NEURODEVELOPMENTAL aspects of ADHD

- Point of view of a
 - Child and Youth Psychiatrist
 - Trained in Child Psychiatry and Neurodevelopmental disorders at NIMHANS, Bangalore (2006-2012) including Post-doc Fellowship
 - RANZCP Adv Training CAP in Melbourne
 - Consultant at CAMHS, Early Psychosis service and headspace, GV health since 2015 and private practice since 2018

ADHD – "Neuro" basics

- ADHD: Executive function deficits in -
 - Sustained attention, response inhibition, working memory, time awareness, delay gratification, emotional regulation
 - **TOP DOWN** Self-regulation and self-monitoring difficulties (thoughts, behaviors, emotions)
 - **TOP DOWN** Self-regulation and self-monitoring PREFRONTAL CORTEX Top-down regulation of behavior, hought and emotion **a2A** reduces the tonic firing of the LC

- A Ferrari with the brakes of a cycle
 - driving through a neurotypical traffic
 - that expects you to drive like everyone else.
- We can imagine the consequences....



Executive function "neuro" deficits

Not Unique to ADHD

"A Final Common Pathway"

ADHD – not just "Neuro" deficits...

• It is a **Neurodevelopmental** disorder

DSM 5 and ICD 11

"There are profoundly unique individual traits and brain skills that are not emerging in this individual as they should."

Dr. Russell Barkley

Neurodevelopmental Disorder (NDD)

Some concepts (with focus on ADHD)

- What are neurodevelopmental disorders?
- Why are they important in mental health?
 - Trauma "BIG T" and Adverse Childhood Experiences (ACEs)
 - Microtrauma "small t" and Microaggressions
 - Microfailures
 - Masking
 - Allostatic load related to stress and self-regulation challenges
 - Adversity STARTING IN EARLY LIFE Vulnerability

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What are neurodevelopmental disorders (NDD)

- Development emergence of skills and competence follows a certain sequence
- "Neurodevelopmental conditions are defined by characteristic differences arising during the developmental period in



that diverge substantially from typical development and tend to co-occur.

When these traits interfere with subjective wellbeing and social, educational or vocational functioning, a **clinical disorder** diagnosis is given."

Thapar A, Cooper M, Rutter M. 2017; Ismail FY, Shapiro BK. 2019; ICD 11.

10 yr old child	Motor co dis	Language dis	SPELD	Mixed dev dis	ID	ASD	SCD	ADHD	Sens Proc dis
Gross motor	10	10	10	10	10	10	10	10	10
Fine motor	5	10	10	5	8	10	10	?:	10
Receptive language	10	5	10	7	8	10	10	10	10
Expressive language	10	5	7	7	7	7-10	7-10	10	10
Speech Articulation	7	5	10	10	8	10	10	10	10
Pragmatic language	10	10	10	10	8	4	4	10	10
Social skills	10	10	10	10	7	4	4	80	10
Scholastic skills (Reading, Writing, Arithmetic)	10	10	5	7	6	10 or more	10	10	10
Executive functions	10	10	10	10	5	5-10 or more	10	5-7	10
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Receptive language	10	5	10	7	8	10	10	10	10
Expressive language	10	5	7	7	7	7-10	7-10	10	10
Speech Articulation	<mark>7</mark>	5	10	10	8	10	10	10	10
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Comorbidity is the rule!

- ADHD in about 30-40% people who have ASD (Lord C et al. 2022)
- ADHD in about 30% people who have SPELD
- SPELD in about 50-60% people who have ADHD (DuPaul, Gormley, Laracy. 2013)
- ADHD in about 30-39% people who have intellectual disability (Emerson E. 2003)

NDD – skill acquisition continues, but lags



• What are neurodevelopmental disorders?

- Why are they important in mental health?
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 - Microfailures
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- Marginalization higher risk of experiencing Microaggressions
 - You are autistic? You are obviously high functioning!
 - You have high potential. If you could just put in more effort…
 - Why are you seeking a label of ADHD? Why put kids on speed?
 - Don't let ADHD define you!

(Anecdotal Lived experience voices)

Microtrauma OR "small t" → subtle but cumultative psychic injury

(Crastnopol, M. 2015)

- Criticism, put downs, mockery, "How dumb can one be??" "My mother always looks at me like I'm disgusting!"
- Being suddenly abandoned
- Chronic indignation "You're always upset with me... Am I never good enough for you?" → self-righteous anger (hard to correct, reflect on)

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Microfailure

- Put in 200% effort but get only 50% results (ALWAYS a GAP)
- Not failing... but I know I fall short; it's just not like others...
- Paddle harder than other ducks in the pond, just to stay afloat (because the brain is not helping...)
- NOT GOOD ENOUGH (forgetting, blurting out, incomplete assignments)
- These experiences are corrosive to sense of self, especially as they accumulate

Masking or Why do I paddle so hard?

 Masking – Use all existing resources (personal and environmental) and abilities to try and show others that I have it under control by controlling my symptoms

• Unmasking

when socio/academic/occupational demand exceeds capacity to mask

Examples of ADHD Masking



Staying too quiet and being overly careful about what you say



Developing perfectionistic tendencies

verywell



Obsessively checking your belongings



Suppressing stimming behaviors like leg bouncing



Reacting as you are expected to instead of how you feel inside



Mimicking or copying other people in social situations

ADHD – Masking

- ADHD symptoms: if not previously sufficiently elevated or impairing \rightarrow due to
 - Iower environmental demands,
 - the presence of supports in the environment, or
 - other protective factors such as high IQ (AND good moral values, resilience, ability to turn adversity into opportunity/strength, ability to be KIND)

Taylor, L. E., Kaplan-Kahn, E. A., Lighthall, R. A., & Antshel, K. M. (2022).

• ADHD masking is a very difficult concept for people without ADHD to understand, so they may find it hard to believe (or enquire).

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Lee, Do Yup et al. "Technical and clinical aspects of cortisol as a biochemical marker of chronic stress." BMB reports vol. 48,4 (2015): 209-16.

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ADHD – Trauma and ACEs

- Children with ADHD were more likely to have experienced a traumatic event than controls – an Australian study
 Schilpzand, E. J. et al., 2018
- ADHD deficits in PFC TOP DOWN self-regulation in the individual with ADHD
 - Risky behaviours and risky situations

• ADHD is highly heritable – 77-88%

Faraone and Larsson, 2019

- ADHD deficits in PFC TOP DOWN self-regulation
 - ALSO quite likely in parents
 - And parents of children with ADHD/NDD more likely to experience stress/burn out

Gajwani and Minnis, 2023

ACEs – Adverse Childhood experiences

(https://www.cdc.gov/violenceprevention/aces/index.html)



Divorce

A CDC study (1998) from Southern California in USA – about 17,000 people surveyed

Australian Childhood Maltreatment Study (2023)

Sexual



ACEs – Adverse Childhood experiences

(https://www.cdc.gov/violenceprevention/aces/index.html)

Sexual



Divorce

Children with multiple neurodevelopmental conditions – are at higher risk of maltreatment

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- No evidence that childhood maltreatment causes symptoms of neurodevelopmental disorders
- BUT childhood maltreatment may worsen the symptoms of neurodevelopmental disorders like ADHD and ASD

Swedish Twins study Dinkler L, et al. 2017

ACEs – Adverse Childhood experiences

(https://www.cdc.gov/violenceprevention/aces/index.html)



Divorce

- ADHD predicts subsequent risk for ACEs
- The inattentive presentation may confer the most risk
- Inattentive presentations could pose a bigger risk given differences in
 - symptom persistence,
 - latency to access to treatment, and
 - treatment duration

Lugo-Candelas, C. et al., 2021



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JEOPARDY

NDD-

Chronic Progressive

EROSION of

Sense of self

allenges

• Adversity STARTING IN EARLY LIFE – Vulnerability

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(In clinical practice – Vulnerability AND Strengths)



Prof. Alessandra Radovini, Mindful, Melbourne

When you do think about a likely neurodevelopmental disorder?

AADPA ADHD guideline, 2022

• Screening for ADHD SHOULD occur in High Risk Groups

High risk groups – children and adolescents Strong recommendation based on Expert consensus evidence

ODD and CD diagnoses	Substance abuse
	Close family member has ADHD
Out of home care	Prenatal exposure to substance use (alcohol or other drugs)
Anxiety	Low birth weight
Epilepsy	Language disorder or Specific Learning Disorder
	Sleep disorder, mood disorder, anxiety disorder
Born Preterm	
	Imprisonment
Diagnosis of ASD, ID or Tic disorder	Acquired brain injury

Strong recommendation based on Expert consensus evidence

• people with borderline personality disorder

High risk

groups

adults

- people with internet addiction
- people with psychotic disorders
- people with substance use disorder
- people with intermittent explosive disorder
- people with a family history of ADHD
- people with suicidal ideation/behaviour.

Binge eating disorder

Gambling disorder

Close family member has ADHD

Prenatal exposure to substance use (alcohol or other drugs)

Low birth weight

Language disorder or Specific Learning Disorder

Sleep disorder, mood disorder, anxiety disorder

Born Preterm

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Screening for ADHD

AADPA ADHD guideline, 2022

• Screening for ADHD SHOULD occur in High Risk Groups

Screening for ADHD

AADPA ADHD guideline, 2022

- Screening for ADHD SHOULD occur in High Risk Groups WHEN
 - does not respond to treatment for high-risk condition as expected, or is unable to adhere to their treatment protocol
 - often has difficulty attending appointments on time or forgets appointments, show signs of ADHD symptoms such as restlessness, difficulty maintaining routines, lack of time awareness, poor working memory, disorganisation, forgetfulness, and distraction that:
 - are not explained by other psychiatric diagnoses (AND)
 - have resulted in, or are associated with, clinically significant psychological, social and/or educational or occupational impairment.

Microaggressions and Microtrauma "small t"

Neurodevelopmental Disorders

Microfailures and Masking

> Mental Health Disorder

Trauma

Trauma "BIG T" and ACEs

Cumulative challenges to self-regulation ability and sense of self since EARLY in Life

Which LENS are you using?

Physical Health Disorder

AOD

Take Home message

tejas.golhar@gvhealth.org.au

ADHD as a 'distinguished' Neurodevelopmental disorder

- Medication available as an effective treatment of core difficulties.
- Some do not fulfil criteria during adulthood (5-7% children but only 2.5% adult have ADHD)

• This can potentially add to the socio-political narratives/debates surrounding ADHD at a given point in time.

ADHD in females

- Clinicians should be aware that ADHD could be under-recognised in girls and women and that they:
 - are less likely to be referred for assessment for ADHD
 - may be more likely to have undiagnosed ADHD
 - may be more likely to receive an incorrect diagnosis of another mental health or neurodevelopmental disorder, such as an anxiety or depressive disorder

AADPA ADHD guidelines, 2022

ADHD in ICD 11 and DSM 5

- ADHD symptoms (reasonably reliable set of observations)
 - mainly observations, so these can also occur in other conditions

- Neurodevelopmental disorders (NDDs) multifaceted conditions with onset in the developmental period
- DSM 5 and ICD 11 require
 - Several symptoms (not one or two; but also NOT ALL)

should be present before age 12yrs (i.e. during or before primary school age)

should be present in more than one context (pervasive)

ADHD in ICD 11 and DSM 5

• ICD 11 -

- Several current symptoms for a particular presentation of ADHD
- that are persistent, and sufficiently severe that they have a direct negative impact on academic, occupational, or social functioning
- Unlike DSM 5 which specifies 6/9 symptoms for children and 5/9 for adults

- There are no subtypes in ICD 11 or DSM 5.
 - Mainly presentations inattentive, hyper-active/impulsive and combined

Remember DSP!

D – Development

- Developmental expectations
- Neurodiversity
- S Systems
 - System \rightarrow person
 - Person \rightarrow system
- P Phenomenology and patterns
 - Phenomenology subjective experience/inner world
 - Patterns "Make a diagnosis!"

Prevalence of ADHD

- 5-7% in Children and Adolescents in Australia
- 2.5% in adults in Australia

Prevalence of ADHD – hasn't increased

• An updated systematic review and meta-regression analysis

Guilherme V Polanczyk, et al. 2014

- By aggregating prevalence studies of ADHD conducted in the three decades (1985-2010), there is no evidence to suggest an increase in the number of children in the population who meet criteria for ADHD when standardized diagnostic procedures are followed.
- Rate of ADHD medicine prescription HAS increased in Australia

Bruno C. et al., 2023

- Twofold increase in the overall prevalence of attention deficit hyperactivity disorder medicine use between 2013 and 2020, from 4.9 to 9.7 per **1000** persons in this population-based study
- most pronounced increases among adolescent females
- Nevertheless, treatment rates remain lower than the estimated prevalence of attention deficit hyperactivity disorder across all subpopulations

ADHD – long term negative outcomes

- Children with ADHD:
 - two-thirds will have a co-occurring mental health or neurodevelopmental condition.

Gnanavel, et al. 2019; Reale et al., 2017

- Adults with ADHD:
 - 80% have at least one additional mental health disorder.

Katzman et al., 2017

- Adolescents with ADHD transitioning into adulthood:
 - risk taking may increase (including earlier sexual activity, risky driving, early pregnancy, delinquency, criminality and substance misuse)
 Franke et al., 2018; Young et al., 2020
- 16yr follow-up study from MTA childhood ADHD study significant worse outcomes in adults when ADHD persisted

Post-secondary education	Times fired / quit job	Current income
Receiving public assistance	Risky sexual behaviour	
Emotional lability	Neuroticism	Anxiety disorder
Mood disorder	Substance use disorder	
Death		

Hechtman, Lily et al.