant positive changes in body weight and related with her index, as well as in terms of vital capacity of the chest. In order to reduce overweight and increase physical capacity, the participants in the experimental group were exposed to the specific means of adapted physical activity, combined with an appropriate diet. In the girls from the control group, only a diet was applied, the control of which was carried out by a nutritionist.

The study on the effect of gymnastics in people with mental disabilities (Dimitrova, B., 2014) allowed to draw the following conclusions:

- motor receptivity and coordination are best in people with Down syndrome, who learn the exercises the fastest, show the greatest interest in the activities and are the most persistent in their actions;
- in autistic people, people with Prader-Willi syndrome or oligophrenia, motor susceptibility and coordination are moderate and good and depend on the nature of the mental disability;
- as a result of the work done with the means of gymnastics, the subjects have reduced the time for independent performance of new exercises, which is proof of the effectiveness of the developed complexes and applied individual approach to teaching;
- The best results are obtained with the active assistance of parents, who are an indispensable part of the overall learning process.

Curricula in special schools allow the requirements for achieving a certain level of knowledge, skills and competencies to be applied flexibly, depending on the needs and abilities of students with special needs, and in accordance with the school curriculum or the individual curriculum of each student .

The aim of the training is to optimize the motor mode of the student, increase physical capacity and coordination, according to the age specifics of development, as an integral part of intellectual and emotional development and education of students with varying degrees of mental retardation and multiple disabilities. forms of rich and emotionally rich program of physical exercises and games (Belomazheva-Dimitrova, S., Denev, S., Aleksieva, M., 2016). The curriculum complies with the following requirements:

- corrective orientation of the educational process;
- long-term planning of the study of elementary motor activities and their repetition in the next classes;
- regulation of the parameters of physical activity (volume, intensity and coordination complexity), in full compliance with the individual abilities of students;
- transition to more complex exercises and tasks is carried out only after mastering the previous ones.

According to H. Özkan and colleagues (2010), as a result of the applied curriculum with sports activities of students in schools included in the system of Education and the Directorate of Social Services for Children in Turkey, at the end of the program in the studied children is positive development of speed, speedrunning, the balance of one leg, as well as the ability to catch the ball and more - increase the achievements in the long jump and throwing a tennis ball.

In modern conditions, issues related to the use of the complex impact of swimming as an educational and pedagogical activity (Nikolova, M., Boyadzhieva, V., 2003), combined with the therapeutic effect of adapted aqua activities, as a means of positively influencing the functional condition, psychomotor and cognitive abilities and social skills of adolescents with disabilities and application of good AFA practices in extracurricular activities and leisure (Jorgić, B., Aleksandrović, M., Dimitrijević, L., Radovanović, D., Živković, D. , Özsari, M., Arslan, D., 2014; Nikolova, M., Goranova, Z., Arslan, D., Yuzara, M., 2014; Arslan, D., 2017).

The systematic use of physical exercises and activities in adapted sports in children with Asperger's syndrome is a leading factor and an important prerequisite for health prevention (Fitzgerald, M., Corvin, A., 2001; Kirilova, I., Djobova, S., 2018) . The research of V. Alexandrova (2019) is aimed at this set, who develops and tests in practice an adapted methodology for swimming for children with Asperger's syndrome. The applied swimming methodology uses the Hallwick`86 approach for conducting aqueducts, independent movements and swimming for people with learning difficulties. The swimming curriculum for the disabled is prepared according to the symptoms of autism and is adjusted to their individual abilities and the peculiarities of their adaptation to physical activity and sports. The analysis of the results of the conducted sports-pedagogical experiment allows V. Alexandrova to conclude that as a result of the applied pedagogical impact with the means of adapted physical activity in swimming, during the observed period significant positive changes in functional capabilities and motor abilities of children with autism. Proof of this is the fact that at the end of the training all children from the experimental group successfully swam the main distance of 25 m, by swimming backstroke with simultaneous arm movements and crawl leg movements.

According to B. Tumanova (2010), swimming is an indispensable tool for adapted physical activity and adapted sports, with a pronounced developmental effect. It is an important factor in solving problems related to the development and upbringing of the individual during childhood and adolescence. The adapted training program for swimming in people with intellectual disabilities developed by the author has a positive effect on the physical development and physical capacity of those involved, as well as on their psychomotor and cognitive abilities (Tumanova, B., 2012).

A similar effect is observed with regard to the activities of water adapted activities during integrated marine camps for children with special educational abilities (Djobova, S., Dasheva, D., Nikolova, M., Geshev, P., 2009). For this purpose, S. Dzhobova (2013, 2019) develops and implements in practice specialized sports and animation programs for outdoor activities with adapted sports and mobile games for people with mental disabilities. This allows participants to gain sports experience, create social contacts and positive emotional experiences and increases the effectiveness of the process of social inclusion and personal identification. To all this must be added the effect that outdoor activities have on children's health.

Undoubted in this regard is the contribution of adapted sailing, which provides great opportunities for people with disabilities to enjoy the natural forces - wind and water, feeling free and independent, and at the same time leads to physical and functional improvement of the body and has great hardening effect (Bahchevanski, S., 2016, 2019). The Special Olympics sailing program enables athletes with mental disabilities to train and achieve personal growth in adapted sailing competitions (Djobova, S., Hristov, H., 2020).

According to P. Koseva (2012, 2013), the importance of sport, compared to other forms of contact, is determined by its recreational nature, which means that it serves for recovery, training and mental relaxation. The implementation of recreational physical activities in the natural environment, in nature, has an extremely positive impact on the process of maintaining and restoring the physical capabilities of people with disabilities. In order to establish the effect of various recreational motor effects with the means of sports orientation on health and functional condition, specific training and social adaptation of students with intellectual disabilities, the author develops and implements the first specialized methodology for adapted motor recreation aimed at improving physical fitness, cognitive abilities and the integration of students with intellectual disabilities. The curriculum for adapted orientation includes the acquisition of theoretical and practical knowledge and skills for adapted physical activity, as a sports-educational, training and entertainment tool and to support the socialization and integration of students with intellectual disabilities. In this direction is the attempt of V. Garkov (2007) to conduct guidance on outlined paths for people with mental disabilities.

A very positive role in improving physical development, improving motor skills, improving self-esteem and shortening the process of integration of athletes with intellectual disabilities play the so-called. united sports (football, basketball, softball, handball, bowling, etc.). The concept of cooperation of athletes with intellectual disabilities and those without such difficulties, called partners, allows athletes (Aleksieva, M., Denev, S., 2015):

- to get acquainted with new sports;
- to continuously increase the level of their sports skills;
- to gain new experience during the various competitions in which they participate;
- to feel valuable to the team;

- to communicate more actively with their peers and make new friends.

An essential moment in the united sports is the correct selection of athletes and partners. They should be approximately the same age and have similar abilities. This will minimize differences and reduce the risk of injury.

S. Denev (2006, 2014) offers his specialized methodology for adapted physical activity for children with intellectual disabilities and sports skills. The methodology has been tested in practice, with the participation of 44 children with intellectual disabilities aged 11-13 years, trained in Bulgarian Resource Centers and its high effectiveness has been proven. Along with the special means of the football game, the Methodology also develops the problems related to the use of stretching and mobile games as a means of influencing the body of children with mental retardation. Especially valuable for the practice is the developed normative base for assessment of the physical capacity and the specific football skills of the children with SEN.

It is extremely important to take into account the positive role of the so-called integrated sport. The main activity of integrated sports is to adapt to the needs of each individual and to contribute to achieving a sense of equality among people with disabilities. Joint participation in various adapted sports and other physical activities of people with disabilities and healthy athletes supports the development of attitudes towards the acceptance of individual differences, protects the right of access to active lifestyles and sports, promotes innovative joint programs and systems leading to personal growth of all participants in this process (Djobova, S., Borukova, M., 2015).

Numerous basketball initiatives in recent years for children and young people with special educational needs, under the auspices of Special Olympics and the Euroleague Basketball, allow people with mental disabilities to become part of the basketball family and prove that in a team with partners, they also can play basketball.

For the participants in the united basketball teams, in addition to participating in the matches, sports and pedagogical tests are conducted to establish the level of specific basketball preparedness both during their preparation and immediately before the start of the competitions (Aleksieva, M., Denev, S., 2010; Aleksieva, M., 2015; Aleksieva, M., Denev, S., 2015).

The pilot study conducted by M. Borukova, S. Djobova, I. Kirilova (2020) to reveal the key points of the methodology of Special Olympics to assess the abilities of athletes with intellectual

disabilities in forming united basketball teams, shows that currently used objective (mainly quantitative) methods actually allow to determine the level of their individual technical and tactical skills. However, according to the authors, this is not enough. Along with the quantitative methods, it is necessary to apply more actively the qualitative (subjective) assessment methods (pedagogical observation, expert assessment, etc.), which allow to reveal the possibilities of athletes for meaningful involvement in the basketball game.

The various adaptations of the basketball game, according to M. Aleksieva (2019), provide ways to apply in practice opportunities for correction of physical development and specific training of people with disabilities. They require the manifestation of all motor skills, which is impossible to provide with the means of rehabilitation. Adaptations of the basketball game provide both social integration and a positive change in the consciousness of society, thus helping to build a society without barriers.

According to P. Demirci (2019), adapting activities for children with cognitive problems is extremely difficult. In these cases, there is no universal formula or specific practices that educators working with such children can apply, due to the strict specifics in the expression of the specific cognitive problem. Therefore, the tasks for the activities have to be adapted, which is expressed in the placement of the tasks in parts (the movements are initially divided for the purposes of learning, and then merged). It is also necessary to include more coordination exercises and exercises that improve students' balance. The thematic content of the physical education and sports classes for disadvantaged children during the sports-pedagogical experiment conducted by the author is in accordance with the requirements of the specialized programs of the Ministry of Education of the Republic of Turkey and the General Directorate for Primary and Secondary Education. basic education of children and depends on their disabilities.

For children in inclusive education with mild mental disabilities, programs in physical education and sports activities from 1st to 4th grade include:

- Compulsory subjects - "Games and physical activities":
 - 4 hours per week for grades 1-3 and
 - 1 hour per week for 4th grade.
- elective subjects - "Sports and physical activities" (after 2nd grade):

- 2 hours a week.

The results of the sports-pedagogical experiment conducted within the specified schedule to establish the impact of physical education and sports in primary schools on the physical capacity of children with special needs, give grounds for P. Demirci to identify as strengths of the physical capacity of the boys included in it have the following qualities:

- explosive force of the abdominal muscles;
- speed endurance;
- flexibility of the spine and
- the explosive force of the lower limbs.

A low level of development is observed in terms of the static force of the upper limbs, the explosive force of the upper limbs during forward and upward muscular forces and the speed of short distances.

* * *

The performed literature reference gives the opportunity to formulate the following working hypothesis:

The development and implementation in practice of a specialized methodology for developing the physical capacity of children with intellectual disabilities from the Republic of Turkey, based on the specific means of adapted physical activity and mobile games, will increase the level of physical development and physical capacity. - full socialization and integration of these children in the system of inclusive education.

I. AIM, TASKS AND METHODOLOGY OF THE RESEARCH

I.1. Aim and tasks of the research

The aim of the present study is to improve the physical development and increase the level of physical incapacity of children with intellectual disabilities, with the help of specific means of rehabilitation.

Research objectives:

1. Establishment of the level of physical development and physical incapacity of children with intellectual disabilities from the Republic of Turkey.
2. Development of a specialized methodology for developing the physical capacity of children with intellectual disabilities with the means of adapted physical activity and sports.
3. Conducting a sports-pedagogical experiment to verify the effectiveness of the developed specialized methodology.
4. Development of the factual structure of physical development and the physical capacity of children with intellectual disabilities.
5. Development of a normative base for control and assessment of the physical capacity of children with intellectual disabilities from the Republic of Turkey.

I.2. Research methodology

I.2.1. Organization of the survey The survey was conducted in the period 2015-2019.

The subject of the study is the process of physical education and sports for children with special educational needs.

The object of the research is the signs of the physical development and the physical capacity of the children with intellectual disabilities in the Republic of Turkey and the impact of their physical activity

The contingent of the study was a total of 38 children with mental disabilities aged 14-18, of which 19 from the Vocational School for People with Mental Disabilities at the Regional Inspectorate of Education in Aydin - Turkey (experimental group) and 19 - randomly selected ,

subjected to traditional activities in the centers for work with children with disabilities (control group).

To verify the effectiveness of the tested methodology, a sports-pedagogical test was conducted both at the beginning and at the end of the experimental period. The attached test battery includes 10 indicators, 3 of which carry information about the physical development of the children, and the remaining 7 - about their physical capacity.

I.2.2. Research methods and indicators

To solve the purpose and tasks of the study, the following research methods are applied:

1. Research and theoretical analysis of the specialized literature - to establish the state of the researched problem (according to literature data) and to reveal the specifics of the educational and specialization of the special educational work with the special ones. The theoretical analysis and summarization of the literary data allowed the development of a specialized methodology for adapted physical activity and sports in this contingent.

2. Anthropometry - to reveal the state of the main morpho-functional features, by collecting information about the height and weight of the studied children (indicators 1 and 2, Table 1). The measurements were performed with standard instruments and standard methods (Slanchev, P., 1991; Zorba, 1999: 426).

Table 1. List of indicators of physical development and physical capacity

Nº	Indicators / Parameters	Measuring units	Accuracy	Direction of growth
1.	<i>Height</i>	m	0,01	+
2.	<i>Weight</i>	kg	0,1	
3.	<i>Body Mass Index (BMI)</i>	kg / m ²	0,01	+ -
4.	<i>30 m sprint</i>	s	0,01	-
5.	<i>Vertical rebound</i>	cm	0,5	+
6.	<i>Jump lenght</i>	m	0,01	+
7.	<i>Throwing a solid ball - forward</i>	m	0,05	+
8.	<i>Throwing a solid ball - backwards</i>	m	0,05	+
9.	<i>Depth of slope</i>	cm	1,0	+
10.	<i>BIP - test</i>	number	1,0	+

For a more complete description of physical development, the so-called Body Mass Index (BMI), which is recommended by the World Health Organization (Petkov, S., Toteva, M., Maznev,

I., Dimitrova, D., 2012) and gives an idea of the degree of nutrition of participants in the experiment (Table 1, indicator 3).

3. Pedagogical testing - to establish the level of development of the physical capacity of the examined children. The attached test battery includes 7 sports-pedagogical tests (Table 1), which carry information about the level of development of:

- the speed of movement in space - indicator 4;
- the explosive force of the lower limbs during muscular efforts in both the vertical and horizontal planes - indicators 5 and 6;
- the explosive force of the upper limbs in the anterior-posterior direction - indicators 7 and 8;
- flexibility of the body - indicator 9 and
- overall endurance - indicator 10.

The initial sports and pedagogical testing was conducted 5 days before the start of the adapted training program, and the final - 5 days after its end. In order to avoid accidental results and in order to establish the real level of preparedness of the children (Osunluk, 1996), the testing procedure was repeated within these 5 days (except for the shuttle run). Better achievements are considered as final results.

Here it is necessary to note that before the application of the sports-pedagogical tests, each of the groups was warmed up with the help of adequate adapted exercises, as well as a number of influences for motivating the children participating in the sports-pedagogical experiment.

4. Sports-pedagogical experiment - to check the effectiveness of the developed specialized methodology for adapted physical activity and sports for young people with intellectual disabilities. The training sessions of both groups were conducted under the guidance of sports educators for 8 weeks (three times a week) and lasted 60 minutes.

At the beginning and at the end of the experimental period, the children from both the experimental and the control group were subjected to sports-pedagogical testing according to the above tests. During the experimental period, the participants in the control group continued their work on the traditional curricula for students with special educational needs (SEN), visiting various centers for work with children with disabilities. Unfortunately, in our opinion, in these centers there is no single methodology for activities with adapted physical activity and adapted sports for children with SEN, which specialists and teachers in physical education and training. This is one of the motives that prompted us to develop our own experimental methodology based on modern requirements for effective work with these children.

Uchebno-trenirovachnaya rabota for guidance vprimo na held sportno-pedagogicheskaya eksperiment with uchastnikami in eksperimentalnaya grupa, CE ppevezhdashe in low pazyvayemaya from the nas spetsializatsionnaya metodika charter to develop physical fitness and specific skills detsata with intelektualni zatrudneniya with sledstvaya na mobile games and adaptatsionnaya fizicheskaya aktivnost and sports

Within this program, exercises for warming up, walking, running, throwing, balance exercises, pulling, ball exercises, rings, stretching and other athletic exercises were performed.

The classes in the experimental group were conducted under the direct supervision of the doctoral student.

Periodically, during the experiment, partial examinations were conducted (some of the control tests), with a view to the application of timely cooperations in the training and training work.

Simultaneously with the collective work, during the classes special time was set aside for individual exercises with some of the children with mental disabilities, which allowed them, albeit more slowly, to get enough.

The essence of the individual work was reduced to the adaptation of the more complex exercises, to those that are achievable for the specific capabilities of the participants. In this way, achievable goals are set before them, which they themselves can control. They are given the opportunity to overcome their absence in some of the studied indicators, to increase their personal achievements and assessments, and thus to achieve.

I.2.3. Mathematical and statistical methods for processing the results of sports and pedagogical testing

The following mathematical and statistical methods have been applied in the processing of the test results:

1. Alternative analysis - To determine the relative shares (in%) of the increments in the level of the studied features for the time of the experiment.
2. Variational analysis- In order to determine the average levels and the variability of each of the observed signs of physical development and physical capacity, as well as to verify the normality of the distribution.
3. Hypothesis testing (through Student's t-test) - To prove or disprove the null hypothesis, ie the significance of the pedagogy of the established differences between the beginning and the middle of the previous year. The values of the Student's t-criterion were calculated for dependent (initial and final data for the same aggregates - experimental and control groups) and independent

(experimental) monitoring and control periods. The critical value of t-criterion (at $k = 36$) for all comparisons, at high guarantee probability ($P_t \geq 95\%$), was determined by V. Gigova (1999) and is 2.02.

4. Factual analysis - For development of the factual structure and identification of the main factors of physical development and physical capacity of the Republic of 14-18 children. The initial correlation matrices are factored by the method of the main components, with subsequent orthogonal rotation of the axes by the so-called varimax criterion (Kaiser, H., 1959; Wainer / Braun, 1988). The construction of the so-called intercorrelation matrices and the extraction of the factors is carried out with the help of the so-called R-technique, in which a certain number of observation units (n) are evaluated by a certain set of indicators (m). This variant assumes the condition $n > m$, which is met with us.

The following criteria and parameters were taken into account during the identification and maintenance of the facts:

- the percentage of the initial dispersion of the studied phenomenon (α^2) explained by each factor;
- the degree of development (manifestation) of the respective feature in the general factual structure (h^2);
- фактопните тегла на показателите в low дадения фактоп and tyahnata posoka (znak) koito pazkpivat silata and hapaktepa na vzaimovpazkata (polozhitelna or otpitsatelna) mezhdu izsledvanite ppiznatsi in pamkite na saotvetniya фактоп (Tsarov, R., 2013).

5. Method of signal deviations - For quantitative assessment of the condition of the measured signs. On the basis of the average level for the whole population participating in the sports-pedagogical experiment, the T-scores of each of the children included in both the experimental and the control group were calculated. According to sports statistics, these estimates are numbered values, presented to us in a 30-point system, which allows to compare the achievements in different observable tests, tests and tests. The following formula is used:

$$T_{ij} = 10 \cdot Z_{ij} + 25$$

As we can see, the T grade is actually a t-grade, which is based on the Z-score, which is based on the achievement of the achievement (H_{ij}) at a minimum to any of the studied children (s), ie the current achievement in the low sao) test. charter tsyalata savkupnost (H_j) and the normalization of the resulting difference ($X_{ij} - X_j$), ie. the standard deviation of the whole population (S_j), i.e.

$$X_{ij} - X_j$$

$$Z_{ij} = \frac{X_{ij} - X_j}{S_j}$$

S_j

On the basis of individual assessments are calculated the so-called. generalized estimates T (as a sum), as for each indicator, as well as for each of the studied populations.

6. Index method - To calculate the body mass index (BMI), which allows to determine the degree of protection of the body. It is calculated according to the formula adopted by the World Health Organization, based on the measured height (in m) and weight (in kg):

BMI = weight (kg) / height (m) (

In assessing the body mass index, the norms valid for the respective age group are applied (Slanchev, P., 1992; Topuzov, I., 2002).

III. RESULTS ANALYSIS

III.1. Mean values and variability of signs of physical development and physical capacity at the beginning of the experimental period

The first research task to be solved is aimed at revealing the average levels and variability of the observed signs of physical development and physical capacity of each of the two groups at the beginning of the experiment. For this purpose, a variation analysis is applied.

The results of the variational analysis of the primary data from the conducted initial sports-pedagogical testing of the participants in the experimental group are presented in Table. 3.

Table 3. Mean values and variability of the studied signs of physical development and physical capacity of the children from the experimental group at the beginning of the observed period.

№	Показатели	Mean	S	V	min	max	As	Ex
	Age	16,16	1,12	6,92	14	18	-0,34	0,02
1.	Height	1,64	0,08	4,97	1,46	1,78	-0,24	0,20
2.	Weight	63,88	14,49	22,68	42	95,5	0,43	-0,28
3.	Body Mass Index BMI	23,55	4,29	18,20	17,94	33,44	0,56	-0,11
4.	Running 30 м	6,59	1,93	29,33	12,42	4,7	2,06	4,44
5.	Vertical Jump	21,68	10,26	47,31	8	53	1,52	3,93
6.	Length jump	1,37	0,52	38,28	0,53	2,23	-0,01	-1,14
7.	Throwing a solid ball - forward	5,37	2,03	37,90	1,31	8,61	0,15	-0,50
8.	Throwing a solid ball - backwards	5,91	2,59	43,75	2,28	10	0,37	-1,32
9.	Depth of incline	14,87	6,69	45,00	6	31	1,07	0,82
10.	BIP test	24,47	18,87	77,12	3	80	1,43	2,80

As can be seen from the table, the group included children between 14 years (Xmin) and 18 years (Xmax), with the average age of the experimental group being just over 16 years (16.16 years). The analysis of fig. 11 shows that in fact the largest (42.11%) is the relative share of 16-year-old children.

The relative share of 17-year-olds is much smaller (26.32%), and of all other ages (14-, 15- and 18-year-olds) only 10.53% participate in the experimental group.

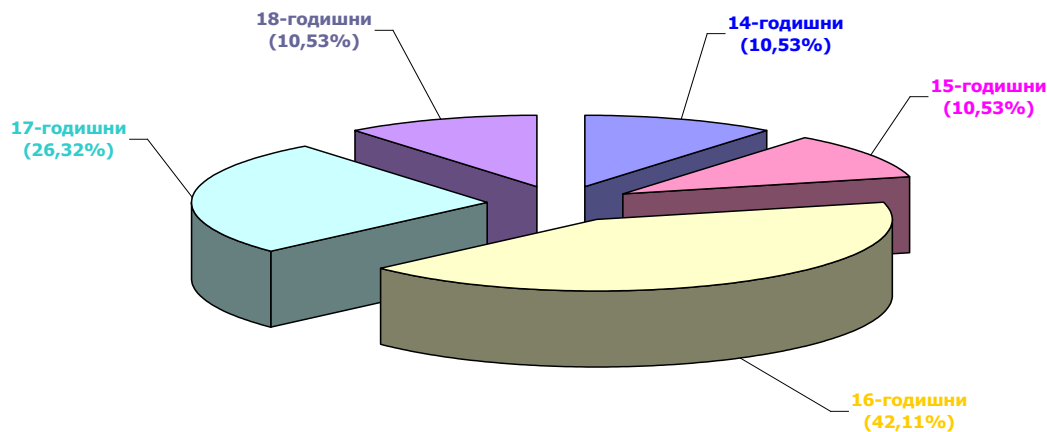


FIG. 11. Distribution of children from the experimental group, according to age

From table. 3 it is clear that the children from the experimental group have an average height of 1.64 m and an average weight of 63.88 kg. However, considered on their own, these indicators are not informative enough for the overall physical development of the subjects. Therefore (below № 3) the additionally calculated body mass index (BMI) is included in the table. As can be seen, the average index for the experimental group is 23.55 kg / m², which gives grounds to assess it as belonging to the overweight zone. This is evidenced by the high relative share of children belonging to this area. From fig. 12 show that almost half (47.37%) of the participants in the experimental group at the beginning of the observation period were overweight, and another 5.26% were obese.

The relative share of underweight children is quite high (15.79%). Only about a third of them (31.58%) have a normal body weight for their age. These results show that, in general, children with mental disabilities have serious problems with their body weight, which has a negative impact on their overall physical development.

Presented in FIG. 13 results show that the experimental group at the beginning of the study was homogeneous in terms of age and height of the children included (V is 6.92% and 4.97%, respectively) and relatively homogeneous in terms of weight and related nutrition index (indicators 2 and 3, V2 = 22.68% and V3 = 18.20%).

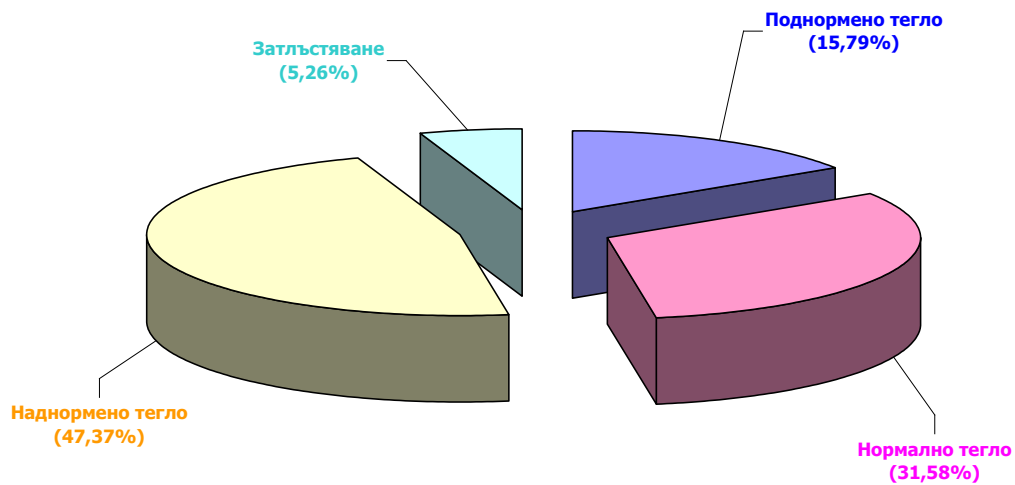


FIG. 12. Relative shares of the nutritional levels of the children from the experimental group at the beginning of the observed period

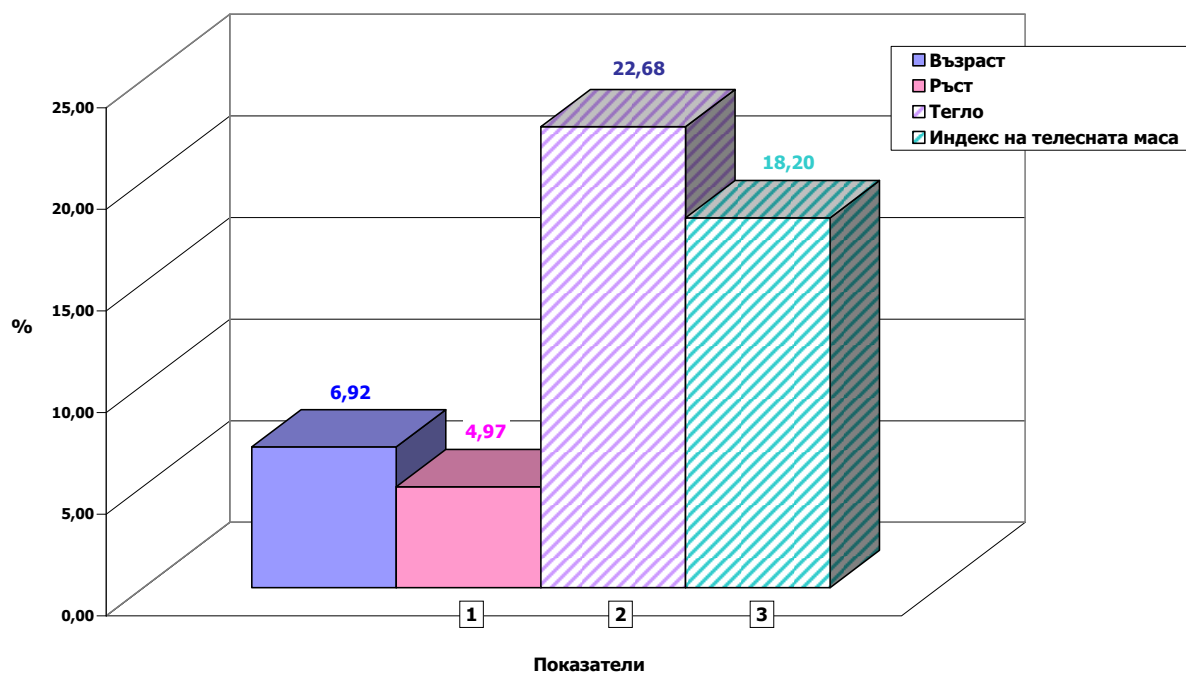


FIG. 13. Dispersal of the signs of physical development of the children from the experimental group at the beginning of the observed period

The other indicators studied by us (from № 4 to № 10 - see Table 3) carry information about the level of development of the signs of physical capacity.

The analysis of table. 3 shows that at the start of the experiment the studied children from the experimental group ran 30 m on average in 5.72 s, showed an average rebound in height of the order of 22.11 cm, in the rebound in length reached an average of 1.57 m etc. From the table, however, it is clear that the individual abilities of children are very different. As can be seen, for example, in the group there is a child who travels the 30-meter distance in 4.51 s and at the same time, another child who moves much slower and achieves a result of only 8.10 s. The achievements in the vertical bounce range between 7 cm (Xmin) and 50 cm (Xmax), in the long jump - between 81 cm and 245 cm, in throwing a solid ball forward - between 2.04 m and 12.35 m and t .n.

All this, quite naturally, affects the homogeneity of the group in terms of the studied signs of physical capacity. The scattering of these signs is illustrated in fig. 14.

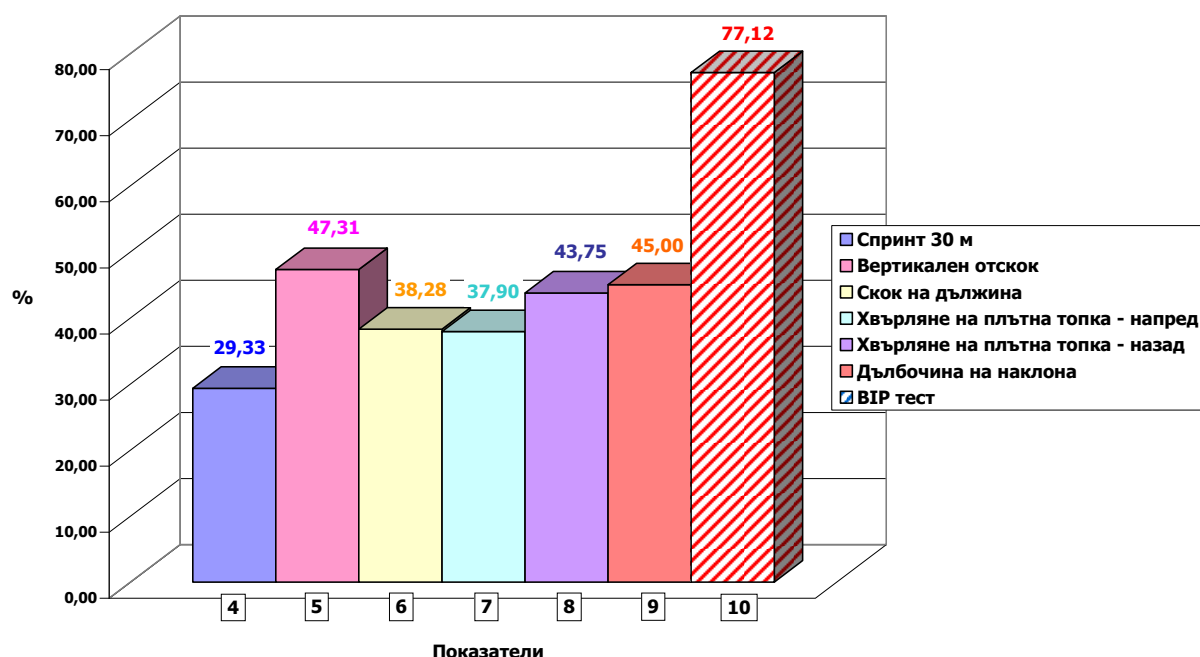


FIG. 14. Dispersion of the signs of physical capacity of the children from the experimental group at the beginning of the observed period

The analysis of the figure shows that for all indicators (except for the 30 m sprint) the values of V are higher than 30% and therefore, according to the norms of sports statistics, the experimental group at the beginning of the experimental period was inhomogeneous in terms of almost all indicators characterizing the physical capacity of the studied children.

The results of the variational processing of the data from the initial testing in the control group are presented in table. 4.

Table 4. Mean values and variability of the studied signs of physical development and physical capacity of children in the control group at the beginning of the observation period

№	Показатели	Mean	S	V	min	max	As	Ex
	Age	16,58	0,61	3,66	16	18	0,50	-0,50
1.	Height	1,71	0,08	4,59	1,52	1,81	-0,73	0,14
2.	Weight	70,73	20,39	28,84	42,5	117	0,94	0,09
3.	Body Mass Index (BMI)	23,99	5,69	23,70	17,96	36,11	0,96	-0,30
4.	Running 30 м	5,72	0,93	16,27	8,1	4,51	1,13	1,16
5.	Vertical jump	22,11	10,32	46,67	7	50	0,87	1,60
6.	Length of jump	1,57	0,46	29,34	0,81	2,45	0,23	-0,64
7.	Throwing a solid ball - forward	6,09	2,80	46,01	2,04	12,25	0,56	-0,14
8.	Throwing a solid ball - backwards	6,85	3,24	47,26	1,56	12,65	0,15	-0,84
9.	Depth of incline	17,16	7,60	44,31	4	30	0,19	-0,82
10.	BIP test	28,21	20,04	71,05	4	65	0,87	-0,44

The table shows that the average age of the children in the control group is very close to that already commented in the experimental group (16.58 years and 16.16 years, respectively). At the same time, the calculated body mass indices for the two groups are very close (23.99 kg / m² in the control group and 23.55 kg / m² in the experimental group, respectively).

The analysis shows that both in the signs characterizing the physical development and in those of the physical capacity, at the beginning of the observed period the picture of the distraction in the control group is very close to the one commented earlier for the experimental group.

The analysis made so far shows that there are certain differences between the average levels of the studied signs of physical development and physical capacity in the two groups. However, this does not give grounds to draw definite conclusions about the advantage of one or the other population studied before establishing the significance of these differences. Therefore, as indicated in the Research Methodology, the null hypothesis was tested using Student's comparative t-test (Fig. 19).

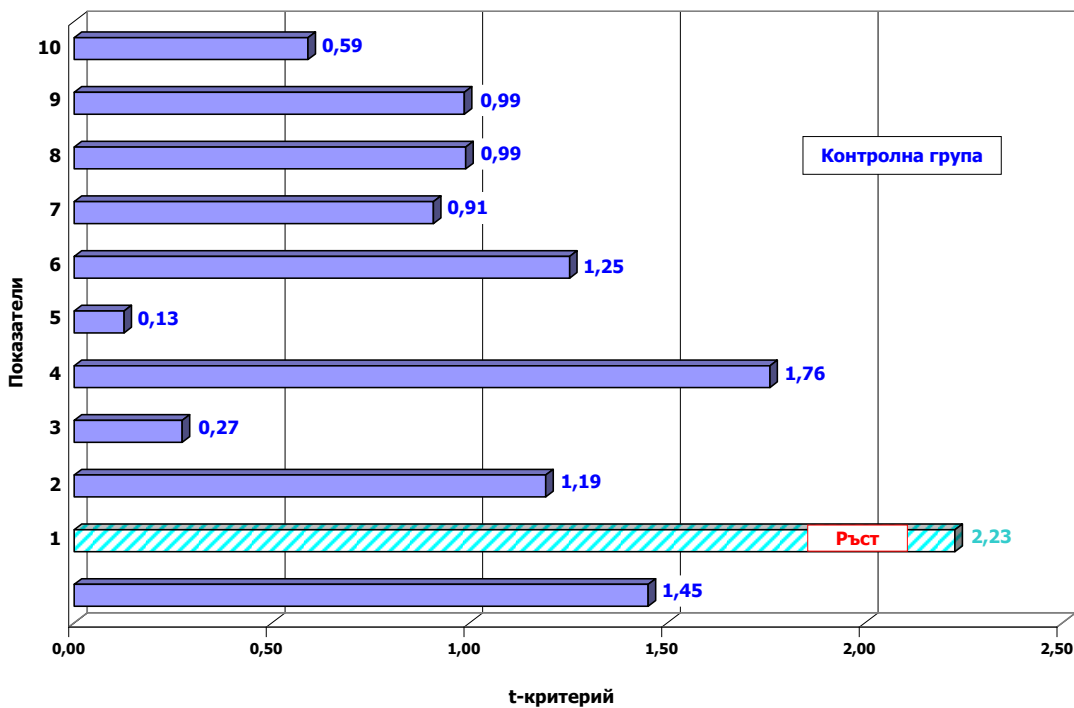


FIG. 19. Significance of the differences between the average levels of the studied signs of physical development and physical capacity at the beginning of the observed period

The analysis of the results presented in fig. 19, show that the values of t range between 0.13 (for indicator 5 "vertical rebound") and 2.23 (for indicator 1 "growth"). At the same time, it is clear that only for indicator 1 the value of t is higher than the critical value ($t_{\text{tabl}} = 2.02$). This gives grounds, with a high guarantee probability ($P_t \geq 95\%$), to reject the null hypothesis on this indicator and accept as true the alternative, according to which the children from the control group at the beginning of the observation period are significantly higher than those included in the experimental group. .

At the same time, it can be convincingly argued that the null hypothesis is valid for all other signs and, therefore, the observed differences between the average levels of these signs are insignificant and can be explained by random reasons. This is proof of the correctness of the old of our sports-pedagogical experiment.

III.2. Mean values and variability of the studied signs of physical development and physical capacity at the end of the sports-pedagogical experiment

To solve the goal and objectives of the study, at the end of the effects applied to the experimental group with the means of adapted physical activity, a second (final) test was conducted, both with this group and with the participants in the control group. As can be seen from table. 5 and FIG. 20, during the experiment there were some changes in the signs of physical development.

Table 5. Mean values and variability of the studied signs of physical development and physical capacity of the children from the experimental group at the end of the observed period

№	Indicators	Mean	S	V	min	max	As	Ex
	Age	16,16	1,12	6,92	14	18	-0,34	0,02
1.	Height	1,65	0,08	4,67	1,48	1,8	-0,01	0,57
2.	Weight	63,49	14,29	22,50	42	95,6	0,50	-0,16
3.	Body Mass Index (BMI)	23,13	4,31	18,61	16,41	33,08	0,53	-0,02
4.	Running 30 м	5,93	0,95	15,98	7,5	4,51	0,38	-0,93
5.	Vertical jump	25,47	9,44	37,07	15	55	2,00	5,54
6.	Length of jump	1,56	0,47	30,23	0,85	2,35	0,11	-1,40
7.	Throwing a solid ball - forward	6,01	2,72	45,30	1,53	11,27	0,55	-0,29
8.	Throwing a solid ball - backwards	6,53	2,65	40,65	2,5	10,36	0,05	-1,38
9.	Depth of incline	17,94	7,80	43,46	8	33	0,52	-0,71
10.	BIP test	31,53	21,98	69,72	12	98	1,92	4,34

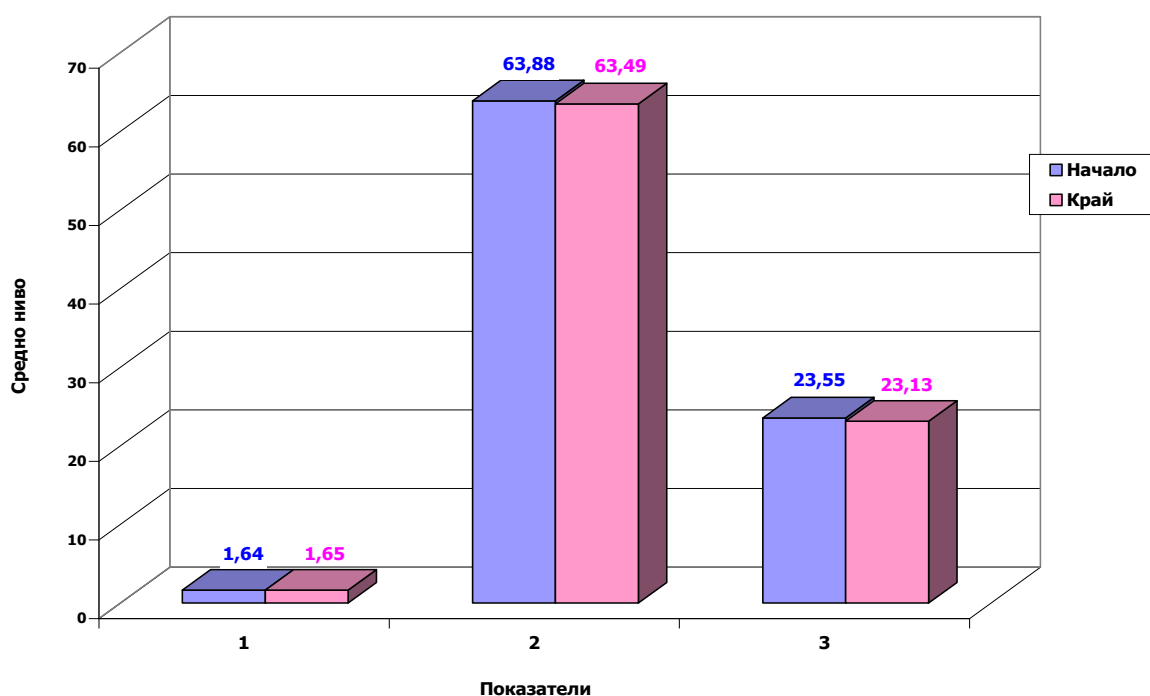
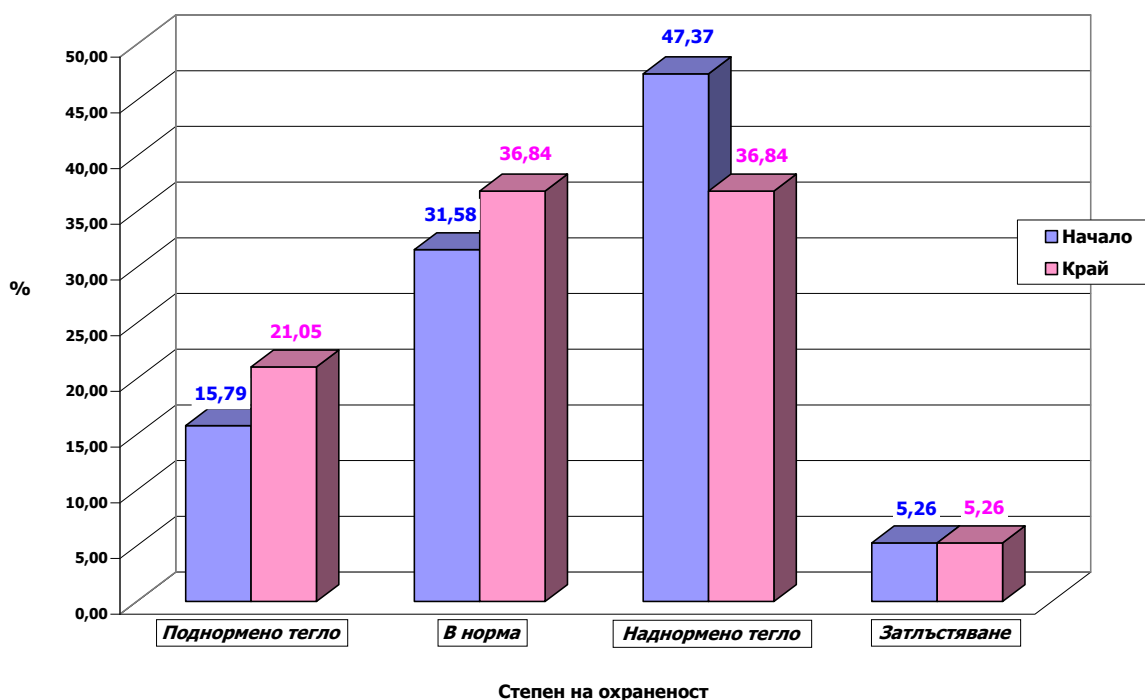


FIG. 20. Comparative analysis of the average levels of signs of physical development in children from the experimental group

A more detailed analysis of the level of nutrition of the children gives grounds to claim that during the experiment there was a decrease in the relative share of children who were initially overweight (Fig. 21).



As it can be seen, the relative share of overweight children has decreased from 47.37% to 36.84%. Also positive is the fact that half (5.26%) of these children at the end of the experiment already belong to the group with normal body weight, the relative share of which increases from 31.58% to 36.84%.

At the same time, however, the increase in the relative share of underweight children can be considered a negative trend.

The relative proportion of obese children does not change during the experiment, which is worrying because these children are most in need of status change.

The one made in fig. 22 comparative analysis of the average levels of signs of physical capacity in children from the experimental group shows that under the influence of the applied effects with the means of adapted physical activity, during the observed period, there was an increase in average levels of all signs of this group.

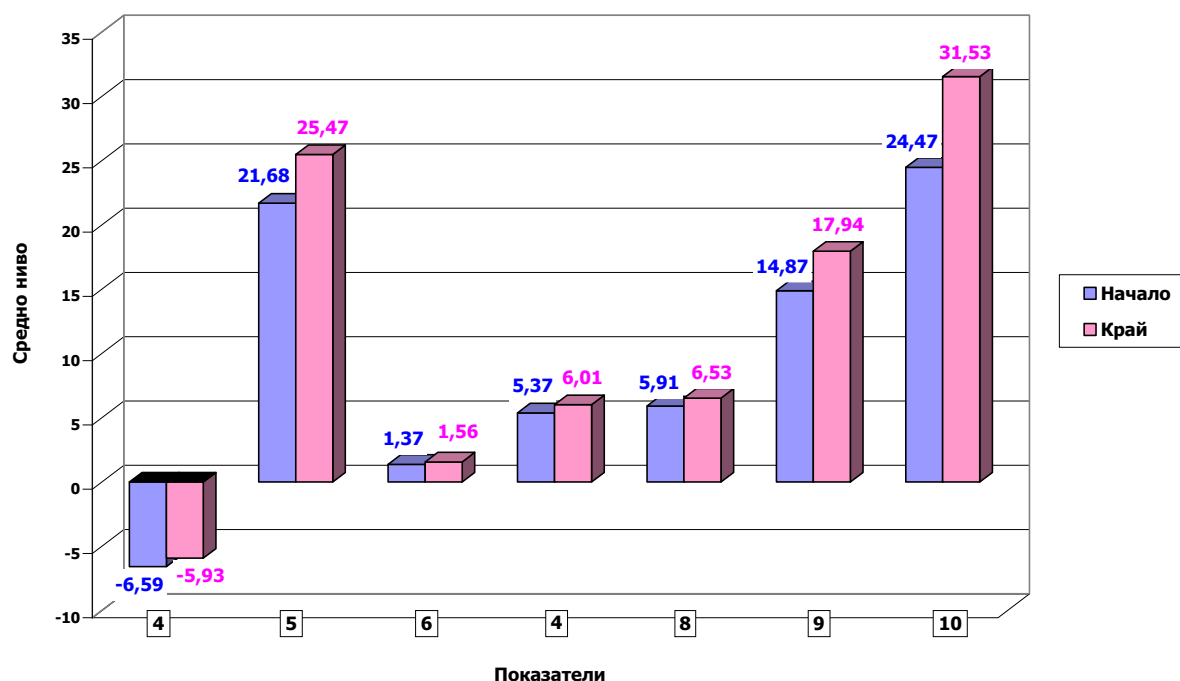


FIG. 22. Comparative analysis of the average levels of signs of physical capacity in children in the experimental group

For example, the average running time of 30 m has improved by 0.66 s, the vertical bounce has improved by an average of 3.79 cm, the long jump by 19 cm, and so on.

However, as noted in the previous section, the existence of certain differences between the average levels of the examined traits does not give grounds to draw serious conclusions before examining their significance.

A test of the null hypothesis, using Student's t-test (Fig. 23), shows that the results confirm this hypothesis.

Evidence is the values of t , which range between 0.08 and 1.35 and, as can be seen, none of them is higher than the critical value ($P_t \geq 95\%$). Therefore, with a high guarantee probability, it can be argued that the adapted methodology developed by us and tested in practice to increase the physical capacity of children with mental disabilities has not caused significant positive changes in the features included in the test battery. This means that before it can be proposed for wider use, the methodology must be improved. The main guidelines for this, in our opinion, are related to:

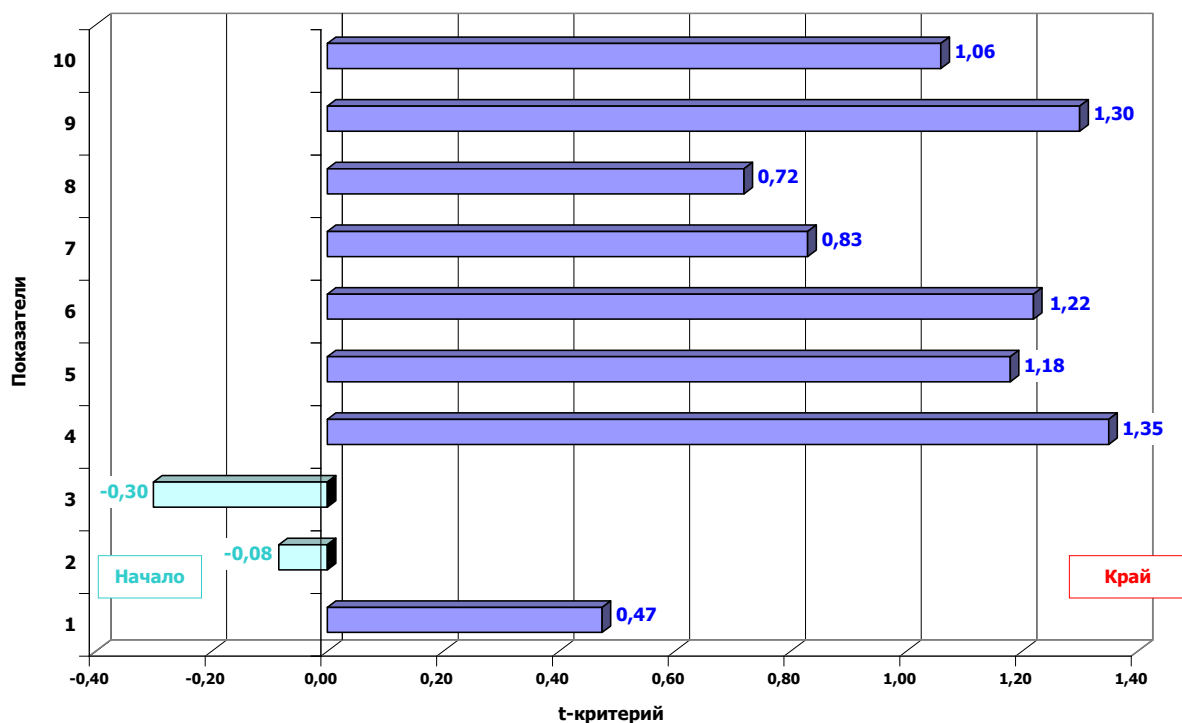


FIG. 23. Significance of the observed changes in the average levels of the studied traits in the children from the experimental group

- increasing the duration of the period for specialized exposure with the means of adapted physical activity;
- increasing the volume of exercises aimed primarily at developing the speed and explosive power of the upper and lower limbs, with muscular efforts both forward and upward, and backward and upward, and more - of general endurance;
- Inclusion of elements from some adapted sports, suitable for the respective age group.

The results of the variational processing of the data from the final testing of the children from the control group are presented in table. 6.

The analysis of the table and fig. 24 show that the changes in physical development in children in this group are very small.

In contrast to the experimental group, the control group did not show changes in the relative proportions of children who are obese and overweight. From fig. 25 it is clear that children with serious weight problems are more than a third of the whole group (36.84%).

Table 6. Mean values and variability of the studied signs of physical development and physical capacity of children in the control group at the end of the observation period

№	Indicators	Mean	S	V	min	max	As	Ex
Age	Age	16,58	0,61	3,66	16	18	0,50	-0,50
1.	Height	1,71	0,08	4,46	1,54	1,81	-0,66	-0,26
2.	Weight	70,85	19,93	28,13	43	117	0,95	0,19
3.	Body Mass Index (BMI)	23,90	5,52	23,11	18,13	36,11	0,98	-0,23
4.	Running 30 m	5,69	0,93	16,35	8,13	4,53	1,35	1,55
5.	Vertical jump	24,42	10,94	44,78	9	53	0,77	1,09
6.	Length of jump	1,60	0,46	28,80	0,82	2,45	0,12	-0,70
7.	Throwing a solid ball - forward	6,16	2,84	46,17	2,05	12,31	0,57	-0,18
8.	Throwing a solid ball - backwards	7,01	3,25	46,40	1,53	12,87	0,14	-0,81
9.	Depth of incline	17,29	7,12	41,18	5	30	0,25	-0,67
10.	BIP test	31,16	21,72	69,71	5	68	0,63	-1,05

However, as a positive fact, it should be noted that at the end of the study period in the children of the control group there was an increase in the relative share of those who have a normal body weight (by 5.26%) at the expense of children with underweight weight.

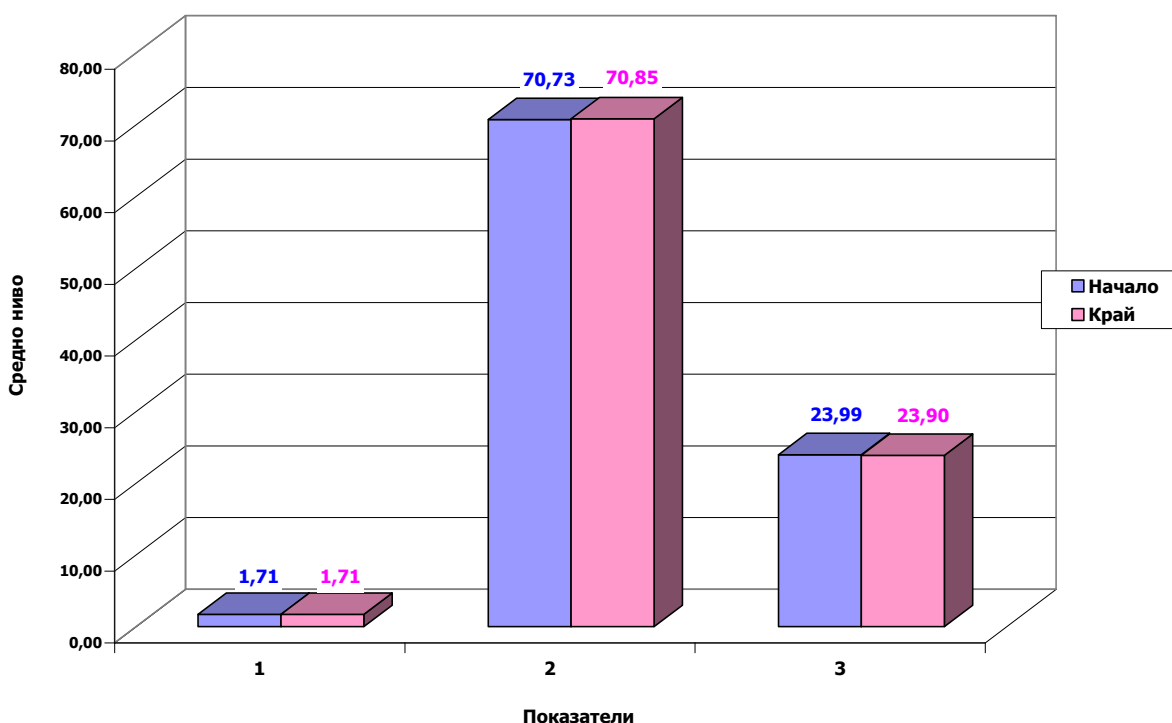


FIG. 24. Comparative analysis of the relative shares of the levels of nutrition of the children from the control group

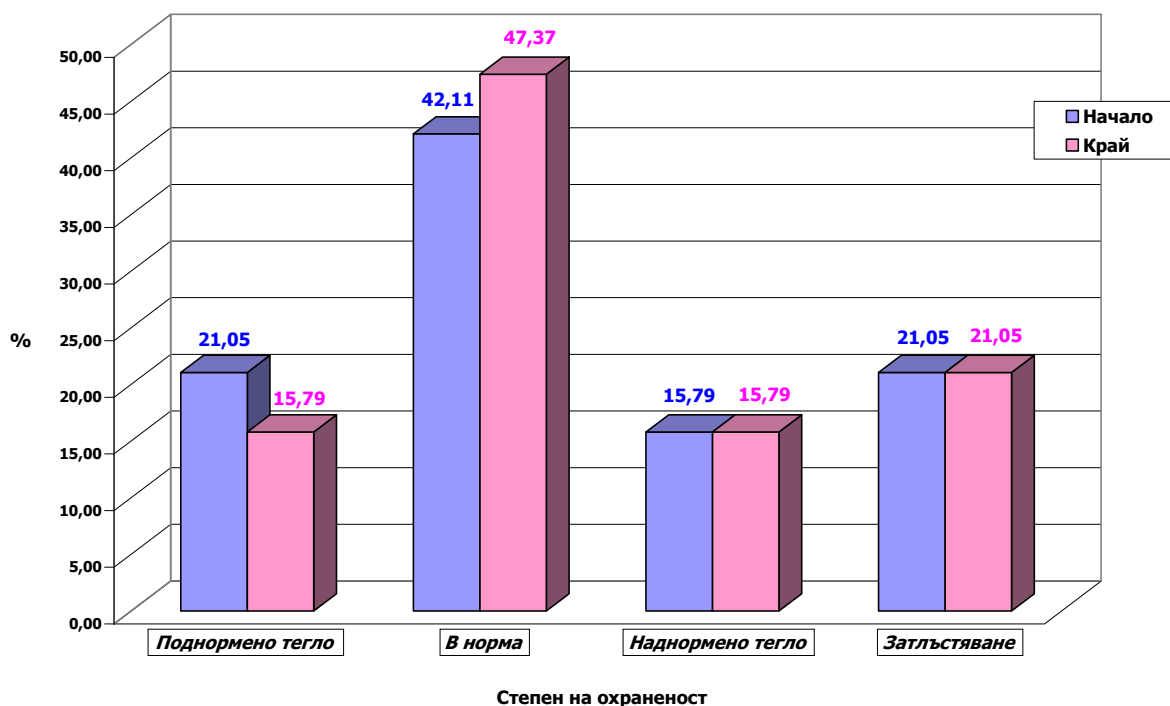


FIG. 25. Comparative analysis of the average levels of signs of physical development in children from the control group

As can be seen from fig. 25, over 5% of them have managed to compensate for their lag and move to the area of normal body weight.

The comparative analysis of the results of the initial and final ranking in the children from the control group shows that some changes in the level of signs of physical capacity also occurred during the experiment (Fig. 26).

The verification of the reliability of the observed changes (Fig. 27) shows that even in this set no significant differences were observed between the mean levels demonstrated at the start and end of the experiment. This is evidenced by the low values of the comparative t-test (between 0.02 and 0.67). Therefore, with a high guarantee probability, it can be argued that the null hypothesis is valid in this group as well.

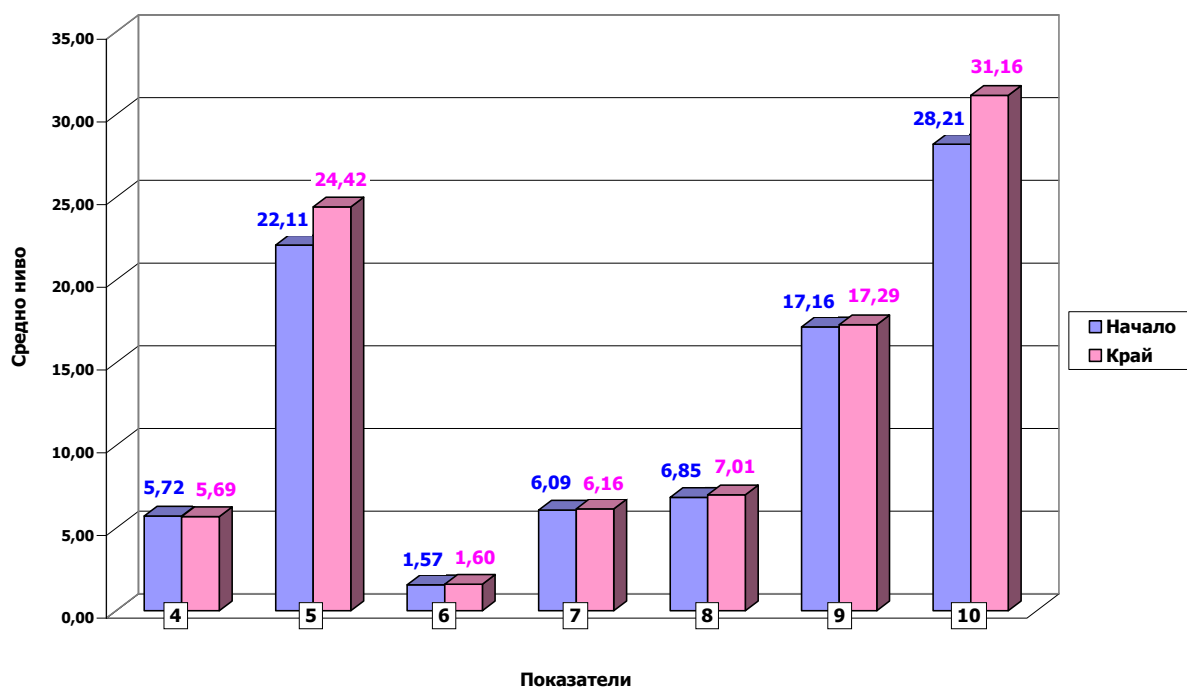


FIG. 26. Comparative analysis of the average levels of signs of physical capacity in children in the control group

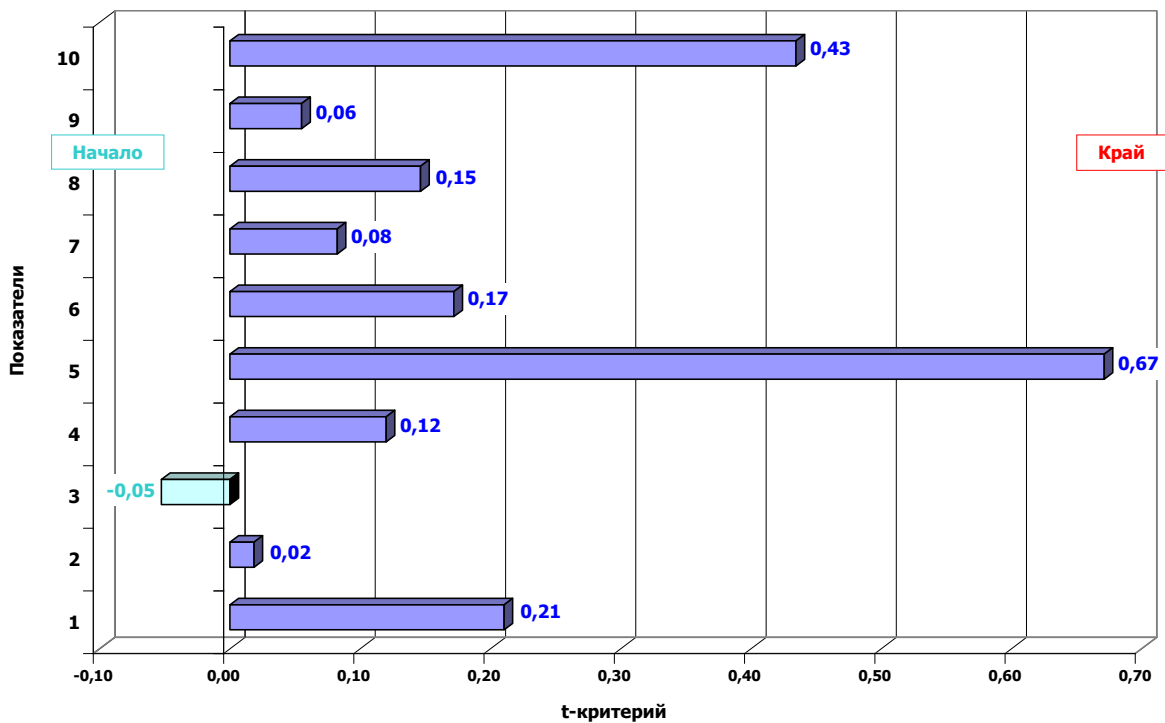


FIG. 27. Significance of the observed changes in the average levels of the studied traits in the children from the control group

As found, the calculated differences between the mean levels of the studied traits obtained at the beginning and end of the observed period in the two groups participating in the experiment are statistically insignificant. However, the analysis shows that at the start of the experiment the control group showed better average results than the experimental one, and at the end of the period the ratio changed - the experimental one was better. Therefore, for the purposes of the study, a comparison was made of the relative shares (in%) of the increments received by both the experimental and control groups. The results of this comparison are illustrated in fig. 28.

The analysis of the figure shows that in the signs characterizing the physical development of children (from № 1 to № 3) the relative shares of the changes in both groups are extremely low and even in some of them (related to body weight) are negative.

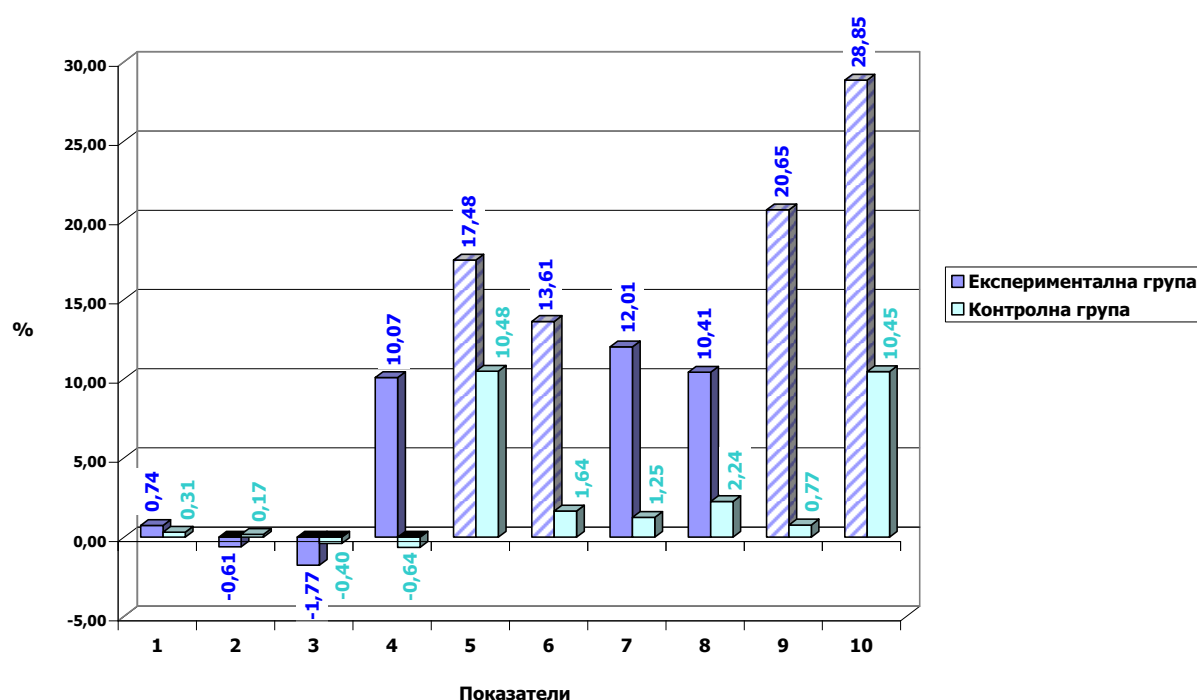


FIG. 28. Relative shares (in%) of the increments in the level of the studied signs for the time of the sports-pedagogical experiment

This is completely natural, firstly because the period of exposure is relatively short so that significant changes in body size occur, and secondly - because under the influence of the applied effects and the growth of the body changes in body weight occur.

However, the same cannot be said for the signs of physical capacity, as can be seen from fig. 28, in the children with mental disabilities included in the experimental group, the relative shares of the observed increments are higher than 10%. The highest relative shares are observed at indicators 10, 9, 5 and 6. According to the norms of sports statistics (Gigova, V., 1990; Tsarova,

R., 2013) at relative shares of increments higher than 11-12% changes in the levels of the relevant traits can be considered significant. Therefore, it can be reasonably considered that as a result of the applied effects with the means of adapted physical activity and mobile games, during the study period, the children in the experimental group had a significant improvement in:

- total speed (indicator 10 - the increase is almost 30%);
- flexibility of the body (indicator 9 - growth of just over 20%);
- the explosive force of the lower limbs during muscular efforts in both the vertical and horizontal planes (indicators 5 and 6 - the average for the group achievement in the vertical bounce increased by 17.48%, and in the long jump by 13.61%). In the other studied signs of physical capacity, the increments in the children from the experimental group are between 10 and 12%.

As can be seen from fig. 28, the relative shares of the average increments in the children from the control group are much lower. The most significant change is observed in terms of:

- the explosive force of the lower extremities during vertical muscular efforts (indicator 5 - increase of 10.48%) and
- overall endurance (indicator 10 - 10.45%).

All this proves that despite the above-mentioned relative imperfections of the applied methodology, which we will correct, the applied AFA funds have caused significant positive changes in the level of the main signs of physical capacity of children with mental disabilities participating in the experimental group.

Important information for the study is the coefficient of variation V , which allows to determine the degree of homogeneity (homogeneity) of each of the two groups participating in the sports-pedagogical experiment, with respect to each of the studied signs of physical development and physical capacity.

The analysis of fig. 29 shows that, as noted above, at the beginning of the sports-pedagogical experiment, the study group, which included children with mental disabilities exposed to the means provided in our methodology, was homogeneous in terms of their growth and relatively homogeneous in other signs of their physical development. Proof of this is the fact that the values of the coefficient of variation in the first three indicators are lower than 30%.

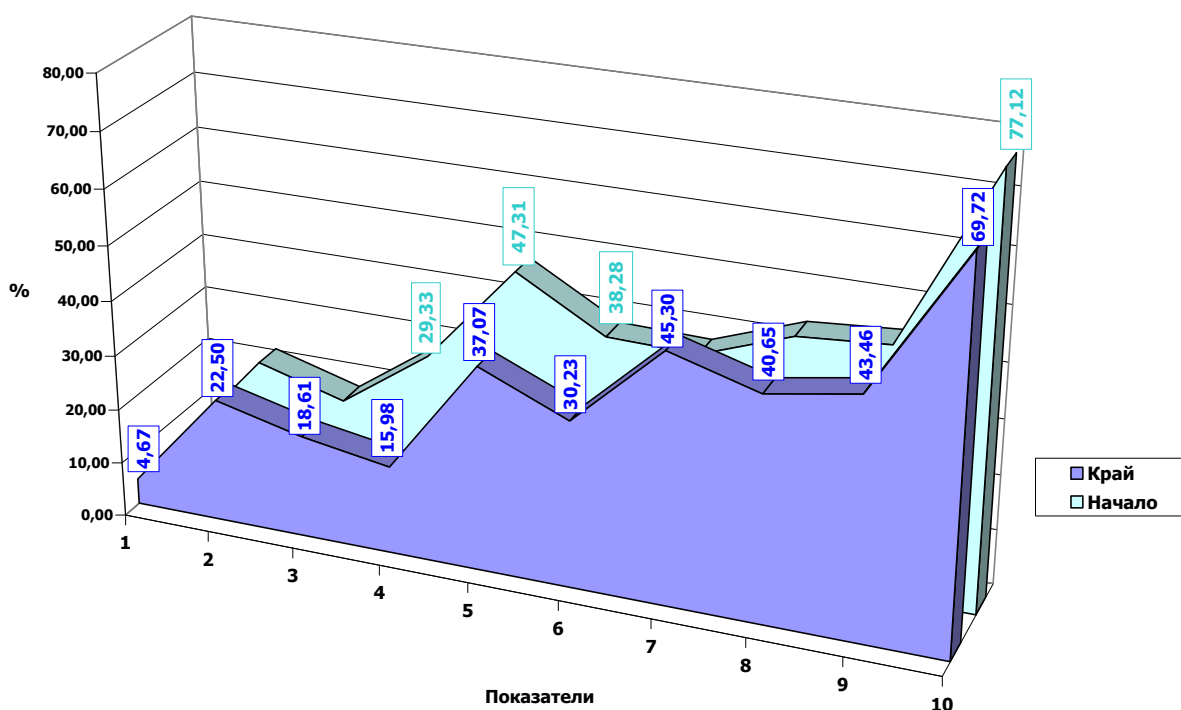


FIG. 29. Dispersion of the studied signs in the children from the experimental group

However, as can be seen, in the other indicators (from the 4th to the 10th) the scattering zone is wider, which is determined by the values of V , which are higher than 30%. This gives reason to believe that at the beginning of the sports-pedagogical experiment the experimental group was inhomogeneous in terms of the studied signs of physical capacity. This fact means that among those included in the group there are children with a higher level of development of each of the relevant traits, as well as those whose level is much lower than the average for the group. Therefore, during the experiment it was extremely important to apply the so-called individual approach.

After the completion of the experimental work, stabilization of almost all studied features was observed.

In the spirit of correctness, it should be noted that even after the application of the means of adapted physical activity, the experimental group remains inhomogeneous with respect to almost all studied signs of physical capacity. This is completely natural when it comes to children with mental disabilities, for whom the great role of the individual approach in the implementation of the applied exercises should be emphasized once again.

In contrast to the experimental group, the control zones of scattering at the start and end of the experimental period are almost identical - the changes observed in the values of the coefficients of variation are in the range of only 2-3%.

III.3. Factor structure of physical development and physical capacity of 14-18-year-old children with intellectual disabilities

The analysis made above allowed to reveal the average levels and the distraction around them of all the observed by us signs of physical development and physical capacity of the studied children with intellectual disabilities.

However, in order to increase the effectiveness of future activities with these children, it is necessary to determine which of the observed signs are the most significant for their general preparedness.

For this purpose, as indicated in the Research Methodology, the factor structure of physical development and their physical capacity was revealed.

The processing of the results of the research, with the help of factor analysis, shows that the factor structure of physical development and physical capacity of this population is determined by 4 main factors that explain a very high percentage (89.04%) of the initial variance of the study. phenomenon (Table 7).

As can be seen from the table and fig. 31, the relative share of the first and most significant factor is 41.65%, and of the last derived IV factor - only 11.94%.

Table 7. Factor structure of physical development and physical capacity of children with intellectual disabilities

№	Indicators	I	II	III	IV	h²	1-h²
1.	<i>Height</i>	0,079	0,491	0,615	0,507	0,883	0,117
2.	<i>Weight</i>	0,022	0,969	0,200	0,071	0,984	0,016
3.	<i>Body Mass Index BMI</i>	0,005	0,963	-0,025	-0,140	0,947	0,053
4.	<i>Running 30 m</i>	-0,554	0,188	-0,119	-0,729	0,887	0,113
5.	<i>Vertical jump</i>	0,857	-0,188	0,224	0,052	0,822	0,178
6.	<i>Length of jump</i>	0,797	0,003	0,121	0,474	0,874	0,126
7.	<i>Throwing a solid ball forward</i>	0,887	0,233	0,174	0,202	0,911	0,089
8.	<i>Throwing a solid ball backwards</i>	0,868	0,268	0,080	0,135	0,850	0,150
9.	<i>Depth of incline</i>	0,488	0,084	0,811	0,048	0,905	0,095
10.	<i>BIP test</i>	0,840	-0,187	0,280	0,149	0,841	0,159
$\Sigma\alpha^2 = 89,04\%$		<i>41,65%</i>	<i>23,45%</i>	<i>12,70%</i>	<i>11,24%</i>		

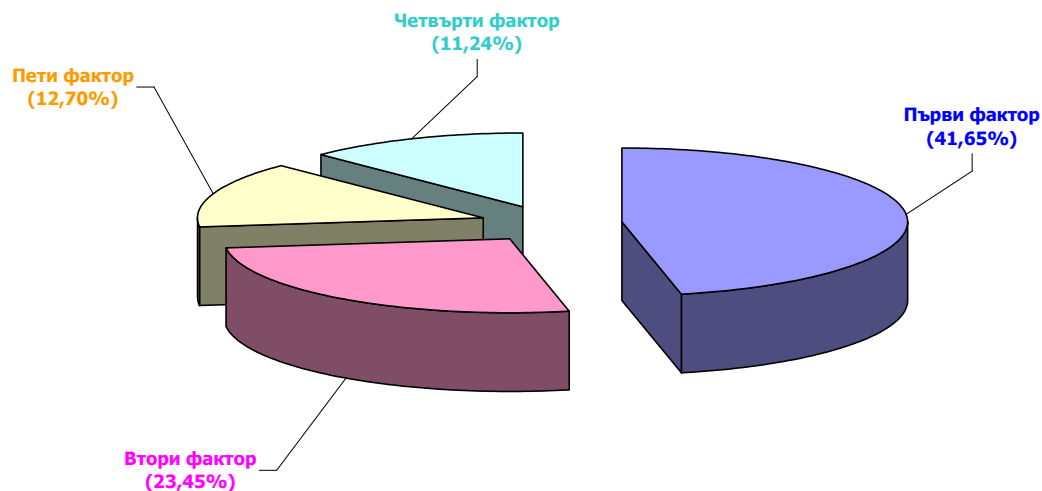


FIG. 31. Relative shares of the factors determining the factor structure of physical development and physical capacity

The analysis of fig. 32 shows that the first factor is determined by 5 main features that are unequivocally related to the physical capacity of children. The highest factor weights in this factor are indicators 7 and 8 (respectively 0.887 and 0.868), which carry information about the level of development of the explosive force of the upper extremities during muscular efforts in the anterior-posterior direction. Very close to them are the factor weights of indicator 5 (vertical rebound - 0.857), revealing the importance of the explosive force of the lower extremities during muscular effort in the vertical plane, as well as indicator 10 (BIP-test - 0.840), informing about overall endurance children's.

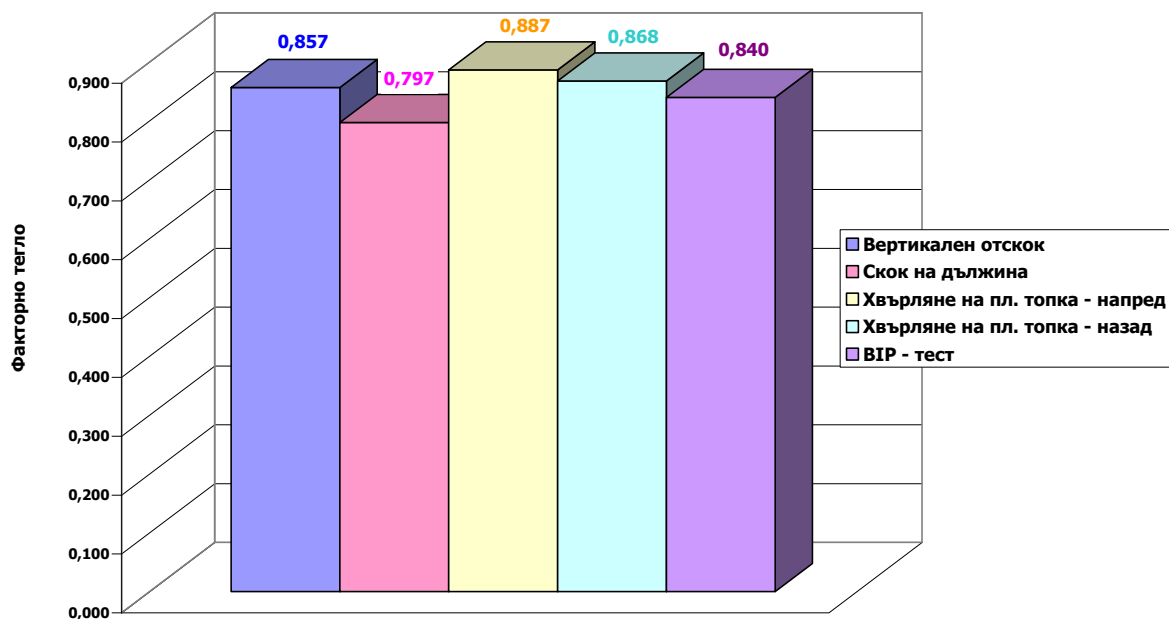


FIG. 32. Factor structure of physical development and physical capacity - factor I.

The last indicator (№ 6), which gives a complete view of the structure of the most important factor for the studied population, is related, like indicator 5, to the manifestation of the explosive force of the lower extremities, but with horizontal muscular effort. All the above gives grounds to identify the first factor in the structure of physical development and physical capacity of the studied children with intellectual disabilities as "explosive power and general endurance".

The next 3 factors that make up the factor structure of physical development and the physical capacity of the studied population are determined by 2 main indicators (Fig. 33).

As can be seen from the figure, the second factor, which explains 23.45% of the initial variance, is morphological and carries information about the body weight of children (indicators 2 and 3) and can be defined as "nutritional status".

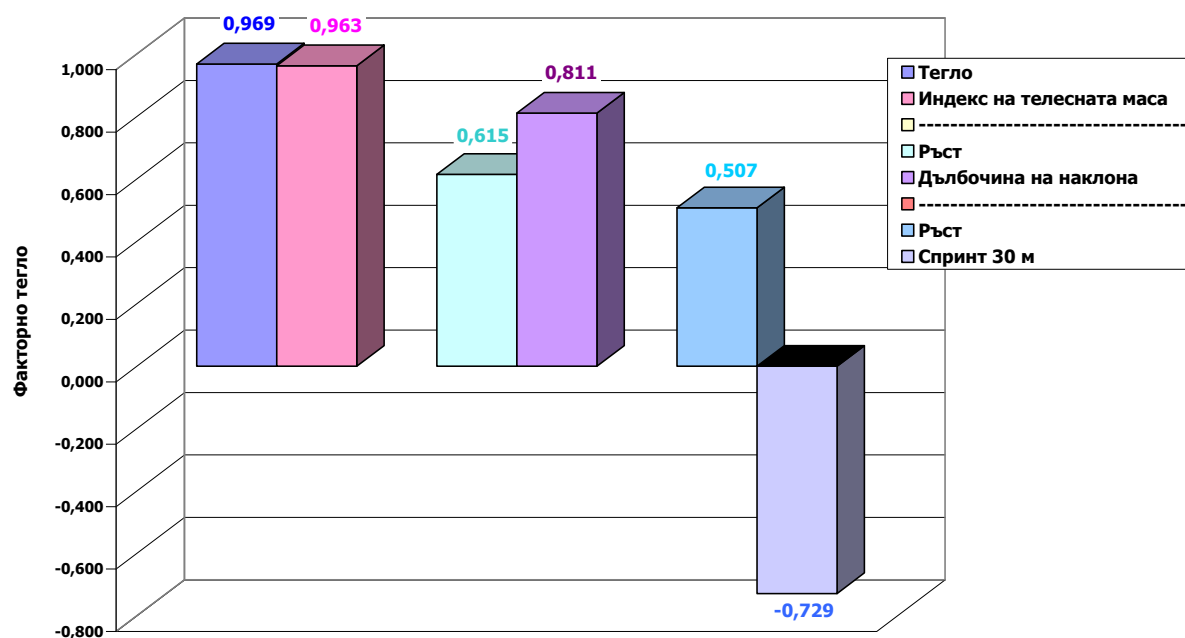


FIG. 33. Factor structure of physical development and physical capacity - II, III and IV factors

The third factor (12.70%) can be identified as "flexibility of the body", which is positively influenced by the growth of children.

The last fourth factor, included in the revealed factor structure, defines the place in it of the "speed of movement on the terrain", as an important motor quality. It is noteworthy that the growth of children has a positive effect on the development of this quality.

In summary, it can be argued that the greatest contribution to the physical development and capacity of the studied 14-18-year-old children with intellectual disabilities from the Republic of Turkey have:

- the explosive force of both the upper and lower limbs;
- body weight;
- flexibility of the spine;
- her height
- the speed of movement in space.

This finding must be taken into account by teachers and other professionals working with children from the studied contingent when building curricula and conducting classes with them.

III.4. Assessment of the physical development and physical capacity of the studied children with intellectual disabilities

As indicated in the Research Methodology, with the help of the sigma method, the results of the testing of children from both groups were evaluated both at the beginning and at the end of the sports-pedagogical experiment. Based on the established individual assessments of each of the children, the so-called average summary assessments for all examined traits (Table 8), as well as the initial and final summarized (group) assessments for each studied population, which are presented in the last row of the table.

It should be noted that the assessments were made in a 30-point system, which allows a more accurate distinction of even minor differences in the levels of development of individual indicators. In order to equate these grades with those used in Turkish schools, it is necessary to divide each grade obtained into three (3).

Table 8. Average summary assessments of the studied signs of physical development and physical capacity

№	Indicators/Groups	Experimental		Control	
		Beginni ng	End	Beginni ng	End
1.	<i>Height (cm)</i>	10,33	11,53	18,53	19,16
2.	<i>Weight (kg)</i>	13,09	12,86	16,99	17,06
3.	<i>Body Mass Index (kg/m²)</i>	14,81	13,96	15,71	15,52
4.	<i>30 m sprint</i>	12,00	16,25	17,58	17,82
5.	<i>Vertical jump</i>	13,72	17,40	14,13	16,38
6.	<i>Length Jump</i>	12,40	16,24	16,45	16,97
7.	<i>Throwing a solid ball – forward</i>	13,20	15,68	15,97	16,27
8.	<i>Throwing a solid ball - backwards</i>	12,88	15,02	16,13	16,65
9.	<i>Depth of incline</i>	12,65	16,87	15,80	15,98
10.	<i>BIP - test</i>	13,18	16,63	15,01	16,45
<i>Average Sum Evaluation (points)</i>		12,82 p.	15,24 p.	16,23 p.	16,83 p.

The analysis of table. 8 and FIG. 34 shows that at the beginning of the observed period the sigma assessments of the children from the experimental group occupy values between 10.33 points (for indicator 1 - height) and 14.81 points (for indicator 3 - body mass index).

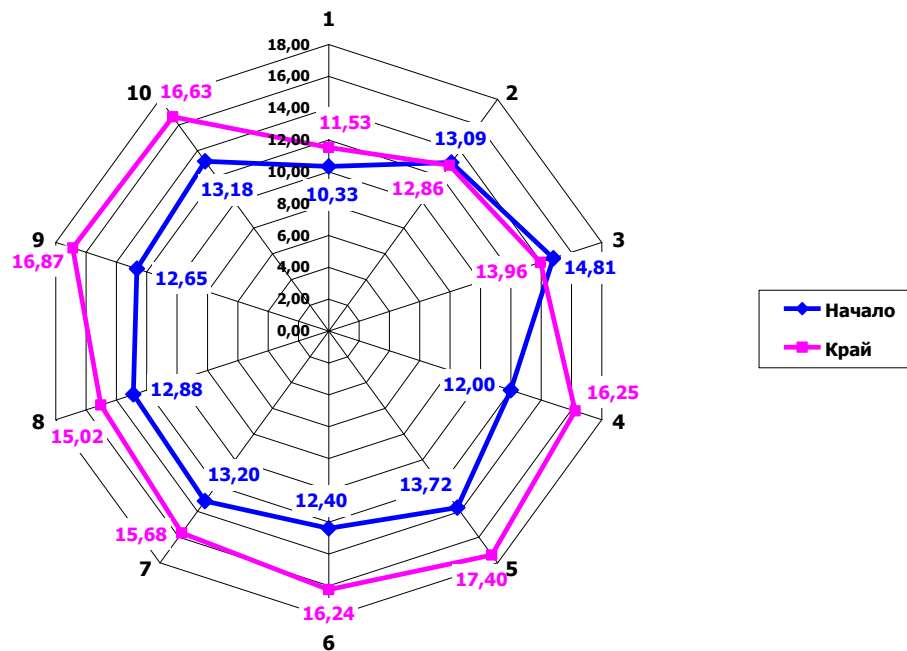


FIG. 34. Assessment of the signs of physical development and physical capacity in the children from the experimental group

In general, the grades are lower than those achieved by the group at the end of the sports-pedagogical experiment. An exception is observed with regard to body weight and the related nutrition index (indicators 2 and 3). This is completely natural, and can be explained by some reduction in weight and the specified index, under the influence of the applied specific effects with the means of adapted physical activity.

The calculated average total assessment of physical development and physical capacity in the experimental group at the beginning of the study period was 12.82 points (Table 8). As can be seen from fig. 34, at the end of the period the experimental group increased the level of its preparedness and its average total score reached 15.24 points. This improvement, of course, is mainly at the expense of the increased level of signs of physical capacity. The highest growth is observed in terms of the level of development of:

- the speed of movement on the terrain (indicator 4 - increase of the average total score by 4.25 points);
- flexibility of the body (indicator 9 - the increase is 4.22 points);
- the explosive force of the lower limbs during muscular efforts in both the horizontal and vertical planes (indicators 6 and 5), respectively with 3.84 points and 3.68 points;

- the total endurance of the children (indicator 10) - the increase is 3.45 points.

As a result of the increased levels of development of the studied traits, the average total score of the whole experimental group increased by 2.42 points and, as noted above, reached 15.24 points.

What is the condition of the control group?

As already mentioned, at the beginning of the experimental period, although insignificant, the control group surpassed the experimental group in terms of the level of development of the studied traits, as a whole, therefore at the beginning of the period its total score was 16.23 points (Table. 8).

The analysis of table. 8 and FIG. 35, however, shows that at the end of the period the average total score of the control group was 16.83 points, which means that the increase in it is only 0.60 points. The biggest difference in achievements here is observed in terms of:

- the explosive force of the lower limbs during muscular effort in the vertical plane and
- the general endurance of the children.

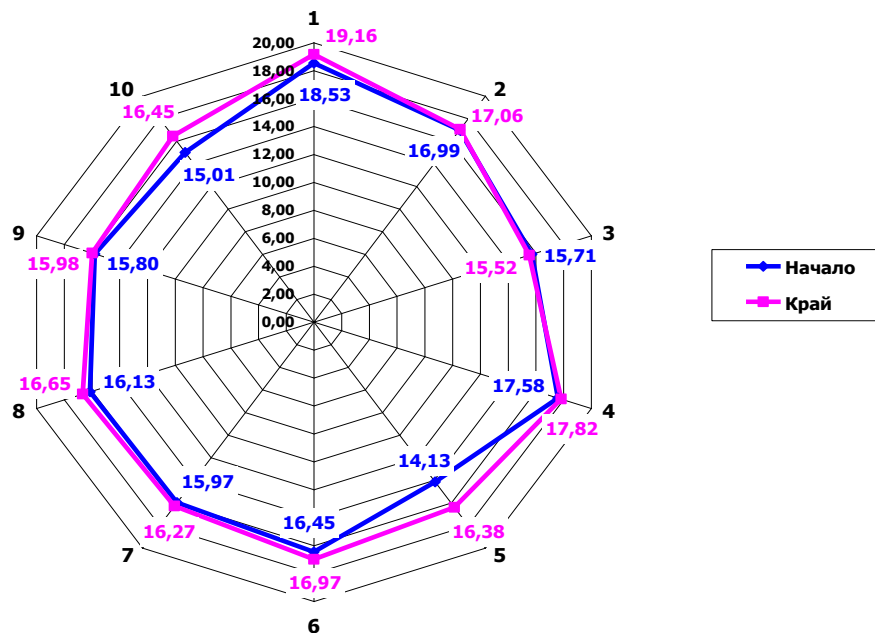


FIG. 35. Assessment of the signs of physical development and physical capacity in the children from the control group

In order to increase the efficiency of future work, the so-called optimization model of the physical development and physical capacity of children with mental disabilities from the experimental group led by us (Fig. 36).

As can be seen from the figure, the highest scores, in general, the experimental group has achieved on indicator 15 (17.40 points), indicator 9 (16.87 points) and indicator 10 (16.63 points). This gives grounds to claim that at the end of the experimental period the children from this group have the highest level of development of the following signs:

- speed of movement in space;
- flexibility of the spine and
- overall endurance.

Therefore, these are the strongest aspects of their preparedness.

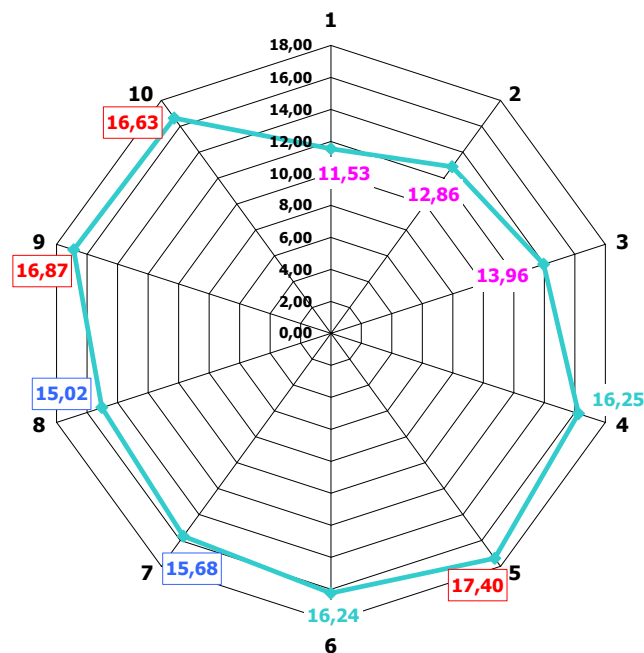


FIG. 36. Optimization model of the physical development and the physical capacity of the experimental group

At the same time, the analysis shows that the lowest scores are observed in the first three indicators. All of them are related to the physical development of the children from the experimental group:

- growth (11.53 points);

- weight (12.86 t) and
- body mass index (13.96 points).

The logic in the application of such models for optimizing the future educational and training work with children requires that the efforts in the next activities be focused mainly on the development of those signs on which the average sigma scores T for the group are the lowest. As can be seen from fig. 36 and as we have already noted, the lowest estimates are related to the parameters of physical development of the studied children. However, it is known that this type of indicators are quite conservative and are not subject to large changes in short periods of impact (in our case 8 weeks).

This gives us reason to believe that increasing the overall level of physical development and physical capacity of the studied children can be achieved if the emphasis in future work is focused on developing the explosive power of the upper limbs during muscular effort both backwards and upwards. and forward and upward.

Efforts to develop the signs that are relatively high for these children (explosive power of the lower extremities under vertical muscular effort, flexibility of the spine and general endurance) will not have the same effect on them.

As already noted, it is extremely important when working with such children to increase the relative share of individual work with each of them, in accordance with his needs and the peculiarities of his motor activity.

As an example, here we present the individual optimization model of one of the children (NS - 16 years old) - fig. 37.

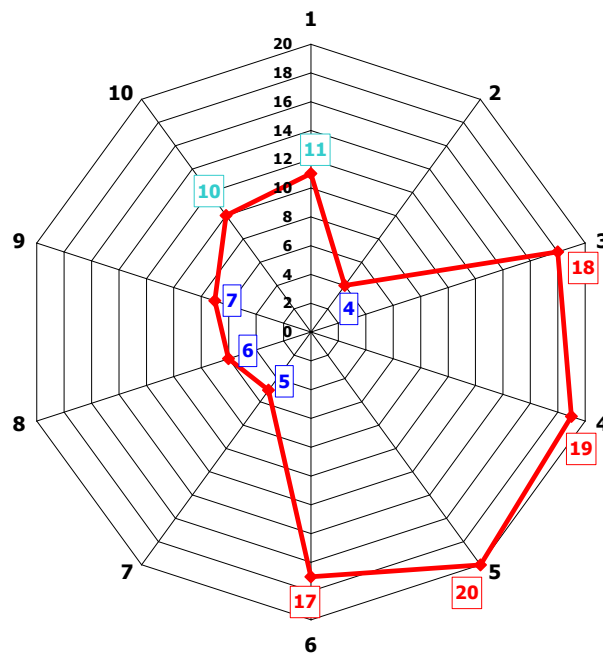


FIG. 37. Individual optimization model of the physical development and physical capacity of NS (16 years old)

The analysis of the model gives grounds to the sports educators working with the specific child to make the following recommendations:

- the accents in the future educational-training work with NS to be directed to the development mainly of:
 - the explosive power of the upper limbs during muscular effort both backwards and upwards and forwards and upwards, and
 - flexibility of the body;
- to increase the volume of work to develop overall endurance.

Similarly, in each ongoing examination of the qualities and skills of children, each of the examined traits in each of them can be assessed. This gives sports educators the opportunity to outline current guidelines for improving the preparation of each of the children and on this basis to develop specific emphases in future individual work with each of them.

III.5. Legislation for assessment of the physical development and physical capacity of 14-18-year-old children with intellectual disabilities from the Republic of Turkey

According to S. Denev (2014), the knowledge, skills and competencies of teachers and other sports professionals working with children with special needs are especially important when working with them. This will enable optimal strategic decisions to be made, which means allocating the total amount of workload so as to ensure, with an acceptably high probability, the maximum effect on both the level of physical capacity and the specific preparedness of children.

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The application of T grades as the first private criterion for optimizing training is based on the theory of sports science (Volkov, N., 1981; Zhelyazkov, Ts., 1998; Tsarova, R., 1981, 2013; Zhelyazkov, Ts., Dasheva, D., 2002, 2017) according to which, the adaptation process is a nonlinear function of physical activity, ie. the dose-effect relationship develops along the so-called logistic curve. This means that depending on the current state of the sign for which the relevant indicator carries information, the same amount of training work will have a different effect. The higher the level of development of this trait, ie. the better the achievement, the less growth can be expected on a unit of training work.

This gives reason to believe that in the training process it is more correct to focus efforts on improving the performance of those indicators that at the moment of preparation have a lower level, ie. lower values of the estimates calculated according to the normative table T (Gyosheva, K., Tsarov, K., Tsarova, R., 1990; Aleksieva, M., 2008). They are determined by comparing the

scores on all studied indicators in a given group or in each of the children. Focusing on indicators with high T scores will not have the same effect on children's overall fitness.

For the needs of optimization and in order to more quickly and easily evaluate the results during the current research conducted with children, the so-called sigma assessment method (see the Research Methodology), with the help of which to develop a normative basis for control and assessment of the physical development and physical capacity of children with mental disabilities from the Republic of Turkey.

One of the important procedures for solving this research task is related to checking the form of the distribution of the observed features in the studied population. This means to determine the degree of proximity to the so-called. normal (Gauss-Laplace) distribution, which ensures correctness in the application of the sigma method for preparation of standards. Appropriate mathematical and statistical processing of the results of our studies shows that, in general, the calculated values of the coefficients of asymmetry (As) and excess (Ex), at a high level of statistical reliability ($P_t \geq 95\%$), are within the norm (see Tables 3 and 4 - in Section III.1 and Tables 5 and 6 - in Section III.2). This gives reason to believe that the set of indicators used to characterize the physical development and physical capacity of the studied children with mental disabilities has a close to the normal distribution, which allows the development of the regulatory framework to apply the sigma method.

The point system used allows comparing the achievements on differently sized tests and indicators (measured with us in m, cm, kg, s, number).

A 30-point scoring system has been implemented, which allows accurate readings of increments even in shorter periods of time, which in turn allows for timely adjustments to the impact.

The average level of the studied population corresponds to 15 points. In the case of better than average achievements, the grades are higher than 15 points and vice versa - in the case of worse results, the grades are lower than 15 points (Table 9).

For indicators where lower values of the result correspond to higher quality (for example, time to run a distance), the rating scales are reversed. In our case, this was done with indicator 4 ("sprint 30 m from a high start").

It should also be noted that for indicator 3 ("Body Mass Index"), due to the special way in which the best results are available in the middle of the scale, the assessment is two-way.

When using the normative table it is necessary to know the following:

- the column numbers correspond to the indicator numbers;
- the evaluation of each result is performed by finding the respective indicator in the table and the result to be evaluated is compared with the values indicated in the column. Against this value, horizontally, in the first column (marked with "T grade") the point assessment of the respective child according to the given indicator is reported;

Table 9. Normative table for assessment of physical development and physical capacity of children with mental disabilities from the Republic of Turkey

Evaluation T (points)	Height	Weight	BMI		30 m sprint	Vertical jump
	1.	2.	3.		4.	5.
30	1,80	93,53	21,4		3,80	38,44
29	1,79	91,78	21,15	21,83	3,95	37,41
28	1,78	90,02	20,89	22,25	4,11	36,38
27	1,77	88,27	20,64	22,68	4,26	35,35
26	1,77	86,52	20,39	23,11	4,42	34,32
25	1,76	84,77	20,13	23,53	4,57	33,29
24	1,75	83,01	19,88	23,96	4,73	32,26
23	1,74	81,26	19,63	24,39	4,88	31,23
22	1,73	79,51	19,37	24,81	5,04	30,20
21	1,73	77,75	19,12	25,24	5,19	29,17
20	1,72	76,00	18,87	25,67	5,35	28,15
19	1,71	74,25	18,61	26,09	5,50	27,12
18	1,70	72,49	18,36	26,52	5,66	26,09
17	1,69	70,74	18,11	26,95	5,81	25,06
16	1,69	68,99	17,85	27,37	5,97	24,03
15	1,68	67,24	17,60	27,80	6,12	23,00
14	1,67	65,48	17,35	28,23	6,28	21,97
13	1,66	63,73	17,09	28,65	6,43	20,94
12	1,64	61,98	16,84	29,08	6,59	19,91
11	1,63	60,22	16,59	29,51	6,74	18,88
10	1,61	58,47	16,33	29,93	6,90	17,86
9	1,60	56,72	16,08	30,36	7,05	16,83
8	1,58	54,96	15,83	30,79	7,21	15,80
7	1,57	53,21	15,57	31,21	7,36	14,77
6	1,55	51,46	15,32	31,64	7,52	13,74
5	1,54	49,71	15,07	32,07	7,67	12,71
4	1,52	47,95	14,81	32,49	7,83	11,68
3	1,51	46,20	14,56	32,92	7,98	10,65
2	1,49	44,45	14,31	33,35	8,14	9,62
1	1,48	42,69	14,05	33,77	8,29	8,59

- when the evaluated result falls between two values, it is equated to the lower (in quality) value;
- in cases where T = 15 points, the assessed result corresponds to the average level of development of the given trait in 14-18-year-old children with mental disabilities from the Republic of Turkey;
- in cases when the evaluated result exceeds the defined limits (from 1 to 30 points), it is evaluated with 31 points if it is higher and with 0 points if it is lower.

Table 9 (continued). Normative table for assessment of physical development and physical capacity of children with mental disabilities from the Republic of Turkey

Evaluation T (points)	Vertical length jump	Throwing a solid ball – forward	Throwing a solid ball – backwards	Depth of incline	BIP – test
	6.	7.	8.	9.	10.
30	2,23	9,72	10,87	27,47	58,74
29	2,18	9,46	10,58	26,74	56,70
28	2,14	9,20	10,29	26,02	54,65
27	2,09	8,94	10,00	25,29	52,60
26	2,04	8,68	9,71	24,56	50,56
25	1,99	8,42	9,42	23,84	48,51
24	1,94	8,17	9,13	23,11	46,47
23	1,89	7,91	8,84	22,39	44,42
22	1,84	7,65	8,55	21,66	42,37
21	1,79	7,39	8,26	20,93	40,33
20	1,74	7,13	7,97	20,21	38,28
19	1,69	6,87	7,68	19,48	36,24
18	1,65	6,61	7,39	18,76	34,19
17	1,60	6,35	7,10	18,03	32,14
16	1,55	6,09	6,81	17,30	30,10
15	1,50	5,83	6,52	16,58	28,20
14	1,45	5,58	6,23	15,85	26,30
13	1,40	5,32	5,94	15,13	24,40
12	1,35	5,06	5,65	14,40	22,49
11	1,30	4,80	5,36	13,67	20,59
10	1,25	4,54	5,07	12,95	18,69
9	1,20	4,28	4,78	12,22	16,79
8	1,16	4,02	4,49	11,50	14,89
7	1,11	3,76	4,20	10,77	12,99
6	1,06	3,50	3,91	10,04	11,09
5	1,01	3,24	3,62	9,32	9,19
4	0,96	2,99	3,33	8,59	7,29
3	0,91	2,73	3,04	7,87	5,39
2	0,86	2,47	2,75	7,14	3,48
1	0,81	2,21	2,46	6,41	1,58

The sum of the T grades for all studied traits, divided by the number of indicators (in our country - 10), gives an idea of the level of physical development and physical capacity of each of the children. This is his generalized assessment (T), which can be considered an analogue of physical development and physical capacity and is the basis for comparison with the assessments of other children in the group and outside it and more - with their own assessments obtained in previous tests.

As noted, the evaluation of results through normative tables allows for tactical (ongoing) optimization of activities, depending on the current level of preparation of each of the children. In contrast, the factor weights of the indicators make it possible to optimize the activities in the

strategic aspect (depending on the importance of the individual indicators for the size of the level of preparedness).

This, according to a number of authors (Tsarov, K, 2001, 2012; Tsarova, R., 2013; Tsankova, M., 2017; Borukova, M., 2018) requires to determine the quantitative impact (importance) of each trait on physical development. and physical capacity, as it is more profitable to work more on qualities represented by indicators of greater importance than on those of less importance.

By this logic, the results of the factor analysis can be applied as a second private criterion for optimizing the amount of work during the classes. This means that the traits reported in each child with a low level of development (low sigma scores T - see section III. 4.) must be rearranged, depending on the significance of each trait, ie. its place in the factor structure of physical development and physical capacity.

The analysis of the factor matrix derived by us (see Table 7 - Section III.3) shows that significant, with the greatest contribution to the physical development and physical capacity of the studied 14-18-year-old children with intellectual disabilities from the Republic of Turkey are :

- the explosive force of the upper limbs;
- body weight;
- flexibility of the spine;
- her height
- the speed of movement in space.

IV. CONCLUSIONS AND RECOMMENDATIONS

The analyzes and summaries made in the dissertation allow us to formulate the following **conclusions**:

1. In general, children with mental disabilities have serious problems with body weight, which has a negative impact on their overall physical development - the average body mass index, in the groups included in the experiment, gives us the reason to put it in the group overweight:

- almost half of the participants in the experimental group at the beginning of the observed period were overweight, another 5.26% were obese and 15.79% - underweight;
- in comparison with the experimental group, in the control group the following is observed:
 - higher relative shares of children with normal body weight and underweight;
 - lower relative share of overweight children, at the expense of those who are obese;

2. During the experiment there were some changes in the signs of physical development:

- the average height of the experimental group was increased by 1 cm and the average weight was reduced by almost 400 g, which is reflected in the body mass index, which decreases from 23.55 to 23.13 kg / m²;
- the relative share of overweight children from the same group has decreased at the expense of those with normal body weight, but, as a negative trend, there is an increase in the relative share of children underweight and maintaining the relative share of children with obesity;
- at the start of the experiment the children from the control group had a better level of morphofunctional development than the experimental one, but at the end of the period this ratio changed;
- The changes in the level of signs of physical development in both groups are insignificant from a statistical point of view.

3. It can be reasonably considered that as a result of the applied effects with the means of adapted physical activity and mobile games, during the study period, the children in the experimental group have improved all the studied signs of physical capacity. The most significant is the increase in the levels of:

- overall speed;
- the flexibility of the body;
- the explosive force of the lower limbs during muscular efforts in both the vertical and horizontal planes.

4. The relative shares of the average increments in the children from the control group are much lower. The most significant change is observed in terms of explosive power of the lower extremities in vertical muscular effort and overall endurance.

5. With a high guarantee probability, however, it can be argued that the adapted methodology developed by us and tested in practice to increase the physical capacity of children with mental disabilities has not caused sufficiently significant positive changes in the level of symptoms included in the test battery. This means that before it can be proposed for wider use, the methodology must be subject to some adjustments.

6. Both at the beginning and at the end of the study, the experimental and control groups were homogeneous and relatively homogeneous in terms of the studied signs of physical development, but inhomogeneous in terms of indicators characterizing the physical capacity of the children included in them, which is completely of course when it comes to children with mental disabilities. After the completion of the experimental work, stabilization of almost all studied traits is observed, which, however, does not change their zone of stability.

7. The factor structure of the physical development and the physical capacity of the studied children with mental deficits is determined by 4 main factors, which explain a very high percentage (89.04%) of the initial variance of the studied phenomenon:

- the first factor can be identified as "explosive power and overall endurance";
- the second factor is morphological and carries information about the body weight of children, which allows it to be defined as "level of nutrition";
- the third factor can be identified as "flexibility of the body", which is positively influenced by the growth of children;
- the fourth factor determines the place in the factor structure of the "speed of movement on the ground". It is noteworthy that the growth of children has a positive effect on the development of this quality.

8. In summary, it can be argued that the greatest contribution to the physical development and physical capacity of the surveyed 14-18-year-old children with intellectual disabilities from the Republic of Turkey have:

- the explosive force of both the upper and lower limbs;
- body weight;
- flexibility of the spine;
- her height
- the speed of movement in space.

RECOMMENDATIONS:

1. Measures shall be taken, together with parents and other educators, as well as health professionals involved in the education and upbringing of children with mental disabilities, to reduce or increase the bodyweight of affected boys and girls. Great tools for this purpose are exercise and adapted sports and more - the introduction of rational nutrition.
2. When working with children, apply the individual approach very skillfully. This will increase the efficiency of the training work invested by both the children and their trainers and will lead to better end results. This finding must be taken into account by teachers and other professionals working with children from the studied contingent when building curricula and conducting classes with them.
3. Before being proposed for wider use, some adjustments should be made to the tested methodology related to:
 - increasing the duration of the period for specialized exposure with the means of adapted physical activity;
 - increasing the volume of exercises aimed primarily at developing the speed and explosive power of the upper and lower limbs, with muscular efforts both forward and upward, and backward and upward, and more - of general endurance;
 - Inclusion of elements from some adapted sports, suitable for the respective age group.
4. The most significant increase in the general level of physical development and physical capacity of the studied children can be achieved if the emphasis in future work is on developing the explosive power of the upper extremities during muscular efforts both backwards and upwards, and forward and upward. Efforts to develop traits that are relatively high for these children (explosive power of the lower extremities under vertical muscular effort, flexibility of the spine, and general endurance) will not have the same effect on them.
5. In determining the emphasis for individual work with each of the children to be applied the normative base developed by us for assessment of the physical development and physical capacity of children with mental disabilities from the Republic of Turkey.

CONTRIBUTIONS TO THE DISSERTATION

1. A specialized methodology has been developed to improve the physical development and physical capacity of children with mental disabilities with the means of adapted physical activity and mobile games.
2. A sports-pedagogical experiment has been organized and correctly conducted, proving the effectiveness of the adapted methodology tested in practice.
3. The factor structure is revealed and the main factors of the physical capacity of 14-18-year-old children with mental disabilities from the Republic of Turkey are derived.
4. A normative base for control and optimization of the physical capacity of children with mental disabilities from the Republic of Turkey has been developed.

PUBLICATIONS ON THE TOPIC OF THE DISSERTATION

1. **Църова, Р., Гюнеш, Ш.** (2015). Адаптирана физическа активност при деца със затлъстяване. Сб. "30 години Педагогически факултет", ВТУ, Изд. "Фабер", В. Търново, ISBN: 978-619-00-0352-6, стр. 409-416.
2. **Özdemir, N., Güreş, A., Güneş, Ş.** (2016). A development of motor skills in mental disability interfere? (Zihinsel engel motor becerilerin gelişimine de engel mi?). International Journal of Human Sciences, Volume 13, Issue 1, ISSN: 1303-5134, pp. 1997-2006.
3. **Özdemir, N., Güreş, A., Güreş, Ş.** (2011). Oryantring sporcularında aleksitimi ve yalnızlık düzeyinin çeşitli değişkenler açısından incelenmesi. Beden Eğitimi ve Spor Bilimleri Dergisi (Journal of Physical Education and Sport Sciences), Ataturk University, Atabesbd, Volume 13, Number 3, ISSN: 1302-2040, pp. 27-34.