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KINETOPROPHYLAXIS OF ATTITUDE DEFICIENCIES OF PRIMARY SCHOOL STUDENTS THROUGH PHYSIOTHERAPEUTIC METHODS

Specialty 533.04. Physical education, sport, kinetotherapy and recreation

SUMMARY
of the doctoral thesis in educational sciences

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of the State University of Physical Education and Sport

Structure of the Commission for public defence of the doctoral thesis:

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The thesis will take place at 28.10.2022, at 14.00, aud. 105 (small hall of the Senate) in the meeting of the Commission for public support of the doctoral thesis within the State University of Physical Education and Sport from the Republic of Moldova (A. Doga street 22, Chisinau, MD-2024).

The doctoral thesis and the summary can be consulted at the Library of the State University of Physical Education and Sport and on the ANACEC website.

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CONTENT

CONCEPTUAL GUIDELINES OF RESEARCH

The actuality and importance of the topic addressed. The growth and development of children is a continuous and long-lasting process. In this context, the physical development and growth of the child represent a biological state of the cells, tissues, organs and the whole organism. Externally, this process is characterized by increasing the proportions of body parts and changing the functional activity of various organs and organ systems [1, 35].

Along with physical development, mental development is represented as a process of formation of children's cognitive activity, development of senses and will, formation of various personality traits such as: temperament, character, capacity, needs and interests. According to contemporary physiological and psychological research, there was and is a close and direct connection between the physical and mental development of students [6, 10, 19, 37, 38].

The importance of multilateral development is indisputable, that's why great attention is paid to the period of growth and development of the body, since the development of the next stages in human life depends on it. In relation to this, an important point is the possibility of assessing the pace of development, which is evaluated with the help of anthropometric methods [32, 33, 35, 40].

Through these methods, the following are highlighted: • somatometric elements: - body length, - weight, - chest volume, • physiometric elements: - muscle strength; • somatoscopic elements: - the shape of the spine, - the chest, - the sole, - the attitude of Freud's body [33, 35].

Studying the particularities of the child's development and the moment of formation of attitude deficiencies is a current problem and requires a continuous study. These aspects have been researched in several fields, including the field of physical therapy [1, 3, 4, 18, 20].

Physical deficiency represents any deviation from normal in the form and physiological functions of the body, which disturbs the normal growth and harmonious development of the body, changes its external appearance, reduces its physical and even intellectual abilities, as well as the ability to work. These deviations from normal can change the shape of the body and its physical functions completely, or only at the level of some segments and regions [8, 9, 28, 30].

The most common attitude deficiencies encountered in primary school students are platypodia, lordotic back, kyphotic back and scoliosis. Every year the number of children with attitude deficiencies is constantly increasing, having a negative effect on the general state of health [2, 19, 22, 23, 30].

More and more research in the field is dedicated to the search for a dynamic stereotype with the aim of overcoming vicious attitudes in primary school children, which are characterized by certain particularities in growth and development, both of the whole organism and at the level of organ systems. Thus, the normal growth and development of the body is mainly determined and conditioned by both internal and external factors, which exert influences throughout life, but with greater intensity in childhood and adolescence. Physical exercise stimulates growth and development, the components of the locomotor system being trained to a large extent [5, 6, 7, 11, 18].

Physical exercise is a means of kinetoprophylaxis. Kinetoprophylaxis, in turn, is considered as an integral part and branch of medical kinesiology, constituting a unanimously accepted axiom in medical sciences according to which: "it is easier to prevent than to treat". Kinetoprophylaxis studies the process of optimizing the state of health and preventing illness of the human body with the help of physical exercises, but practically impossible without the organization of an adequate locomotor activity, taking into account the fact that attitude deficiencies in primary school students constitute a problem in international context. [36, 39, 41, 44].

Physiotherapy and kinetoprophylaxis are based on own means of work and on means from the field of physical education. Based on these, the important role in physical education is the directing of the child's growth process, in the formation of a healthy body. Special attention is given to physical qualities, aiming at: - the development of the body's physiological capacity, - the harmonious physical development of the child, - the development of motor skills, - the formation of hygienic and sanitary skills, - the correction of some

physical deficiencies; that is, the aim is to optimize the biological development of the human being [25, 28, 29, 31].

Due to the current living conditions, such as sedentarism, children spend more and more time in front of gadgets, which leads to the appearance of various deficiencies, and due to the lack of movement, the body's resistance to effort decreases. For this reason, physical education classes should not be held randomly, but by applying a set of methods and means, created appropriately and able to contribute to stimulating the child's physical development process [20, 21, 22, 23].

All these findings impose a new fundamental, theoretical-methodical research problem, namely the development of a complex system of kinetoprophylaxis of attitude deficiencies. The information presented above served as the basis for researching the problem of kinetoprophylaxis of attitude deficiencies [21, 22, 45, 46].

The **purpose of the research:** Perfecting the process of prevention and recovery of attitude deficiencies in primary school students through the implementation of the experimental program that includes physical means of recovery and kinetoprophylaxis.

Research objectives:

1. Studying relevant bibliography and establishing conceptual benchmarks regarding kinetoprophylaxis and recovery of attitude deficiencies in primary school students.

2. Analysis and generalization of the results of the sociological survey regarding kinetoprophylaxis and the recovery of students' attitude deficiencies in the process of the physical education lesson in school.

3. Assessing the level of psychomotor and physical training of students between the ages of 7 and 11.

4. Development of an Experimental Model, "Kinetoprophylaxis of attitude deficiencies of primary school students".

The **hypothesis of the doctoral thesis** claims that, by developing and implementing the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" for kinetoprophylaxis and the recovery of attitude deficiencies, we will ensure the recovery direction of primary school children with attitude deficiencies.

Synthesis of research methodology and justification of chosen research methods.

The following research methods were used in the doctoral thesis: - Theoretical - analysis of pedagogical and kinetotherapeutic literature regarding the studied problem, analysis of school documentation and students' medical files, synthesis, specification, generalization, systematization, modeling, research and dissemination of pedagogical experience. - Practical - pedagogical observation, conversation, questioning, investigation of parents and children, testing, pedagogical experiment, mathematical-statistical processing of research results, their interpretation and graphic presentation, elaboration of conclusions and recommendations.

The most important results are the development of the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students". At the same time, the necessity and efficiency of using directed and specialized means of physical education in the recovery and kinetoprophylaxis of attitude deficiencies in primary school children is demonstrated, as well as in their social rehabilitation during the recovery period. The decisive role of the application of specialized means in obtaining effective results and in a shorter time interval is demonstrated. The necessity of the teacher-student-parent educational partnership in the process of recovery and prevention of attitude deficiencies in primary school children is established.

The important scientific problem. The important scientific problem solved consists in ensuring a direction of recovery in the physical education of primary school children with attitude deficiencies, by developing and implementing the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" for the recovery and kinetoprophylaxis of attitude deficiencies.

The volume and structure of the thesis. The thesis was structured in the following sections: introduction, three chapters, conclusions and practical-methodical recommendations, bibliography and appendices. The bibliography consists of 182 bibliographic sources, 103 text pages of base, 23 figures, 12 tables.

Summary of thesis chapters. Chapter 1 of the thesis includes the analysis and generalization of specialized literature related to the concept and types of attitude deficiencies, anatomy, physiology and

biomechanics of the spine. This information is necessary in the context of the research initiated and carried out by us. Knowledge of the latest innovations helps us to ensure maximum coherence of all the materials selected for the elaboration of this work, which contributes to widening the informational space dedicated to the health of the growing generation. Elements of etiology, pathogenesis and the clinic of attitude deficiencies are also exposed. An impressive number of scholars have studied the problem of the emergence and development of attitude deficiencies. Scientific works with clear informational notes on the causes of physical deficiencies and the factors that trigger them have been developed and edited. Special attention is paid to the methods and practical procedures used at the moment to recover and prevent the appearance of attitude deficiencies in primary school students. In the present work, the best performing methods and means of work in physical therapy, used both in the country and abroad, were selected and analyzed. Giving kinetotherapeutic help to primary school students, I noticed the reasons for such a large number of children with physical deficiencies. At the same time, kinetoprophylaxis was analyzed as a practical part of children's daily activities that can be used to prevent physical deficiencies. In this context, I have exposed the most obvious characteristics and foundations of the discipline in question through the prism of valuable works in the field.

The basic principles in the growth and development of the child between the ages of 7 and 11 and their psychomotor characteristics are exposed. In the development of the Experimental Model, a primary principle was respected, that of the gradation and dosage of physical effort in relation to the age of the children in the study group. At the same time, the particularities of conducting physical education lessons with primary school students and those methodical shortcomings found by us, on which we worked intensively, were exposed. The conclusions of the first chapter reflect the essence of the exposed materials.

In Chapter 2 the stages of research organization are reflected and we can mention that our study was carried out in four successive stages. Each stage had its well-defined objectives, which were successfully achieved. At the same time, the research methods applied in the given study were selected and applied strictly. An important point in the given study was the analysis of the survey results. The analysis of the sociological survey conducted among primary school teachers, physical education teachers who spend lessons with primary school students, parents and directly primary school students is presented, which in turn approaches a clear vision of the situation in the researched field. This chapter also includes an Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" synthesized and elaborated based on the study of relevant literature, the effectiveness of which was verified within the pedagogical study.

In Chapter 3, the comparative analysis of research data and the implementation of research methods through the pedagogical study are shown. The ways of organizing and conducting the pedagogical experiment are presented, with the aim of verifying the effectiveness of the Experimental Model in the physical education of students with attitude deficiencies. In the same way, the author argued the effectiveness of the application of the kinetotherapeutic program for the recovery of deficiencies by analyzing the results obtained. The results were presented in several tables and graphs for a clearer visibility of the research performance.

In **general conclusions and recommendations**, the best scientific results were highlighted that contributed to the resolution of the initially established objectives, as well as to the confirmation of the paper's hypothesis.

THESIS CONTENT

The first chapter of the paper, "Theoretical argumentation of kinetoprophylaxis for attitude deficiencies in primary cycle students", presents the aspects of the psychomortic development of primary school students, the analysis of the system of theoretical and practical knowledge in the field of physical therapy for primary school students, kinetoprophylaxis based on the means medical kinesiology related to the physical and health conditions of the students.

Each age has its laws of growth and development, thus the age between 7 - 11 years is considered by some authors to be the end of childhood and a primary beginning of puberty. The problems of this stage are related to school adaptation [24, 36, 39, 41].

The primary cycle is a short but very intense period, because children in this period of life go through special moments and the most important event is that of entering the first grade or grade zero for

some schools, and the mental and physical development of the students is totally influenced by this new factor [18, 19].

After the analysis of several scientific works by some authors, we can mention that the main purpose of the physical education lesson is to form the moral qualities of students, to strengthen children's health, to develop harmoniously the body and to improve motor skills, to as well as restoring physical and mental strength [11, 14, 18].

In the opinion of some scholars, the primary role of the physical education lesson is that of directing the process of the student's growth and the formation of a healthy body. First of all, a special role is relevantly placed on the strengthening of physical qualities, aiming at the optimal development of the student's physiological capacities. Some of the important qualities are the motor ones, namely: elasticity, mobility, suppleness and coordination.

If we talk about the development of physical qualities, namely: skill, strength, resistance, speed, we all know that they are formed from a very young age and then achieve both qualitative and quantitative performances [18, 31, 33].

Attitude deficiencies are considered by specialists in the field Antonescu D. [8, 9]; Obraşcu C. [34]; Brănişteanu D. [20] deviations from the correct human attitude established by development standards, in which a basic index is the symmetrical position of the body parts in relation to the spine.

Authors Baciu C. [11], Balint N.A. [12]; Zavalişca A. [35] are of the opinion that all the changes that occur in the locomotor system, but especially at the level of the spine, originate in three stages in the deformation of the correct alignment of the body. The first stage is characterized by localized changes at the level of the muscles, when contracting and relaxing a group of muscles, however, the physiological curves take on the normal form. In the second stage, changes occur at the level of muscles and ligaments, the physiological curves normalize only when the spine is extended. This stage can also be called the deformation fixation stage. The third stage is characterized by changes in the skeleton, and physiological curves do not normalize even with skeletal expansion.

Analyzing the mechanism of appearance and action of attitude defects, it was found that the common factor of their appearance is the incorrect, predominantly static position of the body, in which some and the same muscles and ligaments, as well as some and the same portions of the spine are subjected a strong stretch, or on the contrary, an excessive compression. Thus, the listed causes cause the appearance of pathological curves of the spine located differently and oriented either laterally or in the frontal plane. It should be mentioned that certain causes influence more in the period of tender childhood, others in the school period, others in the period of maturity, but all together can be the result of the forced, incorrect position of the child, both in the work process and in the rest [20, 30, 42, 43].

The system of theoretical knowledge and practical activities in the field of physical therapy are closely connected with those of physical education, which in turn are directed by the documentation of the Ministry of Education and Research of the Republic of Moldova, through regulations, orders, decisions based on the changing needs of the instructional process - educational for children of different ages. The school, in turn, modifies the disciplinary curriculum to adjust all the necessary changes.

At the same time, kinetotherapy by its essence, (Kineto - movement and therapy - treatment), differs from physical education, namely by that essential moment called illness or condition, in which it is directly involved, using movement, physical exercise as an independent therapeutic tool. The possibility to act in different situations related to human health, allows us to carry out the given research and to put forward different hypotheses, to develop recovery models operations based on specialized kinetotherapeutic means, using their own professional skills [2, 28].

The most common treatment is non-surgical and depends on the type of deformity. Physiotherapy presents a wide spectrum of methods, techniques and means of work, which are successfully used for both prophylactic and therapeutic purposes. The history of physical therapy has very deep roots, which tell us about the indispensability of human life and movement.

At the present time, intellectual and technical progress allows us to perfect the mechanisms of kinetotherapeutic action in attitude deficiencies through the following objectives:

- improving the position of the spine;
- increasing the flexibility of the spine;
- increase in muscle strength, both abdominal and paravertebral;
- restoring correct breathing [2, 30].

Physiotherapy for children will start with the correct explanation of the element and with a slow execution, after a few trainings the pace and duration will increase. It will alternately choose the number of repetitions and change the initial positions, in this way we will have a real intensification of the metabolism.

In addition to the fact that therapy sessions can prevent certain ailments, we gain a lot of energy, we get a pleasant appearance, a positive state of mind [13, 15, 27].

Examining the school program that emphasizes the didactic content, we understand that the game remains one of the best methods of working within the lesson, regardless of the form of its organization. In this context, the lesson plan remains to capture the motor and mental activity of children, and for this, team work or separate groups are often organized for competition in the form of a sports competition.

The importance of the physical education lesson is enormous, and indisputable, but still the large number of children with attitude deficiencies do not present the idea and understanding of the fact that things are not so good, and require some interventions by modifying the school program, by proposing and implementing some models, a new complex of prophylactic exercises, which we also tried to do in the present paper [11, 18, 33].

The role of kinetoprophylaxis regarding children's health is to ensure the most optimal and good conditions in which to grow and develop normally. The prevention of attitude deficiencies from an early age is also emphasized, as well as the prevention of other diseases that can negatively influence the normal development of children [12, 36].

Reflecting on the content of the materials described in the works of some, namely on the multiple positive influences of all physical exercises as a whole both in physical therapy and in kinetoprophylaxis, we understand that there are a lot of applications with the purpose of treatment or with the purpose of prevention. Being applied to a healthy person, it is called primary kinetoprophylaxis, and is intended to prevent diseases for the body, and directly to increase resistance to pathogenic agents from the external environment. Also, they aim to strengthen the state of health to the highest possible level [14, 16, 17, 26].

Chapter 1 ends with the report on the need to develop and implement an experimental Program for the recovery and kinetoprophylaxis of attitude deficiencies.

In chapter 2, “Methodological and experimental determination of the application of kinetoprophylaxis in attitude deficiencies in primary cycle students”, the scientific research methodology, the organization of the research, the analysis of the results of the sociological survey regarding the problem of kinetoprophylaxis of attitude deficiencies in primary school students in the physical education process are presented.

At the basis of the explanation of scientific research there are many practical methods. In order to achieve the objectives of unfolding and explaining at length, we have chosen the following important methods:

1. The method of studying relevant literature and activity documents;
2. Method of pedagogical observation;
3. The sociological survey method;
4. Test method;
5. Statistical - mathematical data processing methods;
6. Method of pedagogical study;
7. The graphic method.

Organization of the research. The basic and preparatory researches on the above-mentioned theme were organized during the years 2016 - 2020, in four successive stages.

In the first stage (2016 - 2017), several actions were taken to carry out this study, namely the analysis of the methodological-scientific and relevant literature on the research topic. This fact allowed us to study the state of the problem in question, including the anatomical, physiological and biomechanic aspects of the spine, as well as to highlight the particularities of the development of children in the primary cycle. The characteristic features of attitude deficiencies, their causes and kinetoprophylaxis methods were identified. At the same time, the existing problems in the researched field were highlighted and the methods of kinetoprophylaxis and physical recovery of students with attitude deficiencies in the primary cycle were determined. The analysis and generalization of relevant literature allowed us to formulate the purpose,

objectives and hypothesis of the research. In this stage, the author used the method of analysis of relevant literature, the method of conversation, observation, anamnesis or autobiographical interview.

In the second stage (2017 - 2018), the organizational-methodical work of forming the conditions for setting up the basic pedagogical study was carried out, the training programs of the researched student groups were modeled. The results of the study of the methodological and scientific literature, the pedagogical observations, the analysis of the statistical data of the Ministry of Health regarding children with attitude deficiencies, as well as the analysis of the particularities of the physical education school curriculum for primary education and of the program for students of grades I - IV, allowed us to develop an experimental model of attitude deficiency prophylaxis. The factors determining the functional state of the locomotor apparatus of students from the "Pro Succes" and Minerva Theoretical High School in the municipality of Chisinau were studied. At the same time, through the somatoscopic method and the anthropometric method, we evaluated the general attitude of the body and the segmental posture of the spine in an impressive number of 390 primary school students.

We must mention that the evaluation of the students was carried out by the somatoscopic and anthropometric method, using the anthropometric framework, with the presence of the institution's medical examiner and the bilateral fixation of the obtained data. Following the analysis of the obtained results, we find that the number of attitude deficiencies increases with age, thus, out of the number of 93 students studying in the 1st grade, 31 students or 7.94%, have deviations from the normal body position, among 18 of them are girls and constitute 4.61% and 13 are boys, which constitute 3.33%, while in the second grade, out of 98 students investigated, 36 students have attitude deficiencies or 9.23% of the number total of evaluated students, 21 of them are girls and represent 5.38% and 15 are boys, representing 3.84%.

From the students of the 3rd grade, in number of 99 children, the following results were proven: 47 people or 12.05% have deviations from the correct attitude, of them 24 are girls and constitute 6.15% and 23 are boys, which is 5.89%. In the 4th grade, 100 students were examined, 55 students or 14.10% show deviations from the correct attitude, of them there are 32 girls, representing 8.20% and 23 boys, representing 5.89% from the total number of evaluated children.

At the same time, we notice that the number of children in class I - who have attitude deficiencies compared to those in class IV - is much smaller, the difference being 24 students, which constitutes 7.94% of the total number of 390 students investigate. This fact led us to select for the basic scientific study the students of grades IV.

Table 1 and figure 1 present the most important scientific results of finding the presence of attitude deficiencies in large numbers in primary school students.

Table 1. Distribution by age of students with attitude deficiencies (n=390)

Class	Attitude deficiencies (%)
First class	7,94
Second class	9,23
Third class	12,05
Fourth class	14,10

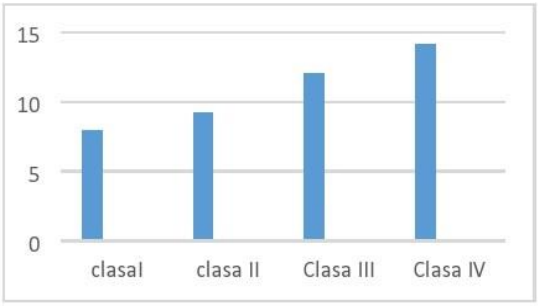

Fig. 1. Percentage of children with attitude deficiencies

At the same time, from the total number of students with deviations from the correct attitude in the 4th grade, the number of girls prevails over the number of boys, which led us to form the experimental group specifically from the 4th grade students.

Analyzing the results of the confirmatory experiment, we conclude the following: - Attitude deficiencies can be congenital and occur less often, but usually, in most cases, they can be acquired during life. The age period that corresponds to the primary cycle is very favorable for the acquisition and installation of attitude deficiencies, which at first appear as a simple resting position, which later becomes a habit, and then a health problem, which requires additional physical therapy efforts.

The third stage (2018 - 2019) included the actual scientific-didactic study, which lasted from September to May. This stage was conventionally divided into two stages: initial and final. In the initial stage, I selected the subjects and created my study group. Also at this stage, a preliminary preparation of the study group was

made, the materials and tools necessary for evaluation and testing were selected. The basic experiment was carried out through the criteria of physical development, psychomotor training and specialized tests. The students were initially examined, measured and tested with the recording of the obtained data. These data constituted the decision-making basis for establishing the objectives, means and indications in the recovery process.

Characterization of the experimental batch. For this study, we followed a group of 30 students from grades IV. The clinical evolution of the students in this group was observed between September and May (2016 - 2020). Criteria for including students in this batch: - age between 9 - 10 years; - the cooperation of parents, teachers and students. The experimental group was divided into two experimental groups: the control group and the experimental group, each group having 15 students (girls). The sport hall was equipped as follows: fixed stairs; bars, parallel walking bars; gymnastic benches; couches; mattresses and devices necessary to facilitate student movements; dumbbells and sandbags of different weights; mirrors; sink; and so on.

In accordance with the tasks of the research, in the basic pedagogical experiment, the influence and effectiveness of the means and methods of the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" on the physical development and motor skills of the students in the experimental group were verified. Classes took place outside of the core schedule. The students in the control group did exercises according to the traditional method. They performed the exercises according to the curricular requirements and within the limits of their own capacities. At the beginning and at the end of the pedagogical study, tests of physical development, psychomotor training, as well as specialized testing of these students were carried out. As a result of the pedagogical study, a comparative analysis of the indices of physical development, motor training, as well as the results of the specialized tests of the students from the IV - classes, at the initial, final stage and in their dynamics, was carried out.

The fourth stage - evaluation, during which the analysis and generalization of the research results was carried out, the obtained results were interpreted. The obtained data were subjected to mathematical-statistical analysis. At the same time, the author elaborated and outlined the methodical-practical recommendations and conclusions in the researched field.

In order to identify the problems that lead to the appearance of attitude deficiencies, a satisfaction evaluation questionnaire of teachers, students and parents of primary school students was carried out.

In order to correctly and multidimensionally achieve the proposed objectives, the survey was carried out under a triple aspect: through the prism of the opinions of the parents of students from primary school education institutions; of physical education teachers and, directly, of students.

231 parents of students from the primary classes of the "Pro Succes" and Minerva Theoretical High School in Chişinău were subjected to the investigation.

As a result of the survey, it was found that the majority of parents are informed about the knowledge of the term physical therapy, namely 81% of them answered "yes" and 19% "no". These results are reflected in Figure 2.

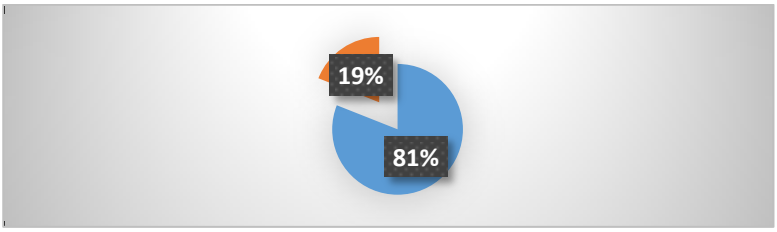

Fig. 2. Graphic representation of the results of the parents' survey regarding the question "Do I know the term physical therapy?"

When asked if they believe that physical exercises are a beneficial aid to children's health, 99% of parents answered "yes" and only 1% answered "no".

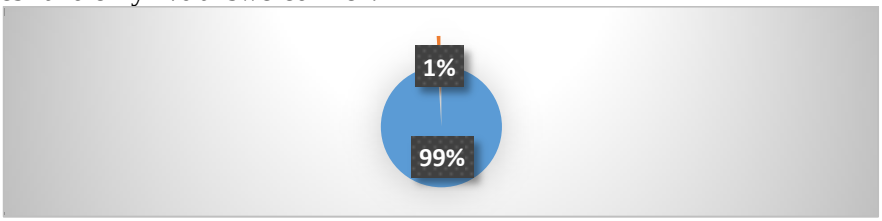

Fig. 3. Graphic representation of the results of the parents' survey regarding the question: "Do they think that physical exercises are a beneficial aid to children's health?"

To the question regarding the necessity of a physiotherapist in the school, 99% of those surveyed answered positively, that is, they want a physiotherapist to work with their children and 1% of them answered no, because they consider that the physical education teacher is enough.

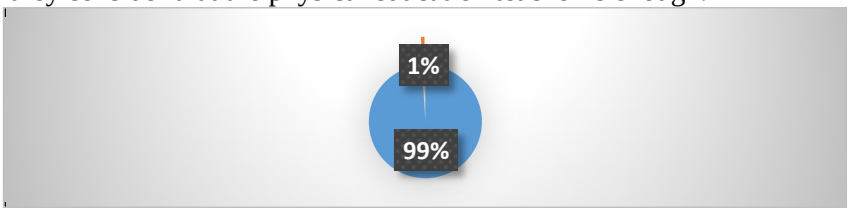

Fig. 4. Graphic representation of the results of the parents' survey regarding the question: "If they want to activate a physiotherapist in the school?"

Following the sociological survey conducted among the parents of primary school students of the "Pro Succes" Theoretical High School, Chisinau municipality, 129 Aşhabad str., we highlighted the following proposals. For a better account of them, we will use the tabular method.

Table 2. Parents' proposals for improving children's health status

Parents' proposals for improving children's health	%
They want a physical therapy specialist to work in the school	99
They want the children's nutrition to be guided by a correct diet	97
They want the child to practice a physical activity outside of physical education classe	67
They want their children to be healthy	100

The survey carried out among physical culture teachers had as its objectives the identification of those causes that lead to the appearance of deficiencies in primary school students. For this purpose, 117 teachers from Chisinau and the whole country were questioned.

Thus, to the question of whether students are involved in sports outside of physical education lessons, 51% of the investigated teachers answered positively and 49% negatively.

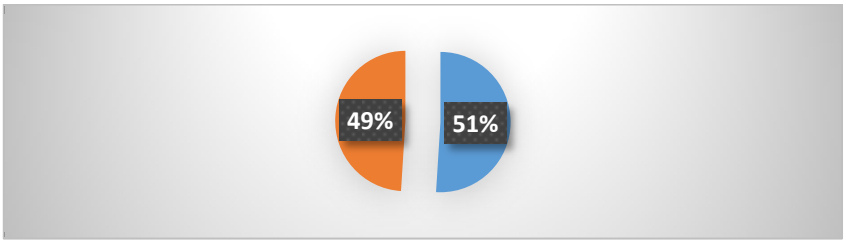

Fig. 5. Graphical representation of the results of the physical education teachers' survey regarding the question: "Do students do sports outside of lessons?"

Regarding knowledge of the term physical therapy, 99% of the respondents answered that they know this term and only 1% do not know what physical therapy is.

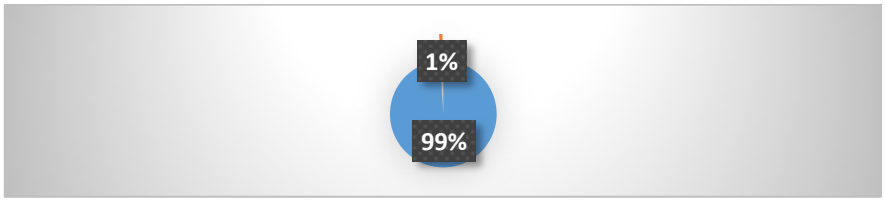

Fig. 6. Graphical representation of the results of the physical education teachers' survey regarding the knowledge of the term physical therapy

When asked whether physical education essentially influences the state of health in life dynamics, the answer was very expressive, 100% of respondents are convinced that physical exercise is an important component throughout life.

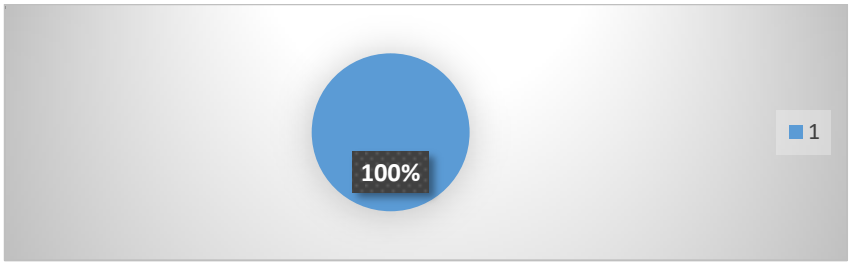

Fig. 7. Graphical representation of the results of the physical education teachers' survey regarding the question: "Does physical education essentially influence the state of health in the dynamics of life?"

Following the sociological survey carried out among physical education teachers, we highlighted the following proposals. For a better account of them, we will use the tabular method.

Table 3 Teachers' proposals for improving students' health status

Teachers' proposals for improving students' health status	**Opinions %**
The school activity of a physiotherapist	99
The need to occupy students with sports outside of lessons	51
Better working conditions for the physical education teacher	100
A more constructive collaboration between teacher and parent	90
The number of students should be smaller in the classes	90

Regarding the sociological survey carried out among the students, it had as its objectives the perception by them of the necessity of the physical education lesson, to establish the level of information of the students about the correct attitude of the body, about attitude deficiencies and causes of the appearance of them. At the same time, the children were asked for proposals to improve their health.

As part of the questionnaire to assess the satisfaction of primary school students, 341 students from the primary classes of the "Pro Succes" Theoretical High School in the municipality of Chișinău, 129 Așhabad str., were surveyed.

A large part of the number of children tested, 99% answered affirmatively to the question of whether they know what it means to be a healthy child and a percentage do not know what it means to be a healthy child.

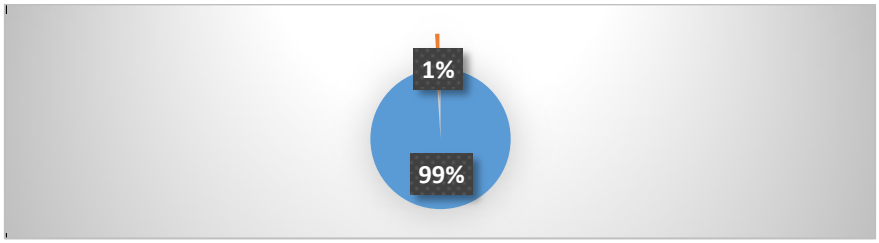

Fig. 8. Graphic representation of the results of the survey of primary school students regarding the question: "If I know what it means to be a healthy child?"

Although 69% of those surveyed confirmed that they do not practice any sports, 99% of them know why it is good to practice physical exercises and only 1% do not.

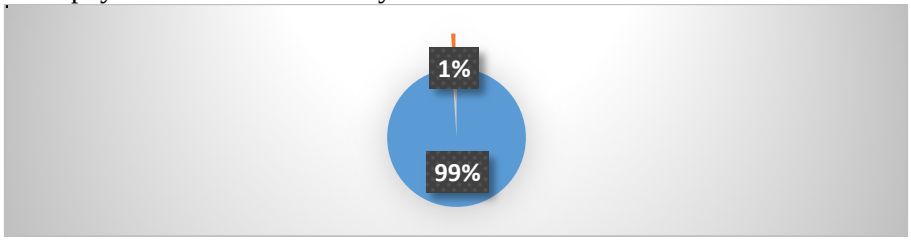

Fig. 9. Graphical representation of the results of the survey of primary school students regarding the question: "If I know why it is good to practice physical exercises?"

The answer to the question what is a healthy way of life is also eloquent, to which 98% of the students answered that they know what a healthy way of life is, and 2% do not know.

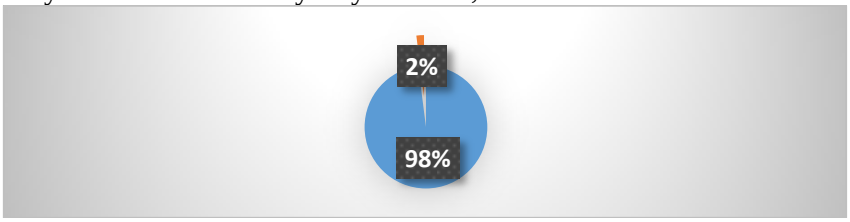

Fig. 10. Graphical representation of the results of the survey of primary school students regarding the question: "If I know, do I know what a healthy way of life is?"

Following the sociological survey, the opinions of the students were also taken into account, which highlighted the following proposals, which I have presented in the following table.

Table 4. The most essential proposals of students for improving health

Student proposals for improving health	**%**
They want a more efficient gym with modern accessories that would allow them to monitor their body's functional data	90
To deal with sports outside of physical education lessons	31
They want a sport of their choice on their days off (tennis, volleyball, basketball, football, swimming)	80
The physical education lesson should be longer than 45 min.	99
They want to spend more time outdoors	91
They want the physical education lesson to be 3 times a week	90
They want to grow up healthy in a modern society	100

To carry out the given study, we developed the experimental model "Kinetoprophylaxis of attitude deficiencies of primary school students".

The name: Experimental program "Kinetoprophylaxis of attitude deficiencies of primary school students".

Objectives:

1. Strengthening the health of fourth grade students from the primary cycle through specialized physical means.
2. Educating the spirit of discipline and conscious attitude towards maintaining a correct body position.
3. The formation of constant skills for practicing physical exercises, especially those that maintain the suppleness and mobility of the spine.
4. Timely development of locomotor skills in IVth grade children.

The structure and continuity of the lesson

In the context of our research, the physical education lesson for children of the 4th grades lasts 45 minutes, in the regime of 2 lessons per week.

According to the recommendation of specialists in the field, the physical education lesson for 4th grade children lasts 45 minutes with 2 lessons per week.

According to the structure, each lesson consists of:

- the preparatory part (7-10 minutes), has, in particular, organizational importance and includes exercises that mobilize the students' attention, creating favorable conditions for the further activation of the neuromuscular apparatus and which orient the students to a correct positioning, as well as the preparation of the students' body in this sense;
- the basic part (27-30 minutes), is directed towards solving two basic tasks: creating favorable physiological conditions for restoring the body's normal posture; recovery of existing defects and consolidation of the correct position of the body;

- the final part (5-6 minutes) is aimed at ensuring a gradual transition to the usual school activity.

Based on the scheduling of 2 lessons per week, the number of physical education hours for 4th grade students should total 68 hours. The distribution of hours according to the type of activities can be as follows:

- learning lessons;
- lessons to consolidate the material;
- motor skills improvement lessons.

Total 68 hours.

The types of lessons are divided into 3 quarters:

I. September - November;

II. December - February;

III. March-May.

The thematic distribution of the material in the program, taking into account the trimesters of the school cycle, is presented in Table 5, which reflects the interdependence between the types of lessons (learning, reinforcing the material, improving motor skills) and basic themes (developing skills motor and psychomotor skills, the formation of the sense of rhythm, the education of corrective movement).

Table 5. Model of quarterly distribution of hours in the discipline "Physical Education" for students from the fourth grade, primary cycle

The content of the program material	***Quarters and number of lessons***		
	I	II	III
1. Complex of special exercises for the preparatory part of the lesson:			
1.1. Aligning in a row respecting a certain distance from each other.	1 – 20	21 – 45	46 – 68
1.2. Walking exercises. Normal walking, with the knees raised, with the back forward, on the toes. Walking with a stop after the signal, with the correct positioning of the lower limbs.	1 – 20	21 – 45	46 – 68
1.3. Explaining the correct supine position using this initial straight position for the following exercises: a) raising the head; b) flexion of the lower limbs in the knee and coxofemoral joints; c) teaching pectoral and abdominal breathing with hand control.	1 – 20	21 – 45	46 – 68
1.4. Explanation of the correct position in the prone position, using this initial straight position for the following exercises: a) hands forward, to the sides, behind, raising them a little in the type of execution of the movements; b) the same movement with resistance to 3-5 movements; c) the same movement, accompanied by the bending and unbending of the fingers during resistance.	1 – 20	21 – 45	46 – 68
1.5. Special exercises for the spine	1 – 20	21 – 45	46 – 68
2. Special exercises for the basic part of the lesson:			
2.1. Development of motor capacities of the spine: - Hanging on the wall bars – explaining the correct initial position and possible mistakes; - Hanging on tiptoes, knees bent, turning the body to the right or left. - Explanation of the correct quadrupedal position and horizontal crawling.	1 – 8	21 – 31	
	9 – 16	32 – 40	
	17 – 20	41 – 44	
2.2. Elements from sports games with a specialized character for the basic part of the lesson (complex training of coordination skills through games, with a predominant effort on the spine): - the basketball game; - the game "ball in the air"; - the game of "catch" with flexion of the trunk	I	II	III
	3 – 10	21 – 30	45 – 52
	11 – 15	31 – 40	53 – 60
	16 – 19	41 – 43	61 – 67

2.3. Control lessons	20	44	68
3. Complex of actions and special exercises for the concluding part of the lesson:			
3.1. Relaxation of the body:	in all lessons		
- exercises on the spot and in motion with a soothing character;	in all lessons		
- lesson totals;	in all lessons		
- homework assignment.			
1. The model complex of specialized exercises no. 1.	1 – 19		
2. The model complex of specialized exercises no. 2.	21 – 43		
3. The model complex of specialized exercises no. 3.	45 – 67		

The experimental model "Kinetoprophylaxis of the attitude deficiencies of primary school students" developed for the physical education of students of the IV class of the primary cycle that uses corrective gymnastics exercises, was tested in the framework of the basic pedagogical study to demonstrate the effectiveness of the corrective measures in order to achieve the predetermined performance.

In Chapter 3, ”Experimental argumentation of the effectiveness of kinetoprophylactic means of recovery of physical deficiencies in primary class students”, aiming at the objectives of the research, in the preliminary research, the version of the model specialized in physical education for students of classes IV, with attitude deficiencies was developed and presented. The Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" that we proposed, passed the experimental approval in the basic research process and during their realization was corrected and perfected from the point of view of the application of general means and methods and specialized physical education. The entire system of kinetoprophylaxis lessons must be based on the maximum mobilization of children's mobility and on educating their conscious attitude towards meeting the requirements. This fact is necessary so that in the long process of learning and systematic training, persistent positive results can be obtained in restoring the correct posture of the body.

For a more explicit rendering of the informative content of the obtained results, we used the tabular method. Thus, in Table 6 we presented the comparative analysis of the initial indices of the physical development of students in grades IV.

Following the results obtained, we can mention the fact that the weight of the girls is approximate. In the control group, following the measurements, it was found that the girls weigh approximately 40.00 kg, and in the study group, the result is 39.50 kg, which proves the homogeneity of the researched groups.

Table 6. Comparative analysis of the initial indices of the physical development of students in grades IV

No.	**Tests**	**Control group (n = 15)**	**Experimental group (n = 15)**	**T**	**P**
		$\overline{X}$ **± m**	$\overline{X}$ **± m**		
1.	Height (cm)	138,50 ± 1,73	138,00 ± 1,72	0,20	> 0,05
2.	Weight (kg)	40,00 ± 0,86	39,50 ± 0,85	0,41	> 0,05
3.	Chest Excursion (cm)	4,70 ± 0,19	4,50 ± 0,18	0,77	> 0,05
4.	Chest circumference at rest (cm)	69,75 ± 1,64	69,00 ± 1,62	0,33	> 0,05
5.	Pignet index (level of physical development) points	27,00 weak	27,00 weak	-	-
6.	Erismann index (conventional units)	- 4,25	- 4,55	-	-

Note: P – 0,05; 0,01; 0,001;
t = 2,048; 2,763; 3,674

At the same time, the Pignet index showed a poor level of development, namely the level presented by the criterion - (Ip = 27.00 points), both in the control group and in the experimental group. At the same time, the Erisman index in the control group is - (Ie=4.25 points), and in the experimental group - (Ie = 4.55 points), which denotes insignificant statistical differences.

So, as we can see in Table 6, after performing the initial testing of students in grades IV, it was found that the results are practically equal, and their differences are statistically insignificant, where (P>0.05).

Table 7 shows the dynamics of the indicators of physical development monitored in the tests performed in the experimental and control groups by the students of grades IV. We can see that the results of the students in the control group from the beginning of the study to the end of it suffered certain positive changes in the dynamics of physical development.

Table 7. Comparative analysis and dynamics of physical development indices of female students in the control and experimental groups during the pedagogical study

No	Tests	Control group (n=15)		T	P	Experimental group (n = 15)		T	P
		Initial	Final			Initial	Final		
		$\overline{X}$ ± m	$\overline{X}$ ± m			$\overline{X}$ ± m	$\overline{X}$ ± m		
1.	Height (cm)	138,50±1,73	143,00±1,64	2,83	<0,05	138,00±1,72	144,00±1,60	3,82	<0,01
2.	Weight (kg)	40,00±0,86	42,50±0,85	3,08	<0,01	39,50±0,85	41,00±0,80	1,92	>0,05
3.	Chest excursion (cm)	4,70±0,19	5,07±0,17	2,17	<0,05	4,50± 0,18	5,55±0,15	6,56	<0,001
4.	Chest circumference at rest (cm)	69,75±1,64	73,25±1,62	2,27	<0,05	69,00±1,62	79,25±1,56	6,83	<0,001
5.	Pignet index (level of physical development) points	27,00 Weak	26,00 Weak	-	-	27,00 Weak	23,00 Medium	-	-
6.	Erismann index (conventional units)	- 4,25	- 3,5	-	-	- 5,25	+3,00	-	-

Note: P – 0,05 0,01 0,001;
t = 2,145 2,977 4,140

At the same time, the characteristic indices of the physical development of the students in the study group show us a more pronounced progress, presenting statistically significant results, where P<0.05, compared to the students in the control group. The only exceptions are the anthropometric indices of height and weight of the students under research. These results can be achieved due to the physiological growth of the child. In our opinion, the obtained results are possible due to the fact that the content of the physical education program for primary school students does not have the expected effect on their physical development. This is also demonstrated by the tests that reflect the general state of the locomotor apparatus, namely the Pignet and Erismann Tests, which show a poor level of general physical development.

At the same time, in Table 7 we observe a positive increase in the results for each test applied in the study group during the pedagogical study.

Analyzing the data in the table, a series of improvements in the parameters tested in the control group is highlighted. These, in most cases, are truthful (P<0.05). The positive changes in the indices probably took place, both due to the physiological development of the children's bodies, and through the influence of the applied means, namely general physical exercises in physical education lessons.

We mention that the Pignet index, being a qualitative index, reflects the gradual transition of the girls in the study group from the poor level (Ip = 27 points) to a better qualitative level (average: Ip = 23 points), proportional to the development and resistance of the body. In the control group, the female students presented a weaker level of physical development and it remained practically unchanged, with only one point and this being a weak criterion.

To confirm the results of the evaluations according to the Pignet method, we also selected the Erismann method, which, in the same way, mirrors the physical development of the students in

the study group and the dynamics of the index that reflects the modeling of the narrow-shaped chest (Ie = - 5.25) in a chest relatively normal configuration (Ie = +3.00). While the negative values of the Erismann index - 5.25 demonstrate the fact that the students in the control group still have some narrowing of the chest, a parameter that at the end of the study improved a little, but represents negative values Ie = (-3.50) .

Table 8 shows the final indicators of the physical development of the students subjected to the study, and their evolution during the study was clearly favorable in the study group (P<0.05), except for height and weight.

So, the aforementioned demonstrates that the means and methods of physical education applied during the pedagogical study did not generate any negative effect on the physical and functional development of the body of the children included in the study.

More than that, they had clearly beneficial effects, especially in the experimental group.

Table 8. Comparative analysis of the final indices of the physical development of IV grade students in the final stage of the pedagogical study

No.	Tests	Control group (n = 15)	Experimental group (n = 15)	T	P
		$\overline{X}$ ± m	$\overline{X}$ ± m		
1.	Height (cm)	143,00±1,64	144,00±1,60	0,43	> 0,05
2.	Weight (kg)	42,50±0,85	41,00±0,80	1,28	> 0,05
3.	Chest Excursion (cm)	5,07±0,17	5,55±0,15	2,09	<0,05
4.	Chest circumference at rest (cm)	73,25±1,62	79,25±1,56	2,66	<0,05
5.	Pignet index (level of physical development) points	26,00 slab	23,00 mediu	-	-
6.	Erismann index (conventional units)	- 3,50	+3,00	-	-

Note: P – 0,05; 0,01; 0,001;
t =2,048; 2,763; 3,674

The most important results for the study group are presented by the test: Excursion of the ribcage, which changed visibly during the study period reaching from 4.50 ± 0.18 at the beginning to 5.55 ± 0.15 at the end, where P <0.001, and the Circumference of the chest at rest, where initially it was 69.00 ± 1.62, and at the end 79.25 ± 1.56, for P<0.001.

Thus, by ordering the specialized means included in the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" it was possible to improve considerably the indicators of the physical and functional development of the students in the experimental group compared to those in the control group.

This fact demonstrates both the experimental dynamics and the final indices of all the evaluated tests, including the Pignet and Erisman indices.

In accordance with the tasks of the research, an analysis of the motor training indices of students from grades IV - a in the experimental group was carried out. The parameters that were evaluated in the students of the experimental group were compared in the pedagogical research with those of the students in the control group, who did the physical education lessons according to the traditional method. The students performed the exercises within the limits of their own abilities.

The experimental group worked according to the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students", specially developed in this regard. Classes took place outside of the core schedule.

The results obtained from the pedagogical study are reflected in Tables 9, 10 and 11, and were aimed at assessing the level of psychomotor training of the researched groups of girls.

Table 9. Comparative analysis of the initial indices regarding the physical training of students in grades IV

No.	Psychomotor tests	Control group (n = 15)	Experimental group (n = 15)	T	P
		$\overline{X} \pm m$	$\overline{X} \pm m$		
1.	Running 30m (sec)	6,40±0,14	6,31±0,13	0,42	> 0,05
2.	Standing long jump (cm)	150,50±2,63	151,00±2,62	0,13	> 0,05
3.	Steeplechase over a distance of 2x15m between the hurdles (sec)	11,50±0,22	11,45±0,21	0,17	> 0,05
4.	Throwing the 2 kg medicine ball (cm)	295,00±6,70	298,00±6,68	0,32	> 0,05
5.	Push-ups (no. of times)	4,90±0,38	4,80±0,38	0,18	> 0,05
6.	Cooper test 3 min (m)	320,00±7,33	325,00±7,34	0,48	> 0,05

Note: P – 0,05; 0,01; 0,001;
t = 2,048; 2,763; 3,674.

The level of psychomotor training was checked according to the following tests:

- the 30-meter run: reflected the speed of cyclic motor actions;
- standing long jump: appreciates the manifestations of strength and speed;
- sprinting over a distance of 2 x 15 meters between the hurdles: speed and coordination abilities;
- throwing the 2 kg medicine ball: strength and coordination abilities;
- hanging from the bar: static resistance of the hands;
- push-ups: attest to the strength of the hands;
- Cooper test: general resistance capacity in cyclic movements.

Thus, Table 9 presents the comparative analysis of the initial indices for all the tests studied in the pedagogical study. As can be seen from the table, at the beginning of the pedagogical study, the control group and the experimental group did not present true differences in all the examined tests, which proves their relatively homogeneous character for P>0.05.

Table 10 shows the dynamics of the indices of the tests carried out during the pedagogical study in the control and experimental groups. We can mention the following results of the cross-country running test over a distance of 2x15 m between the hurdles, where we find that both the students from the control group (11.28±0.20) and those from the study group (10.71±0 ,18), at the final evaluation they presented positive results compared to the initial evaluation. However, in the control group the results obtained are statistically insignificant for P>0.05, while in the experimental group the values obtained are significant, where P < 0.01. We believe that these results were obtained due to the content of the Experimental Model elaborated and implemented by us in the research process.

As a result of the research, it was proven that the final indices for all the studied tests underwent changes in a positive sense, even if for the majority no statistically significant differences where P>0.05 were appreciated.

The given research had as an overall effect the development to a certain extent of the children's motor capacities, including speed, strength, coordination and resistance.

The observed situation can be explained by the fact that the irrelevant improvement of the parameters tested in the control group occurred, first of all, within the natural process of physiological development of the children, as well as by the relatively passive training of the children in the directed pedagogical process of physical education.

Table 10. Comparative analysis of the physical training indices of IV grade students (control group and experimental group) carried out in the dynamics of the pedagogical study

No.	Teste	Control group (n=15)		T	P	Experimental group (n = 15)		T	P
		Initial	Final			Initial	Final		
		$\overline{X}$ ± m	$\overline{X}$ ± m			$\overline{X}$ ± m	$\overline{X}$ ± m		
1.	Running 30m (sec)	6,40±0,14	6,31±0,13	0,70	>0,05	6,32±0,13	5,94±0,11	3,30	<0,001
2.	Standing long jump (cm)	150,50±2,63	152,55±2,60	0,83	>0,05	151,00±2,62	160,05±2,58	3,68	<0,001
3.	Steeplechase over a distance of 2x15m between the hurdles (sec)	11,50±0,22	11,28±0,20	1,10	>0,05	11,45± 0,21	10,71±0,18	3,89	<0,001
4.	Throwing the 2 kg medicine ball (cm)	295,00±6,70	300,80±6,65	0,92	>0,05	298,00±6,68	320,80±6,53	3,52	<0,001
5.	Push-ups (no. of times)	4,90 ±0,38	5,21±0,37	0,88	>0,05	4,80±0,38	6,27±0,35	4,20	<0,001
6.	Cooper test 3 min (m)	320,00±7,33	330,00±7,30	1,44	>0,05	325,00±7,34	355,00±7,28	4,34	<0,001

Note: P – 0,05; 0,01; 0,001;
t = 2,145; 2,977; 4,140

In Table 11, the final indices of the tests carried out during the pedagogical study for the students in the experimental group were presented.

Analyzing the data from Table 11, we can say that the students in the experimental group obtained positive changes in all the physical training manifestation tests, where P < 0.01.

Table 11. Comparative analysis of the final indices regarding the physical training of students in grades IV

No.	Psychomotor tests	Control group (n = 15)	Experimental group (n = 15)	T	P
		$\overline{X}$ ± m	$\overline{X}$ ± m		
1.	Running 30m (sec)	6,31±0,13	5,94±0,11	2,17	< 0,05
2.	Standing long jump (cm)	152,55±2,60	160,05±2,58	2,23	< 0,05
3.	Steeplechase over a distance of 2x15m between the hurdles (sec)	11,28±0,20	10,71±0,18	2,11	< 0,05
4.	Throwing the 2 kg medicine ball (cm)	300,80±6,65	320,00±6,53	2,06	< 0,05
5.	Push-ups (no. of times)	5,21±0,37	6,27±0,35	2,08	< 0,05
6.	Cooper test 3 min (m)	330,00±7,30	355,00±7,28	2,42	< 0,05

Note: P – 0,05; 0,01;0,001;
t = 2,048; 2,763; 3,674

The obtained results show us that, based on the specially organized physical education classes, which directly included a complex of general and special means for the correction of attitude deficiencies, a considerable improvement was achieved in the motor capacities of the students in the experimental group, namely: speed motor actions, speed-strength manifestations, coordination and resistance.

One of the most important tasks of the pedagogical study consists in determining, through specialized tests, the dynamics of attitude deficiencies in the fourth grade students - included in this study.

For this, the following specialized tests were applied:

• the mobility of the spine in the frontal plane, in the dorsal plane, as well as the lateral mobility of the spine in the left lateral decubitus and in the right lateral decubitus;

• general endurance of the back muscles;

• static force;

• the endurance of the body muscles on the left and right side;

• endurance of the frontal and dorsal group of muscles of the lower limbs.

The examination of specialized test indices during the study period is revealed in statistical detail in Tables 12, 13 and 14.

In Table 12, the initial indices of the specialized tests within the pedagogical study are analyzed, which initially did not present statistically true differences in practically all the tests included in the study, namely between the two groups of students investigated, where P>0.05.

One of the basic indicators characterizing the normal state of the spine is the test: Mobility of the spine, both in the frontal plane (cm) and in the dorsal plane (cm). The results of the initial evaluation of the girls in the experimental group show us their homogeneity through the values obtained, thus, the frontal mobility in the girls in the control group is 6.60±0.72, and in those in the study group 6.65±0.72, where P>0.05. We find the same thing in the case of dorsal mobility, where the study group presents 5.28±0.63, and the control group 5.20±0.62, the one that also denotes statistically unreliable results, where P>0, 05.

Table 12. Comparative analysis of the initial indices of the results of the specialized initial testing of girls in grades IV

No.	Tests	Control group (n = 15)	Experimental group (n = 15)	T	P
		$\overline{X}$ ± m	$\overline{X}$ ± m		
1.	Mobility of the spine:				
	- in the frontal plane (cm)	6,60±0,72	6,65±0,72	0,05	> 0,05
	- in the dorsal plane (cm)	5,20±0,62	5,28±0,63	0,09	> 0,05
2.	Lateral mobility of the spine:				
	- left side (cm)	11,00±1,21	11,10±1,23	0,06	> 0,05
	- right side (cm)	12,30±1,35	12,40±1,36	0,08	> 0,05
3.	General endurance of the back muscles (sec)	7,00±0,52	7,08±0,53	0,11	> 0,05
4.	Body muscle endurance:				
	- on the left side (sec)	3,60±0,52	3,69±0,53	0,12	> 0,05
	- on the right side (sec)	3,85±0,46	3,90±0,47	0,08	> 0,05
5.	Thigh muscle endurance: front group (sec)				
	- left foot	16,00±1,74	16,48±1,75	0,19	> 0,05
	- right foot	15,20±1,65	15,83±1,66	0,27	> 0,05
6.	Thigh muscle endurance: back group (sec)				
	- left foot	15,80±1,70	15,60±1,68	0,08	> 0,05
	- right foot	15,65±1,69	15,88±1,70	0,10	> 0,05
7.	Static force (kg)	35,50±1,17	36,00±1,18	0,30	> 0,05

Note: P – 0,05; 0,01; 0,001;
t = 2,048; 2,763; 3,674

Table 13 shows the indices of the specialized tests carried out in the dynamics of the pedagogical study on the groups of children investigated.

As can be seen, in the control group, during the pedagogical study, the indices from the specialized tests underwent positive changes. We mention in particular the improvement of the mobility of the spine, the resistance of the muscles of the back and thighs, those of the lower limbs,

as well as their static strength. But all the improvements revealed by the specialized tests have a statistically inconclusive character where P>0.05.

From the presented, we state that the traditional way of organizing physical education is not efficient enough for students with attitude deficiencies and does not contribute to the clear improvement of the indices in the specialized tests, because, during one year of studies, the considerable reduction of the number of students with attitude deficiencies and their general state of health.

Table 13 Comparative analysis of the indices of specialized tests in the dynamics of pedagogical study for girls in grades IV

No.	Teste	Control group (n=15)		T	P	Experimental group (n = 15)		t	P
		Initial	Final			Initial	Final		
		$\overline{X}$ ± m	$\overline{X}$ ± m			$\overline{X}$ ± m	$\overline{X}$ ± m		
1.	Mobility of the spine: - in the frontal plane (cm) - in the dorsal plane (cm)	 6,60±0,72 5,20±0,62	 7,09±0,70 5,59±0,61	 0,73 0,67	 >0,05 >0,05	 6,65±0,72 5,28±0,63	 9,11±0,67 7,31±0,55	 3,72 3,62	 <0,01 <0,01
2.	Lateral mobility of the spine: - left side (cm) - right side (cm)	 11,00±1,21 12,30±1,35	 11,92±1,19 13,14±1,34	 0,81 0,66	 >0,05 >0,05	 11,10±1,23 12,40±1,36	 15,34±1,15 17,00±1,25	 3,75 3,71	 <0,01 <0,01
3.	General endurance of the back muscles (sec)	7,00±0,52	7,41±0,51	0,83	>0,05	7,08±0,53	8,86±0,48	3,72	<0,01
4.	Body muscle endurance: - on the left side (sec) - on the right side (sec)	 3,60±0,52 3,85±0,46	 4,10±0,50 4,04±0,44	 1,04 0,45	 >0,05 >0,05	 3,69±0,53 3,90±0,47	 5,52±0,45 5,28±0,41	 3,89 3,28	 <0,01 <0,01
5.	Thigh muscle endurance: front group (sec) - left foot - right foot	 16,00±1,74 15,20±1,65	 16,95±1,73 16,08±1,63	 0,58 0,57	 >0,05 >0,05	 16,48±1,75 15,83±1,66	 22,13±1,71 20,81±1,54	 3,46 3,28	 <0,01 <0,01
6.	Thigh muscle endurance: back group (sec) - left foot - right foot	 15,80±1,70 15,65±1,69	 17,03±1,69 16,62±1,67	 0,77 0,61	 >0,05 >0,05	 15,60±1,68 15,88±1,70	 21,71±1,53 21,62±1,63	 4,02 3,65	 <0,01 <0,01
7.	Static force (kg)	35,50±1,17	37,00±1,15	1,36	>0,05	36,00±1,18	41,00±1,13	4,57	<0,01

Note: P – 0,05; 0,01; 0,001;
t = 2,145; 2,977; 4,140

At the same time, the final indices of the specialized tests for the students of the experimental group underwent a much more pronounced change in the sense of their improvement, where P<0.01, compared to the initially certified values.

We mention that the targeted influence of the specialized means of physical education within the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" is effective and allows for a considerable improvement of the general condition of the locomotor system in the studied students, which we can demonstrate including through the elevation of the index: The general resistance of the back muscles (sec), which is one of the most important indicators characterizing the general condition of the locomotor apparatus and especially of the spine in the children of the study group. Thus, if initially this index presented values of

7.08±0.53, then, at the end of this study, the values increased significantly presenting 8.86±0.48, where P<0.01.

Table 14 presents the comparative analysis of the final indices of the specialized tests from the control and experimental groups. As we can see, at the end of the study, the experimental group truly outperforms the control group in all specialized tests, reflecting the state of the locomotor apparatus P<0.05.

Table 14. Comparative analysis of the final indexes of the specialized tests for students of grades IV

No.	Teste	Grupa martor (n = 15)	Grupa experimentală (n = 15)	T	P
		$\overline{X}$ ± m	$\overline{X}$ ± m		
1.	Mobility of the spine: - in the frontal plane (cm) - in the dorsal plane (cm)	 7,09±0,70 5,59±0,61	 9,11±0,67 7,31±0,55	 2,08 2,10	 < 0,05 < 0,05
2.	Lateral mobility of the spine: - left side (cm) - right side (cm)	 11,92±1,19 13,14±1,34	 15,34±1,15 17,00±1,25	 2,07 2,11	 < 0,05 < 0,05
3.	General endurance of the back muscles (sec)	7,41±0,51	8,86±0,48	2,07	< 0,05
4.	Body muscle endurance: - on the left side (sec) - on the right side (sec)	 4,10±0,50 4,04±0,44	 5,52±0,45 5,28±0,41	 2,12 2,07	 < 0,05 < 0,05
5.	Thigh muscle endurance: front group (sec) - left foot - right foot	 16,95±1,73 16,08±1,63	 22,13±1,71 20,81±1,54	 2,13 2,11	 < 0,05 < 0,05
6.	Thigh muscle endurance: back group (sec) - left foot - right foot	 17,03±1,69 16,62±1,67	 21,71±1,53 21,62±1,63	 2,05 2,14	 < 0,05 < 0,05
7.	Static force (kg)	37,00±1,15	41,00±1,13	2,48	< 0,05

Note: P – 0,05; 0,01; 0,001;
t = 2,048; 2,763; 3,674

So, it is visible that the targeted use of the specialized means of physical education included in the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" allowed the positive influence on the physical and psychomotor development of the children in the experimental group, demonstrated by the truthful statistical results , where P < 0.05.

In the process of the pedagogical experiment, we also followed the indicators of the functional state of the body of the fourth-grade students in the study group. These evaluations had the purpose of monitoring throughout the school year the deviations in the activity of the cardiovascular and respiratory system of the targeted children, in order to intervene if necessary by changing the content of the program or the intensity of the physical effort.

Thus, in Table 15, the results obtained regarding the comparative analysis of the statistical data, related to the functional state of the body of the evaluated students, are presented.

Table 15. Comparative analysis of the results of the functional state of the body of students of grades IV

No.	Psychomotor tests	Control group (n = 15)	Experimental group (n = 15)	T	P
		$\overline{X}$ ± m	$\overline{X}$ ± m		
1.	Heart rate (beats/min)	90,00±2,16	88,64±2,15	0,45	> 0,05
2.	Breathing frequency (number of cycles)	23,00 ±0,74	24,00±0,75	0,95	> 0,05
3.	Vital lung capacity (cm^3)	1840,00 ±67,23	1880,00 ±68,05	0,42	> 0,05
4.	Oxygenation	96,00	96,00	-	-

Note: P – 0,05; 0,01; 0,001;
t = 2,048; 2,763; 3,674

As we can see, according to the data of the comparative analysis of the results of the tests applied in Table 15, no significant differences were detected in the girls from the experimental and control groups (P>0.05). So, the above-mentioned demonstrates that the means and methods of directed physical education, applied during the pedagogical experiment, did not generate any negative effect on the physical and functional development of the body of the children in the experimental groups. Moreover, the procedures in the manner and application scenario described had clearly beneficial effects, especially in the study group compared to the physiological norm.

Thus, we find that the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students", developed by us for the physical education classes of fourth grade students with attitude deficiencies of the locomotor system can beneficially influence their kinetoprophylactic process. At the same time, the traditional organization of the physical education of children with attitude deficiencies can only to a certain extent stabilize the state of the locomotor apparatus in students of grades IV. However, there are cases in which it can even incite progression, because it admits the insufficient mobilization of students in their own locomotor development.

The results of the pedagogical study showed us the effectiveness of the Experimental Model "Kinetoprophylaxis of the attitude deficiencies of primary school students" in solving the recovery and kinetoprophylaxis tasks of fourth grade students and allowed, through a complex of general means and methods and specialized physical education, strengthening the health of the students in the experimental group and reducing the attitude deficiencies of these students, proven by the Pignet and Eresmann tests.

These improvements were also confirmed by the dynamics of the Erismann index, which, in the same way, mirrors the physical development of the female students in the experimental group and the dynamics of the index that reflects the modeling of the narrow-shaped chest Ie = (- 5.25) initially evaluated, in a chest of relatively normal configuration Ie = (+3.00).

In Table 16 and Figure 11 we present the comparative analysis of the research results of the Pignet and Erismann index, which reflects the level of physical development of the students in the study group during the research period. Thus, we find that the Pignet Index demonstrates the gradual transition of students from the study group from the weak level, where Ip = 27 points, to a more qualitatively average level, for Ip = 23 points, proportional to the development and resistance of the body. This is the most important result of our research. At the same time, it is interesting that the evaluated children do not complain of pain, have minimal discomfort during a prolonged effort and defend themselves as healthy people. However, following the kinetoprophylactic lessons based on the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" results in an obvious therapeutic effect with an average level of development.

Table 16. Comparative analysis of Pignet and Erisman indices, in the initial and final stage of the study group

No.	Tests	Control group (n = 15)	Experimental group (n = 15)	Conventional units
1.	Pignet index (physical level) points	27,00 Weak	23,00 Medium	- 4
2.	Erismann index (conventional units)	-5,25	+3,00	+ 7,75

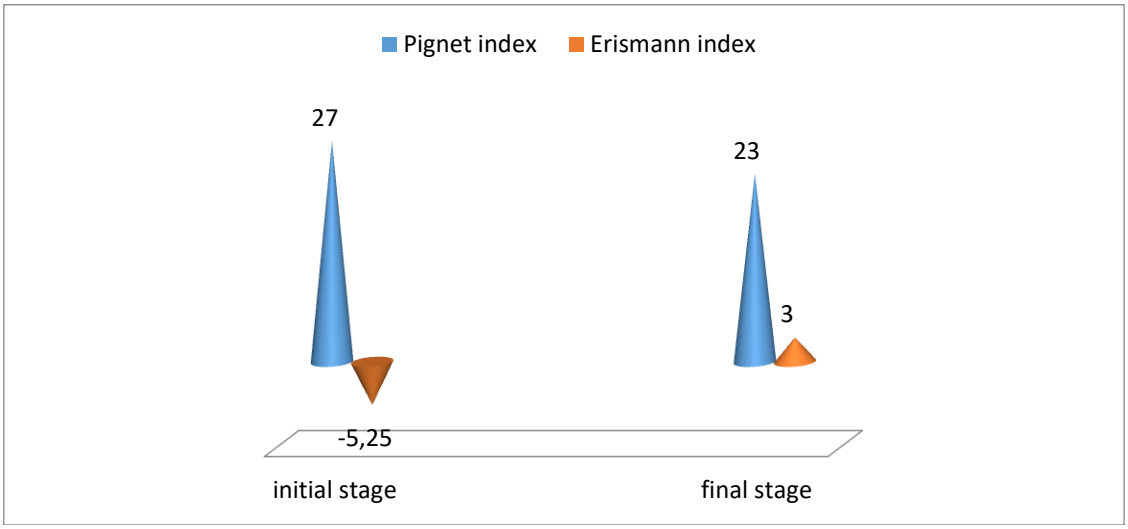

Fig. 11. Dynamics of the Pignet and Eresmann indices

The Erismann index served as confirmation of the efficiency of the proposed model, exceeding the limit of Ie = 7.75 final conventional units, starting from the initial assessment of Ie = (- 3) conventional units.

We can mention that the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" ensured a multilateral influence on the students' body through the complex implementation of general and specialized means and methods under the conditions of a positive emotional state.

Thus, kinetoprophylaxis lessons should be considered as part of the physical education system based on a complex approach to children who need recovery. Namely, the 45-minute lesson ensures full intensity and content for the kinetoprophylaxis of attitude deficiencies. The system of kinetoprophylaxis classes must be based on the maximum mobilization of children and the education of a conscious attitude of them in the face of meeting the requirements. This fact is necessary for obtaining lasting positive results in the recovery of the correct position of the body in the process of a systematic training and long-term training.

GENERAL CONCLUSIONS AND RECOMMENDATION

1. The theoretical approach to the researched phenomenon allowed us to highlight the following essential moments. Primary school students are characterized by certain particularities in growth and development, both at the level of the whole organism and at the level of organ systems. In this context, the stage of the primary cycle is characterized by a series of essential changes in the child's life: the environment, the circle of people, new obligations appear, physical activity is reduced. All these factors, together, require an intense physiological activity of the entire system of organs, therefore, during the period of adaptation to school conditions, increased attention from parents and teachers is necessary on the normal development of the locomotor system.

2. The study of specialized literature allowed us to establish conceptual benchmarks regarding kinetoprophylaxis and the recovery of attitude deficiencies in primary school students in the physical education process. It allowed us to analyze the phenomenon of recovery and prevention of physical deficiencies of these children.

3. The analysis and generalization of the results of the sociological survey allow us to state that physical education for students aged 7-11 in the primary cycle, through the use of kinetoprophylaxis, is of great importance in their development and in the prevention of attitude deficiencies, confirmed by 58% of the respondents. At the same time, the direction revealed by us requires special attention and entails the need to perfect activities of this kind in order to search for and apply the most effective and necessarily scientifically argued forms and means.

4. Summarizing the results of the sociological survey, we can mention the problems that currently prevent the implementation of the kinetoprophylaxis process of attitude deficiencies in physical education lessons, namely: the lack of necessary funding, the lack of an equipped sports hall.

5. Assessment of the physical state of the locomotor apparatus in students aged 7-11 years from primary schools, highlighting the fact that the incidence of attitude deficiencies among them is on average approximately 6-10% of the total number of students at this level, and the phenomenon has a tendency to expand. In primary school students who suffer from attitude disorders, as a rule, a reduction in the minimum level of mobility is observed, in most cases pain sensations are recorded, a fact that considerably reduces their psychosocial integration.

6. Elaboration and argumentation of the experimental model "Kinetoprophylaxis of attitude deficiencies of primary school students" aimed at reducing attitude deficiencies in students of grades I - IV - has demonstrated its effectiveness and necessity, because it involves the complex and appropriate use of physical education means, allowed the improvement of the condition of the locomotor apparatus of the investigated children and the positive influence on the physical and psychomotor development of children with attitude deficiencies that allow the directed recovery of the function of the locomotor apparatus and must be organized based on didactic rules and principles that include a minimum of 68 hours in one year of studies.

7. The implementation of the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" for primary school students with the use of kinetotherapeutic work tools, allowed us to note the improvement of physical development indices in all evaluated tests, which present statistically significant values.

8. The directed influence of the specialized means of physical education, included in the Experimental Model "Kinetoprophylaxis of attitude deficiencies of primary school students" demonstrated its effectiveness in the pedagogical experiment, a fact that denotes the gradual reduction of the number of students with attitude deficiencies in the experimental group. The Pignet index demonstrates the gradual transition of children from a poor level (Ip = b27) of physical development to a more qualitative, medium level, where Ip = 23 proportional to the body's development and resistance. As for the dynamics of the Erismann index, the recovery of the conformation of the ribcage was found for (Ie = +3.00) a fact confirmed by the comparative analysis of the experimental data.

***

1. The prevention of attitude deficiencies should be carried out from an early age, especially in preschool and primary education, as well as immediately after the student suffers from various diseases that can cause them to appear (traumas, poliomyelitis, etc.).

2. There is a need to intensify the educational partnership student - teacher - doctor - parent in order to prevent attitude deficiencies.

3. Lessons for children with attitude deficiencies must be organized outside the timetable, 45 minutes each. These hours must be carried out by the specialist in the field.

4. Lessons must be organized as part of the physical education system, based on a systemic and complex concept for a long period of time.

5. The expansion of the volume and content of the means used for the purpose of kinetoprophylaxis of attitude deficiencies in students and their prevention in the healthy ones is to be achieved by placing the hours in a special program for physical education, based on general and specialized means, both prophylactic and of psychomotor development.

6. Training in physical education classes some skills regarding the correct physical development of students, through the use of directed and specialized exercises, which experimentally demonstrated their effectiveness. In the kinetoprophylaxis of attitude deficiencies in 4th grade children, it is necessary to apply the means, methods and forms of physical education with a competitive and game character, being necessarily accompanied by musical accompaniment.

7. Equipping educational institutions with special literature and methodical recommendations in order to make the activity of preventing deviations from normal physical development more efficient.

8. Educating in physical education classes some skills regarding correct physical development and strengthening of health. This fact can be achieved by effectively combining in the primary study program the development of complex physical skills, with systematic training on the importance of some or other types of physical exercises and sports, as well as the prevention rules to be followed, both during the performance physical exercises and practicing sports, as well as in everyday life.

9. Informing students about the causes of attitude deficiencies and their kinetoprophylaxis measures during class hours and other extracurricular activities.

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ANNOTATION

Slimovschi Marina "Kinetoprophylaxis of attitude deficiencies of primary school students through kinetotherapeutic methods": doctoral thesis in pedagogical sciences, specialty 533.04 - Physical education, sports, kinetotherapy and recreation

Structure of the thesis. The study consists of introduction, 3 chapters, general conclusions and practical-methodical recommendations, bibliographic sources composed of 182 sources, 8 annexes, 103 pages of basic text, 23 figures, 15 tables. The obtained results are presented in 9 scientific papers.

Keywords: kinetotherapy, deficient attitude, primary school students, spinal column, growth and development, internal and external factors, causes of attitude deficiencies, physical recovery, kinetoprophylaxis, recovery program, exercise complex, experimental model, special methodology.

The aim of study: Development the prophylaxis process and improvind the attitude of students about the attidude to ones own health, through the implementation of an experimental model that will consists of recovery exercises and kinetoprophylaxis.

Objectives of the research:

1. Literature research and establishing the concepts regarding kinetoprophylaxis and recovery of attitude deficiencies in primary school students in the process of physical education.
2. Analysis and generalization of the results of the sociological survey regarding kinetoprophylaxis and recovery of students; attitude deficiencies in the process of physical education lesson in school conducted among specialists of various professional orientations.
3. Determination the level of psychomotor and physical intellectual training of students with ages between 7-11 years.
4. Elaboration and argumentation of the efficiency of the experimental model in physical education directeded to correction the attitude deficiencies in the students of primary level I-IV.

The originality and novelity of the thesis represents the implementation of an experimental model program for kinetoprophylaxis and recovery of attitude deficiencies. Also, it is proven the necessity and efficiency of using the directed and specialized means of physical education in the recovery and kinetoprophylaxis of attitude deficiencies of children of the primary level, as well as in their social rehabilitation during the recovery time; the fundamental aim is the application of specialized means in obtaining efficient results and in a short time; the importance for the collaboration of teacher-student-parent in the process of recovery and prophylaxis of attitude deficiencies in primary school children is indispensable.

Theoretical importance. The development of the Experimental Model Program for kinetoprophylaxis and the recovery of attitude deficiencies in primary school children will allow awareness from students and importance to protect the spinal health and will create premises for the implementation of the model in practice. Considering the large number of childrens with attitude deficiencies, as well as the existing gaps in their physical activity, there is a need for state recognition and financing from the state of this model, and implementation in primary schools from the country.

Implementation of the obtained results. The scientific results of the research were successfully implemented in the practice of physical education activity in the Pro Succes Theoretical High School in Chisinau and in the Minerva Theoretical High School, on a study group made up of fourth-grade students, with the aim of validating the experimental model.

ADNOTARE

Slimovschi Marina „Kinetoprofilaxia deficienţelor de atitudine a elevilor claselor primare prin metode kinetoterapeutice”, teză de doctor în ştiinţe ale educaţie, Chişinău, 2022.

Structura tezei. Lucrarea este alcătuită din introducere, 3 capitole, concluzii generale şi recomandări practico-metodice, un indice bibliografic care citează 182 surse, 8 anexe, 103 pagini text de bază, 23 figuri, 15 tabele. Rezultatele obţinute sunt reflectate în 9 lucrări ştiinţifice.

Cuvinte-cheie: kinetoterapie, deficienţe de atitudine, elevi, ciclul primar, coloană vertebrală, creştere şi dezvoltare, factori inerni şi factori externi, recuperare fizică, kinetoprofilaxie, exerciţii fizice.

Scopul lucrării: Perfecţionarea procesului de profilaxie și recuperare a deficienţelor de atitudine la elevii din ciclul primar prin intermediul programului kinetoterapeutic ce ar include mijloace fizice direcţionate spre corecţia atitudinii corpului.

Obiectivele cercetării:

1. Studierea literaturii de specialitate şi stabilirea reperelor conceptuale privind kinetoprofilaxia și recuperarea deficienţelor de atitudine la elevii din ciclul primar.
2. Analiza şi generalizarea rezultatelor sondajului sociologic referitor la kinetoprofilaxia și recuperarea deficienţelor de atitudine a elevilor în procesul lecţiei de educaţie fizică în şcoală.
3. Aprecierea nivelului pregătirii psihomotrice și fizice a elevilor de vârsta 7–11 ani.
4. Elaborarea Programului experimental la educaţia fizică direcţionat pentru reeducarea și kinetoprofilaxia deficienţelor de atitudine la elevii claselor I-IV.

Noutatea şi originalitatea ştiinţifică a lucrării: constituie elaborarea şi implementarea unui Model experimental pentru kinetoprofilaxia și recuperarea deficientelor de atitudine. Totodată, este demonstrată necesitatea şi eficienţa utilizării mijloacelor direcţionate şi specializate ale educaţiei fizice în recuperarea si kinetoprofilaxia deficienţelor de atitudine şi într-un interval mai restrâns de timp; este stabilită necesitatea parteneriatului educaţional profesor-elev-părinte în procesul recuperării şi profilaxiei deficienţelor de atitudine la copiii din ciclul primar.

Rezultatele obținute care contribuie la soluționarea problemei științifice importante: Elaborarea Modelului experimental pentru kinetoprofilaxia și recuperarea deficienţelor de atitudine la copiii din ciclul primar. Implementarea în practică a modelului și a programei propuse a contribuit la îmbunătățirea stării de sănătate a elevilor claselor a IV.

Semnificaţia teoretică. Va permite conştientizarea necesităţii şi a importanţei exerciţiilor fizice speciale in menţinerea unui corp sănătos. Va consolida cunoștințele din domeniul kinetoterapiei și argumenta științific necesitatea exercițiilor fizice direcționate ce se regăsesc în modelul pedagogic propus de noi.

Valoarea aplicativă. Determină posibilitatea sporirii nivelului de implicare a specialiștilor în problema kinetoprofelaxiei copiilor din ciclul primar, prin includerea unor modele noi de instrumente kinetoprofilactice, demonstrate științific ce pot fi utilizate la lecțiile de eucație fizică cu elevii claselor primare cu deficiențe de atitudine din țara noastră.

Implementarea rezultatelor ştiinţifice: Rezultatele științifice ale cercetării au fost implementate cu succes în practicarea activității educației fizice în Liceul Teoretic Pro Succes din Chișinău și în Liceul Teoretic Minerva, pe un lot de studiu format din eleve din clasa a patra, cu scop de validare a modelului experimental.

АННОТАЦИЯ

на докторскую диссертацию Слимовски Марины «Кинетопрофилактика нарушения осанки у учащихся начальной школы с помощью кинетотерапевтических методов», Кишинев, 2022.

Структура работы. Работа состоит из введения, 3 глав, общих выводов и практических методических рекомендаций, библиографии из 182 источника, 8 приложений, 103 страницы основного текста, 23 рисунков, 15 таблиц. Количество публикаций по теме диссертации – 9.

Ключевые слова: кинетотерапия, нарушение осанки, учащиеся начальных классов, позвоночник, рост и развитие, внутренние и внешние факторы, причины нарушения осанки, физическое восстановление, кинетопрофилактика, программа восстановления, комплекс упражнений, экспериментальная модель, специальная методика.

Цель исследования: совершенствование восстановительного процесса у детей начальной школы, страдающих нарушением осанки, посредством внедрения экспериментальной модели состоящей из средств физического воспитания и кинетопрофилактики.

Задачи исследования:

1. Изучение специальной литературы и концептуальных аспектов кинетопрофилактики и восстановления нарушения осанки у детей начальной школы в процессе физического воспитания.

2. Анализ и обобщение результатов анкетирования по кинетопрофилактике и восстановлению у детей начальной школы нарушения осанки в процессе занятий физкультурой в школе.

3. Оценка уровня психомоторной и физической подготовленности школьников 7-11 лет.

4. Разработка и аргументация эффективности экспериментальной модели направленного на физическое воспитание и кинетопрофилактику нарушение осанки у учащихся I-IV классов.

Новизна и научная оригинальность исследования заключается в разработке и реализации экспериментальной модельной программы кинетопрофилактики и восстановления нарушения осанки. При этом показана необходимость и эффективность использования направленных и специализированных средств физического воспитания при восстановлении и кинетопрофилактике в более короткие сроки; установлена необходимость воспитательного партнерства педагог-ученик-родитель в процессе восстановления и профилактики нарушения осанки у младших школьников.

Полученные результаты: Разработка экспериментальной программы кинетопрофилактики и восстановления нарушения осанки у детей младшего школьного возраста.

Теоретическое значение. Это позволит нам осознать необходимость и важность специальных упражнений для поддержания здоровья тела.

Прикладное значение: Определяет возможность повышения уровня вовлеченности специалистов в вопросе кинетопрофилактики детей в старшей школе.

Внедрение результатов исследования. Научные результаты исследования были успешно внедрены в практику физкультурной деятельности в Теоретическом лицее «Pro Succes» г. Кишинева и в Теоретическом лицее «Минерва», на учебной группе, состоящей из учащихся 4-х классов, с целью подтверждение экспериментальной модели.

SLIMOVSCHI MARINA

KINETOPROPHYLAXIS OF ATTITUDE DEFICIENCIES OF PRIMARY SCHOOL STUDENTS THROUGH PHYSIOTHERAPEUTIC METHODS

Specialty 533.04. Physical education, sport, kinetotherapy and recreation

SUMMARY

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