Mindfulness-Based Cognitive Therapy (MBCT) and ADHD Undergraduate Students: A Commentary on Randomized Controlled Trial Results

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Abstract

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders worldwide. Over the past decade, diagnosis rates have dramatically increased, especially in college and university student populations. Given that those with ADHD traditionally underperform academically and are less likely to graduate than their non-ADHD peers, finding effective treatment protocols is a high priority. This paper reviews the challenges associated with ADHD and possible treatment protocols. It then provides a commentary on a recent randomized controlled trial on the effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) in undergraduate ADHD students. According to the research conducted by Gu et al. (2018), MBCT shows promise as a treatment option and demonstrated improvements on a variety of psychological, mood-related, and performance-based rating scales. Reflecting on the research outcomes of Gu et al. (2018), this paper analyzes its strengths and explains the valuable role that it serves in identifying effective non-drug treatment options.

I. Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder that affects 5-7% of children (Polanczyk et al., 2007) and 2.5-4.4% of the adult population in the United States (American Psychiatric Association [APA], 2013; Asherson et al., 2016; Brown & Landgraf, 2010; Hepark et al., 2019). Among college and university students, ADHD rates are estimated to be as low as 2% and as high as 8% (DuPaul et al., 2009; Weyandt et al., 1995).

Those with the disorder experience symptoms of inattention and/or hyperactivity-impulsivity, which fall under one of three subtypes: primarily (1) inattentive, (2) hyperactive-impulsive, or (3) combined (APA, 2013). However, beyond inattentiveness, hyperactivity, and impulsivity, ADHD poses considerable cognitive, social, and emotional challenges for individuals diagnosed with the disorder (Barkley et al., 2007; Brown, 2013).

Historically, those in the medical field have held that children outgrow ADHD with age (Hill & Schoener, 1996; Shaffer, 1994); however, other studies have shown symptom continuity in adult populations (Biederman et al., 2000; Ramussen & Gillberg, 2000). Researchers believe that persistence rates into adolescence and adulthood occur in 70-90% of children with ADHD (Barkley, 2006; Biederman et al., 2000; Farone et al., 2006; Fischer et al., 1990). Sibley et al. (2021) concluded that although remission of ADHD symptoms may occur, this effect is typically only temporary and that 90% of children with the disorder will experience residual symptoms in adulthood. Longitudinal research (n = 2232) by Stern et al. (2020) found that childhood ADHD is associated with more significant emotional problems in early adulthood, and Barkley and Fischer (2011) identified that children diagnosed with ADHD (n = 135) scored significantly lower in executive functioning (EF) scores in adulthood than non-ADHD (n = 75) peers.

Those with ADHD are vulnerable to comorbid psychiatric conditions and risks, including moods, anxiety, and substance use disorders, as well as an increased risk of accidental death, self-inflicted injury, and suicidal ideation, attempts, and completions (Barkley et al., 2008; Barkley & Fischer, 2019; Torgersen et al., 2006). Studies have indicated that 80% of those with adult ADHD have a concurrent psychiatric disorder (Sobanski et al., 2017; Torgersen et al., 2016). This can make identifying and treating the disorder particularly challenging, as comorbid conditions and symptoms may dominate clinical assessment, and thus lead to higher rates of untreated patients (Watters et al., 2017). Moreover, with the complexity of the disorder, research has shown an average decreased life expectancy of 9 to 13 years in ADHD populations, with a 25-year decrease in the most severe cases of the disorder (Barkley & Fischer, 2019).

With the impairments that those with ADHD experience, the transition from adolescence to emerging adulthood can be particularly challenging, especially for those entering postsecondary education

(Brown, 2013; Gu et al., 2018). Comparatively, only 15% of those with ADHD complete a four-year degree versus 48% for non-ADHD individuals and only 0.06% of those with ADHD hold graduate degrees versus 5.4% for non-ADHD individuals (Kuriyan et al., 2013).

Adults with ADHD present an increased risk for drug and alcohol abuse and dependency, binge eating and obesity, tobacco use, sleep disorders, and risky sexual behaviour (Barkley & Fischer, 2019; Gu et al., 2018; Schoenfelder & Kollins, 2016). Additional research has suggested that those with ADHD are also at an increased risk for automobile accidents, crime, and suicide (Barkley, 2006; Barkley & Fischer, 2019; Smith et al., 2000). Given the fact that ADHD is the most common neurodevelopmental disorder (Polanczyk et al., 2007; Sibalis et al., 2019), it is imperative that effective treatment options be explored and provided to mitigate the risks and vulnerabilities of the condition.

Fortunately, ADHD stimulant medication is among the most effective psychopharmacological treatments available, with a patient efficacy rate of 70-85% (Barkley, 2006; Brown, 2009; Findling et al., 2011). Since the 1930s when stimulant medications were implemented by Dr. Charles Bradley in ADHD-related symptoms, observed improvements in focus, attention, self-control, and academic performance have been established in over 200 clinical trials (Barkley, 2006; Connor, 2006). Today, stimulant medications include substances such as methylphenidate, dextromethylphenidate, dextroamphetamine, mixed amphetamine salts, lisdexamfetamine, and magnesium pemoline, and non-stimulant medications include atomoxetine and guanfacine (Brown, 2013; Connor, 2006). Despite the fact that medications are typically well-tolerated, some notable side effects include appetite suppression, weight loss, elevated heart rate and blood pressure, irritability, anger, insomnia, vomiting, stomach pain, headache, anxiety, and psychosis (Connor, 2006). Additionally, there have also been reports of sudden death among those with underlying heart conditions (Connor, 2006). However, as Barkley (2006) and Brown (2013) indicate, the risks of unmedicated ADHD symptoms may outweigh the adverse risks of stimulant medication use. When properly screened and monitored by a physician, stimulant medications are believed to be quite safe in ADHD patient populations (Barkley, 2007; Connor, 2006).

However, a growing concern is the rate at which stimulant medications are being prescribed, as drugs like methylphenidate are now some of the highest prescribed worldwide (Kennedy, 2018; Swanson, 2003). Illicit use of ADHD stimulant medication, especially among high school and postsecondary students, appears to be on the rise (Advokat, 2010; Olfson et al., 2013; Varga, 2012). According to Kennedy (2018), an estimated 20% of college students have used prescription stimulants, which is a rate far higher than those diagnosed with ADHD in student populations. Even with these risks and concerns about over-prescription and misuse, stimulant medications have been the only treatment protocol

shown to significantly improve symptoms of ADHD (Barkley, 1998). Of all the treatment options, stimulants have routinely shown the greatest effect size in those with ADHD (Barkley, 1998; Brown, 2009; Brown, 2013).

With that said, research has shown that psychosocial interventions can be highly effective forms of treatment for those with ADHD (Cairncross & Miller, 2020; Young et al., 2020). In the past six years, many clinicians have explored the efficacy of Mindfulness-Based Cognitive Therapy (MBCT) in the treatment of ADHD (Bachmmann et al., 2016; Geurts et al., 2021; Gu et al., 2018; Janssen et al., 2019). MBCT research outcomes have been particularly valuable for postsecondary populations with ADHD as they often encounter significant challenges with the abrupt cessation of routine and structural and parental support (Fleming & McMahon, 2012). Although stimulant medication is the first-line treatment for ADHD, there has been criticism over its efficacy in postsecondary populations. Stimulant medications did not help students adjust to postsecondary environments compared to non-ADHD students (Rabiner et al., 2008). Moreover, students with ADHD enter postsecondary education with significantly higher rates of self-perceived peer rejection (Hoza et al., 2005), fear of intimacy (Marsh et al., 2015), and psychological and emotional distress (Green & Rabiner, 2012). Although stimulant medications may assist with focus and attention, a multimodal approach may be more effective at targeting complex emotional, psychological, and social needs (Nugent & Smart, 2014), especially as postsecondary students with ADHD tend to use fewer coping mechanisms in times of distress than their ADHD peers (Turnock et al., 1998). Students with ADHD may not know how to find or ask for assistance in times of distress due to feelings of learned helplessness and daily demoralization (Wehmeyer et al., 2010).

Numerous risks emerge when considering postsecondary ADHD student outcomes. First, postsecondary students with ADHD are at a greater risk of experiencing stress, problematic spending, social and relationship difficulties, substance abuse, course failure, academic probation, dropout, and suicide than their non-ADHD peers (Barkley, 2006; Becker et al., 2014; Brown, 2009). Second, postsecondary institutions are struggling to meet the demands of student populations (Francis & Horn, 2017; Kitzrow et al., 2003), which translates to more students being placed on waitlists (Cornish et al., 2017; Hardy et al., 2011). For this reason, both time-saving and cost-effective treatment plans will be necessary to meet the growing demands for university-based counseling services. In the case of ADHD, individuals make up a large portion of the student population and require social support and academic accommodations. Third, since many individuals are either reluctant to take ADHD medication or eventually stop the treatment protocol altogether, effective non-drug therapies become increasingly sought after (Sibalis et al., 2019). For example, research has shown that less than 20% of children

prescribed stimulant medication for ADHD continue to take for durations longer than one year (Marcus et al., 2005). Common concerns for discontinuation include psychological side effects and medication ineffectiveness (Toomey et al., 2012). Fourth, although a large body of research suggests that stimulant medications are effective in the treatment of ADHD, some studies have shown that stimulant medication is not associated with better adjustment and performance outcomes in postsecondary student populations with ADHD (Advokat & Scheithauer, 2013; Blase et al., 2009). For example, although stimulant medications may reduce interruption, fidgeting, and hyperactivity, these changes often do not correlate with improvements in life quality (Advokat & Scheithauer, 2013). This may be due to the fact that clinical trials do not always translate to real-world or everyday experiences (Advokat & Scheithauer, 2013). For these reasons, the recent research by Gu et al. (2018) on MBCT serves an important role in providing pertinent experimental data in ADHD university populations, as clinical trials on effective psychosocial interventions have been largely neglected in this demographic.

II. ADHD Neuroscience

Researchers believe that one critical area of the brain affected by ADHD is the prefrontal cortex (PFC), an area of the brain correlated with executive function disorders (Barkley, 2006; Brown, 2013; Yasumura et al., 2019). Those with ADHD experience inhibited dopaminergic and norepinephrinergic activity in the frontostriatal networks (Arnstein, 2009; Barkley et al., 1992). Stimulant medications, the first-line treatment for ADHD, block dopamine reuptake and inhibit norepinephrine transport (Brown et al., 2018; Connor, 2006), which help regulate neural activity in the brain during cognitive tasks (Konrad & Eickhoff, 2010). Those with ADHD are prescribed methylphenidate and amphetamine medications to improve dopaminergic and noradrenergic signalling in the brain by raising available neurotransmitter levels (del Campo et al., 2011; Vanicek et al., 2014; Volkow et al., 2001). Dopamine and norepinephrine are chemically linked pathways and play a cooperative role in brain function as "hydroxylation of the former yields the latter" (del Campo et al., 2011, p. e145). These catecholamines play an integral role in mood, reward, expectation, attention, and movement, and if dysregulation occurs, individuals often experience significant challenges in day-to-day functioning (Hosenbocus & Chahal, 2012). With low or hypo-dopaminergic neurotransmission in the PFC, those with ADHD struggle to regulate their attention, behaviour, and motivation (Barkley 2006; Barkley et al., 2007; Blum et al., 2008), as having either too much or too little dopamine negatively impacts cognitive abilities and focus (Hosenbocus & Chahal, 2012). Some research suggests that those with ADHD exhibit polymorphisms in dopamine transporter (DAT) genes, including DRD2, DRD4, and DAT1 (Blum et al., 2008; Dougherty, 1999; Spencer et al.,

2007). Studies have shown that individuals with ADHD often have higher DAT levels, which means that dopamine may be removed more readily from the brain – thus leading to deficits in particular brain regions (del Campo et al., 2011; Krause, 2008; Volkow et al., 2009; Volkow et al., 2011).

III. Mindfulness-Based Cognitive Therapy (MBCT)

Mindfulness-based interventions (MBIs) are becoming increasingly popular psychosocial treatment options for individuals with ADHD (Geurts et al., 2021). Mindfulness is defined as "paying attention in a particular way: on purpose, in the present moment, and non-judgementally" (Kabat-Zinn, 1994, p. 4). Individuals that practice mindfulness cultivate the capacity to become more aware of their thoughts, feelings, bodily sensations, and behaviors, as well as the ability to bring their attention back to the present moment (Geurts et al., 2021). In recent years, Mindfulness-Based Cognitive Therapy (MBCT) has shown particularly promising results in a variety of clinical settings. MBCT is a hybrid of meditation practice and cognitive therapy developed by Dr. Zindel Segal at the University of Toronto and Dr. Mark Williams at Oxford University (Sears, 2015; Segal, 2013), which was originally designed to help prevent relapse in high-risk depression populations (Alsuabie et al., 2017; Sipe & Eisendrath, 2012). MBCT teaches "participants to recognize and disengage from maladaptive automatic cognitive patterns, and to develop a nonjudgmental and compassionate attitude toward their own cognitions and feelings" (Classder-Micus et al., 2018, p. 915). In clinical settings, it has been applied in the treatment of anxiety (Apolinário-Hagen et al., 2020; Evans et al., 2008), depression (Eisendrath et al., 2016; Teasdale et al., 2000; Zemestani & Nikoo, 2020), and bipolar disorder (Docteur et al., 2020; Williams et al., 2008). Because ADHD has high anxiety, depression, and bipolar disorder comorbidity rates (Barkley, 2007; Barkley & Fischer, 2019), MBCT may be even more valuable due to its treatment versatility. Despite the promising outcomes of MBCT, its efficacy in the treatment of ADHD still requires more clinical investigation (Haydicky et al., 2015).

Research suggests that mindfulness practices help target the core symptoms of ADHD, which include inattention, inability to focus, restlessness, impulsivity, and a lack of self-control (Meppelink et al., 2016). MBCT can be used to help individuals overcome reactive, automatic, and impulsive responses (Cortese et al., 2012; Crane et al., 2017) and enhance one's capacity to recenter attention when it drifts. Moreover, mindfulness-based practices are associated with greater emotional regulation, and lower impulsivity scores (Crane et al., 2017). Given that the ADHD mind is associated with altered connectivity and impaired activity in various regions of the brain (Cortese et al., 2012), mindfulness practices have been shown to improve the executive attention network (Tang et al., 2007), which "allows [for] voluntary control of

behavior in accordance with goals" (Posner et al., 2016, p. 1). This means that with practice, those engaged in mindfulness have the capacity to evaluate and move beyond impulsive reactions, as well as habits and expectations (Fan et al., 2005). A growing body of evidence suggests that mindfulness practices have been associated with improvements in executive function (Jha et al., 2007; Lao et al., 2016) and working memory (Jha et al., 2010).

With the complexity of ADHD symptoms, MBCT may prove beneficial not just for its capacity to target executive function and attention but also mood and emotion dysregulation, as evidenced by its extensiveness in clinical assessments. Therefore, the question that emerges from MBCT research on ADHD is whether mindfulness practices can have comparable results to medication in ADHD populations.

IV. MBCT and Undergraduate Students with ADHD

In their randomized controlled trial, Gu et al. (2018) tested Mindfulness-Based Cognitive Therapy (MBCT) versus pharmacological treatment in a sample of Chinese undergraduate students with ADHD. Students were recruited from five universities in southern China. The original sample consisted of 93 individuals (ages 19-24), but after applying various exclusion parameters, a total of 54 individuals were tested (experiment group n = 28 versus control group n = 26). Clinical measures included the following scales. First, the 30-item Conner's Adult ADHD Self-Rating Scale (CAARS-S) was used to measure ADHD symptoms of inattentiveness, impulsivity, and hyperactivity (Conners et al., 1999). Second, the Attentional Network Test (ANT) measured neuropsychological performance through attention efficiency scores, which included 96 computer-based trials (Fan et al., 2002). Third, the 21-item Beck Anxiety Inventory (BAI) and the second edition Beck Depression Inventory (BDI-2) measured depression and anxiety scores (Beck et al., 1988; Beck et al., 1996). Fourth, academic GPA was also taken throughout the study to measure educational performance. Fifth, the 15-item Mindful Attention and Awareness Scale (MAAS) was used to measure "characteristics of mindfulness" (Gu et al., 2018, p. 382), including receptivity and awareness (Brown & Ryan, 2003).

Despite its relatively small sample size, this study is one of the only clinical trials conducted on ADHD in university populations and one of the only studies conducted on Chinese students. Other clinical trials on ADHD have either (a) focused on children or teens or (b) investigated demographics from other countries like the Netherlands (Janssen et al., 2018; Meppelink et al., 2016). Considering the potential cross-cultural differences in university experiences and ADHD treatment protocols, more research needs to be conducted in this respective area to better define the effectiveness of mindfulness practices. Importantly, as the researchers of this study have identified, the rates and symptoms of ADHD in postsecondary Chinese students are similar to students in the United

States. Therefore, like the United States, China is likely trying to find effective treatment protocols for the high rates of ADHD students in postsecondary institutions.

According to the research by Gu et al. (2018), the MBCT training program in the experimental group lasted for six weeks and consisted of one-hour sessions each week. These sessions were held at an on-campus outpatient psychology clinic and led by a skilled MBCT practitioner and accompanying psychologist. In addition to these sessions, subjects in the experimental group were routinely assigned daily meditation practices and exercises for approximately 30 minutes per day. The clinical interviewer was blind to individuals in the experimental and control groups, and they conducted assessments at three timed intervals: pre-treatment, post-treatment (six weeks), and follow-up (three months later). The control group followed the same interview process; however, they did not undertake any counseling or therapeutic practices, but were instead provided with ADHD medication during the trial.

As the research team hypothesized, (1) the MBCT group outperformed the medication group in ADHD symptom improvement, including significantly lower pre-treatment and follow-up inattentiveness scores (MBCT = 18.22 reduction versus control = 5.30 reduction) and hyperactivity-impulsivity scores (MBCT = 14.43 reduction versus control = 0.23 increase). These scores were based on CAARS-S subscale measures. Additionally, the MBCT group also showed lower depression and anxiety scores, (3) higher mindfulness scores after treatment, (4) greater improvements in neuropsychological performance at post-treatment and the three-month follow-up, and (5) sustained their increases three months after the treatment concluded (Gu et al., 2018). Unlike the medication group, which would have to continue treatment protocols (i.e., undergo regular physician visitations, checkups, and prescription refills), the MBCT group maintained their treatment results through personal practice. The MBCT group did not need continued or ongoing training with an MBCT practitioner – thus demonstrating the enduring benefits of the training sessions. Therefore, MBCT would be especially effective for those who elect to stop their medication or receive adverse side effects. Additionally, in overall ADHD symptom scores, 57% of MBCT subjects showed a positive response after the six-week treatment, while only 23% of those in the control group showed improvement.

V. Implications for ADHD and Comorbid Disorder Treatment

Interestingly, the positive response from MBCT treatment increased at the three-month follow-up, with 71% of MBCT participants experiencing a reduction in ADHD symptoms versus 31% for the control. A 71% efficacy rate on self-report CAARS-S scale scores is comparable to the efficacy rates of stimulant medication, which were found to be effective in 70-85% of users (Barkley, 2006; Brown, 2009; Findling et al., 2011). Of course, many researchers also claim that although stimulant medication studies

have shown positive results, many individuals with ADHD stop using their medication within a year (Marcus et al., 2005; Sibalis et al., 2019; Toomey et al., 2012). It is important to note that Gu et al. (2018) did not suggest that these treatment protocols need to be viewed in either/or terms. Instead, the authors stress that multimodal therapies may increase the effectiveness of treatment plans for those with ADHD. Given the study results, MBCT may also be beneficial for alleviating the negative symptoms associated with stimulant medication use, including anxiety, irritability, and restlessness (Gu et al., 2018). One extensive survey (n = 61779) found that US children with ADHD had significantly higher rates of anxiety (18% versus 2% for the control), depression (15% versus 1% for the control), conduct disorder (27% versus 2% for the control), and speech problems (12% versus 3% for the control) (Larson et al., 2011). In adult populations, a probability sample (n = 3199) found US adults with ADHD had significantly higher rates of mood disorders, including major depressive, dysthymia, and bipolar disorder (38.3% versus 11.1% for the control), anxiety disorders, including generalized anxiety disorder (GAD) and panic disorder (47.1% versus 19.5% for the control, and substance use disorders (15.2% versus 5.6%). As these studies indicate, ADHD is a complex disorder that may require more than what psychopharmacological monotherapy can offer. Given that MBCT has been used to treat multiple comorbid disorders associated with ADHD, it may play a highly versatile and pragmatic role in treatment plans. Because children and adults are both subject to comorbid risks, protocols should be implemented early in life to minimize exposure to psychological distress.

Additionally, when thinking about cognition and performance, MBCT may help to improve deficits in ADHD subjects by improving brain functions in regions associated with attention, focus, and executive function (Tang et al., 2015). For example, ANT scores in the MBCT group showed improvements in alerting, orienting, and executive functioning subscales (Fan et al., 2002; Gu et al., 2018). Moreover, alongside the findings from Janssen et al. (2018), MBCT appears to be a *valuable* treatment option when used in conjunction with stimulant medications for those with ADHD. As Janssen et al. (2018) found, those receiving both MBCT and psychostimulant treatment (n = 60) had superior results in (1) ADHD symptoms, (2) mindfulness scores, (3) self-compassion, (4) overall mental health, and (5) daily functioning than the group that only received psychostimulant treatment (n = 60). Similar to the three-month follow-up results identified by Gu et al. (2018), Janssen et al. (2018) found that those who received MBCT training sustained positive results until their six-month follow-up. As Gu et al. (2018) had considered in their research, MBCT may be an effective treatment protocol that is both time-efficient and cost-effective for university counseling services. Though Janssen et al. (2018) used longer training sessions (2.5 hours for eight weeks versus 1 hour for six weeks), the cost-to-benefit ratio means that those receiving MBCT can benefit from shorter therapy durations and also sustain positive

results in the absence of continued therapy sessions via personal mindfulness practices.

With the results of these randomized controlled trials, MBCT appears to be a highly promising treatment protocol for those diagnosed with ADHD. Ideally, with more extensive clinical trials, it may become an approach utilized and implemented by college and university counseling services.

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