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ASSESSMENT OF SCHOOL MATURITY OF CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY SYNDROME

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Abstract. Nowadays, one of the necessary tasks of a pediatrician is to assess the child's readiness for the schooling. The process of a child's transition from kindergarten to school is a real test, because in addition to the academic load that children are given from the first days of school, they need to go through a period of adaptation and socialization among their peers. Children with diseases of the nervous system, including attention deficit hyperactivity disorder, may be immature by the time they enter school, which will subsequently lead to poor academic performance, maladjustment and conflicts with peers and teachers due to a decrease in adaptive and communication abilities.35 children of senior preschool age (17 girls, 18 boys) from the city of Veliky Novgorod took part in the study. To assess school maturity, the Kern–Jirasik test was used. ADHD was more often reported in boys. In 36% of cases, children with ADHD had neurological features in the form of delayed speech development, 12% had local tics, and 16% had enuresis. The study found that 60% of children with attention deficit hyperactivity disorder had a low level of school maturity, while 50% of children in the control group had a high level of school maturity.When studying personal maturity, fine motor skills and visual coordination, visual-spatial perception and visual memory, as well as intellectual maturity, a low level of development prevailed in children with attention deficit disorder, while a high level of these indicators predominated in healthy children. Children with attention deficit hyperactivity disorder are not ready for school; this requires further development of approaches to teaching such children.

Key words: *attention deficit hyperactivity disorder; Kern and Jirasik test; school readiness assessment.*

ОЦЕНКА ШКОЛЬНОЙ ЗРЕЛОСТИ ДЕТЕЙ, ИМЕЮЩИХ СИНДРОМ ДЕФИЦИТА ВНИМАНИЯ И ГИПЕРАКТИВНОСТИ

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Резюме. В наше время одной из необходимых задач врача-педиатра становится оценка готовности ребенка к обучению в школе. Процесс перехода ребенка из детского сада в школу является настоящим испытанием, потому что помимо учебной нагрузки, которая предоставляется детям с первых дней школы, им необходимо пройти период адаптации и социализации среди сверстников. Дети с заболеваниями нервной системы, в том числе и с синдромом дефицита внимания и гиперактивности (СДВГ), могут оказаться незрелыми к моменту поступления в школу, что в последующем повлечет за собой плохую успеваемость, дезадаптацию и конфликты со сверстниками и учителями из-за снижения адаптационных и коммуникатив-

ных способностей. В исследовании приняли участие 35 детей старшего дошкольного возраста (17 девочек, 18 мальчиков) города Великий Новгород. Для оценки школьной зрелости был использован тест Керна–Йирасика. СДВГ чаще регистрировался у мальчиков. В 36% случаев дети с СДВГ имели неврологические особенности в виде задержки речевого развития, 12% — локальные тики, 16% — энурез. В ходе исследования было установлено, что 60% детей с синдромом дефицита внимания и гиперактивности обладали низким уровнем зрелости, в то время как 50% детей в контрольной группе имели высокий уровень школьной зрелости. При исследовании личностной зрелости, мелкой моторики и зрительной координации, зрительно-пространственного восприятия и зрительной памяти, а также интеллектуальной зрелости у детей с синдромом дефицита внимания преобладал низкий уровень развития, у здоровых детей наблюдалось преобладание высокого уровня данных показателей. Дети, имеющие СДВГ, не готовы к школьному обучению, это требует дальнейшей разработки подходов к обучению таких детей.

Ключевые слова: *синдром дефицита внимания и гиперактивности; тест Керна и Йирасика; оценка готовности к школе.*

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a behavioral developmental disorder characterized by impaired control, decreased attentiveness, high levels of impulsivity and motor activity [1]. This mental disorder is diagnosed in 8–15% of cases in pediatric practice all over the world, and in 60% of cases the disorder persists into adulthood [2]. In European countries, the ratio of ADHD occurrence in boys and girls ranges from 3:1 to 16:1 [3]. The incidence of the disease has increased very much over the last 20 years, from 2.2 to 30% as well as the prevalence of autism.

Nowadays, the exact etiology is unclear, but some studies link the pathology to genetic predisposition and central nervous system damage at the early stages of development [4]. Psychoemotional stress may also be the cause of ADHD [5].

There are three types of ADHD: hyperactive/impulsive type, inattentive type, and combined type [6].

The problem of ADHD is poorly studied in children. Nowadays, insufficient awareness of the disease among both teachers and parents leads to the decrease in the child's mental state. It also will affect his or her personality, self-esteem and socialization in the future [7]. In addition to the academic load that a child receives at the 1st grade of school, a student with ADHD has an enormous stress while adapting to new conditions and new society.

Children with ADHD have less adaptive and communicative abilities compared to their peers. Due to their immaturity by the time they enter school, children with ADHD have not only difficulties in understanding the school curriculum, but also problems with socialization. It can be manifested by conflicts with classmates and teachers [8]. These problems can affect the emotional state of the child in the future.

A number of authors have described the pathogenesis of the ADHD — the theory of impaired neurotransmitters metabolism that control the higher mental functions. It is a cause of the presence of additional neuropsychiatric disorders in children with ADHD [9].

THE AIM OF THE STUDY

The aim of the study is to assess the level of school readiness in children with attention deficit hyperactivity disorder.

MATERIALS AND METHODS

Thirty-five children of preschool age were examined in the city of Veliky Novgorod. The group of children with attention deficit hyperactivity disorder consisted of 25 children. No one has acute diseases at the time of the study. The control group consisted of 10 children. No one of them has acute and chronic diseases at the time of the study too. The Kern-Jirasek test [10] was used to determine school maturity. All children underwent an anthropometry.

The first task was to draw a male figure. The presence of elements of male clothing, all facial components, and the number of fingers drawn on the limbs were important. This task assessed the child's personal maturity.

The second task was to write the proposed phrase. An attention was paid to the legibility of the written letters, their size, and the presence or absence of deviation of inscription from the horizontal level. This task was used to assess fine motor skills and hand-eye coordination.

The third task was to draw a group of ten dots. The number of dots, their size and deviation from

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the column or other dots were important. This task was used to assess visual-spatial perception and visual memory.

These three tasks were evaluated with a scale from 1 to 5, where 1 is a perfectly completed task and 5 is a major deviation of the task.

After assessing each of them, the scores were summed and the level of overall school readiness were determined.

The fourth task was a questionnaire (20 questions). Each answer of a question was converted to an equivalent point. After the addition of scores, the level of verbal intelligence was determined.

RESULTS

17 girls and 18 boys were in the study. The ADHD was registered more often in boys. The manifestation of ADHD occurred from 4th year of life, anamnesis vitae was without peculiarities. Children received at least 4 courses of symptomatic treatment (nootropics, adreno- and sympathomimetics, and vitamin therapy). All children attended kindergarten, where were additional lessons with a speech therapist and a psychologist. Children with ADHD visited a neurologist every 3 months. 50% of children were from large families or without sibs. An organic brain pathology was present in 40% of children. It can be cause of the lack of effectiveness of drugs and lessons with speech therapist and psychologist. The physical development of children in both groups was comparable to the normal.

Children with ADHD in 36% of cases had neurological features in the form of delayed speech development, 12% — local tics, 16% — enuresis (Fig. 1).

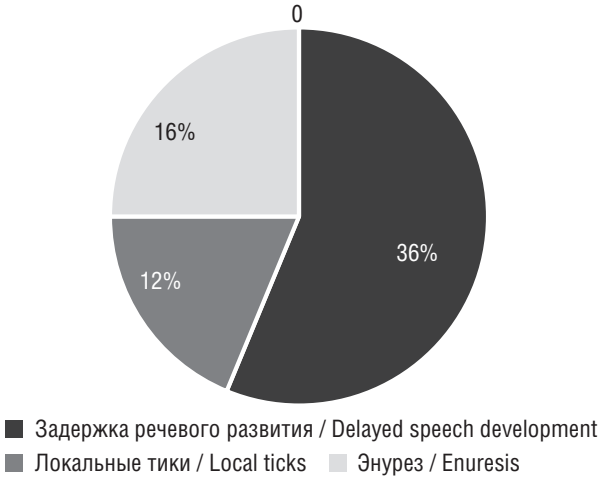

Fig. 1. Neurological characteristics of children with attention deficit disorder

Рис. 1. Неврологические особенности детей с синдромом дефицита внимания

The study found that 60% of children with ADHD had a low level of maturity, while 50% of children in the control group had a high level of school maturity.

We also have studied the personal maturity in children with attention deficit disorder. The low level of development prevails in this group (52% — low level, 20% — medium level, 28% — high level), in control group the high level prevails (60% — high level, 30% — medium level, 10% — low level). We observe a decrease in the level of personal maturity in the majority of children with ADHD compared to healthy children. This indicator can explain the inability of children with ADHD to independently predict their behavior, including motor activity, as well as an inability to adequate reacting to different situations. These qualities may affect the concentration of attention during the learning process, as well as the lack of motivation to fulfill the school plan.

The examination of fine motor skills and visual coordination detected that the low level was in children with ADHD (40% — low level, 32% — medium level, 28% — high level), and the high level was in healthy children (100% — high level). In this case, the presence of a lower level of development of fine motor skills and visual coordination in children with ADHD can lead to difficulties in writing and reading. Also it should be noted that in healthy children this task was performed at the highest level in 100% of cases. More than a half of children with ADHD performed this task at a high and average level.

In the study of visual-spatial perception and visual memory the low level of development prevails in children with ADHD (52% — low level, 20% — medium level, 28% — high level), and the high level prevails in second group (90% — high level, 10% — medium level). This result shows a pattern between children with ADHD and possible impairment of visual memory and visual-spatial perception, which can also be one of the causes of school failure.

The examination of intellectual maturity shows its low level in children with ADHD (36% — low level, 28% — below average level, 36% — average level), and the ratio of children with average and high level is 50% each in group 2.

The results show that children with ADHD are not ready for quick and well processing information, also they do not have an enough vocabulary

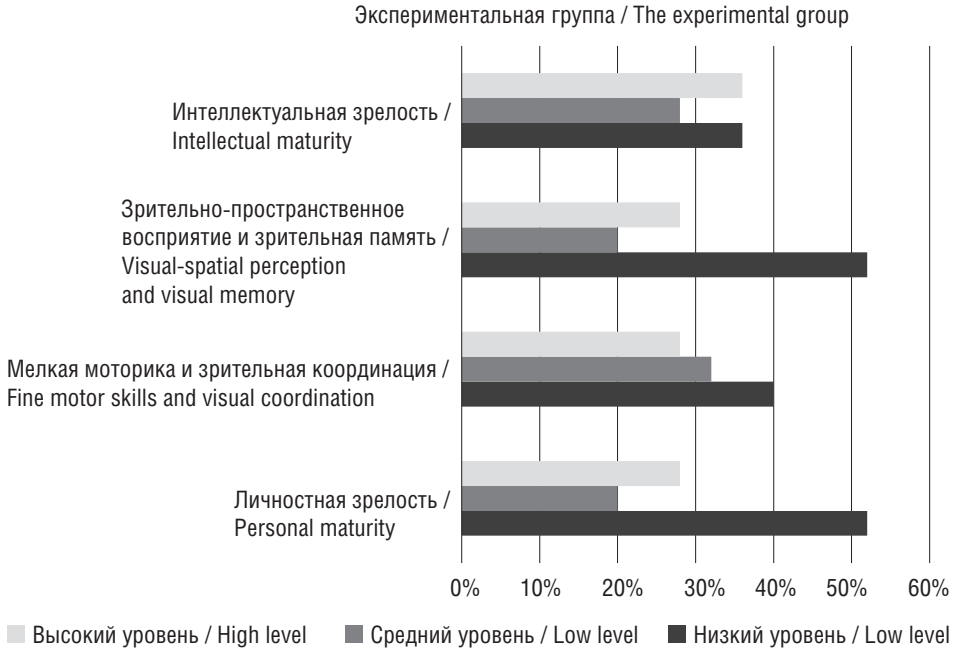

Fig. 2. Evaluation of the results of the Kern–Jirasik school maturity test in children with attention deficithy peractivity disorder

Рис. 2. Оценка результатов теста школьной зрелости Керна–Йирасика у детей с синдромом дефицита внимания и гиперактивности

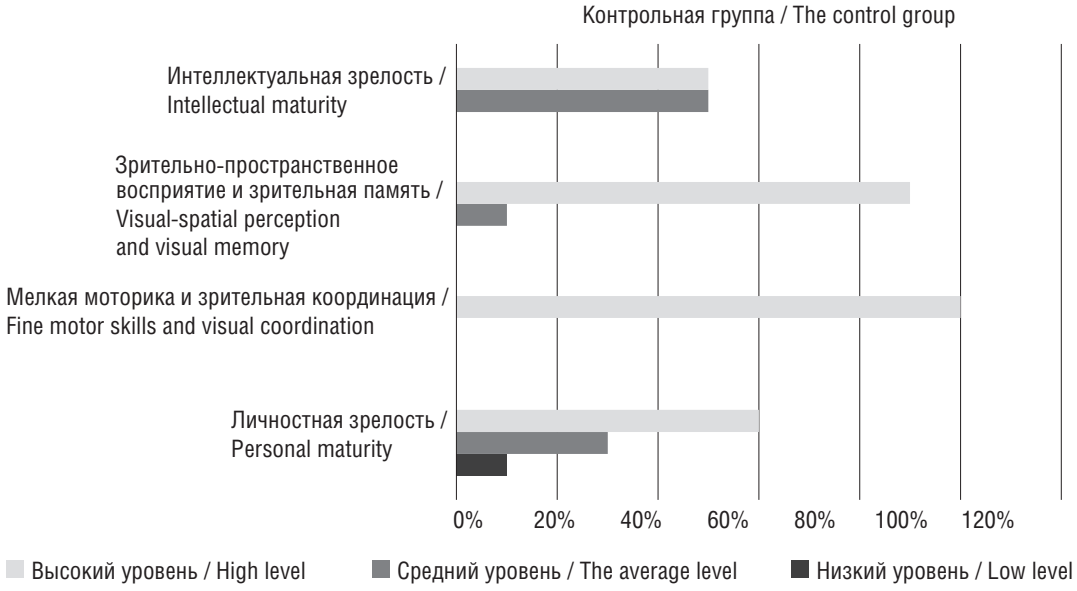

Fig. 3. Evaluation of the results of the Kern-Jirasik school test in healthy children

Рис.3. Оценка результатов теста школьной зрелости Керна–Йирасика у здоровых детей

or they are inability to apply it fully. In most cases, children with ADHD have a significantly lower level of verbal intelligence compared to healthy children (Fig. 2, 3).

CONCLUSIONS

Thus, children with ADHD have predominantly low levels of personal maturity, fine motor skills and hand-eye coordination, visual-spatial perception and visual memory, and also low levels of verbal intelligence. These markers are very important for studding and adaptation to school and new community.

1. Children with ADHD are not ready for schooling due to their immaturity, low personal maturity (52% — low level), fine motor skills and hand-eye

coordination (40% — low level), visual-spatial perception and visual memory (52% — low level), insufficient verbal intelligence compared to healthy peers (36% — low level).

2. The solution of the unpreparedness of children with ADHD for school are later first grade enrollment, attendance of pre-school lessons for better adaptation to new environment, classes with a speech therapist and psychologist, and individual approach of parents and pediatrician to the diagnostics and treatment.

We recommend an active sports and walking outside for the correct ratio of physical and mental activity. Individual lessons should be carried out with breaks, so the child does not have time to get tired. It is acceptable to use a game format while teaching immature children.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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Consent for publication. Written consent was obtained from the patient for publication of relevant medical information within the manuscript.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Вклад авторов. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Источник финансирования. Авторы заявляют об отсутствии внешнего финансирования при проведении исследования.

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