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The Boundaries Between Normality, ADHD and PBD in Child Psychiatric Clinical Practice

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Abstract

Attention-Deficit Hyperactivity Disorder (ADHD) is considered one of the most common neurobehavioral disorders of childhood. Clinical descriptions and diagnostic criteria for ADHD have been redefined over time; current conceptualization of the syndrome is characterized by lack of attention and/or hyperactivity-impulsivity. Epidemiological studies show large differences in the incidence, indicating that the effort of current taxonomic systems to offer diagnostic accuracy have not yielded substantial results. Bipolar Disorder (BD) with onset in childhood, commonly referred as Pediatric Bipolar Disorder (PBD), is distinguished from the adult type by the rarity of affective symptoms. Neither depressive mood nor hypomanic euphoria is apparent in the clinical picture of bipolar children and adolescents. Instead they exhibit a severe irritability and their symptoms are expressed in consecutive cycles, which include brief episodes of depressive, hypomanic, manic or mixed periods without free intervals. There has been a delay in the recognition of this clinical picture. Nevertheless, the diagnostic criteria in the current taxonomic systems are not separated from those of adults. The contemporary literature contemplates the relationship between ADHD and PBD. These two disorders share similar clinical picture with slight variations, thus the differential diagnosis in favour of PBD mainly based on the presence of affective disorders in the family. In this paper, we try to examine whether comorbidity exists, whether ADHD is over-diagnosed against PBD or whether ADHD represents a prodromal manifestation of PBD. Children with ADHD-PBD comorbidity tend to express mostly an irritable phenotype with a chronic course and have higher rates of conduct disorders. This suggests a symptomatic continuum spectrum between ADHD and PBD which is possibly responsible for the difficulties met in differential diagnosis and the variation of comorbidity rates. It seems that the earlier the onset of PBD more often it is associated with symptoms of ADHD. The relationship between PBD and ADHD has important implications for treatment. The diagnostic confusion regarding the evaluation and relationship of these two clinical entities is strongly reflected in the proposed course of pharmaceutical treatment. The diagnostic issues concerning the diagnosis of ADHD versus PBD and their entangled relationship refer to the difficulty of defining the limits of normal and abnormal in the mental health of children and adolescents and the limitation of the taxonomic systems in respect to the particularities of this developmental age spectrum.

Keywords

Attention-Deficit Hyperactivity Disorder (ADHD), Pediatric Bipolar Disorder (PBD), Comorbidity, Diagnostic Issues, Limitations, Normality

1. Introduction

Children's psychological development and its disorders offer a broad field of discussion on the notions of normality and pathology. Childhood is a time of constant developmental changes. Changes both at the biological and the psychological level are quite rapid. Taking environmental factors into consideration as well, the developmental approach has shown that each stage has its own characteristics. Thus, a symptom or behaviour cannot be classified as pathological except only in relation to the child's developmental level and the specific environmental context surrounding it.

Therefore, difficulties in the effort to define clinical entities in the field of child psychopathology are to be

expected. The classification of mental health disorders in childhood continues to be a very concerning issue, causing much discussion about diagnostic fidelity. This is due to the fact that, as all classifications keep evolving, following developments in sciences relevant to their object, so do the suggested psychiatric classifications reflect the current clinical and theoretical approaches, especially those of their authors. In addition, their continual revision demonstrates the lack of definite knowledge in the field of mental health disorders [1].

Attention-Deficit Hyperactivity Disorder (ADHD) is considered to be the most common neurobehavioral disorder in childhood. The core symptoms of ADHD include hyperactivity, impulsivity and distractibility. Despite claims that it is a distinct nosological entity, multiple revisions and redefinitions of the syndrome demonstrate otherwise. Furthermore, an ever growing interest in mood disorders in children has been recently observed. Childhood onset bipolar disorder is no longer considered so rare, while children are more likely to present a non-episodic, chronic course, without discrete periods of mania or depression as in adulthood.

The phenomenological overlap between ADHD and PBD includes an extensive list of symptoms associated with both disorders. The eminent question that arises: when does a child's irritability not point to ADHD but to PBD? Diagnostic confusion between ADHD and PBD may be due to the result of features common to both classes of disorders, but has mainly to do with forms of severe ADHD: with mood liability, emotion dysregulation and mania. In contemporary classification systems, the emotion dysregulation symptom is no longer a core feature. The same applies to irritability, which is no longer a symptom of paediatric depression and is found only in mania. Without a detailed history listing of pathological episodes, it is hard to distinguish an impulsive, distractible, emotionally labile, irritable child with ADHD from a child with mania [2].

2. Attention-Deficit Hyperactivity Disorder (ADHD)

Hyperactivity prevailed in the Anglo-Saxon bibliography through a mainly neurobiological approach. It portrayed the behavioural state of children with minor brain damage or minor brain dysfunction, including a broader range of dysfunctions of the central nervous system. Recent literature shows difficulties in defining the structural dimension of the symptoms of hyperactivity and inattention, which are heterogeneous and closely connected to other common childhood problems. Many studies show contradictory results concerning the definition of ADHD. Some authors underline the lack of agreement among lab data on attention and behavioural manifestations [3][4][5]. While others show that the manifestations of attention deficit are not homogeneous [6].

2.1. ADHD Diagnosis and Classification

Difficulties and controversy concerning the definition of ADHD are clearly demonstrated by the various forms this disorder takes in successive editions of DSM. It first appeared in the second edition of DSM in 1968 [7] under the name of "hyperkinetic reaction of childhood", focusing mainly on the hyperactive symptomatology. Later studies emphasized the impulsivity and distractibility component of the disorder [8]. Consequently, in DSM-IIIR, [9] it appeared as "attention deficit-hyperactivity disorder" manifesting itself in two subcategories: with or without hyperactivity. It was considered that children of both groups exhibited mainly impulsivity and distractibility, combined only in some cases with hyperactivity.

Despite diagnostic changes, problems persisted. Studies have shown that the hyperactivity and impulsivity symptoms can coexist as a factor separate from inattention. Furthermore, children exhibiting inattention without hyperactivity have been identified, different from those exhibiting hyperactive and impulsive symptomatology [10][11] [12]. In order to take these facts into account in DSM-IV [13], the term "attention-deficit disorder" prevailed. Attention symptoms thus have a prominent role and can exist without being necessarily accompanied by hyperactivity. Three diagnostic subcategories are proposed: Attention-Deficit Hyperactivity Disorder Combined Type, Attention-Deficit Hyperactivity Disorder Predominantly Inattentive Type and Attention-Deficit Hyperactivity Disorder Predominantly Hyperactive-Impulsive Type.

This approach was also adopted in the recent fifth revision of DSM [14]. However, the following changes have been made in the diagnostic criteria: the required condition "to take place in more settings" has been enhanced with the use of the term "some symptoms in every setting", the onset criterion has been changed from "symptoms present before the age of seven" to "some symptoms present before the age of twelve", its types have been replaced by the presence of indicators defining and pointing to previous types, it is now allowed to double-diagnose comorbidity with PDD and lastly it has been included in the chapter for neurodevelopmental disorders.

Controversy still remains. Some researchers claim that the children with Attention-Deficit Hyperactivity Disorder Predominantly Inattentive Type and those with Attention-Deficit Hyperactivity Disorder Combined should be classified in two separate disorders [15] [16].

2.2. ADHD: Critique Evaluation

The prevalence of ADHD varies from 2% to 17% [17]**.** This great fluctuation in epidemiology is probably due to different ways of research methodology and data collection. Nevertheless, it underlines the weaknesses concerning the proper application of diagnostic criteria. Even though the approach is purely in a behavioural context, it seems that several diagnostic criteria are rather vague or interpreted differently by clinicians affected by different socio-cultural

backgrounds. Some civilisations, e.g. the Mediterranean one, are more tolerant to children's mobility and activity than others.

The vagueness of certain criteria raises the issue of what is normal and what is pathological in child development. Diagnostic criteria such as: "often gives the impression of not listening when talked to" or "often has trouble taking calmly part in activities", are rather subjective. Furthermore, these criteria often correspond to features completely commonplace in many children. On the other hand, children with ADHD often come from families with some parental psychiatric pathology [18]. We can assume an over diagnosis of ADHD in families with great difficulties in parental provision, marked by inefficient structured frameworks, allowing children to cross boundaries and exhibit disruptive behaviours.

Despite all efforts made in the current bibliography, it is evident that the application of diagnostic criteria can depend on particular situations, thus leading to diagnostic inaccuracy.

3. Pediatric Bipolar Disorder (PBD)

Already in 1838, Esquirol[19] had referred instances of manic attack in school- aged children. In the early 20th century, Kraepelin [20] had also described in detail cases of depressive and manic attacks in children and adolescents. Still, bipolar disorders in children and adolescents were not recognized as an official psychiatric diagnosis until 1970. Since 1980, the rise in suicides and suicide attempts, particularly in adolescents, led to the systematic research of bipolar affective disorder in childhood and adolescence. Since then, there have been many studies, and these moods episodes have been steadily recognized [21].

3.1. PBD Diagnosis and Classification

Current classification systems do not distinguish between the diagnostic criteria for childhood and adult onset BD. However, the clinical practice, presents a different picture.

Pediatric bipolar symptoms are differentiated from the typical adult presentation of BD by the rarity of mood symptoms. Very often neither the depressive mood nor the hypomanic euphoria is at the forefront. Instead, children seem to be characterized by an intense irritability with violent attacks and physical manifestations. Psychotic symptoms could take the form of auditory or visual hallucinations and delirium can coexist, though rarely mentioned spontaneously by the young patient. The most distinguishing trait lies in the virtual absence of a cyclic symptomatology, consisting of discrete periods of both mania and depression interspersed with normal functioning. Bipolar children and adolescents demonstrate signs of repeated cycles including brief depressive, hypomanic, maniac or mixed episodes, with no symptom-free periods [22][23]. For Craney and Geller [24], PBD corresponds to a serious picture of adult BD involving chronic mixed mania, psychotic characteristics and a continuous cyclic clinical course. Children with PBD also show a residual social functioning, as well as learning difficulties [25].

3.2. PBD: Critique Evaluation

Studies have shown that mood disorders are diagnosed at a percentage of 0.3% in infancy, 1.8% in the latent period, and reach 4.7% in mid-adolescence. Despite research showing a significant increase of PBP in children and adolescents in the last decade, the prevalence of the PBD remains relatively low [26].

Epidemiologists claim that PBD is underestimated, maintaining that the disorder is under-diagnosed due to diagnostic confusion and the different clinical picture in children [27]. They also note that detailed research would reveal the high prevalence of the disorder in hospital child psychiatry units, stating that PBD could be the most common psychiatric disease in hospitalized children and adolescents [28].

Nevertheless, it seems that clinicians in Europe appear fairly hesitant in the diagnosing of PBD. Meyer at al [29] refer that BD in children is rarely diagnosed in Germany; while 63% of psychiatrists have used this diagnosis in adolescents, only 7.8% have done so in children. Kochman et al [30] confirm the rarity of the diagnosis in France. Soutullo, et al study [31] also shows evidences of low diagnosing in Europe; only 1.2% of hospitalized children in Denmark and 1.7% of adolescents in Finland were diagnosed with BD. In Italy, authors record 4% prevalence, in children and adolescents and in the Netherlands the prevalence adolescents of mania and hypomania was 1.9% and 0.9% respectively.

This again begs the question of boundaries between normality and pathology in childhood. In a single day, children can feel periods of euphoria and intense excitement alternating with periods of sadness or dysthymia, directly related to their social activities and emotional needs. In adolescents, the mood liability -which can be extreme-, makes it very hard to distinguish normality and pathology in mood disorders [30].

According to Stringaris et al [32] clinical pictures fulfilling the BD criteria of DSM-IV are rare in children, because manic episodes are usually briefer than what is required. They conclude that more research is necessary about these brief episodes to determine whether they actually constitute a clinical image of PBD. Taylor [33] argues that brief episodes of excessive emotional manifestations -mainly anger- presented in younger children do not necessarily constitute the onset of a classical BD. Furthermore, recent longitudinal studies have found that hypomanic and manic symptoms in youth can be inconsistent and disappear in time [2] [34] [35] [36].

As for ADHD, it seems that for PBD as well there is no complete consensus and a lack of consistency about diagnostic criteria in PBD. Differential diagnosis should include ADHD, the reaction to a hostile environment, substance abuse, serious emotional dysfunction and the autistic spectrum disorders.

4. ADHD vs. PBD: Differential Diagnosis

The differential diagnosis between ADHD and PBD in childhood poses a main diagnostic issue. Many symptoms associated with ADHD overlap with presenting manic symptoms of PBD, including restlessness, hyperactive behaviour accompanied by tachylalia and tachypsychia, rapid flow of ideas, agitation, distractibility, sleep disruption and poor school performance. This is evident in the following table [37; See Table1]:

Table 1. *Schapiro, 2005.*

Symptoms	ADHD	Mania
Elation		X
Grandiosity		X
Pressured speech	X	X
Irritability	X	X
Hostility		X
Impulsivity	X	X
Hypersexuality		X
Distractibility	X	X
High levels of motor activity	X	X
Sleep disturbance	X	X

For some authors the main differential diagnostic element in favour of PBD is the existence of mood disorders in the family context [38]. However, research has shown that the children of bipolar patients have an increased risk of developing pre-school ADHD, and raised levels of subthreshold depressive and manic symptoms than the children of control parents with other or no psychiatric pathology [39].

Kochman et al [40; see Table2] suggest some points on which the differential diagnosis between the two disorders should be based:

Table 2. *Kochman et al., 2005.*

ADHD	Early bipolar disorder
Few or no family history of mood disorders	Frequent mood disorders in the family
Noisy child	Maladjusted, overemotional child
Hyperactive behaviour	Fluctuating behaviour, with a succession of calm, depressive or manic periods
Tendency for impulsive, sometimes violent behaviour, generally controllable by others	During depressive or manic attacks, violent, sometimes extreme behaviour, barely responding to intervention by others
Rare suicide ideas	Very frequent suicide ideas and threats, as well as suicide attempts
No psychotic symptoms	Frequent psychotic symptoms
No target-focused behaviour. Instead, tendency to diffuse behaviour	Target-focused behaviour (intensely sexual, etc.), youth self-deemed as above the law

5. ADHD-PBD Comorbidity

To bypass the diagnostic dilemmas in differential diagnosis, most researchers referred to comorbidity. Epidemiological studies in the US raise the comorbidity rates to 70%-90% in children and 30%-40% in adolescents [41][42][43]. Significantly lower rates of PBD with comorbid ADHD are recorded in studies outside the US [44] [45].

In children with ADHD, Biederman et al [46] found 11% comorbidity with bipolar disorder, and another 12% after 4 years follow-up. Children with comorbidity show more serious psychopathology, more frequent hospitalization and lower psychosocial functioning. Similar results are given by Wozniak et al [47]. Children with comorbidity of manic symptoms and ADHD also showed higher rates of major depression, psychosis, anxiety disorder and conduct disorders. As for their clinical picture, children with ADHD-PBD comorbidity demonstrate mainly a phenotype of chronic irritability and higher rates of antisocial conduct disorder. This particular phenotype implies a symptomatic continuity between ADHD and early onset BD, which is probably the cause of the difficulties in differential diagnosis and the differences in comorbidity rates [48].

An argument for comorbidity is that PBD and ADHD show common residual characteristics as to the neurocognitive function [49]. For Ruckidge, [50] residual functioning is clearly greater in adolescents with PBD and ADHD comorbidity, compared to those with only PBD. She believes that ADHD negatively affects the cognitive function in PBD. Neurobiological studies show that adolescents with PBD and ADHD comorbidity have a decreased activation of prefrontal areas in comparison to PBD, no-ADHD adolescents [51].

ADHD-PBD comorbidity signifies differences in the onset age and in gender. Most researchers agree that, when comorbidity is present, the onset age for PBD is lower [48] [52]. It seems that the earlier PBD begins the more often it is combined with ADHD symptoms often preceding mood disorders [53]. There is also evidence that ADHD in these children signals the onset of a family form of BD [42]. Some authors consider that there is a precursor and subthreshold stage of PBD which can be confused with normal mood liability or demonstrate itself as ADHD [54][55]. As far as gender is concerned, data is conflicting. According to Geller [42], comorbidity presents more often in boys. Faraone [56], on the other hand, does not confirm the existence of gender differences.

5.1. Longitudinal Course of ADHD-BD Comorbidity

Comorbidity may continue in adult life, complicating the development of the disorder [57]. Clinical studies in adults shows high and more consistent comorbidity rates that range from 6%-30% [58]. According to Pataki and Carlson [2], however, studies following children with ADHD well into adulthood show that these individuals present no higher rates of BD than those of the general population. Also the evidence from longitudinal studies does not support that childhood ADHD is a primordialdevelopmental form of adult BD [58].

Adult patients had an onset age of 5 years earlier, higher rates of anxiety disorders, as well as alcohol and substance

abuse. They were normothymic for shorter periods, and depressive more often [59]. A recent study [60] confirms that adult patients with ADHD-BD comorbidity had the onset of BD at a younger age, more episodes of mood disorders, and higher levels of impulsivity than bipolar patients with no comorbidity. Authors conclude that the clinical picture of ADHD-BD patients differs than that of BD patients without ADHD or those that had ADHD in childhood and were cured.

5.2. Overdiagnosing of ADHD and PBD

The increase in diagnosing of the PBD is now added to the frequent diagnosing of ADHD [61]. In addition to comorbidity, the change in diagnostic criteria for both disorders is a decisive factor to this, resulting to diagnostic convergence.

Basing an ADHD diagnosis solely on behavioural criteria and playing down the emotional dysregulation both contribute to the current diagnostic confusion with mania [2]. EspeciallyforPBD, the cycling criterion is essentially cancelled out by the acceptance that there is a chronic course marked by rapid cycling, with fluctuations in mood occurring daily or more than once a day. Furthermore, some researchers suggest as a hallmark of PBP an extended period of chronic, severe irritability which is related to more profound aggression and thus is qualitatively different [25].

It is highly important to keep in mind that the use of these criteria leads to a different diagnosis than the classic BD. Up to now longitudinal studies of childhood irritability suggest that it is unlikely to develop into adult BP [62].

6. Treatment Dilemmas

The relationship between PBD and ADHD is not simply a matter of nosological taxonomy, but has important consequences on the therapeutic approach as well. It is generally acknowledged that early intervention both in ADHD and PBDincreases the chances there are to avoid a bad prognosis [54]. The diagnostic confusion between the two clinical entities is reflected on the suggested treatment as well, mainly regarding pharmacologic treatment.

It is known that stimulants are used to treat ADHD, while mood stabilizers, are considered the first-line treatment for PBD. A meta-analysis by Consoli [63] shows that mood stabilizers have a better response to acute manic episodes in children with PBD without ADHD comorbidity. As mentioned above, in the US there is a high prevalence of ADHD and also a widespread use of pharmacologic therapy for its treatment. According to some authors, the high rates of ADHD-PBD comorbidity recorded are partly due to the frequent use of stimulants. It is likely that stimulants trigger an early onset of BD through a behavioural mechanism of sensitization [64]. It also appears that young bipolars, diagnosed as hyperactive in childhood and exposed to stimulant treatment, present a negative outcome of BD, not exclusively explainable by ADHD-PBD comorbidity [65]. According to some researchers, methylphenidate increases ADHD emotional symptomatology [66] [67]. It can be thus concluded that stimulants could aggravate an underlying mania [68] [69]. It has also been observed that, while 92% of manic and psychotic symptoms caused by stimulants recede after the end of the treatment, 8% persist [70].

Yet other studies indicate that when a bipolar patient receives a treatment with mood stabilizers, the addition of a stimulant could further improve the clinical picture, due to controlling the comorbid ADHD symptoms [71][72] [73]. This treatment option is supported by recent research data showing common elements between ADHD and PBD in multiple levels; genetic, biochemical and neuropsychological. It has been observed that both mania and ADHD are characterized by an erratic regulation of wakefulness constituting a central pathogen that leads to attention deficit. Hyperactive and impulsive behaviour is a self-regulating attempt to stabilize wakefulness, increasing external stimulation [74]. According to this perspective, the use of stimulants is not a risk factor that could aggravate an underlying mania, rather could even be the treatment of choice for acute manic episodes.

In conclusion, current research maintains that ADHD pharmacologic treatment has no negative effect on manic symptoms. Authors also recommend the use of second-generation antipsychotics instead of the typical mood stabilizers, in combination with stimulants or atomoxetine [75] [76]. Nonetheless, pharmacological treatment on its own is not enough, and children and their families are also in need of psychological intervention.

7. Conclusion

The relationship between ADHD and BD in childhood is profoundly complicated and multifaceted. Studies distinguish two separate disorders that often coexist or could be the early manifestation of the other. The specific relationship between these two disorders seems to vary according to the child's age and family history.

Diagnostic dilemmas concerning ADHD and PBD emphasize the difficulties of defining the limit between normality and pathology in children's mental health and the inability to construct and concede a common classification for mental disorders in child psychopathology. The course of the developmental process from infancy to childhood and adolescence encapsulates many different procedures through which changes occur at various levels. In this developmental course, clinical pictures can change, therefore diagnoses as well. This brings up the question of whether or not a taxonomical system can grasp and record, in the codified way required by each classification, all this clinical complexity and developmental dynamics [1].

The high comorbidity rate between these two disorders raises questions both at a clinical and a theoretical level [77]. The coexistence of these two different diagnoses seems to significantly affect the person's psychopathology and is not just the sum of their symptoms. In most cases there is a psychopathology of different quality, requiring different examination procedures and therapeutic plans [78].

Despite great progress made in the last years, the neurobiological model for mental disorders in childhood cannot yet offer comprehensive answers. It would be advantageous to combine it with the psychodynamic approach, which takes into account other parameters such as the subject's personal history; therefore the symbolic function of the symptom, as well as its relation to the family and social environment in which it is expressed. The sole phenomenological approach to diagnosis, without taking into consideration the developmental course of children's mental disorders and the significance of personal history, accentuates diagnostic confusion.

To conclude, we could argue that contemporary classifications of childhood mental health disorders are neither final nor purely objective. Discussion and controversy on the relationship between ADHD and PBD mirror the fluidity of our knowledge in various sensitive areas of childhood mental health. There is also a scientific consensus that it would take more research to identify developmental and genetic differences between these two disorders and develop specialized therapeutic interventions. Nevertheless, we must take special care with the direction of future research so as to not overlook the suffering of children and their families.

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