

Supporting patients with ADHD: Missed opportunities?

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With a prevalence rate of about 5% of children worldwide, attention-deficit/hyperactivity disorder (ADHD) is one of the most frequent neurodevelopmental childhood disorders (Polanczyk et al. 2007). For a long time, ADHD had been understood as an exclusive childhood disorder, which grows out by adolescence and is nonexistent in adulthood (Klein and Mannuzza 1991; Ross and Ross 1976). However, a large body of research in the last two decades demonstrated that ADHD persists up into adulthood as a valid and reliable disorder (Barkley et al. 2002; Biederman 2005; Faraone et al. 2000; Mannuzza et al. 1998; Rasmussen and Gillberg 2000). The extent to which symptoms of ADHD persist from childhood to adulthood is difficult to estimate due to a high heterogeneity of methodologies and designs between studies. Therefore, estimations of persistence rates in children with ADHD who still suffer from symptoms of ADHD in adulthood vary between 30 and 60% (Biederman 1998; Biederman et al. 2000; Seidman et al. 2005; Willoughby 2003). A more recent epidemiologic study performed by Barbaresi et al. (2013) reported a persistence of ADHD into adulthood in 29–38% of cases. Although there is disagreement about the actual percentage of ADHD children who will still suffer from the disorder in adulthood (Willoughby 2003), there is little doubt that it is a substantial proportion. As ADHD symptoms have also been reported in older adults, lifetime stability of ADHD is assumed (Guldborg-Kjär et al. 2013; Kooij et al. 2005; Michielsen et al. 2012; Semeijn et al. 2016). Regarding the

developmental trajectory, it is notable that the clinical picture of ADHD in adulthood differs from the clinical picture of childhood ADHD. Motor symptoms of hyperactivity/impulsivity were shown to be less dominant in adults with ADHD, whereas cognitive dysfunctions (such as inattention and disorganization) were found to become more pronounced in adult ADHD (Biederman et al. 2000; Davidson 2008). Moreover, symptoms of ADHD in adulthood were demonstrated to be closely linked to academic failure, social dysfunction, low self-esteem and reduced quality of life (Agarwal et al. 2012; Biederman 2005; Canu and Carlson 2007; Canu et al. 2008).

However, many basic problems and questions encountered in research with and the clinical management of adults with ADHD are not solved or answered yet. Such issues comprise, besides others, aspects of validity of ADHD assessment and diagnoses or the efficacy of treatments. For example, there is an ongoing discussion about the validity of the assessment of ADHD-like symptoms and behaviors in various settings, including the school, private or occupational setting. There is particular concern about how the assessment of ADHD is established in comparison with related disorders and clinical concepts. Regarding the treatment of adult ADHD, for instance, the question whether the treatment of ADHD has long-term effects has been discussed recently on the very successful 6th World Congress on ADHD, held in Vancouver, Canada (April 20–23, 2017). In some regard, these issues may even become more difficult when treating and studying adults with ADHD as their daily lives and daily routines are usually less structured, more complex and more heterogeneous than the lives of children (e.g., no daily school routine in adulthood). Furthermore, adults have to prove themselves in additional areas of life which are associated with manifold challenges,

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including partnership, marriage and family, parenthood, occupation or driving a motorized vehicle.

Because of these challenges and the associated responsibilities adults with ADHD face (e.g., being a parent, financial decision making, dealing with customers or clients, supervising employees), research on effective treatment strategies for adult ADHD is of particular relevance. In this respect, it has to be pointed out that this is not only a plea for critical and high-quality studies on pharmacological treatment, but also, and possibly even in particular, for high-quality studies on non-pharmacological intervention strategies. This plea is motivated by the idea that pharmacological treatments that have repeatedly been shown to have beneficial effects on patients' functioning (at least short-term effects) should not be understood as an independent, sort of *stand-alone* treatment option. It is true that group studies demonstrated that pharmacological treatment alone has the potential to improve different aspects of functioning of patients with ADHD, for example cognitive functions as measured with laboratory-based neuropsychological tests (Fuermaier et al. 2017; Tucha et al. 2011), while group studies on non-pharmacological treatments like cognitive trainings or neurofeedback provided no or only limited evidence of effectiveness (Cortese et al. 2015, 2016). However, when asking clinicians or adult patients themselves in what way medication-induced improvements have an effect on the patients' life, it seems that a sizeable number of patients do not necessarily experience major changes, at least not in all areas they experience difficulties in. In the first place, this may seem surprising as appropriate and well-monitored pharmacological treatment of ADHD is assumed to compensate imbalances or deficiencies of neurotransmission allowing more normal brain functioning. However, when giving this more thought, it is not so surprising anymore as this compensation is exactly what the pharmacological treatment does. Nothing more! But this does not automatically mean that with better brain functioning all of a sudden all skills and knowledge are immediately available to the individual who possibly processed information incompletely and failed to develop skills for decades because of these imbalances or deficiencies of neurotransmission. Of course, many patients do not immediately know what to do with and how to apply their improved functions. Since some patients, however, seem to be able to make use of their improved capabilities, one may assume that there are certain factors such as personal and environmental factors (e.g., critical self-reflection or cues and feedback provided by partners, family and friends) that can support patients in applying their improved functions. Therefore, additional support (e.g., in the form of systematic training of skills, instruction, reorganization, coaching and/or alike) may be the key for patients to apply their improved capabilities.

Providing such non-pharmacological interventions aside pharmacological interventions seems superior to just hoping that patients find out by themselves how to benefit from their improved functions.

In another context, I once described these considerations in the form of an analogy (Tucha 2017), namely whether we expect a child with a crippled leg who never learned walking to dance after a gifted surgeon performed a surgery, repairing the skeletal and muscular injury causing the disability. Most likely not! We would not even expect the child to walk since muscles have to be built up, a feeling of balance and motor programs have to be developed, movement control to be practiced and dancing steps to be learned. The same applies to patients with ADHD who benefit from pharmacological treatment. Therefore, non-pharmacological interventions (e.g., like coaching) should be seen as an essential part of pharmacological approaches to the treatment of ADHD, helping patients to translate their increased abilities into daily life. From recent meta-analyses, we already learned that some non-pharmacological approaches (e.g., function training or neurofeedback) are not as promising as once hoped (Cortese et al. 2015; 2016). These sobering findings should not demotivate research in this field. However, it is becoming clear that there is still a long way for us to go in order to find out which pharmacological and non-pharmacological treatments work and which combinations do the trick.

This issue of attention-deficit/hyperactivity disorders makes another step forward in this journey. Its articles focus on aspects related to non-pharmacological interventions (Kysow et al. 2017; Philipsen et al. 2017) and pharmacological treatment (Tanaka et al. 2017). Moreover, the genetic association between ADHD and Parkinson's disease (Geissler et al. 2017) as well as pre-service teachers' perceptions of sluggish cognitive tempo (Meisinger and Lefler 2017) are elucidated.

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