

Early Detection and Recognition of Children with ADHD (Attention Deficit Hiperactivity Disorder) Symptoms

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ABSTRACT

Aim of this study was to determine the probability of occurrence of Attention Deficit/Hyperactivity Disorder- ADHD in children of preschool age and early school age, and to identify differences in the assessment of children identified with high probability for the disorder with regard to assessment by parents and teachers, and with respect on age and sex of children. Total of 107 children were included in the study: 51 girls and 56 boys. The study employed two questionnaires: Questionnaire for Analysis at School for teachers and Questionnaire for Analysis at Home for parents. Both questionnaires contained 39 statements which covered three dimensions of child's behavior needed for ADHD diagnosis. Raw data in each questionnaire were converted according to the standard norms of Guide to Standard Scores (SS) and Total Standard Scores (TSS) and as such were used for statistical analysis. It was found that a considerable number of children demonstrated high probability for ADHD disorder in assessments done by both parents and teachers. Parents recognize probability of ADHD presence more frequently among male children, while teachers recognize this probability more often among female children. Research shows that a significant percentage of children from the entire sample have been labeled with significant ADHD symptoms. Given the age of the child both parents and teachers recognize similar levels of high ADHD probability. Future studies should be directed toward early detection and recognition of children with ADHD syndrome, and clinical evaluation as a first step toward successful treatment and prevention of additional psychological and other problems in an adult.

Key words: Attention Deficit Hyperactivity Disorders, early diagnosis, child, gender, age

Introduction

Attention Deficit Hyperactive Disorder (ADHD) is one of the most common neural developmental disorders among children and adolescents. Numerous authors¹⁻³ define hyperactivity as developmental disorder of absence of behavioral inhibitions reflected through developmentally insufficient attention levels, excessive activity and impulsiveness which impedes self control and behavior organization as related to future actions. Attention Deficit/Hyperactivity Disorder is an attention disorder that is not in an expected level for a certain age and shows expression of behavior incompatible with social norms (obedience, self-control and problem-solving ability).

It starts at preschool age (before the age of 4), it is pervasive (present in all situations) and not related to

sensory, motor, psychiatric or neurological disorders or intellectual disabilities⁴. According to the Diagnostic and Neurological Guide for Mental Disorders – DSM-IV⁵ significant characteristic of this disorder is a constant lack of attention and/or hyperactive – impulsive behavior which tends to be more common and difficult than expected for people of corresponding developmental levels.

The data on ADHD frequency differ. In the last few decades scientists from the entire world have made significant research efforts in order to define frequency of this disorder. Several world-renowned publications reported varying levels of frequency of the disorder, from as low as 1% up to 20% in various regions among school age children⁶ (6). Most often mentioned are levels of 3 to 5

percent during the adolescent age, which depends on diagnosis criteria and views of what is considered as normal in a particular community^{6,7}. Girls and boys diagnosed with ADHD show equally strong symptoms, but the diagnosis is three times more common for boys than for girls⁸.

Since ADHD disorder is more and more common and poses difficulties for children and their surroundings and even has negative effects on their development most of the research has been focused on identifying possible causes of this disorder. Today, more and more researchers believe that the disorder is caused by various neuroendocrine, neurochemical and neuroanatomic factors⁷. Evidence from various studies, among other pharmacological, confirms involvement of particular neurotransmitting systems in genesis of ADHD, particularly dopamine, noradrenalin and serotonin pathways⁹. Genetic factors make up 80% of ADHD etiology¹⁰. Numerous studies show that disorder is highly hereditary. Many patients confirmed hereditary nature of the disorder as most of them had a close relative with the same diagnosis. Genetic predispositions for ADHD are equal for boys and girls¹¹.

Most commonly accepted criteria for ADHD diagnosis are found in Diagnostic and Neurological Guide for Mental Disorders (DSM-IV-TR). In accordance with DSM-IV-TR, in order to diagnose ADHD an individual must show at least 6 out of 9 symptoms of hyperactivity – impulsiveness and meet following specific criteria:

1. Seriousness (at least 6 months up to the point of inadaptability)
2. Early stage (prior to 7 years of age)
3. Pervasiveness (presence in at least two surroundings)

Diagnosis is difficult to make before fourth fifth year of age, because typical behavior of young children is more variable and there are less expectations to maintain attention and behavior control^{1,2,12}. Diagnosis is most common at the time of school entry or at the time of entry into fifth grade, because these are the periods when adaptability requirements for children are greatest.

Lack of attention, hyperactivity and impulsiveness are three dimensions of ADHD. ADHD symptoms affect cognitive, academic, emotional, social and developmental functioning and behavior of an individual¹³. Clinical image of the disorder differs depending on child's age and development level. Numerous studies have shown that presence of hyperactive disorder causes significant problems in various surroundings¹⁻³. Most of children with this syndrome lack positive experiences of participation in various social situations. They do not find understanding within their own families. The real difficulties of children with the ADHD syndrome and their parents start with school enrolment^{1,14}. Best results are achieved if action is taken as soon as the problem is identified since at that stage it is possible to prevent, or at least to decrease emergence of additional difficulties in form of behavior disorder and psychological problems. Because of chronic nature of the ADHD disorder it is important to identify

and start the treatment early on in order to increase chances for child's appropriate cognitive, academic, emotional, social and developmental functioning. Considering seriousness of the implications and demands of the ADHD diagnosis on child's development main goal of this particular work was to determine differences in analysis of children with high disorder probability on the basis of feedback by parents and teachers as related to child's gender and age. In relations to this goal sub goals have been defined as well:

1. Determine the probability for the ADHD disorder in selected sample of children on the basis of Questionnaire for Parents.
2. Determine the probability for the ADHD disorder in selected sample of children on the basis of Questionnaire for Teachers.
3. Compare parents' and teachers' answers in evaluation of children identified as having high probability for disorder in relation to child's gender.
4. Compare parents' and teachers' answers in evaluation of children identified as having high probability for disorder in relation to child's age.

Materials and Methodes

Research took place at the »Ivan Gundulić« Elementary School and kindergarten »Dječiji Vrtići« in Mostar (Kindergartens: »Sunce«, »Radobolja«, »Zvončić« and »Kameni«) in the period from May to July of 2010.

Mentioned institutions were randomly selected. The only criteria were that the children are between 5 to 8 years old. Total of 107 children were included in the study: 51 girls and 56 boys. Out of the entire sample 71 of them were of school age between 6 and 8 years old and 36 were 5 years old from the kindergarten.

The study employed two questionnaires: 1. Questionnaire for Analysis at School for preschool teachers and school teachers and 2. Questionnaire for Analysis at Home for parents. Enclosed with the questionnaires was a memo asking for cooperation with detailed instructions how to fill out the questionnaire. It was emphasized that the responses are anonymous and that results were to be used only for research purposes. The parents were asked to, should they be willing to participate, send completed questionnaires within a week of receipt. Same timeframe was given to teachers. For the purpose of this study in whole manuscript we use term teachers for both preschool teachers and school teachers.

Both questionnaires contained 39 statements which covered three dimensions of child's behavior needed for ADHD diagnosis. Parents and both teachers assignment was to estimate to what extent listed behaviors are manifested in child's everyday activities in terms of Likert's scale (never, rarely, sometimes and always). Raw data in each questionnaire were converted according to the standard norms of Guide to Standard Scores (SS) and Total Standard Scores (TSS) and as such were used for statistical analysis.

A major measuring instrument in this study was the Scales for Diagnosing of Attention Deficit/Hyperactive Disorder¹⁵ by authors Gail Ryser and Kathleen McConnell. It is dedicated for children 5 to 18 years of age. Scales are created according to the directions of DSM IV criteria – Diagnostics and Statistical Manual of Mental Disorders. It was divided in three symptoms groups: lack of attention, hyperactivity and impulsiveness. The scales consisted of two questionnaires: Questionnaire for Parents and Questionnaire for Teachers. Raw data obtained through questionnaire processing were converted into Standard Scores (SS).

According to the written norms the SS results for all three symptoms groups added together are laid out in Total Standard Score (TSS) and their value is evidenced in child ADHD probability table (Table 1). The table provides reliable and valid results from two sources and is a valuable addition to the process of ADHD assessment. Procured results can be part of the extensive analysis and children manifesting high or very high probability for a disorder should undergo further diagnostic methods which may include clinical assessment, observation, interviews and other evaluations¹⁵.

TABLE 1

COMPARISON OF 20 SUBJECTS WITH HIGH ADHD PROBABILITY, ASSESSED BY PARENTS AND 35 SUBJECTS WITH HIGH ADHD PROBABILITY ASSESSED BY TEACHERS, IN RELATION TO SUBJECT'S GENDER (DATA OBTAINED VIA QUESTIONNAIRE FOR PARENTS AND TEACHERS, MAY TO JULY, 2010)

Responders	Number (%) of subjects by gender	
	Male	Female
Parents	12 (66.7)	8 (21.6)
Teachers	6 (33.3)	29 (78.4)*

* χ^2 -test=10,618; p=0.001

Procured results are statistically processed through a programming system SPSS for Windows (Version 13.0 SPSS Inc, Chicago IL, USA) and Microsoft Excel (Version 11 Microsoft Corporation, WA, USA). The statistical test used was the χ^2 test for comparison of nominal variables. Level of significance was $p < 0.05$.

Results

Based on the Questionnaire for Parents which assesses probability of children having ADHD, results show that most often there is a low probability for ADHD disorder (χ^2 -test=7,720; df=6; p=0.001) (Figure 1). Parent assessment data shows that probability of disorder presence was very high in 6.5% of children and high in 3.7% of children.

Based on the Questionnaire for Teachers which assesses probability that children have ADHD it was shown that most often there is a low probability for ADHD disorder (χ^2 -test=73,841; df=5; p=0.001) (Figure 2). Data obtained from teachers' shows that probability of syn-

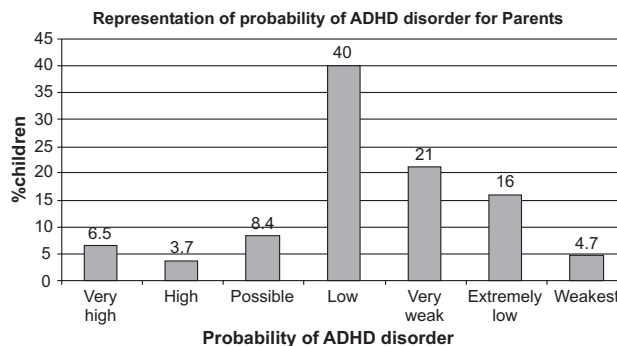


Fig. 1. Representation of probability of ADHD disorder (data obtained through Questionnaire for Parents from sample of 107 children, aged 5 to 8, from May to July, 2010).

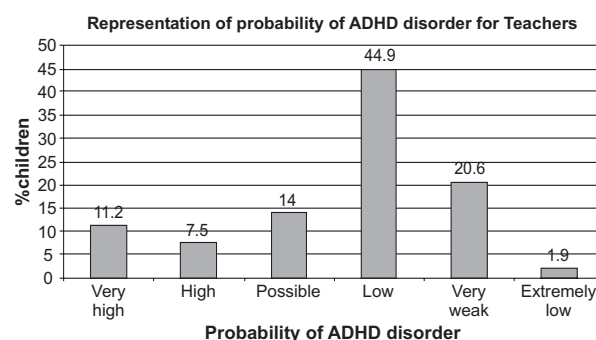


Fig. 2. Representation of probability of ADHD disorder (data obtained through Questionnaire for Teachers from sample of 107 children, aged 5 to 8, from May to July, 2010).

drome existence was very high in 11.2% of children and high in 7.5% of them.

Comparison of probability for ADHD disorder, according to the data obtained via Questionnaires for Teachers and Parents shows significant differences in assessment of ADHD probability, depending on the gender identity. Parents recognized a higher ADHD probability in male children, while teachers recognized a higher ADHD probability in female children (χ^2 -test=10,618; p=0.001) based on the sample of 107 children, aged 5 to 8, conducted in period between May and July, 2010.

Comparison of the probability for ADHD disorder, according to the data obtained via Questionnaires for Teachers and Parents shows insignificant differences in assessment of ADHD probability, depending on the age. Parents and teachers did not differ greatly in assessment of probability of ADHD existence in relation to the subject's age. Parents and teachers equally recognized a higher ADHD probability in all age groups (χ^2 -test=2.161; p=0.570; Fisher's Exact Test) (Table 2).

We can conclude that a significant number of children demonstrated high probability for ADHD disorder in assessments made by both parents and teachers. Parents recognize probability of ADHD presence more frequently among male children, while teachers recognize it more often among female children. Given the age of the child,

TABLE 2

COMPARISON OF 20 SUBJECTS WITH HIGH ADHD PROBABILITY, ASSESSED BY PARENTS AND 35 SUBJECTS WITH HIGH ADHD PROBABILITY ASSESSED BY TEACHERS, IN RELATION TO SUBJECT'S AGE (DATA OBTAINED VIA QUESTIONNAIRE FOR PARENTS AND TEACHERS, MAY TO JULY, 2010)

Responders	Number (%) of subjects by age			
	5	6	7	8
Parents	9 (47.4)	3 (42.9)	6 (27.3)	2 (28.6)
Teachers	10 (52.6)	4 (57.1)	16 (72.7)	5 (71.4)*

* χ^2 -test=2,161; $p=0.570$; Fisher's Exact Test

both parents and teachers recognize similar levels of high ADHD probability.

Discussion

ADHD is a complex disorder build from symptoms of lack of attention, hyperactivity and impulsiveness where recognition of the problem is made more difficult by possible domination of one of these symptoms. Detection and recognition of ADHD by parents, preschool teachers and teachers at schools comes across many obstacles. Our research shows that a significant percentage of children from the entire sample have been labeled with significant ADHD symptoms. It is important to emphasize that our conclusion aims to explain the probability for this disorder in our sample of children, something which could be obtained with further diagnostic evaluation and confirmation of the diagnosis.

Based on parents' answers, a very high probability for the disorder was showed in 6.5% of children while a high probability was in 3.7% of children. Based on the studies conducted in Australia, parents estimated that around 10% of children had significant symptoms and high probability for this disorder¹⁶. According to some authors, disorder in adolescent population is not significantly present among population where average frequency of ADHD is around 5 percent⁶. Based on our results, frequency is somewhat higher in 5% and we would not agree with the statement that this value is insignificant. That means that in each youth group and each preschool and school classroom there are 1–2 children who have a high probability of presence of ADHD symptoms.

On the other hand, looking back at the data received while evaluating teachers' comments, estimation is that there are a significant number of children that showed presence of ADHD symptoms, as well. Teachers recognized that 11.2% children showed a very high disorder probability and 7.5% a high disorder probability. During one study American teachers have estimated that 15.8% of children have a very high disorder probability¹⁷ as we have closely established in our study.

Data gathered through processing of Questionnaire for Teachers and Questionnaire for Parents, confirmed the probability of ADHD disorder according to existing

data obtained in other countries. With this data in consideration, we believe that further clinical diagnostic processing would determine the real number of frequencies for this disorder among our group of children, and other children which have not been involved in this research and for whom there objectively exists the same probability for presence of the ADHD disorder. The children in this study who have been discovered and recognized with high and very high probability of presence of ADHD syndrome should undergo systematic clinical evaluation by the multidisciplinary team, which unfortunately does not exist in our country. With this study we wanted to not only emphasize the importance of early detection and recognition of children with ADHD symptoms, but also the importance of their treatment. Currently in our country, the children with ADHD do not have an adequate treatment and generally have been left without any support to sole care of their parents and educational institutions.

With this study we also compared parents' and teachers' perceptions of children as related to their gender. We obtained statistical significance by comparison of two perceptions. According to parents' statements male children show more ADHD symptoms, while according to teachers' statements female children show more disorder symptoms. From the literature it is known that male children are more recognized to have this disorder. Research in most cases state that males have three to four times more pronounced ADHD disorder than females^{6,13}. The question can be made why did we obtain such differences in evaluations? Parents identified boys and more likely to have ADHD because at home it is easiest to identify hyperactivity symptoms as compared to all other disorder symptoms. It is the hyperactivity symptoms that are often stated as most pronounced with boys⁷. From the literature it is known that girls with this disorder show symptoms of lack of attention more often than boys¹⁸ which may be the explanation for teachers' responses. Considering that in school environment the greatest expectation on a child is to be able to pay attention the teachers assessed that girls have greater probability for ADHD because with them the lack of attention is the leading symptom of ADHD disorder.

In our study, when considering evaluation between parents and teachers while considering the age of a child, the ones with higher probability for ADHD have been approximately equally recognized for each age group. Opposite to ours, the research in Columbia shows difference in disorder recognition by parents and teachers in relation to child's age. The teachers have evaluated children ages 6 to 10 as showing higher disorder probability than the ones ages 4 to 5¹⁹. Knowing that our children up to 5 years old were all of preschool age and have received the same type of assessment as the ones of school age we concluded that the disorder symptoms were equally represented among preschool and school age children, and that parents and teachers in our study did not have difficulties identifying disorder symptoms in home and school environments. In addition, all children in our

sample belonged to the lower age category; therefore in order to attain differences in relation to age it would be necessary to expand the sample to include 4 year olds and ages 9 and up in order to assess these assumptions.

One of the problems of this study was small sample size. Expanding the sample size would allow a deeper analysis of this problem. Based on our study, the problem is present in our country as much as in other countries. Detailed report on this disorder would be obtained if the analysis went as far as the actual diagnosis of the disorder in a child. This would require joint effort of psychologists, parents, teachers and the entire research team which then begs the question whether our society is ready for such a thing. Based on our experiences parents are still very reluctant to openly discuss ADHD disorder. We believe that additional education regarding this disorder would encourage many parents to seek help for their child, while education of psychologists, teachers, educators and special needs teachers would be one of the first steps for timely detection and recognition of these children. It would also be a significant prerequisite for

improving cognitive, academic, emotional and overall developmental functioning of each child. It is important to emphasize that this is a first ADHD study in Herzegovina region and even the entire country of Bosnia and Herzegovina. Future studies should be directed toward early detection and recognition of children with ADHD syndrome and clinical evaluation as a first step toward successful treatment and prevention of additional psychological and other problems in an adult.

Conclusion

According to the sample collected, our research shows that a significant percentage of children have noticeable ADHD symptoms. Given the age of children, parents, preschool teachers and teachers recognize similar levels of high ADHD probability. Future studies should be directed toward early detection and recognition of children with ADHD syndrome and clinical evaluation, as first steps toward successful treatment and prevention of additional psychological and other problems in adulthood.

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RANO OTKRIVANJE I PREPOZNAVANJE DJECE SA SIMPTOMIMA ADHD-A (POREMEĆAJ HIPERAKTIVNOSTI I DEFICITA PAŽNJE)

SAŽETAK

Cilj ovog rada bio je utvrditi vjerojatnost pojave deficita pažnje/hiperaktivnog poremećaj – ADHD kod djece predškolske i rane školske dobi, te utvrditi razlike u procjeni djece označene sa visokom vjerojatnošću za poremećaj s obzirom na procjenu od strane roditelja i učitelja, te s obzirom na dob i spol djece. U istraživanje je bilo uključeno 107 djece: 51 djevojčica i 56 dječaka. U istraživanju su korištena dva upitnika: Upitnik za školsko procjenjivanje za učitelje i Upitnik za procjenjivanje kod kuće za roditelje. Svaki upitnik sadrži 39 tvrdnji koje obuhvaćaju tri dimenzije ponašanja djeteta potrebnih za dijagnosticanje ADHD-a. Sirovi rezultati svakog upitnika su konvertirani prema standardnim

normama Priručnika u Standardni rezultat (SS) i Totalni standardni rezultat (TSS), te kao takvi su iskorišteni za statističku obradu. Procjenom roditelja i učitelja pronađen je značajan broj djece koji pokazuje visoku vjerojatnost za ADHD poremećaj. Roditelji su učestalije prepoznavali veću vjerojatnost prisutnosti ADHD-a u muškom spolu, dok su učitelji to učestalije uočavali u ženskom spolu. Istraživanje je pokazalo da značajan postotak djece iz cijelog uzorka su označeni sa izraženim ADHD simptomima. S obzirom na dob djeteta, roditelji i učitelji su prepoznali slične razine visokih ADHD vjerojatnosti. Buduće studije trebale bi biti usmjerene prema ranoj detekciji i prepoznavanju djece s ADHD-om sindrom, te daljnjoj kliničkoj procjena, kao prvim koracima ka uspješnom liječenju i prevenciji dodatnih psiholoških i drugih problema u odrasloj dobi.