

Effectiveness of Mind-body interventions in dealing with ADHD and learning disability: A Review

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The relationship between mind and body is much stronger than we generally comprehend. The more researchers and practitioners explore the realm of mind-body therapies, the more possibilities are created and new hope is kindled. Although a bulk of literature is available on mind-body medicine, there is still a dearth of studies based on their application among children who have some neurodevelopmental problems. This paper is an attempt to review the research available on the application of therapies like hypnotherapy, biofeedback, and meditation to children with ADHD and learning disabilities. The study also aims to suggest ways to design better interventions using the aforementioned tools in the treatment of childhood disorders and to encourage more robust empirical studies.

Keywords: ADHD, Learning disabilities, *Clinical* hypnotherapy, Meditation, Bio/neurofeedback

Introduction

“Mind” is an abstract concept which is hard to define. Ever since the beginning of human understanding, we have tried to comprehend its workings and its influence on our whole existence. As we attempted to make Psychology a scientific discipline, researchers became focused on studying overt processes originating from measurable aspects of brain functioning. Yet, the covert aspect or the mental processes can't be ignored as we know that if the brain is like the hardware-visible to us for inspection, then the mind can be compared to software which is not visible but still working all the time. “Mind” is a much broader and complex concept often considered synonymous to consciousness (Reber, 2016). While the brain is the part of the “body”, the mind is its invisible yet inherent aspect which leads to the subjectivity of the experience while perceiving the same external stimulus. Mind is not only the unique originator of “conscious” experience but also the

skilled yet mischievous weaver of “unconscious” processes. With the advent of behaviourism (in the early 20th century), researchers became limited to the study of overt and measurable aspects of behavior while ignoring the covert one. However later, researchers started exploring the covert processes due to numerous apparent observations of mind-body connection in the clinical area and due to the recent technological advancements, which make the scientific study/measurement of mental processes possible.

The whole field of psychosomatic illness explains how psychological processes can cause somatic symptoms (Suls & Bunde, 2005; Greil, 1997). As the mind works as a powerful factor in causing/ aggravating physical ailments, it can also be a significant factor in their healing. That is why the researchers have been exploring the realm of “mind-body interventions” and getting noticeable success. There are numerous techniques which are used as mind-body therapies which come under the umbrella term of alternative and complementary therapies. These therapies have varied uses but for the purpose of this study, the researcher intends to review research literature pertaining to the use of mind-body

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interventions in dealing with neurodevelopmental challenges like attention deficit hyperactivity disorder (ADHD), attention deficit disorder (ADD) and learning disabilities (dyslexia, dysgraphia, dyscalculia etc.). Conventional therapy has been insufficient in providing side-effect free successful interventions. Hence, here arises the need to explore the domain of mind-body therapies.

Out of the multicolored bouquet of mind-body therapies, this paper focuses on the use of clinical hypnotherapy, meditation and biofeedback among the children having neurodevelopmental deficits. Although hypnotherapy, biofeedback, and meditation practices are different approaches, they have important commonalities. For example, all three of them facilitate inducing a relaxed and focused state of mind or consciousness, which is a significant prerequisite for working on cognitive deficits like attentional problems and learning disabilities.

Clinical hypnotherapy and its use for ADHD and learning disabilities

Clinical hypnotherapy refers to a scientific method to induce a relaxed state of focused (inner) awareness and self-control (Wolraich et al., 2008). The therapist uses various induction and deepening techniques and facilitates the process of self-exploration for the client. During hypnosis, the client is in a suggestible state, and with his or her consent, the therapist may provide positive and valuable suggestions to the client's subconscious mind. Clinical hypnotherapy is a well-established treatment option for disorders such as stress, anxiety, and depression (Hammond, 2010; Alladin & Alibhai, 2007), as well as pain management (Saltis, Tan & Cyna, 2017). It is successfully used in dealing with a wide range of psychological disorders in the late adolescent and adult populations (Hammond, 2010; Alladin & Alibhai, 2007). However, its use among children is reported less in the literature as cognitive processes are still in the process of maturation (Wolraich et al., 2008). The focus of the present study is to review recent research conducted among children and young adolescents (between the ages of 6 and 14) suffering from neurodevelopmental issues like ADHD and LD. For the treatment of childhood disorders, hypnotherapy is mostly not used as an isolated method but as an important part of the therapeutic intervention, which includes other

treatment strategies as well (Kurtz, 2008). With children, techniques like story-telling, imagination, fantasy, verbal and role-playing games, distraction, creative metaphors, etc. are fruitful (Millis & Crowley, 2014; Kohen & Olness, 2011). Also, self-hypnosis has been taught to children to make themselves calm, focused, and motivated (Kurtz, 2008).

The recorded historical background of hypnosis dates back to the 18th century, when it emerged from the techniques of Mesmer, Braid, Charcot, etc. However, the first notable publication regarding child hypnosis, entitled "Suggestion in Infancy," was published in the late 19th century by Baldwin (1891). By 1900, researchers became less concerned or interested in child hypnosis, and only after the late 1950s was research in child hypnosis restarted (Kohen & Olness, 2011). Since then, there has been a relative increase in work related to child hypnosis.

Pediatric hypnotherapy is an interesting area with great potential. Because they are in their formative years and are more suggestible than adults, children make excellent hypnotic subjects (Huynh, Vandvik, & Diseth, 2008). A good therapist can act responsibly and sensitively to help a child through hypnosis by utilising his or her abilities of fantasy and imagination.

There have been a number of studies supporting the use of child hypnosis in conditions including asthma (Saadat & Kain, 2007), pain management (Butler et al., 2005), enuresis (Huang et al., 2011), eating disorders (Mantle, 2003), etc. However, the use of hypnosis in the treatment of ADHD and other learning disabilities in children is still limited. A recent survey in the UK found that nearly 45 percent of families relied on non-conventional treatments, including hypnotherapy, for their children with ADHD (Fibert & Relton, 2020).

Many times hypnotherapy has been combined with bio/neurofeedback and has produced significant results (Thomson, 2019; Amon & Campbell, 2008; Hammond, 2001; Anderson et al., 2000; Barabasz & Barabasz, 2000) for reducing ADHD symptoms and excessive theta activity.

Amon and Campbell (2008) used a computer and biofeedback programme called "The Journey to the Wild Divine" and found a significant reduction in ADHD symptoms in the experimental group as compared with the control group. Another non-randomized observational study conducted in China, Korea, and Taiwan (Martenyi et al. 2010) focused

on comparing the use of different treatment modalities like pharmacotherapy and psychotherapy (including CBT, hypnotherapy, and psychoeducation) among ADHD children. The study could not establish a significant positive effect of any treatment modality for ADHD symptom reduction when compared with no treatment.

A recent randomized follow-up study examined the effectiveness of hypnotherapy on adults with ADHD (Hiltunen et al., 2014) and found that ADHD symptoms decreased significantly after hypnotherapy. These results are highly encouraging for future studies, particularly those involving children. Only the methodology for induction and deepening would have to be changed for children, considering the fact that the last thing a child wants to do is to close his or her eyes for a medical treatment or procedure (Barabasz & Watkins, 2005).

Many researchers have endeavoured to examine the effectiveness of hypnosis on children with learning disabilities. Some findings could not establish the efficacy of hypnosis per se (Johnson et al., 1981), but there are still a few studies that showed encouraging results of systematic, designed hypnosis intervention among children with learning impairments (Crasilneck & Hall, 1985). In 2007, Joffe, Cain, and Maric provided an intervention to children with specific language impairments who had comprehension deficits. They trained them to produce mental imagery related to stories told to them. Results showed that the experimental or treatment group significantly benefited from the training in terms of answering literal questions from the story. However, there was no significant improvement in terms of answering the inferential questions (Kohen & Olness, 2011).

Meditation for ADHD and learning disabilities

Numerous meditation styles and approaches exist, ranging from transcendental meditation to mindfulness meditation, vipassana, zen, tai chi, Qigong, etc. However, all of them encourage non-judgmental awareness and observation of internal (thoughts, feelings, bodily sensations, etc.) and external (environmental) stimuli (Wahbeh, Elsas, & Oken, 2008). Meditation practise of any form is believed to induce an altered state of relaxed yet expanded awareness with a better integrated sense of self

(Krisanaprakornkit et al., 2010). Many clinical interventions have been devised using mindfulness meditation techniques (Kabat-Zinn, 1982; Teasdale et al., 2000).

Although medication remains the primary treatment for ADHD among children, meditation has emerged as an important drug-free alternative therapeutic technique. The roots of meditation are in India (Krisanaprakornit, 2010), and over the past decades, many styles of meditation have been developed and are now practised all over the world. Meditation's benefits in enhancing executive functioning are well established because it deals with a relaxed state of expanded awareness (Zeidan et al., 2010; Tang et al., 2007; Chan & Woollacott, 2007).

Different meditation techniques like transcendental meditation (TM), Sahaj Yoga Meditation, and mindfulness/Vipassana meditation have been found to be helpful in reducing ADHD symptoms as well as associated stress and anxiety among children (Grosswald et al., 2008; Harrison, Manocha, & Rubia, 2004; Van der Oord, Bogels, & Peijnenburg, 2012).

The combined effect of mindfulness and neurofeedback was examined by Balgemann (2015) on executive functioning measured by the Stroop task. The combined intervention was found to boost specific aspects of executive functioning.

Positive effects of meditation practice on children with learning disabilities have also been shown in a few studies. For example, in Burlington, a 5-week mindfulness meditation-based intervention given to 34 adolescents diagnosed with learning disabilities showed anxiety reduction and noticeable improvement in social skills and academic performance (Beauchemin, Hutchins, & Patterson, 2008).

In a recent study, the effectiveness of a 20-week mindfulness meditation intervention (called MMA, which combines mindfulness meditation, cognitive behaviour therapy, behaviour modification, and mixed martial arts) on adolescents with learning disabilities who also had ADHD and anxiety was investigated. The study found that treated adolescents' parent-rated post-intervention behaviour changed significantly (Haydicky et al., 2012).

Although there are many studies supporting the positive effect of meditation on executive functioning, some scholars emphasize the need for more scientifically controlled studies (Krisanaprakornit,

2012; Greydanus, 2007). Overall, a review of literature and other resources available online shows that there is preliminary evidence that meditation practice has emerged as a significant mind-body intervention to deal with various problems encountered by children with developmental disabilities like ADHD and LD (Connor, 2012).

Biofeedback for ADHD and learning disabilities

Biofeedback is a therapeutic modality in which physiological processes are measured and visually displayed on a computer screen. Depending on the patient's condition, he or she gradually learns to manipulate the physiological processes with the help of feedback in order to improve health and performance (Shaffer & Moss, 2006). Physiological processes that can be measured and manipulated include EEG, EMG, GSR, breathing rate, heart rate, etc.

The first reported study on the effect of neurofeedback training on reducing hyperactivity in a child was conducted by Lubar and Shouse (1976). Since then, there has been an increase in studies on the use of bio- and neurofeedback in the treatment of inattention and hyperactivity problems. A bulk of the literature supports the effectiveness of EEG biofeedback or neurofeedback for reducing the symptoms of ADHD or ADD (Blanton & Johnson, 1991; Tansey, 1993). As it is known that children with ADHD/ADD have relatively dysfunctional brain wave activity characterized by high theta waves (Vernon, Frick & Gruzelier, 2004), neurofeedback becomes a promising way to help the child learn to influence the brain wave patterns by reducing theta activity, enhancing sensory motor rhythm (SMR), and/or lowering beta (Arns et al., 2009; Vernon, Frick & Gruzelier, 2004).

Besides the popular SMR enhancement protocol, another approach called the slow cortical potential (SCP) was tested on ADHD patients and produced a significant reduction in symptoms of inattention, hyperactivity, and impulsivity (Gevensleben et al., 2009; Leins et al., 2007).

Although neurofeedback training has been found to be effective in the treatment of ADHD (Lubar et al., 1995; Beaugard & Levesque, 2006; Arns et al., 2009), some scholars have raised questions regarding

the sole efficacy of neurofeedback on ADHD symptom reduction while emphasising the possibility of other possible factors not taken into account. Recently, researchers have catered to the need for conducting more rigorous studies, and their findings are encouraging for the efficacy of neurofeedback for ADD/ADHD treatment (Riesco-Matas, Yela-Bernabé, Crego & Sánchez-Zaballos, 2021; Duric et al., 2012; Bakhshayesh et al., 2011). Finally, it can be safely stated that neurofeedback treatment is a non-invasive, side-effect-free alternative to drug therapy and that it is at least as effective as drugs, if not better (Nash, 2000). It also has the added benefit of more long-term effects (Monastra, Monastra & George, 2002).

As mentioned earlier, the efficacy of neurofeedback (NFB) increases manifold when combined with other mind-body interventions like hypnosis and meditation (Hammond, 2019; Balgemann, 2015; Amon & Campbell, 2008; Barabasz & Barabasz, 2000). Thus, the efficacy of NFB can be enhanced by including other drug-free mind-body therapies in the treatment programme for children with ADHD.

Biofeedback and neurofeedback have already been identified as promising treatments for decreasing inattention and hyperactivity. Although ADHD and learning disabilities are distinct disorders, they frequently coexist. Both of them have neurophysiological impairments and compromised cognitive abilities as compared to their healthy peers (Jancke & Alahmadi, 2015; Vernon, Frick, & Gruzelier, 2004). As neurofeedback is an effective way to influence neurophysiological functioning by manipulating brain wave activity, some studies explore its role in helping children with ADHD who also have learning disabilities. Linden, Habib, and Radojevic (1996) found neurofeedback training to be effective for 18 children with ADHD and learning disabilities.

Few other studies acknowledge the effect of neurofeedback training on children with learning disabilities specifically. Fernandez et al. (2003) discovered promising results demonstrating the efficacy of neurofeedback treatment on children with learning disabilities. The Wechsler Intelligence Scale for Children (WISC) and Test of Variables of Attention (TOVA) scores significantly increased in the experimental group of children after 20 sessions of neurofeedback. Recent findings suggest non-invasive

brain stimulation (NIBS), which includes neurofeedback (NFB), transcranial electrical stimulation (TES), and transcranial magnetic stimulation (TMS), has been successfully used to enhance numerical ability skills in children with learning disabilities (Furlong et al., 2016; Cohen Kadosh, 2013).

Despite some evidence that bio/neurofeedback is a successful treatment for ADHD and LD, scholars have expressed the need for more rigorous studies examining the effect of bio/neurofeedback (Heinrich, Gevensleben, & Strehl, 2007; Loo & Barkley, 2005; Yucha & Montgomery, 2008).

Discussion and Conclusion

The current paper examined the effects of mind-body interventions such as hypnotherapy, bio- and neurofeedback, and meditation on children with ADHD/ADD and learning disabilities. As ADHD/ADD and LDs interfere with children's overall development and obstruct the path of their achievements and psychological well-being (Voigt et al., 2017), these disorders definitely require proper attention and intervention. As a child with ADHD and/or LD lags behind his peers in terms of academic and other areas of achievement, besides cognitive impairments, various other psychological problems like anxiety, depression, conduct disorders (Spencer, Biederman, & Mick, 2007), low self-esteem (Wadman, Durkin, & Conti-Ramsden, 2008), etc. also emerge among the paediatric population. Mind-body interventions include an array of treatment strategies that are being utilised by psychotherapists. In this paper, numerous promising studies have been reported that pave the way for enhanced drug-free treatment of paediatric neurodevelopmental impairments in the future. However, before concluding anything, two points need to be taken into account. First, all these approaches were primarily and initially devised for adults, so a lot of modification and customization needs to be done in order to apply them to children. The cognitive development of children is going on as they are developing biologically. So, as a researcher or practitioner, one must move to the cognitive and socio-psychological level of a child in order to devise strategies.

For example, in the case of hypnosis, the use of storytelling, creative metaphors, role playing, sometimes indirect Ericksonian patterns (Millis & Crowley, 2014; Kohen & Olness, 2011, Wester, 2007), and at other times

a direct approach (Barabasz & Watkins, 2005) can be skillfully utilised (when appropriate) to reap the benefits of hypnosis with children. Be it hypnosis, biofeedback, or meditation, new ways have to be devised to make them attractive or useful to children. Imagination and fantasy should be mixed into the therapeutic recipe. This is the reason indirect approaches are used more with children.

Starting a neurofeedback programme with an ADHD or LD child is also not easy. However, with new technology, attractive video games are used to get the child hooked onto the screen, which provides visual feedback with which the child plays happily while the EEG brain wave activity is being changed (Blandon et al., 2016; Ali, Mahmud, & Samaneh, 2015) in the background (many times not even with the child knowing about it). Combining hypnotherapy and neurofeedback can offer even better results.

The difficulties encountered when providing hypnotherapy and/or biofeedback to children are also encountered when providing meditation to them. Most meditation practises necessitate closing one's eyes, which appears to be a difficult task for ADHD or LD children. Even if meditation practises like mindfulness can be practised with open eyes, getting a hyperactive or impulsive child hooked on the technique may be difficult. At least initially, conscious effort is required in meditation. Researchers should include strategies appealing to kids like use of imagination, role-playing, etc. to get started and maintain children's active involvement as well as later long-term practice. Whatever the method, if one is dealing with children, it must have creativity, adaptability, and flexibility. Many scholars suggest that while doing therapy with kids, the therapist shouldn't work "on them" but "with them" (Kohen & Olness, 2011; Barabasz & Watkins, 2005; Erickson, 1958).

The second important point to be considered for making mind-body therapies more acceptable is to devise systematic, structured, and standardized procedures that are replicable, generalizable, and well controlled (Krisanaprakornit, 2012; Greydanus, 2007).

The application of mind-body therapies to the specific paediatric population with developmental and cognitive impairments is still understudied. More intensive research is required. To the knowledge of researchers, there are almost no studies exploring the role of mind-body interventions among Indian children. Rigorous research work needs to be done to fill this void.

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