

REVIEW ARTICLE ON PREVENTION AND TREATMENT OF ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD) IN CHILDREN THROUGH AYURVEDA

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ABSTRACT

Attention Deficit Hyperactivity Disorder (ADHD) is the commonest neurobehavioral disorder of childhood and one of among the most prevalent chronic health conditions affecting school-age children. It is characterized by inattention, including increased distractibility and difficulty sustaining attention; poor impulse control and decreased self-inhibitory capacity; and motor over activity and motor restlessness. The incidence of ADHD, ranging from 2% to 16% is depending on the diagnostic criteria and assessment tools. *In Ayurveda* it can be correlated to *Unmad* (insanity) due to etiology of vitiation *dhee*, *dhriti* and *smriti* that causes imbalance of *kala* and *karma* which results into improper contact of the senses with their objectives (*Asatmendriyarthasamyoga*) and give rise to inattention, hyperactivity and impulsivity.

Present time no clear cut treatment in modern medicine except presynaptic dopaminergic agonists, i.e. methylphenidate. This article serves to highlight *Ayurvedic* medicine along with *Panchkarma* therapies approaches in use today for children with ADHD, including dietary therapies, environmental hygiene.

KEYWORDS: Attention-deficit hyperactivity disorder, *Unmad*, *Panchkarma*.

INTRODUCTION

In present era day to day psychosomatic disorder affected children are increased in pediatric clinics, out of that Attention deficit hyperactivity disorder (ADHD) one of them. Attention deficit hyperactivity disorder (ADHD) is among the commonest neurobehavioral disorder of

childhood and can profoundly affect the academic achievement, well-being and social interactions of children.^[1] It is characterized by persistent symptoms of inattention, hyperactivity, and impulsivity.^[2]

The incidence of ADHD is range conservatively from 3-7 percent, with its diagnosis made 3-9 times more often in boys^[3-4] out of them approximately 25% of ADHD children also suffer from anxiety, and 15-75 percent has a co-morbid mood disorder.^[5] The disease most commonly affects the children of age group 6 to 12^[6] and mostly signs and symptoms appear before age of seven.^[7]

Etiology

ADHD is a multi-factorial disorder of brain developmental processes. So there are many etiological factors are contribute for development of pathogenesis of ADHD i.e. Birth complications, such as toxemia of pregnancy, prolonged labor, and obstructed delivery. Some maternal drug, smoking and alcohol use during pregnancy, lead or mercury exposure (prenatal or postnatal) are commonly linked to attentional difficulties associated with the development of ADHD. In previously hyperactive children, food colorings and preservatives are increasing the intensity of hyperactivity.^[8] About 70–80 % of the phenotypic variance of each disorder may be explained by genetic factors.^[9] Attention deficit hyperactivity disorder is commonly associated with other psychiatric and neurological conditions.^[10]

Pathogenesis

Children with ADHD have approximately a 5-10% reduction in the volume of the brain structures and MRI findings suggest low blood flow to the striatum. Functional MRI data also suggest deficits in a wide spread functional networks for selective and tonic attention in ADHD, that include the striatum, prefrontal regions, parietal lobe, and temporal lobe.^[11]

Diagnostic criteria

DSM-5 criteria is used for diagnosis of ADHD, it making the diagnosis state that the behavior must be developmentally inappropriate and must begin before 12 year of age, must be present for at least 6 month, must be present in 2 or more settings and reported as such by independent observers, and must not be secondary to another disorder^[12]

DSM-5 identifies 3 subtypes of ADHD are following:

1. Predominantly inattentive type.

2. Predominantly hyperactive-impulsive type.
3. Combined type, are more commonly diagnosed in males.

Inattention

1. Fails to give close attention to details or makes careless mistakes.
2. Difficulty sustaining attention in tasks or play activities.
3. Does not seem to listen when spoken to directly.
4. Not follow through on instructions.
5. Difficulty organizing tasks and activities.
6. Avoids or dislikes in tasks that require sustained mental effort.
7. Loses things.
8. Easily distracted.
9. Forgetful in daily activities.

Hyperactivity and impulsivity

1. Fidgets with or taps hands or feet or squirms in seat.
2. Leaves seat in situations when remaining seated is expected.
3. Runs about or climbs in situations where it is inappropriate.
4. Unable to play or engage in leisure activities quietly.
5. Often “on the go,” acting as if “driven by a motor”
6. Talks excessively.
7. Blurts out an answer before a question has been completed.
8. Difficulty waiting his or her turn (e.g., while waiting in line).
9. Interrupts or intrudes on others.

Combined

If both inattention and hyperactivity-impulsivity are met for the past 6 months.

Ayurveda and ADHD

There is no any single disease in *Ayurvedic* tests which seems like ADHD described in modern medicine, but some references about abnormal behavior are discussed under in *Ayurveda* features of *vataprakriti*, *Anavasthita Chittatva*, *Mano vibhrama*, *Buddh ivibhrama*, *Smriti vibhrama*, *Sheela vibhrama*, *Cheshta vibhrama*, and *Achara vibhrama* can be correlated with ADHD.^[13] The cause of ADHD in *Ayurveda* can be inferred, with the vitiation of *Dhee* (rational thinking), *Dhriti*(retaining power of mind), *Smriti* (memory) which causes abnormal

conduction resulting in improper contact of the senses with their objectives and developed inattention, hyperactivity and impulsivity.^[14] To understand the etiology of ADHD in Ayurveda, it's important to understand the two sub doshas involved in memory. These are *Prana Vata*, which governs the brain, sensory perception, and the mind; *Sadhaka Pitta*, which governs the emotions and their effect on the functions of the heart.^[15]

ADHD is commonest neurobehavioral disorder that's why first line therapy like, CNS stimulant, Antidepressants, Alpha 2, agonists and Norepinephrine reuptake inhibitors; the response rate for any single stimulant drug is nearly 85%.^[16]

Management

1. The *Ayurvedic* treatment of ADHD involves correction or balancing of tarpaka kapha, sadhaka pitta, and prana vayu, the doshas present in the brain.
2. **Nootropic herbs:** following herbs have possible action on psycho-neurological deficits; Ashwagandha, Brahmi, Shanka pushpi, *Jatamansi* (*Nardostachys Jatamansi*, *Vacha* (*Acoruscalamus*). These may act as a mild stimulant and sedative also depending on what mood state needs to be balanced.
3. **Panchakarma procedures-** *Abhayanga*, *Shirodhara* and *Shiro Pichhu*.

Behavioral therapy (*SatvaAvajayachikitsa*): *Sattvavajaya Chikitsa*

ADHD is the commonest neuro-behavioral disorders in pediatrics age group, so some protocols adopted for treating these type of patients i.e.

- Counseling to the parents, family members, teachers and child itself is of great help in treating as well as prevention of ADHD patients.
- The use of medicines which have properties of cognitive function along with Meditation or *Yoga*.
- It is assisted with the daily diet regulation and making sleep time-table of an affected child. Diet should be of nutritional balance, on proper time, avoiding excess oil and spice, rich in antioxidants and immunity boosters.
- Sound sleep and a good amount of water intake is also a must.
- Scalp massage (*Shiro abhyanga*), massage of soles of feet with sesame oil is also beneficial in decreased hyperactive.
- Daily work should be listed and overcoming problems (e.g. during writing) should be handled one by one and slowly.

- Daily use of Cow's ghee, cod-liver oil, are playing good role to develop brain activities and prevent developing of ADHD.

The previous studies have been shown the nootropic effect of some herbal medications which play a major role in treating as well as prevention of ADHD, such as:

Ashwagandha

The use of *Ashwagandha* in Indian culture for a very long time for all age groups irrespective to sexes and even during pregnancy without any side effects.^[17] Clinical trials and animal research support the use of WS for anxiety, cognitive and neurological disorders i.e. Two new glycowithanolides, sitoindoside IX (1) and sitoindoside X (2), isolated from *Withania somnifera* Dun., were evaluated for their immunomodulatory and CNS effects (anti-stress, memory and learning) in laboratory animals.^[18]

Brahmi

It has been traditionally used for its medicinal properties as a neuro-protective and protects the nerves degeneration. It effectively treats depression and epilepsy and it has been observed that *Brahmi acts as anti- depressant* properties equal to modern anti-depressant medicines.^[19]

Vacha

The methanol and acetone extract of *Acorus calamus* leaves was evaluated for their CNS activity in mice. They showed the spontaneous locomotors activity for immobility by time using through forced timed swim test, diazepam induced sleeping time and motor impairment assessment using Rota rod for CNS depression/ analytic activity of ACME and ACAE in mice.^[20] The various methods which is used for inducing the experimental epileptic models induces the recurrent seizures and epileptic discharge similar to humans post traumatic epilepsy through generation of free radicals into sensorimotor.^[21]

Jatamansi

It has been widely used for medicine and in perfumery for centuries in India. It is valued for many medicinal properties such as anti-lipid per oxidative, antioxidant, sedative, tranquilizing, antihypertensive, antidepressant-like activity, anticonvulsant activity and hypotensive properties and several nervous disorders such as epilepsy, neurosis, insomnia, excitation, alzheimer's disease, learning and memory disorders.^[22]

Tinospora cordifolia

It is used as a *Rasayana* in Ayurveda since *vedic* period for treating and prevention of many diseases. Previous studies suggests the effect of *Tinospora cordifolia* on learning and memory in normal rats and on cyclosporine induced memory deficits, both alcoholic and aqueous extract of *T. cordifolia* enhanced the cognition in normal rats as were seen in behavioral tests – Hebb William maze and the passive avoidance task.^[23]

Panchkarma* procedures*a. *Abhyang* (oleationtherapy)**

Abhyanga is the process of application of plain / medicated oil or *Sneha Dravya* over the body with massage.^[25] *Snehana* therapy is useful for promoting strength, nourishment (bulk), vitality (energy) to the deficient part and particular required area of the body. The *abhyanga* with medicated oils i.e. *Chandanaadhi*, *Mahanarayana* and *Bala* are provides stimulation to the nervous system improves the sensory motor integration.

b. *Shirodhara*

Shirodhara is a type of *Murdha taila*^[27] (Application of oil to the head/ scalp) in which prescribed medicated oil/ liquid is continuously poured over the forehead and then allowed to flow over the scalp from a specific height for a certain period of time. *Mahanarayana* and *Bala* are more effective in treating patients of ADHD by lipophilic and hydrophilic active principles of *Vatavyadhinashaka* (*Vata* normalizing) drugs, which may modulate the secretions of various neurotransmitters and hormones in brain. Constant flow of liquid use in *Shirodhara* act as relax the mind, calms & tranquilizer the patients.^[28]

Dietary management

Most of ADHD affected patients have the proper nutrients deficient that's why, parents who are troubled with medicating their children are often more comfortable with the initiative of dietary interventions.^[29] Proper nutrition is essential for growing children, and children who eat a diet high in "junk food" in early childhood are more likely to exhibit hyperactivity by age seven; this may reflect a long-term nutritional imbalance.^[30] So advised the parents to refined, carbohydrates, sugars, and processed foods containing additives should be completely eliminated from the diet.

CONCLUSION

ADHD is a complex, chronic, and heterogeneous condition that affects 2% to 16% children. In *Ayurveda* it may be correlated to *Unmad* (insanity) disease which is *Vatika Vikara*. So line of treatment according to *Vatika* disorders such as neuro-protective medications along with *Pancha karma* therapies have definitely shown outcome on the disease and thus pave way to further researches in employing *Ayurvedic* methods towards the management of *ADHD*. This field of study still remains a obscurity and needs lot to be done.

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