

Differentiation of the clinical diagnoses of autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD) and post-traumatic stress disorder (PTSD)

Różnicowanie diagnoz klinicznych zaburzeń ze spektrum autyzmu (ASD), zespołu nadpobudliwości psychoruchowej (ADHD) i zaburzeń po stresie traumatycznym (PTSD)

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Abstract

Introduction and objective: The aim of the presented research was to analyse the differentiation of clinical diagnoses of autism spectrum disorder, attention-deficit/hyperactivity disorder and post-traumatic stress disorder with the use of diagnostic tools. **Materials and methods:** The study involved 110 carers of 2–10-olds, patients of a psychiatric treatment ward. Medical records were assessed for the diagnosis obtained by the child in the course of treatment, then parents were interviewed. The usefulness of individual methods for differentiating clinical diagnoses of autism, Asperger's syndrome, attention-deficit/hyperactivity disorder and post-traumatic stress disorder was assessed using ROC (receiver operating characteristic) curves. **Results:** In many cases, the diagnoses obtained by the children were found to be different from those indicated by the tools. In addition, the tools themselves were in some cases found to be ineffective in diagnosing the disorder for which they were designed. The analyses also showed that crisis experiences can moderate the symptoms observed in children, thus influencing the diagnosis and the clinical picture. **Conclusions:** The presented analyses confirmed the thesis that the differential diagnosis of children is not an easy task, and that a potentially traumatic factor can affect the clinical picture of a disorder, as well as be its cause. The issues of unreliability of some tools used in the diagnosis and/or their inconsistency with the diagnoses obtained in the course of treatment were also found to be significant.

Keywords: PTSD, ADHD, ASD, child diagnosis

Streszczenie

Wprowadzenie i cel: Celem prezentowanych badań była analiza różnicowania diagnoz klinicznych zaburzeń ze spektrum autyzmu, zespołu nadpobudliwości psychoruchowej i zaburzeń po stresie traumatycznym. Założono, że u dzieci pewne grupy zaburzeń nie dają jasnego obrazu i w efekcie mogą wpisywać się w obraz sugerujący inną jednostkę diagnostyczną. **Materiał i metody:** W badaniu wzięło udział 110 opiekunów dzieci w wieku 2–10 lat – pacjentów oddziału leczenia psychiatrycznego. Przeanalizowano dokumentację medyczną pod kątem diagnozy uzyskanej przez każde dziecko w toku leczenia, następnie przeprowadzono wywiady z rodzicami. Przydatność poszczególnych metod w różnicowaniu diagnoz klinicznych autyzmu, zespołu Aspergera, zespołu nadpobudliwości psychoruchowej i zaburzeń po stresie traumatycznym oceniono z wykorzystaniem krzywych ROC (*receiver operating characteristic*). **Wyniki:** W wielu przypadkach diagnozy otrzymane przez dzieci różniły się od diagnoz, na które wskazały narzędzia. Równocześnie narzędzia okazywały się niekiedy mało skuteczne w rozpoznawaniu zaburzenia, z myślą o którym zostały przygotowane. Analizy wykazały również, że doświadczenia kryzysowe mają potencjał moderowania objawów obserwowanych u dzieci, przez co wpływają na obraz kliniczny i diagnozę. **Wnioski:** Prezentowane w artykule analizy potwierdziły tezę, że diagnoza różnicowa u dzieci nie jest zadaniem łatwym, a ponadto ujawniły, iż czynnik potencjalnie traumatyczny może nie tylko wpływać na obraz zaburzenia, ale także być jego przyczyną. Istotne okazały się też kwestie zawodności niektórych narzędzi stosowanych w diagnozie lub/i niespójności

rozpoznać z diagnozami formułowanymi w toku leczenia. Dla diagnostów i terapeutów oznacza to duże wyzwanie, związane z koniecznością refleksji nad wyborem narzędzi oraz zebrania dodatkowych informacji mogących stanowić podstawę różnicowania.

Słowa kluczowe: PTSD, ADHD, ASD, diagnoza dziecka

INTRODUCTION

Psychologists and practising therapists repeatedly point to cases of children who are misdiagnosed and, as a result, subjected to inappropriate therapeutic interventions, often including pharmacotherapy (Odachowska and Woźniak-Prus, 2018). The ambiguity of the clinical picture and the masking of symptoms by ongoing developmental tasks are considered the reasons. Lack of appropriate tools to perform a full differential diagnosis and insufficient diagnostic knowledge are also problems. This leads to under- or overestimation of the symptoms of some disorders and thus an incorrect diagnosis, resulting in inadequate therapeutic, corrective or supportive interventions. For example, impulsive or anxious behaviour in children is not always a symptom of a disorder, but can often be an expression of their struggle with tension resulting from a developmental crisis (Schaffer and Kipp, 2015). Emotional difficulties and behavioural problems, on the other hand, often accompany chronic somatic conditions and motor disabilities in children (Kowaluk-Romanek, 2019). Additionally, professionals increasingly note that diagnoses often become attempts to account for deficits in parental care. These are just some examples illustrating how difficult differential diagnosis in children can be and how many aspects need to be considered. According to evidence-based practice in psychology (EBPP), as recommended by the American Psychological Association (APA Presidential Task Force on Evidence-Based Practice, 2006), diagnostic standards should be based on good practice and all stages of the diagnostic reasoning process must be appropriately structured. The idea is to integrate the best available empirical evidence with practice in the context of an individual's characteristics and cultural background (APA Presidential Task Force on Evidence-Based Practice, 2006). Evidence-based diagnosis and the selection of tools should arise not only from the clinician's experience, but, above all, validated, reliable data and up-to-date scientific research (Blease et al., 2016). Diagnostic tools are usually based on the criteria of the International Statistical Classification of Diseases and Related Health Problems (ICD) and the American Psychiatric Association's classification of mental disorders (Diagnostic and Statistical Manual of Mental Disorders, DSM) for nosological diagnosis. The use of criteria and procedures included in the classifications aims to organise and standardise the diagnostic process, as well as the terminology used to describe deficits, disorders or disabilities. Although these aspects are important from a physiological point of view, they

may lead to the omission of elements that play an important role in the development of the disorder but do not fit into the criteria.

DIFFERENTIAL DIAGNOSIS OF DISORDERS IN CHILDREN

The essence of the diagnostic differentiation process is to assess the likelihood that a given clinical symptom (or group of symptoms) is present in a given clinical entity. Based on the observable/presented symptoms, the diagnostician generates diagnostic hypotheses and then gradually eliminates (usually based on new analyses) the least likely assumptions. The procedure continues until the correct and/or most likely diagnosis is reached. In this context, differential diagnosis is the process of identifying symptoms and comparing them with clinical entities included in the ICD and DSM classification systems (Cierpialkowska and Sęk, 2016). Diagnosis is established based on the data on the individual's broad and contextualised functioning, which is then compared with symptoms described in the classification systems. Symptom descriptions from existing psychotherapeutic models and strategies can be also used (Cierpialkowska and Sęk, 2016). The differential diagnosis should take into account the specificity of the symptoms of the disorder, the elements that distinguish it from other diagnostic entities and the broader context of the child's functioning. Ongoing developmental task and situational factors should not be overlooked. The fact that many cases of disorders are classified based on too little data seems to be a common problem in clinical practice. The diagnosed disorders are also often an attempt to account for parental deficits, with neurodevelopmental and/or hyperkinetic disorders being recently relatively popular.

The issue of differentiation between autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD) and post-traumatic stress disorder (PTSD) analysed in this paper is still uncommon. Usually two diagnostic entities, e.g. PTSD and ADHD (Odachowska and Woźniak-Prus, 2018) or PTSD and ASD (Stavropoulos et al., 2018), are compared. Difficulties also arise when dealing with very similar clinical entities, such as ASD and Asperger's syndrome (AS) (Korendo, 2018). This poses a challenge for diagnosticians: a proper diagnostic process should consider the symptoms of the disorder in question, but it also requires an insight into the specificity of the manifestations of other disorders that give rise to similar behaviour but often have different aetiology and functions.

AUTISM SPECTRUM DISORDER AND HYPERKINETIC DISORDERS

DSM-5 (American Psychiatric Association, 2013) classifies autism spectrum disorders under the heading of neurodevelopmental disorders. This is a very broad term that encompasses developmental-age-specific dysfunctions; neurodevelopmental disorders typically manifest during infancy, childhood or adolescence, and may arise as a result of abnormal central nervous system (CNS) development during foetal life and early childhood (Lai et al., 2013). According to DSM-5, neurodevelopmental disorders include intellectual disability, communication disorders, ASD, ADHD, specific learning disorders (SLD), movement disorders including developmental coordination disorder, tics, and other neurodevelopmental disorders (American Psychiatric Association, 2013). The updated ICD-11 diagnostic criteria for autism also classify ASD into the broad group of neurodevelopmental disorders (World Health Organization, 2019). Autism is associated with persistent deficits in initiating and sustaining social interactions and social communication, as well as with a range of restrictive and repetitive behaviours (RRBs) and interests. The onset of the disorder, which causes impairments in important functional areas, is usually in early childhood. The diagnosis of ASD is based on behaviours that are inconsistent with developmental norms, forming the triad of impairment, which includes: (1) a marked inability to form relationships and participate in social interactions, (2) impairments in verbal and non-verbal communication, (3) schematic behaviour, narrow range of activities and interests, and deficits in imagination (Lord et al., 2018; Pisula, 2012).

The prevailing assumption in clinical psychology is that ASD has a neurobiological (Minshew et al., 2002) and constitutional (Rutter, 2005) aetiology. Research also points to genetic determinants, in which prenatal, perinatal and post-natal factors leading to CNS development or damage may play an important role (Gerc, 2012; Mundy et al., 2007). Despite the neurobiological aetiology of ASD understood in this way, the biological indicators that could be used in everyday clinical diagnosis are still not well defined. The diagnosis is reached based on clinical manifestations characteristic of ASD and a structured interview (Rynkiewicz and Kulik, 2013).

The diagnosis of hyperkinetic movement disorders (HMD) is based on the presence of certain persistent patterns in the child's behaviour, which, as in ASD, are arranged in a characteristic triad of symptoms; these are inattention, impulsivity and hyperactivity in ADHD (Barkley, 2006; Wolańczyk and Komender, 2014). Attention deficit disorder is manifested by very short attention spans relative to developmental abilities, or problems focusing on a given activity for a longer period of time, even under favourable conditions (Borkowska, 2006; Świącicka, 2005; Wolańczyk et al., 1999). The poor efficiency of the attentional selection mechanism in these children gives rise to difficulties choosing the most important stimulus at a given

moment and high distractibility. The behaviour of a child with ADHD is dictated by an impulse occurring at a given moment, and the inability to predict the consequences of a particular action, both for the child itself and for others, means that there is no reflection on one's behaviour (Borkowska, 2006). The accompanying hyperactivity, manifested by increased mobility, can take the form of motor expansion or restlessness. The nosological diagnosis of ADHD is symptomatic and based on the current ICD and DSM criteria, which were mentioned earlier in the paper. There are hypotheses questioning the validity of the diagnosis of attention deficit disorder and hyperactivity disorder due to the low symptom specificity and significant overlap with other diagnoses (Faraone, 2005). However, this seems to be contradicted by data indicating a neurobiological basis of ADHD (Gałkowski and Pisula, 2003). As pointed out by researchers, the observed abnormalities in specific structures of the nervous system are caused by changes in the genetic material, the expression of which is modulated by environmental factors (Dickstein et al., 2006; Wolańczyk and Komender, 2014).

The behaviour of a child with ADHD, particularly in the areas of impulse control, hyper-reactivity and difficulty focusing, also fits the clinical picture of stress-related disorders (Odachowska and Woźniak-Prus, 2018). It is therefore necessary to differentiate between the two types of disorders in the context of the aetiological factor.

STRESS-RELATED DISORDERS

Diagnosis and differentiation of PTSD from other psychiatric disorders is more complex in children than in adults. The impact of trauma is individualised and depends on many factors. These diagnostic difficulties are due to the child's developmental level and limited ability to verbalise their mental states, as well as the fact that children often present with non-specific or delayed symptoms (Badura-Madej and Dobrzyńska-Mesterhazy, 2007; Odachowska and Woźniak-Prus, 2018). The earlier the adverse factors act, the deeper and more extensive the damage they cause (Briere and Scott, 2010). The most severe brain changes occur in the youngest children (0–3 years) during the pre-verbal period. Researchers emphasise that the younger the child, the less mature the coping strategies (Perry and Pollard, 1998). Experiences that meet the criteria for trauma have a particular impact on the child. Trauma experienced early in life affects the developing brain (Perry et al., 1995).

PTSD symptoms may vary in severity and depth depending on the developmental stage, external situational factors and the level of support received. Agitation, excessive response to stimuli, irritability, physiological disturbances, and significant withdrawal are the main symptoms found in infants. Increased anxiety reactions in new situations, anger, avoidance of certain situations through increased mobility, and sleep disturbances are typical symptoms observed up to 1 year of age. At a later age,

reactions to trauma-related words are noticeable, while reactions to trauma-related symbols, violent reactions and night terrors are more common in further developmental stages (Gil, 2006; Scheeringa et al., 1995; Taylor, 2010). Based on analyses of post-traumatic stress symptoms in young children (Scheeringa et al., 1995), the diagnosis of PTSD up to the age of 48 months is justified if at least one of the following symptoms appears: re-experiencing, reduced activity (visible social withdrawal, rigid affect, loss of acquired skills), hyperactivity (responding fearfully to stimuli, excessive irritability or agitation, sudden bouts of anger, difficulty concentrating), fear and aggression (aggressive behaviour, close contact with caregivers, fear of the toilet or objects). Regression and increased separation anxiety are also characteristic, especially in younger children (Dabkowska, 2014; Taylor, 2010). Difficulties in interpersonal relationships are an additional symptom in children over 2 years of age, while decreased self-esteem and self-worth are observed in older children. This wide variety of responses poses diagnostic challenge. Children may not show some of the symptoms at all or may not show all the symptoms at the same time, the symptoms may be delayed or somatised. Additionally, PTSD shares some symptoms with those typical of ASD (e.g. relationship difficulties, isolation) and/or ADHD (e.g. hyperarousal). Therefore, a thorough analysis of the aetiological factors rather than just the observable symptoms is needed to reach the correct diagnosis. Both the knowledge of criteria and the ability to navigate the differential diagnosis of disorders whose picture may resemble PTSD are needed. Misdiagnosis results in inappropriate interventions, which in turn significantly affects the child's future (Odachowska and Woźniak-Prus, 2018). It is therefore of key importance to point out some specific elements suggestive of symptoms arising from crisis experiences. The diagnosis of trauma may be under- or overestimated (Odachowska and Woźniak-Prus, 2018), primarily because early trauma affects the child's emotional, social and cognitive development. According to analyses, this has far-reaching consequences (also in adulthood) not only in the form of PTSD, but also somatisation, depressive, dissociative, anxiety or personality disorders (Leviton et al., 2003; Matza et al., 2003).

Given the considerations outlined above, analyses were planned to compare the symptoms presented by children using several tools and to verify whether obtaining a diagnosis of one disorder precluded a different diagnosis reached with another tool. Estimation of the diagnostic validity of the tools themselves was also an important aspect.

METHODS

Analyses were conducted to assess the differentiation of autism spectrum disorders (ASDs), hyperkinetic movement disorders (HMDs) and stress-related disorders (SRDs) using the following diagnostic tools:

- Autism Spectrum Rating Scales (ASRS) by S. Goldstein and J.A. Naglieri, adapted by E. Wrocławska-Warchał and R. Wujcik, designed to measure ASD behaviours;
- CONNERS-3 by C. Keith Conners in the Polish adaptation by R. Wujcik and E. Wrocławska-Warchał, based on DSM-5 standards and diagnostic criteria;
- a structured diagnostic interview questionnaire for ADHD according to ICD-10 criteria (Wolańczyk and Kołakowski, 2005);
- Essener Trauma-Inventar für Kinder und Jugendliche (ETI-KJ) questionnaire for children and adolescents by E. Morawa, A. Masko, I. Kolankowska, W. Senf and S. Tagay, assessing the severity of PTSD symptoms;
- Assess Your Child (Original name: "Oceń Swoje Dziecko", OSD; full name: Assess Your Child in Six Dimensions) – a structured interview for caregivers by M.L. Bloomquist, which allows screening for deficits based on caregiver's knowledge. The tool assesses self-control, social and emotional development and academic skills. It additionally includes a scale to assess parental well-being and family relationships.

Furthermore, a structured interview was used to collect demographic data, data on the child's family situation, previous treatment, possible mental disorders, family history of addictions and dysfunctions, and potentially traumatic experiences of the child. Medical records were also analysed for the diagnosis established in the course of psychiatric treatment.

The whole examination was conducted by a clinical psychologist in the ward. At the initial stage, an interview was held with the parent, during which a structured interview and tools requiring the presence of a diagnostician were implemented. Then the parents were asked to complete a set of tests described above. The duration of all stages of the study was estimated to be approximately 120 minutes. It was analysed whether the tools commonly used in psychological practice allowed to confirm the diagnosis included in the child's file, and whether the tools would prove effective in the diagnostic process.

CHARACTERISTICS OF THE STUDY GROUP

The study was conducted among patients of one of the psychiatric treatment units for children in Warsaw. A total of 110 children aged 2–10 years, including 29 girls and 81 boys, participated in the study. Data obtained from 107 patients were included in the analyses (3 patients were excluded due to missing data). The mean age of the children was approximately 5 years ($\mu = 4.95$, $\sigma = 1.86$, min. = 2, max. = 10). Most patients (74.8%) were raised in complete families, nearly one-fifth (19.6%) were children from single-parent families, and 5.6% of patients came from blended families.

In many cases, discrepancy was found between the diagnoses received by the children and those indicated by the tools. For example, 13 children presented with PTSD symptoms,

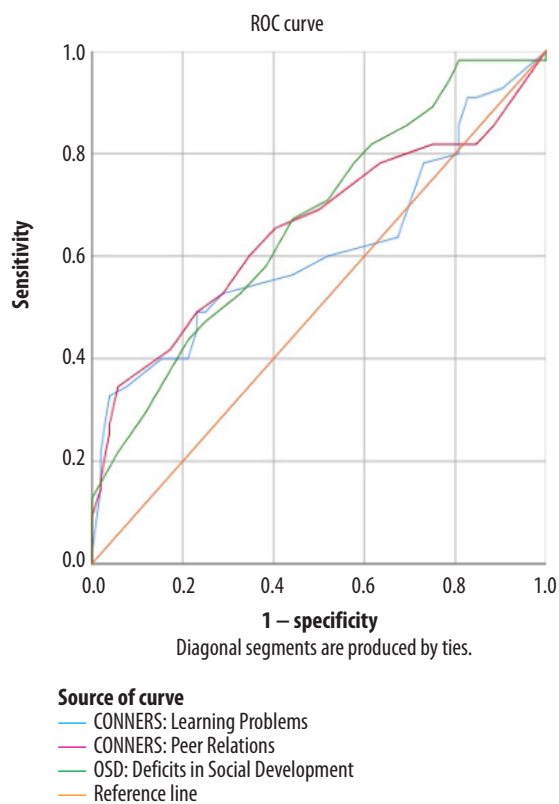


Fig. 1. ROC curve of autism diagnosis classification for tools indicating a positive correlation

while only 1 diagnosis of PTSD appeared in the medical records. The results obtained in the tests in the study group were analysed with reference to the diagnostic criteria on the basis of which the diagnoses were formulated. Furthermore, it was assumed that there were differences in the severity of ASD and ADHD symptoms depending on the potentially traumatic situations experienced in childhood.

RESULTS

Statistical analyses were performed using IBM SPSS Statistics software (version 26, macOS operating system). The usefulness of individual diagnostic tools in differentiating clinical diagnoses of autism, AS, ADHD and PTSD was assessed using receiver operating characteristic (ROC) curves. An area under the curve (AUC) value below 0.5 indicated a negative correlation (the higher the score, the less likely the diagnosis), while an AUC value above 0.5 indicated a positive correlation (the higher the score, the more likely the diagnosis). Classification was performed for each diagnosis separately, using the individual ADHD, CONNERS, ASRS, ETI-KJ and OSD scores. Borderline cut-off points that make a clinical diagnosis likely were calculated for the relevant classifiers. The minimum of the f (sensitivity – specificity) function was taken as the cut-off point for each research tool. The analyses included, in turn, an assessment of the concordance of the individual diagnostic tools

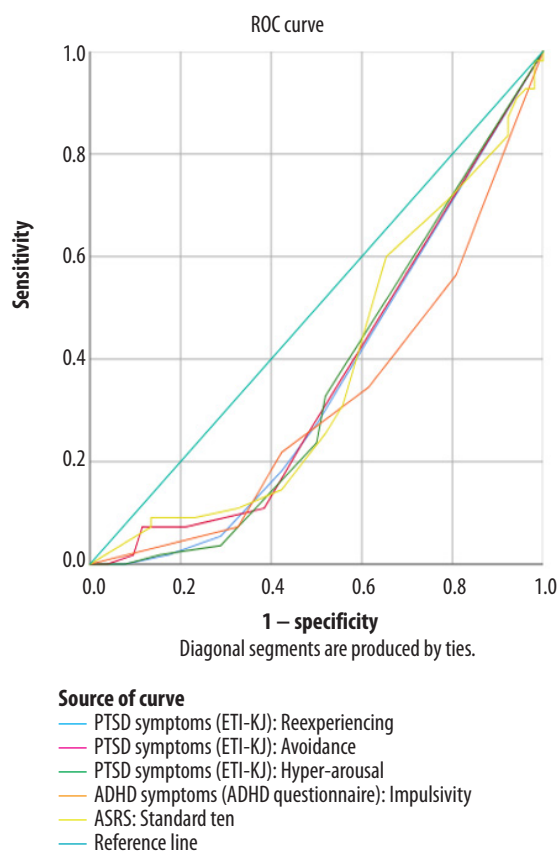


Fig. 2. ROC curve of autism diagnosis classification for tools indicating a negative correlation

and an assessment of the concordance between the clinical diagnosis and the diagnosis made with the tools. Analyses of the usefulness of the diagnostic tools used in differential diagnosis were then presented.

Predicting clinical diagnosis

Of the tools tested, eight scales were found to be useful in predicting the diagnosis of autism: ASRS ($p < 0.05$), Impulsivity (ADHD) ($p < 0.01$), Learning Problems ($p < 0.05$) and Peer Relations ($p < 0.01$) from the CONNERS questionnaire, as well as all OSD scales for PTSD symptoms ($p < 0.05$) and Social Development Deficits ($p < 0.01$). A positive correlation was found for three of these scales (the higher the score, the more likely the diagnosis). These were: Learning Problems (a child's score >7.5 made the diagnosis of autism more likely), Peer Relations (>5.5) (CONNERS) and Social Development Deficits (OSD) (>19.5). ROC curve for sensitivity and specificity values is shown in Fig. 1.

A negative correlation was observed for five relevant scales (the higher the score, the less likely the diagnosis). These were: ETI-KJ (Reexperiencing, Avoidance and Hyper-Arousal – a score >0.5 made the diagnosis of autism less likely), Impulsivity in the ADHD questionnaire, and, interestingly, the ASRS score (a score >66.5 made the diagnosis of autism less likely) (Fig. 2).

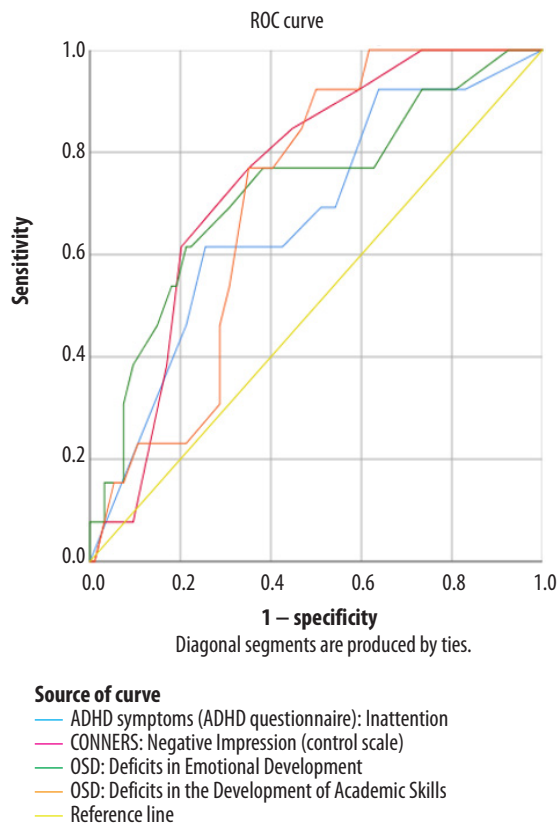


Fig. 3. ROC curve for the classification of fulfilment of PTSD diagnostic criteria for tools showing a positive correlation

Next, prediction of the clinical diagnosis of AS was analysed, in which one scale, Deficits in the Development of Academic Skills from the OSD questionnaire, proved useful ($p < 0.05$). Here, a negative relationship was found (the higher the score, the less likely the AS diagnosis): a score above 10.5 was associated with a less likely AS diagnosis.

In the next step, prediction of meeting the diagnostic criteria for PTSD was analysed. Four inventories from tools that were not directly related to PTSD were found to be useful here: Inattention from the ADHD questionnaire ($p < 0.05$), Negative Impression from CONNERS ($p < 0.01$) and Deficits in Emotional Development ($p < 0.01$) and Deficits in the Development of Academic Skills ($p < 0.05$) from OSD. A positive correlation was found in all cases (the higher the score, the higher the likelihood of meeting the diagnostic criteria for PTSD). With regard to attention deficits, a score >5.5 in the ADHD questionnaire was associated with a higher likelihood of meeting the diagnostic criteria for PTSD. An analogous relationship was found for a score >8.5 in Negative Impression (CONNERS). In the OSD questionnaire, a score >16.5 in Deficits in Emotional Development and a score >15.5 in Deficits in the Development of Academic Skills increased the likelihood of meeting the diagnostic criteria for PTSD (Fig. 3).

Meeting the diagnostic criteria for ADHD was the last issue analysed in relation to predicting the diagnosis of a given disorder using the inventories included in the tools for diagnosing

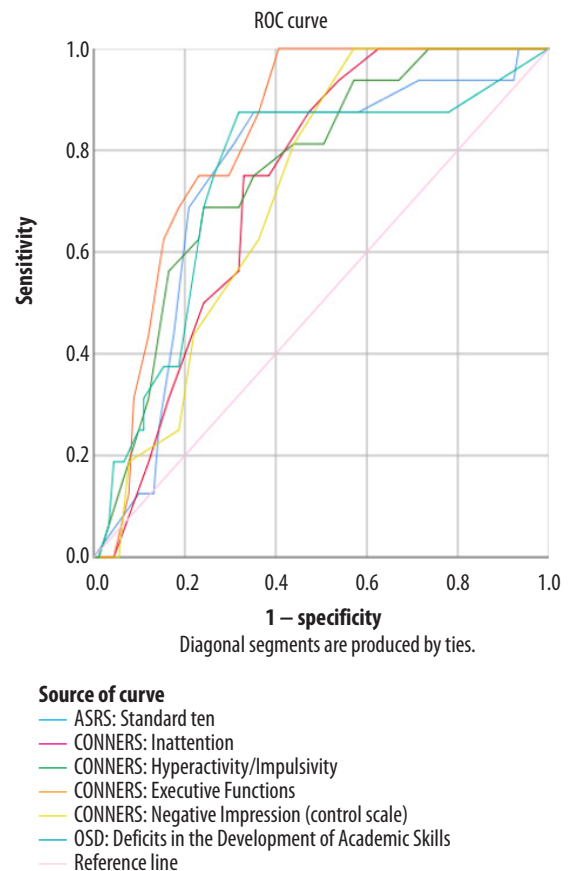


Fig. 4. ROC curve for the classification of fulfilment of ADHD diagnostic criteria for tools showing a positive correlation

other deficits. Seven scales proved useful here: ASRS ($p < 0.01$), CONNERS scales – Inattention ($p < 0.01$), Hyperactivity/Impulsivity ($p < 0.001$), Executive Functions ($p < 0.001$) and Negative Impression (control scale) ($p < 0.01$), as well as OSD scales – Deficits in Social Development ($p < 0.01$), and Deficits in the Development of Academic Skills ($p < 0.01$).

A positive correlation was found for six of these scales. These were CONNERS scales: Inattention (a score >10.5 increased the likelihood of meeting the diagnostic criteria for ADHD), Hyperactivity/Impulsivity (>13.5), Executive Functions (>9.5), Negative Impression (control scale; >8.5). A positive correlation was also noted for ASRS (>68.5 increased the likelihood of meeting the diagnostic criteria for ADHD) and Deficits in the Development of Academic Skills in OSD (>16.5). Sensitivity and specificity values are shown in the ROC curves plotted in Fig. 4.

A negative correlation was found for one of the OSD scales, i.e. Deficits in Social Development, with a score >18.5 associated with increased likelihood of meeting the criteria for ADHD.

Differences in the severity of disorder depending on childhood trauma

The study also analysed the severity of disorders in relation to stressors. Comparisons for different types of trauma and

selected demographic data collected in the interview were made using the non-parametric Mann–Whitney U test for independent samples. Groups that experienced and did not experience trauma, as well as groups differing in selected variables meeting the criteria for a potentially traumatic stimulus, were compared for the severity of ADHD and autism (ASRS).

The analyses conformed the hypothesis that the severity of ADHD symptoms is associated with a number of variables and potentially traumatic experiences. ADHD was more severe among children with a family history of psychiatric disorders ($U = 941, p < 0.05$) and substance abuse ($U = 996.5, p < 0.05$), as well as in children who experienced trauma/accidents ($U = 489.5, p < 0.05$) or violence ($U = 403, p < 0.05$) after the age of 2 years. Hyperactivity appeared to be more severe in patients with a family history of psychiatric disorders ($U = 855.5, p < 0.01$) and those hospitalised after the age of 2 years ($U = 1,044, p < 0.05$). Impulsivity was more severe in children from families with a history of psychiatric disorders ($U = 924.5, p < 0.01$) and substance abuse ($U = 1,078.5, p < 0.05$), and in children who experienced trauma/accidents ($U = 429, p < 0.01$), violence ($U = 294.5, p < 0.001$), and hospitalisation ($U = 1,029.5, p < 0.05$) after the age of 2 years. In the case of the second tool to assess the severity of ADHD (CONNERS), inattention was found to be more severe in boys ($U = 736.5, p < 0.01$) and in those with a family history of psychiatric disorders ($U = 968, p < 0.05$). Hyperactivity/impulsivity were more severe in children from single-parent families ($U = 602.5, p < 0.05$) and from families with a history of psychiatric disorders ($U = 863, p < 0.01$). Executive dysfunctions (CONNERS) were more severe among children who had experienced trauma/disease by the age of 2 years ($U = 955.5, p < 0.05$), and children from families with a history of psychiatric disorders ($U = 968.5, p < 0.05$). In contrast, disobedience/aggression were more severe among children who experienced violence after the age 2 years ($U = 432.5, p < 0.05$). The analysis of the severity of autism (ASRS) showed that higher scores were associated with a family history of psychiatric disorders ($U = 784, p < 0.001$) and substance abuse ($U = 964.5, p < 0.01$), as well as with experience of severe illness ($U = 204.5, p < 0.01$) or violence ($U = 432.5, p < 0.05$) after the age of 2 years.

As the above results show that traumatic experiences have an impact on the severity of disorders children. It should be noted that the experiences analysed were related to the period before the diagnosis of the disorder in question, and therefore could play a role in its aetiology. The results as a whole revealed a complex picture of disorders and potential aetiological factors.

SUMMARY

The analyses presented in this paper aimed to identify difficulties in differentiating clinical diagnoses of autism spectrum disorder (ASD), hyperkinetic disorders (ADHD) and

post-traumatic stress disorder (PTSD). It was also assessed in what way traumatic experiences can distort the clinical picture of other disorders and/or lead to these disorders. The study considered the accuracy and reliability of the diagnoses made, analysed by assessing the likelihood of the diagnosis using tools based on appropriate diagnostic criteria.

The research showed differences in the severity of disorders depending on childhood trauma experienced; it also showed that most of the diagnostic tools analysed did not fully reflect the picture of the disorder in question, and that diagnoses made using the tools did not always confirm that a specific deficit exists. Additionally, a number of inventories included in the tools proved useful in predicting the fulfilment of diagnostic criteria for other disorders. Although it may indicate their co-occurrence, it may also point to diagnostic errors resulting from symptomatic diagnosis.

Some methods did not make the diagnosis likely, and sometimes other scales proved more helpful in verifying the diagnostic hypothesis. For example, ASRS score and data obtained using the OSD interview were highly useful in predicting the fulfilment of ADHD diagnostic criteria (apart from scores in some of the CONNERS-3 scales). The latter tool was helpful for the majority of diagnoses and made the largest number of diagnoses likely.

Only one scale has been shown to be useful in predicting the clinical diagnosis of AS: Deficits in the Development of Academic Skills (OSD), i.e. the higher the score, the less likely the diagnosis of AS. Since the most recent diagnostic classification system (ICD-11) includes AS in autism spectrum disorders (World Health Organization, 2019), it would be expected that the tools used to diagnose ASD would also make this diagnosis more likely. Analyses to date suggest a relatively frequent co-occurrence of ASD and ADHD. It is worth noting that reports on the coexistence of the two disorders, estimated to account for up to 50–70% of cases (Rong et al., 2021), are increasingly criticised (Hours et al., 2022; Leitner, 2014). Problems also arise in the course of the differential diagnosis of ADHD and other disorders, including PTSD. The relationship between these two entities may be of a different nature, which raises many diagnostic doubts (Odachowska and Woźniak-Prus, 2018).

CONCLUSIONS

The differential diagnosis of disorders in children is not an easy task. This was confirmed by the discussed analyses, which also showed that a potentially traumatic factor may not only influence the clinical picture, but it can also often cause the disorder. Previous analyses also indicated difficulties in differentiating disorders in children. For example, ADHD, apart from common features with ASD, requires differentiation from PTSD (Kenny and Lane, 1997; Odachowska and Woźniak-Prus, 2018; Perry et al., 1995), externalising behaviours (EBs), e.g. oppositional defiant

disorder, and conduct disorders (Biederman et al., 1991), depressive and anxiety disorders (Drabick et al., 2006). The etiological factor is of great importance here, and the list of environmental variables that may be involved in the development of symptoms is long.

Although the currently prevailing trend points to the role of neurological factors in the aetiology of ASD, there are concepts advocating that autism may arise from a traumatic experience during the child's development, e.g. a failure to meet the child's basic needs, mainly due to problematic relationships between the child and the primary caregiver, most often the mother (Danielewicz and Pisula, 2003; Suchowierska et al., 2012). Events that may lead to such situations include a traumatic childbirth, lack of bonding with the mother (stay in an incubator or maternal rejection) and other potentially traumatic experiences (Młynarska, 2008). Autistic behaviours may then constitute a psychogenic defence mechanism activated by children in response to the lack of safety and threats arising in the environment. Autism spectrum disorders understood in this way are functional in nature (Talarowska et al., 2010). Concepts pointing to prenatal (Gołaska, 2013; Jagielska, 2014), genetic (Baron-Cohen and Bolton, 1999), biological (Pisula, 2012) or neurochemical (Wujcik et al., 2010) predisposing factors are also important.

A stressful stimulus resulting from various conditions seems to be an element shared by and at the same time differentiating the described entities. Given the impact of traumatic factors early in life, it should be remembered that it may be reflected in the child's behaviour, but also contribute to functional changes at the CNS level. In such a case, the symptoms presented by the child will fit into the clinical picture of various disorders and sometimes suggest an inappropriate diagnostic entity. This is important as the analyses presented in this paper revealed the unreliability of the tools used in the diagnosis and/or the inconsistency of the results obtained with the diagnoses reached during treatment. This poses a great challenge to both diagnosticians and therapists. It should not be limited to establishing a diagnosis, which may be an advantage in the context of educational challenges; the diagnosis should be, above all, the first stage of appropriate therapeutic intervention. Apart from differentiating diagnoses, the analysis of possible co-occurrence of disorders seems to be an important aspect, but this is an area requiring further exploration.

Conflict of interest

The author reports no financial or personal relationships with other individuals or organisations that could adversely affect the content of the publication and claim ownership of this publication.

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Author contributions

Original concept of study; collection, recording and/or compilation of data; analysis and interpretation of data; writing of manuscript; critical review of manuscript; final approval of manuscript: EOR.

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