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ACADEMIC CHALLENGES FOR CHILDREN WITH ADHD: POLICY IMPLICATIONS FOR SCHOOL-BASED PRACTICE

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Abstract

ADHD is a common neurobiological condition affecting 5.3% to 20% of the children worldwide and its prevalence in adults is increasingly recognized. The objectives of the comprehensive review were to analyze and to get acquainted with symptoms and Diagnostic criteria for ADHD, to explore neurobiological developmental impairment of executive functions explicit in ADHD students, to identify common learning problems and to examine the academic and educational characteristics of children with ADHD and their academic challenges. ADHD is associated with academic underachievement across the developmental spectrum. Research suggests that deficits in executive functioning could be at the heart of ADHD-related academic under-performance. The executive function deficits include response inhibition and working memory, cognitive flexibility, planning and fluency. Research findings indicate that school based interventions, if timely and consistent, can moderate the academic challenges a child with ADHD experiences. Findings of the review have implications for addressing issues of designing effective teacher training programmes.

Key words: Attention Deficit Hyperactivity Disorder (ADHD), impulsivity, sluggishness of ADHD, response inhibition, neurobiological developmental impairment of executive functions

Attention Deficit Hyperactivity Disorder (ADHD) is a developmental, neurobiological condition defined by the presence of severe and pervasive symptoms of inattention, hyperactivity and impulsivity (APA, 1994). It is defined as a persistent pattern of inattention and/or hyperactive and impulsive behaviour that is more frequent and severe than is typically seen at a given stage of development which can significantly impact many aspects of behaviour and performance both at school and at home (Faraone, Sergeant, Gillberg, &

Biederman, 2003) and has a strong genetic, neurobiologic, and neurochemical basis (Biederman, Faraone, & Milberger, 2009). Symptoms are usually present from early childhood, they tend to become particularly problematic when the child starts school and they may remain troublesome across the lifespan. The symptoms of ADHD are associated with impairment in educational, social and emotional function.

Through a comprehensive review of the literature the researcher made an effort to critically examine the current state of knowledge regarding ADHD, to analyze and to get acquainted with symptoms of ADHD, Diagnostic criteria for ADHD (DSM IV & DSM-5), to explore neurobiological developmental impairment of executive functions explicit in ADHD students, to identify common learning problems often accompanying ADHD and to examine the academic and educational characteristics of children with ADHD and academic challenges for children with ADHD.

ADHD is affecting 5.3% to 20% of the children worldwide and its prevalence in adults is increasingly recognized (Moffitt & Melchior, 2007). In India there is very little systematic research in ADHD in children. The few studies that are available report prevalence rates ranging from 10 to 20% (Bhatia, Choudhary & Sidana 2005).

Schools play important roles in the psychosocial development of the child as they constitute frames where developmental domains engage and transform (Noam & Hermann, 2002). Children with ADHD are typically identified by classroom teachers due to chronic inattentive and/or disruptive behaviours exhibited in the classroom. These children are easily distracted, as having difficulty completing assignments, and not completing homework (being forgetful and/or disorganized). Such students are at a higher risk for academic difficulties and for developing more severe behaviour problems and/or problems with interpersonal relationships (Barkley, 2006). At the same time, teachers may also report that students exhibiting these characteristics are more capable than their academic performance indicates.

Diagnostic Criteria for ADHD

A) DSM-IV-TR

Clinical guidelines for diagnosis of ADHD are provided in the American Psychiatric Association diagnostic manual commonly referred to as the DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, IV Edition, Text Revision). According to DSM-IV the essential features of ADHD are (1) Persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently

observed and is more severe than is typically observed in individuals at the level of development; (2) Some hyperactive-impulsive or inattentive symptoms must have been present before seven years of age; (3) Some symptoms from the symptoms must be present in at least two settings; (4) There must be clear evidence of interference with developmentally appropriate social, academic or occupational functioning; (5) The disturbance does not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorders and is not better accounted for by another mental disorder.

The American Psychiatric Association recently published DSM-V, the first major revision to the diagnostic manual for psychiatric disorders since 1994. In DSM-V, ADHD is included in the section on Neuro-developmental Disorders, rather than being grouped with the disruptive behaviour disorders, i.e., Oppositional Defiant Disorder and Conduct Disorder. This change better reflects the way ADHD is currently conceptualized.

There were some changes in the DSM-V for the diagnosis of ADHD: symptoms can now occur by age 12 rather than by age 6; several symptoms now need to be present in more than one setting rather than just some impairment in more than one setting; new descriptions were added to show what symptoms might look like at older ages; and for adults and adolescents age 17 or older, only 5 symptoms are needed instead of the 6 needed for younger children.

B) DSM-V Criteria for ADHD

People with ADHD show a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development

a) Inattention

Six or more symptoms of inattention for children up to age 16, or five or more for adolescents 17 and older and adults; symptoms of inattention have been present for at least 6 months, and they are inappropriate for developmental level. 1. Often fails to give close attention to details or makes careless mistakes, in schoolwork, work, or during other activities (e.g. overlooks or misses details, work is inaccurate). 2. Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading). 3. Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction). 4. Often does not follow through on instructions and fails to finish school work, chores, or duties in the work place (e.g., starts tasks but quickly loses focus

and is easily distracted). 5. Often has difficulty organizing tasks and activities (e.g., **difficulty managing** sequential tasks; difficulty keeping materials and **belongings in order**, messy, disorganized work; has poor time management; **fails to meet deadlines**). 6. Often avoids or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers). 7. Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, and mobile telephones). 8. Is often easily distracted by extraneous stimuli. 9. Is often forgetful in daily activities (e.g., returning calls, paying bills, keeping appointments).

The only difference from DSM-IV is that all symptoms are followed by examples of different ways they may show up, including ways they would appear in older adolescents and adults. Thus, although the symptom list remains the same, the inclusion of developmentally appropriate examples should help guide clinicians evaluating older adolescents and adults.

b) Hyperactivity and Impulsivity

Six or more symptoms of hyperactivity-impulsivity for children up to age 16, or five or more for adolescents 17 and older and adults; symptoms of hyperactivity-impulsivity have been present for at least 6 months to an extent that is disruptive and inappropriate for the person's developmental level: 1. Often fidgets with or taps hands or squirms in seat. 2. Often leaves seat in situations when remaining seated is expected. 3. Often runs about or climbs in situations where it is inappropriate. 4. Often unable to play or engage in leisure activities quietly. 5. Is often "on the go" acting as if "driven by a motor". 6. Often talks excessively. 7. Often blurts out answers before questions have been completed. 8. Often has difficulty awaiting turn. 9. Often interrupts or intrudes on others.

These are only slightly modified versions of the hyperactive-impulsive symptoms from DSM-IV. As was done for the inattentive symptoms, however, the new DSM-V generally includes developmentally appropriate exemplars of these symptoms in older adolescents and adults.

Number of Symptoms Required and Duration of Symptoms

To possibly warrant a diagnosis of ADHD, individuals younger than 17 must display at least 6 of 9 inattentive and/or hyperactive impulsive symptoms. This is the same number as was required in DSM-IV.

For individuals 17 and above, however, only 5 or more symptoms are needed. This change from DSM-IV was made because of the reduction in symptoms that tends to occur with increasing age. As in DSM-IV, the symptoms must be present for at least 6 months to a degree that is judged to be inconsistent with an individual's developmental level.

Additional Diagnostic Criteria

As in DSM-IV, a sufficient inattentive and/or hyperactive impulsive symptom is only the initial criteria that must be met for ADHD to be diagnosed. Additional diagnostic criteria, and modifications that have been made to these, are presented below.

a) Age of onset criteria

In DSM-IV, the age of onset criteria was "some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years." In DSM-V this has been revised to "several inattentive or hyperactive-impulsive symptoms were present prior to 12 years." Thus, symptoms can now appear up to 5 years later. And, there is no longer the requirement that the symptoms create impairment by age 12, just that they are present.

b) Multiple settings requirement

In DSM-IV, symptoms were required to cause some impairment in at least 2 settings. DSM-V has changed this to "several inattentive or hyperactive-impulsive symptoms are present in two or more settings." Thus, symptoms must only be evident in more than one context but don't have to impair an individual's functioning in multiple contexts.

c) Minor change in subtype designation

In DSM-IV, there were 3 ADHD subtypes: *Combined Type* for individuals who showed at least 6 inattentive and 6 hyperactive-impulsive symptoms, in addition to meeting all the other criteria; *Predominantly Inattentive Type* when sufficient inattentive but insufficient hyperactive-impulsive symptoms were present; and, *Predominantly Hyperactive-Impulsive Type* when sufficient hyperactive-impulsive symptoms inattentive but insufficient inattentive symptoms were present.

In DSM-V these categories have been retained, but are now referred to as *Combined presentation*, *Predominantly inattentive presentation*, and *Predominantly hyperactive-impulsive presentation* a) *Combined Presentation*: if enough symptoms of both criteria inattention and hyperactivity-impulsivity

were present for the past 6 months b) **Predominantly Inattentive Presentation:** if enough symptoms of inattention, but not hyperactivity-impulsivity, were present for the past six months c) **Predominantly Hyperactive-Impulsive Presentation:** if enough symptoms of hyperactivity-impulsivity but not inattention were present for the past six months. Because symptoms can change over time, the presentation may change over time as well.

d) New requirement to specify severity

DSM-V also requires clinicians to specify the severity level of a client's ADHD as Mild, Moderate, or Severe. *Mild* is restricted to cases where there are few, if any, symptoms beyond those required to make the diagnosis and no more than minor impairment in functioning. In DSM-IV, where clinically significant impairment was required, these individuals would not be diagnosed. *Moderate* is simply defined as symptoms or functional impairment between 'mild' and 'severe'. People in this category may not necessarily show clinically significant impairment and thus also would not have been diagnosed under DSM-IV. *Severe* is reserved for cases with many symptoms in excess of those required for the diagnosis, or several symptoms that are especially severe, or marked impairment resulting from symptoms.

Academic and Educational Characteristics of Children with ADHD

Children with ADHD show significant academic underachievement, poor academic performance, and educational problems. In terms of activity limitations, children with ADHD score significantly lower on reading and arithmetic achievement tests than controls. In terms of restrictions in social participation, children with ADHD show increases in repeated grades, use of remedial academic services, and placement in special education classes compared with controls. Children with ADHD are more likely to be expelled, suspended, or repeat a grade compared with controls (Carlson & Mann, 2000).

Earlier it was believed that children with ADHD outgrow their symptoms by adolescence (Rapport, Scanlan, & Denney, 1999). However, in recent years it has become increasingly evident that children with ADHD have a high risk for the continuation of their primary symptoms into adolescence and adulthood (Carlson, & Mann, 2000). The behaviours associated with ADHD change as children grow older. For example, a preschool child may show gross motor over activity—always running or climbing and frequently shifting from one activity to another. Older children may be restless and fidget in their seats or play with their chairs and desks. They frequently fail to finish their schoolwork, or they work carelessly. Adolescents with ADHD tend to be more withdrawn and less

communicative. They are often impulsive, reacting spontaneously without regard to previous plans or necessary tasks and homework.

ADHD and School Performance

Individuals with ADHD may experience impairments in all aspects of life (APA 1994); however, it is educationally based impairments that are more important. Students with ADHD generally have poor scholastic outcomes, including grade retentions and school dropout (Zentall, Smith, Lee, & Wlaczorek, 1994). Barry, Lyman, and Klinger (2002), examining the occurrence of academic underachievement in a group of children diagnosed with ADHD, found that the greater the severity of behavioural symptomatology in children with ADHD, the greater the negative impact on their school performance.

Inattention, hyperactivity, and impulsivity are the core symptoms of ADHD. A child's academic success is often dependent on his or her ability to attend to tasks and teacher and classroom expectations with minimal distraction. Such skill enables a student to acquire necessary information, complete assignments, and participate in classroom activities and discussions (Forness & Kavale, 2001). When a child exhibits behaviours associated with ADHD, consequences may include difficulties with academics and with forming relationships with his or her peers. As they reach adolescence, these children are also at greater risk of drug and alcohol abuse and other issues such as increased rate of motor vehicle accidents, adding a substantial cost burden to the society. These children also suffer from problems with family and peer relationships that continue into adulthood and prevent the individual from achieving their maximum potential (Parr, Stein, & Amler, 2001).

Executive Function Deficits and Academic Performance

DSM-IV diagnosis of ADHD focuses on the behavioural problems of inattention, hyperactivity and impulsivity, but does not explain the cognitive impairments that are commonly experienced by ADHD individuals (Barkley, 2006). The cognitive deficits – or executive function deficits – experienced by ADHD individuals include response inhibition (Barkley 1997) and working memory (Tannock 1998). Indeed, Barkley (2006) suggests that while poor response inhibition is the core deficit in ADHD, it subsequently gives rise to other executive function deficiencies, such as cognitive flexibility, planning and fluency.

The implication of executive functions in the research suggests that deficits in executive functioning could be at the heart of ADHD-related academic underperformance. This, taken with the consistent finding of the significant role

played by inattentive symptoms in the ADHD-academic performance relationship, suggests a possible inattention—executive function impairment pathway to academic problems in ADHD individuals. The majority of students with ADHD have deficits in the key executive functions such as: 1. Poor organizational skills; 2. Poor working memory; 3. Difficulty activating and maintaining alertness; 4. Reconstitution (taking issues apart, analyzing the pieces, and combining into a new whole); 5. Internalizing language; 6. Controlling emotions; 7. Shifting (from one issue or event to another); 8. Planning and organizing materials and assignments; 9. Controlling emotions; 10. Planning and organizing materials and assignments; and 11. Self-monitoring

Common Learning Problems Often Accompanying ADHD

1. Language Deficits: Several language-processing problems are common among teenagers with ADHD.

1.1. Spoken Language: Talks a lot spontaneously, if he can choose the topic; has difficulty responding to questions when he must think and give organized, concise answers; may talk less or give rambling answers; Reluctant to speak in class because of slow processing speed and difficulty organizing ideas; may even be willing to accept failing grade rather than speak in front of the class.

1.2. Written Language: Slow reading and writing; takes longer to complete work, produces less written work; Difficulty writing essays; difficulty organizing ideas and putting them in proper sequence; Difficulty getting ideas out of head and on paper; written test answers, discussion questions, or essays may be brief; written expression is adversely affected by deficits in key executive skills such as working memory and analysis, sequencing and synthesis.

1.3. Processing Speed: Low scores on the Processing Speed Index (PSI) of the Wechsler Intelligence Scale for Children (WISC-IV) or Wechsler Adult Intelligence Scale (WAIS-IV) may be indicative of problems with hand-eye coordination or slow processing speed. Slow processing of information: reads, writes, and responds slowly; may take twice as long to do homework and class work and to complete tests; doesn't have time to double check answers; Recalls facts slowly; Can't quickly retrieve information stored in memory such as math facts, algebra formulas, foreign languages, history dates or facts, or grammar rules.

1.4. Listening Comprehension: Difficulty following directions: becomes confused with lengthy verbal directions, may not hear or pick out homework assignments from a teacher's lecture; Loses main point; difficulty identifying key points to write while taking notes.

1.5. Reading Comprehension: Can't remember what is read, then has to read it again; difficulty understanding and remembering what is read; difficulty with long reading passages; Makes errors when reading silently; may skip words, phrases, or lines; Difficulty identifying and remembering key facts from reading; Linked to executive functioning deficits.

2. Poor Memory: Students with ADHD may have difficulties with short-term, long-term, and/or working memory. Often these memory skills are interrelated.

2.1. Short-Term Memory Problems: Difficulty remembering information in the here and now, for roughly 20 seconds; may not remember teacher requests, instructions, multi-step directions, or verbally presented math problems.

2.2. Working Memory Problems (an executive skill): Low scores on the Working Memory Index of the Wechsler Intelligence Scale for Children or the Wechsler Adult Intelligence Scale are indicative of problems with working memory; difficulty holding information in mind while actively processing it; difficulty retrieving information from long-term memory that is needed in working memory to solve a problem.

2.3. Long-term Memory Problems: Difficulty placing information into, and retrieving it from, long-term storage; difficulty memorizing material such as multiplication tables, math facts, or formulas, spelling words, foreign languages, and/or history dates; lacks memorization strategies; difficulty quickly retrieving information stored in long-term memory; may not do well on tests requiring recall of information from long-term memory, even though the student studies.

3. Poor Fine Motor Coordination: Handwriting is poor; sometimes, small and difficult to read; may write slowly; may avoid writing and homework because writing is difficult; May prefer to print rather than write cursive, even as an adult.

Educational Challenges for Students with ADHD

a) Primary years

As many as 80% of students with ADHD have been found to exhibit academic performance problems (Cantwell, Baker 1991) and about 20–30% have been classified as having learning disabilities due to deficits in the acquisition of specific academic skills (DuPaul & Stoner, 2003). Learning difficulties can exacerbate behavioural problems and affect the social and emotional wellbeing of the student, resulting in underachievement, antisocial behaviour, a sense of failure, alienation from peers, and school and social exclusion (Loe & Feldman, 2007). Students vary in the type of symptoms they display, from dreamy and inattentive to impulsive, loud and constantly in motion, and some will show

both inattentive and hyperactive/impulsive behaviour. Their behaviours vary day to day, minute to minute, and across different learning contexts (Tannock & Martinussen, 2007).

Cognitive difficulties underpin both inattentive behaviour and underachievement. In particular, poor working memory is impaired by ADHD, and is linked with inattentive behaviours (Tannock & Martinussen, 1998). Working memory is necessary for performing complex tasks such as mental, arithmetic, listening and reading comprehension, and reasoning, and the quality of working memory predicts future academic achievement in literacy, maths and science (Barkley, 2003). Students with ADHD wrote less, their texts were disorganised, their vocabulary was limited and they made more errors than their peers (ReAM, Pedron, & Cornoldi, 2007).

Poor self-regulation is a major contributor to academic and behavioural problems in children with ADHD. Self-regulation has three components: an attentional, inhibitory, and an organisational, strategic component which directs cognitive processing. Children with a reduced capacity for self-regulation have a low tolerance of frustration, and a tendency to emotional outbursts and to view things in personal terms. They cannot use everyday language effectively as a cognitive and social tool for passing on information and resolving conflicts (Douglas, 2005). Lack of social skills, such as forming friendships and relating to peers, creates increasingly significant problems for children in the primary school years. Hyperactive and impulsive behaviours contribute to unrestrained and overbearing behaviours that make children with ADHD unpopular with their peers (Hoza, 2007).

b) Secondary years

Evans, Serpell, Schultz, & Pastor (2007) described the problems faced by adolescents with ADHD that have been identified in research. In adolescence, the problems experienced at younger ages – academic difficulties, discipline problems at school and at home, conflict with peers – often have more serious consequences, such as school dropout and entering the juvenile justice system. Physical and social maturation may also bring new problems such as car accidents, driving infringements, difficulty in relationships, vocational problems and substance abuse. Furthermore, the school setting, routines and expectations change as students move from primary to secondary school. Students are expected to be independent learners and they move from the security of one teacher and one class to many (Pearce & Forlin, 2005). Many adolescents with ADHD have significant problems related to homework completion and class preparation. They often come to class unprepared, fail to

attend or recall assignments, and rush through schoolwork making careless mistakes. They may not begin tasks in a timely manner, make prompt decisions, and make little effort, remember responsibilities, organise materials and manage time efficiently. Students with ADHD can also struggle to apply and review the material they have learned. They find it difficult to understand material covered, and often do not allow sufficient time for test preparation (Robin, 1998)

Conclusion

Attention deficit hyperactivity disorder is associated with academic underachievement across the developmental spectrum, from pre-schoolers to adults. Of the features of ADHD, it is inattentive symptoms and executive function deficits that are associated with academic problems. Research findings indicate that school based interventions if timely and consistent can moderate the academic challenges a child with ADHD experiences (Murray, Rabiner & Hardy, 2011). The review recognizes the importance of teacher in understanding behavioural disorders and determining classroom practices. In addressing the relevance and need for addressing ADHD in school related contexts, the findings of this review also have implications for school mental health with specific reference to the Indian context.

The role of the teacher is important in optimizing the development of children with ADHD. Many teachers are not aware of what researchers have learned in working with children with ADHD. Findings of the review have implications for addressing issues of designing effective teacher training programmes. Since ADHD is a complex disorder, surfacing in the preschool years and manifesting symptoms throughout adulthood, it is not surprising that there are no simple teaching methodologies agreed upon by all. Further research is needed to determine what kind of teacher training best prepares teachers to work with children with ADHD, and which teaching methodologies are most effective for children with ADHD in the classroom.

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