ADHD: Current Concepts in Children and Adolescents

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- One of the most frequent disorders within child & adolescent psychiatry,
- characterized by
- -the heterogeneity of presentations, which may take opposite forms,
- -frequent and variable comorbidities and an overlap with other disorders,
- -the context-dependency of symptoms,
- Which may or may not become apparent during clinical examination.

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While the neurobiological and genetic underpinnings of the disorder are beyond dispute, biomarkers or other objective criteria, which could lead to an automatic algorithm for the reliable identification of ADHD in an individual within clinical practice, are still lacking.



Definitions and Phenomenology

ADHD According to the DSM-5 and ICD-10/11



ADHD According to the DSM-5 and ICD-10/11

- A neurodevelopmental disorder,
- -diagnostic classification: based on the observation of behavioral symptoms
- -a diagnosis of exclusion and should not be diagnosed if the
- behavioral symptoms can be better explained by other mental disorders
- common comorbidity with other mental disorders

ADHD According to the DSM-5 and ICD-10/11

- DSM-5: symptoms of inattention (11 symptoms) and
- hyperactivity/impulsivity (9 symptoms).
- The former differentiation between subtypes in the DSM-IV provec
- to be unstable and to depend on the situational context, on
- informants, or on maturation, and was therefore replaced by
- "presentations."

ADHD According to the DSM-5 and ICD-10/11

- Symptoms have to be present in two or more settings
- before the age of 12 years for at least 6 months and have to
- reduce or impair social, academic, or occupational functioning.
- In adolescents over 17 years and in adults, five symptoms per
- dimension need to be present for diagnosis.

ADHD According to the DSM-5 and ICD-10/11

- The DSM-5 distinguishes between different presentations of ADHD: predominantly inattentive (6 or more out of 11 symptoms present), predominantly hyperactive/impulsive (6 or more out of 9 symptoms present), and combined presentation (both criteria fulfilled),
- as well as a partial remission category.

ADHD According to the DSM-5 and ICD-10/11

The ICD-10 classification distinguishes between hyperkinetic disorder of childhood (with at least six symptoms of inattention and six symptoms of hyperactivity/impulsivity, present before the age of 6 years) and hyperkinetic conduct disorder, a combination of ADHD symptoms and symptoms of ODD and CD.

ADHD According to the DSM-5 and ICD-10/11

- In the ICD-11, the latter category has been dropped, as has the precise age limit ("onset during the developmental period, typically early to mid-childhood").
- Five ADHD subcategories match those of the DSM-5.
- Behavioral symptoms need to be outside the limits of normal variation
- expected for the individual's age and level of intellectual functioning.





- low energy, sleepiness, and absent-mindedness,
- and is estimated to occur in 39 to 59% of (adult) individuals with ADHD.
- The question of whether SCT might constitute a feature of ADHD or
- a separate construct that overlaps with
- ADHD inattention symptoms is unresolved.



- from hyperactivity/impulsivity, as well as from inattention dimensions,
- it remains uncertain whether it should be considered as a separate disorder.
- Twin studies have revealed a certain overlap between SCT and ADHD, especially with regard to inattention symptoms, but SCT seems to be
- more strongly related to nonshared environmental factors.

Emotion dysregulation is another associated feature, as a possible core component of childhood ADHD, although it is not included in the DSM-5 criteria.

Deficient emotion regulation is more typically part of the

symptom definition of other psychopathological disorders,

such as ODD, CD, or DMDD.

- However, 50-75% of children with ADHD present symptoms of emotion
- dysregulation (anger, irritability, low tolerance for frustration, and outbursts, o
- sometimes express inappropriate positive emotions).
- The presence of these symptoms increases the risk for further comorbidities
- such as ODD and also for anxiety disorders.
- For adult ADHD, emotional irritability has been confirmed as
- a primary ADHD symptom by several studies.



Whether emotion dysregulation is inherent to ADHD,

- applies to a subgroup with combined symptoms and
- a singular neurobiological pathway,

or is comorbid with but independent of ADHD,

is still a matter of debate.



Faraone et al distinguished three ADHD prototypes with regard to

deficient emotion regulation:

prototype 1 with high-emotional impulsivity and deficient self-regulation,

prototype 2 with low-emotional impulsivity and deficient self-regulation

prototype 3 with high-emotional impulsivity and effective self-regulation.



All three prototypes: inappropriate intensity of emotional response.

- While prototypes 1 and 3 build up their responses very quickly, prototype 2 is slower to respond but experiences higher subjective emotional upheaval that
- is overtly shown in the behavior.
- Prototypes 1 and 2 both need more time to calm down compared with

prototype 3 in which emotional self-regulation capacities are intact

Dimensional versus Categorical Nature of ADHD



Dimensional versus Categorical Nature of ADHD



- dimensional rather than categorical understanding of the ADHD construct,
- as its core symptoms and comorbid features are dimensionally distributed
- in the population.
- Subthreshold ADHD is common in the population, with an
- estimated prevalence of approximately 10%.

Dimensional versus Categorical Nature of ADHD

According to Biederman and colleagues, clinically referred children with

subthreshold ADHD symptoms show a similar amount of functional deficits

and comorbid symptoms to those with full ADHD,

but tend to come from higher social-class families with fewer family conflicts

to have fewer perinatal complications, and to be older and female

(for the latter two, a confound with DSM-IV criteria cannot be excluded).





Another approach which is in accordance with a dimensional concept is to analyze ADHD and categorize subtypes according to temperament/personalit traits.

Temperament/personality traits are usually defined as neurobiologically

based constitutional tendencies, which determine how the individual searches

for or reacts to external stimulation and regulates emotion and activity.

While temperament traits per se are not pathological,

- extreme variations or specific combinations of traits
- may lead to pathological behavior.
- This approach has been investigated in several studies
- by Martel and colleagues and Nigg, who employed a temperament mode comprising three domains empirically derived.



- (2) positive affect or surgency which includes overall activity,
- expression of happiness, and interest in novelty;

(3) effortful control which is related to self-regulation and the control of action

The latter domain shows

a strong overlap with the concept of executive function.

In a community sample, early temperamental traits, especially effortful

control and activity level, were found to potentially predict later ADHD.

Three temperament profiles in a sample of children with ADHD:

one with normal emotional functioning; one with high surgency,

characterized by high levels of positive approach-motivated behaviors

and a high-activity level; and one with high negative("irritable") affect.



The latter showing the strongest, albeit only moderate stability over 2 years.

Irritability was not reducible to comorbidity with ODD or CD and

was interpreted as an ADHD subgroup characteristic with predictive validity

for an unfavorable outcome.

These ADHD temperament types were distinguished by resting-state and peripheral physiological characteristics as measured by fMRI.

Comorbidity

Comorbidity with ADHD



Comorbidity with ADHD



ADHD increases the risk of:

Substance misuse disorders (2.4-fold for smoking)

Adolescence problematic media use Risk of becoming obese for adolescent girls Different forms of dysregulated eating in children and adolescents

1.5-fold

9.3-fold

1.23-fold

Common

The risk of coexisting ADHD being seen as a comorbid condition and not the primary diagnosis is enhanced in many childhood disorders of different origins.

ADHD is common in:

- reading disorders, mild intellectual dysfunction
- disorders with well-known and circumscribed genetic defects, normally not related to ADHD (e.g., neurofibromatosis, Turner's syndrome, Noonan's syndrome)
- traumatic brain injuries, pre-, peri- or postnatal stroke, or syndromes due to toxic agents, such as fetal alcohol syndrome
- epilepsy
- preterm born children, extremely preterm-born children

Differential Diagnosis, Primary and Secondary ADHD The most important medical conditions which are known to "mimic" ADHD and need to be excluded during the diagnostic process

o epilepsy

(especially absence epilepsy and rolandic epilepsy)
 thyroid disorders
 sleep disorder
 drug interaction

 anemia
 leukodystrophy

The most important psychiatric conditions to be excluded:
learning disorder
anxiety disorders
affective disorders

An adverse home environment also needs to be excluded!

The picture is complex, as many differential diagnoses may also occur as comorbidities!

ADHD has a DDX and also a comorbidity of bipolar disorder in 21 to 98% of cases.

Absence epilepsy is a DDX of ADHD but is also considered to be a frequent comorbidity, 30-60% of children with absence epilepsy.

The picture is complex, as many differential diagnoses may also occur as comorbidities!

The prevalence of the ADHD phenotype in benign childhood epilepsy with centrotemporal spikes (rolandic epilepsy) lies at 64 to 65%, and is possibly related to the occurrence of febrile convulsions.



Primary versus Secondary ADHD

"Idiopathic ", "primary," or "genotypic" ADHD ADHD phenotype," or "phenocopy, or "ADHD-like"

Specified developmental ADHD "genotype "

ADHD of circumscribed origin other than developmental

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Summary

Nosological systems continue to define ADHD

according to behavioral criteria,

based on observation and on informant reports.

Valid neurobiological markers or other objective criteria

that may lead to unequivocal diagnostic classification

are still lacking.

Summary

- On the contrary, the concept of ADHD seems
- to have become broader and more heterogeneous.
- Thus, the diagnosis and treatment of ADHD
- are still challenging for clinicians,
- necessitating increased reliance
- on their expertise and experience.

Thank you

