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SCOPE OF PANCHAKARMA IN NEURO-DEVELOPMENTALDISORDERS

Dr. Pradnya Vijay Pawar[1]*, Dr. Jayprakash Khairnar[2] and Dr. Vikram Shelavle[3]

[1]M. D. Scholar (Kaumarbhritya).
[2]M. D. Professor & HOD.
[3]M. D. Associate Professor.

***Corresponding Author: Dr. Pradnya Vijay Pawar**

M. D. Scholar (Kaumarbhritya).

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ABATRACT

Pediatric neurology has emerged as an important and flourishing super specialty of pediatrics. Burden of neurological disorders in childhood age group is enormous. About aquarter of chronic childhood problems are neurological in origin. Indian subcontinent faces a great burden of neuro-developmental disorders due to dual challenge of genetic and acquired disease burden posed bynutritional, infectious, toxic and traumatic insults. with a pediatric population thatconstitutes nearly 40% of 1200 million people in india, prevalence of neurologicaldisorder in community is estimated as 27. 5 per 1000 populaton in age group 6 months-2years. Pursuit for healthy offspring has been mentioned as one of the feats of human life. Not only being childless has been a criticism since ancient times but having a child with congenital or developmental deformities is also a cures. *Ayurveda* focuses on preventive measures for healthy progeny. *Panchakarma* helps in improving the quality of progeny. It not only improves the quality of life of child suffering from neuro-development disorders, but also relieves the physical, mental and social stress of the custodian. this paper aims athighlighting the vast scope of therapeutic efficacies of *panchakarma* in pediatric neurology.

KEYWORD: Pediatric neurology, *Ayurveda*, *Panchakarma*, Neuro-developmentaldisorders.

INTRODUCTION

Neuro-developmental disorders are impairments of the growth and development of the brain or central nervous system. A finer use of the term refers to the disorder of brain function that affects emotion, self-control, learning ability and memory and that unfolds as the individual grows. A recent study found the prevalence of neuro-developmental disorders to be nearly 12% in Indian children aged 2-9years, providing a much needed peek into some of the major health problems faced by the country. INCLEN study estimated 7. 5-18% prevalence of neuro-developmental disorders in 2-9year age group. Burden of neurological disorder in childhood age group is enormous; this high prevalence of neurological disorders like cerebral palsy, epilepsy, febrile seizures, attention deficit hyperactivity disorder(ADHD), autism and mental retardation etc. In present era, daily visits to pediatricians are greatly influenced by these disorders. Their mounting prevalence in present era demands some productive effforts in this direction. *Ayurveda* the ancient system of medicine not only exemplifies the management of disease but also spots light on precautionary measures to avert their occurrence. *Ayurveda* is gaining fast popularity for its management of complex neuro-developmental disorders. Present article explores the *panchakarma* procedures helpful in the management of neuro-developmentaldisorders.

MATERIALS

Ayurveda and modern literature, related research articles, clinical and experimental studies etc. neuro-developmental disorders and their management through *panchakarma.*

1. Attention deficit/ Hyperactivity disorder (ADHD)

Attention deficit/ Hyperactivity disorder (ADHD) is among the most common neurobehavioral disorders presenting for treatment in children. ADHD affects an estimated 4% to 12% of school aged children worldwide with survey and epidemiologically derived data showing that 4 to 5% of college aged students and adults have ADHD. The world health organization (WHO) uses a different name- hyperkinetic disorder (HD). Hyperactivity disorder is defiend by symptoms of inattention, hyperactivity and impulsivity. Symptoms of inattention include failing to pay close attention to details, appearing to not listen when spoken directly, becoming easily distracted and experiencing frequent forgetfulness in daily activities. Symptoms of hyperactivity include being fidgety or restless, running or climbing excessively in inappropriate situation, having difficulty in playing quietly, atedcting as if “driven by

motor" symptoms of impulsivity include blurting out answer before a question has been completed, having difficulty awating his or her turn, and causing frequent interruptions or intrusion. Prenatal exposure to substance (e. g, nicotine, alcohol) and damage to the central nervous system from trauma or infection increase the risk of HD. The diagnosis is based on strict clinical criteria described in the diagnostic and statictical manual of mental disorders fourth edition (DSM IV). Stimulant (either methylphenidate or amphetamines) are the frist line of treatment in allopathy. Norepinephrine reuptake inhibitors (atomoxetine and bupropion) are also effective and along with tricyclic antidepressants, are considered the second line of treatment. Common side effects include appetite suppression and sleep disturbance with stimulant medications, gastrointestinal tract symptoms with atomoxetine and sedation with alpha agonists (clonidine and Guanfacine). Hyperactivityand impusivity improve with age; however, problems with attention, organization and planning are usually lifelong disorders. HD may be associated with academic under achievement, difficulties in interpersonal relationships, and poor self-esteen. These can have long-reaching effects (e. g, lower levels of educational, employment attainment). Many adults require continuing pharmacotherapy. Regardless of the name used, ADHD/HD is one of the most thoroughly researched disorders in medicine. It has been associated with a broad range of negative outcomes for affected subjects and with a serious financial burden to families and society, which characterizes it as a major public health problem. In *ayurvedic* texts, there is no clear-cut description of any disorder matching that of ADHD. Description of abnormal behavior though are found scattered in our texts, they include *anavashita chittatva* (mental instability), *Manovibrama* (confusion of mind), *buddhivibrama* (confusion state of intellect) etc. the clinical presentation of ADHD when analyzed from *ayurvedic* perspective indicates towards *vata pradoshaja vikara* (disease due to *vata-dosha* responsible for movement and congnition). As the root seat of pathogenesis is higher centers, in such cases *shiroabhyanga* (head massage), *shirodhara*(streaming of medicated liquid over forehead), *shiropichu*(keeping sterile cotton pad dipped in medicated oil over bregma), *shirobasti* (retention of medicated liquid overhead), *abhyanga*(therapeutic massage), *basti* (therapeutic enema) and *nasya* (errhine therapy) may prove to be useful. Oleating the body helps in pacification of *vata* which is responsible for hyperactive behavior in ADHD patients. So, using oil in the form of *abhyanga*, *dhara*, *pichu* and *shirobasti* may be helpful in the children with ADHD;moreover, *Sparsha chikita*(tactile stimulation therapy) has its own role in healing the patient. Basti has been referred to as the prime treatment modality for pacification of vitiated *vata*, so *matra basti* (therapeutic oil enema) with *vatanashaka taila* (oil yo alleviate *vata*) also may be beneficial in such cases. Moreover, *basti* by its potency draws morbid doshas located in the entire body, right from the foot to head and expels them out through the lower gut. Nasya is a therapeutic measure where the medicated oil or drugs are administered through nose to eliminate the vitiated doshas situated in *sira*. Though *nasya* is indicated after 8 years of age, *pratimarsha nasya* can be given at any age. As per a research work by cowley et. al (1975), certain drugs administered through nose may have an impact on immediate psychological functions by acting on limbic system through olfactorynerves.

2) Cerebral Palsy

Cerebral palsy is a non-progressive disorder of tone and postur thatresults from an acquired prenatal and postnatal insult that is not the result of an obvious congenital abnormality. Nearly 15-20% of the total physically handicapeed children suffer from cerebral palsy. For india, the estimated incidence is around 3/1000 live births; however, being a developing country, the expected actual figure may be much higher.

Despite the advancement in modern technology and improved neonatal care, stagnant or increasing incidence of cerebral palsy has been observed, which is of great concern. Numerous perinatal risk factors have been linked to cerebral palsy, including prematurity, congenital infections such as toxoplasmosis, other infections, rubella, cytomegalovirus and herpes simplex (TORCH), trauma, neonatal infections etc. high levels of cytokines in blood of term infants who develop quadriparetic spastic cerebral palsy suggest that material inflammation(chorioamnionitis) plays a role in such cases. Neonatal examination is not predictive of cerebral palsy, findings of cerebral palsy become apparent during first two years of life. Management of children with cerebral palsy requires a multidisciplinary approach. the treatment of spasticity shoulde be individualized and can respond to physiotherapy, anti-sposmodic agents, orthopedic or neurosurgery. Spasticity often worsens over time. cerebral palsy is often associated with mental retardation but severe motor deficit may be associated with normal intelligence.

Cerebral palsy cannot be correlated with single disease or condition, as it is a multi-factorial disease with clinical features of wide variation. As per contribution of the causative factor the disease phenomenon comes under the broad heading of *Aadibala*(herediatary anomalies), *Janmabala*(congenital anomalies) and *Doshabala*(disease caused by vitiated dosha) *pravrit vyadhi.* However, considering the classification and individual features of cerebral, it can be taken as condition closer to *vata vyadhi* or *vata vikara* or v*ata* predominantcondition.

A comparison of classification of cerebral palsy and *vata vikara* can bemade.

Comparison of classification of cerebral palsy and *vata vikara.*

Classification of cerebral palsy		***Vata vikara***
Hypotonic CP		Saada
Spastic type	Monoplegia Hemiplegia QuadriplegiaDiplegia	*Ekangavadha Pakshavadha Sarvanga roga Pangu*
Ataxic, Athetosis or Dyskinetic type		*Cheshtavriddhi, Chalatva*

Athough children are presumed to be *sukumara* and contraindication for panchakarma therapy, but panchakarma proves to be advantagesous in neuro developmental disorders like cerebral palsy. Although there is no promising treatment fo cerebral palsy in any system of medicine, but still panchakarma can enhance the quality of life of cerebral palsy patients,
nailing its worth in today's era of neuro-developmental suffering.

Therapies like *abhyanga* with *vatanshaka* and *balya Sneha*, *shashita shali pinda sweda*, *Basti*, *Shirodhara*, *Shirobasti*, etc. may prove to be beneficial.

3) Autism spectrum disorders

Autism spectrum disorders are group of child-development disabilities defiend by substantial social, interaction and behavioral impairment.

Autism is stated to be a "developmental disorder" as the symptoms generally appear in the first two years of life. The term "spectrum disorders" refers to the fact that although people with ASDs share some common symptoms, ASDs affects different children in different ways, with some experiencing very mild symptoms and other experiencing sever symptoms. There are multiple causes of ASD, although most are not yet known, research suggest that genes can act together with influence from the environment to affect development in ways that lead to ASD. Children with ASDs way show lack of talking about feelings and usually resist physical contact. As an infant there is delayed and absent social smiling. Speech often is delayed and when present, it is frequently dominated by echolalia (meaningless repetition of words). Another hallmark characteristic of ASDs is the demonstration of restrictive or repetitive interests or behaviors, such as lining up toys, flapping, hands, rocking his or her body, or spinning in circles. common comorbidities are mental retardation(in up to 80%), seizure disorder(in25%), anxiety disorders, OCD and attention deficit/ hyperactivity disorder. Seizure often start around the onset of puberty. The earliest studies of autism suggested a relatively poor prognosis, with only a small number if individuals (1% to2%) being able to function independently as adult. Recent research reveals major gains, but not a cure, with early diagnosis and treatment.

The clinical presentation of ASD when analysed from *ayurvedic* perspective indicates towards *vata Nanatmaja vikara*(Diseases occurring due to only vitiated *vata). Mookatva* (muteness/dumbness or alphasia), *Ashabdashravana badhirya*(deafness or hearing impairment), *Anavasthichittatva*(mental instability) and *satata gati* (continuous movement) are few of the *Vata Nanatmaja vikara* which find resemblanceto the features of Autism. *Vata dosha* is a prime factor responsible for theneurological as well as physiological functions of the body. *Dushti* (vitiation) of *vata* is the most important reason in developing the features of autism. Acharya charaka also mentions that this *Dushta vayu* (vitiated vayu) can destroy the senses (*shrotraadishu Indriyavadham Kuryaadoushttsameerah*). To win over this *kupita vayu* (vitiated *vayu*), there is nothing better than *basti. Matra basti* can be administered in suchcases. Taila (oil) is deputed to be param *vatahara*(best to alleviate vata). And this *vatashamana* can be achieved by *snehananasya, shirobasti, shirodhara* and *abhyanga.*

DISCUSSION

As Neuro-developmental disorders ensue due to impairment in the growth and development of brain, measures can be implemented to prevent such happening. Preconceptional shodhana (Purification) is one of such measure. The benefit of *virechana* has been reffered to as "*Beejakarmukatvam*" i. e it improvesthe quality of *beeja* (male and female gametes), thus helping in healthy progeny. Though genetic factors also seem to play a role and may be to avoid these kind of genetic disorders, *Acharya charaka* has prohibited consanguineous marriage, citing it as one of the prime causes for developing genetic and congenital disoders. as the neuro-developmental disorders are a result of prenatal and perinatal insult, antenatal and postnatal management as advised in classics should be followed. Every physiological and psychological variation in the mother exerts its influence in the growing fetus. The pregnant woman must obeyvarious norms of health to keep herself and the fetus healthy. The *jatakarma* mentioned in the *paricharya of Navajata*(various procedures done for the baby soon after birth) should be followed as they promote intellect, longevity, and strength of the child. *Bala paricharya*(regimens for child), various *prasha* and *Medhya rasayana* (intellect enhancer) mentioned in the classics should be usedfor a healthy childhood devoid of any suffeings. *Sattavajaya chikitsa* or couselling of the parents, family members, teachers and child itself may also prove to be beneficial in the management of these disorders. once the disorder has developed, no therapy promises reversal of the pathology or complete recovery. Yet, *Panchakarma* carries a ray of hope, not only it can improve the quality of life of the child and crustodian but may be useful in gifting the sufferes a better health. Panchakarma therapies like *basti*, *Nasya*, *shirodhara*, *abhyanga*, *shashtika shali pinda sweda* have their role in neuro-developmental disorders.

Brimhana nasya can be used effectively due to its direct effect on the I*ndriya*(senses) *nasya* has proven effects at neuropsychological levels.

Abhyanga is a process by which the body surface undergoes manual pressure by various techniques and various substances to provide not only relaxation to the body but to pacify several type of diseases. Skin is the gateway of the body through which Abhyanga of drug mainly occurs through first (*Udakdhara)* and second (*Asrigdhara)* layers of skin. The oil used in abhyanga reaches up to 6 layer (*majja)* in 900 *matra kala* (285 seconds). This layer mainly contain the never fibers which by *abhyang*a gets nourishment to combat disease occurringdue to vata. Abhyanga increases blood suppy to area of application. It is recorded that amount of amino acids like tryptophan fairly increases in blood after performing a lymphatic massage. this increased level of tryptophan in plasma may cause an increase in the level of several neurotransmitters and serotonin that helps an individual to fight anxiety, depression and many more.

Abhyanga may influence the emotional status of an individual by tactile stimulation. *Twak or Sparshendriya* is the seat of *vata* and *abhyanga* with oil alleviates the vitiated vata. A slow rhythmic *samvahana* with light stroke can induce tranquility. *Anuloma gati*(movement towards caudal direction) in neck and back is very much beneficial for the nervous system. Thus this therapy might prove beneficial in neurodevelopmental disorders not only by controlling*vata* to perform its physiological functions, but by stimulating nervous system also. In pathological conditions involving tight and restricted state of fascia, the myofascial release techniques like gentle massage, deep pressure and tactile stimulation restores the normal status of fascia and impacts flexibility to stretchand move without undue restriction.

Shiroabhyanga nourishes the *indriya*. It helps to over come anxiety, stress as well as mental fatigue. *Shashtik shali pinda sweda* is a type of sudation procedure, performed by boluses *of shashtik shali*(oryza sativa linn) cooked with *balamoola kwatha (decoction of sida cordifolia linn) and milk. Shashtik shali pin*da sweda may improve the blood circulation (due to heat), relieve muscle spasm, and increase tendon extensibility. Thus, it may help in reduction of spasticity and facilitate free movement of joints and may especially be beneficial in cases of spastic cerebral palsy. *Shashtik shali* posses *snigdha, guru* and *sthira* properties, these guna are opposite to that of *vata* and thus may be helpful in pacifying vata. Moreover, *shashtik shali, bala* and *godugdha* are *balya* in nature, thus mayprovide strength to the body. *Basti* is prime treatment modality for *vata dosha*.

There is no treatment equivalent to *basti* in the protection of *marma* and in themanagement of their afflation which are considered as vital parts in body. It stabilizes the ayu (age) and normal functions of dosha (major structural components of body). It may act through neuronal stimulation via enteric nervous system(ENS). ENS or gut brain is an integrative system with structural and functional properties like those in central nerous system. It lies entirely in the wall of the gut (mesenteric and myenteric plexuses), containing approximately 100 million neurons exactly equal to the number in the entire spinal cord. This makes the role of *basti i*n neurological disorders very clear. Basti eaches up to *grahani. Grahani* possess *pittadhara kala*. As per acharya *dalhala pittadhara* kala and *majjadhara* kala are same. Thus, It can be interpreted that *basti* reaches up to *majja*. Moreover, being the best pacifier of vata, it normalizes the functioning of *vayu*. Thus, the role of basti in neurodevelopmental disorders cannot be neglected. Nasya karma is a means ofdelivering drugs preferentially to the brain. Olfactory nerves arise from a specialized olfactory epithelium in the olfactory mucosa and ascend through the cribriform plate to reach the olfactory bulb which lie inferior to frontal lobes. Axons of olfactory bulb neurons extend posteriorly and form olfactory tract which projects into a region called lateral of olfactory area which is located at inferior and medial surface of the temporal lobe. The olfactory nerves relate to the higher centers of brain i. e limbic system, consisting mainly of amygdaloidal complex, hypothalamus ganglia etc. the limbic system is concerned with multifunctional capabilities including behavioral aspect of human beings. So, the drugs administered through nose may stimulate the higher centers of brain which might regulate the nervous system functions and may prove to be beneficial in neurobehavioral disorders. *Shirodhara* includes a relaxant state.

These calming effects are mediated by the brain wave coherence, a waves, and a down regulation of the sympathetic outflow. The midpoint of the forehead is known *as agya chakra*. Focusing on *agya chakra* during meditation with closed eye leads to psychosomatic harmony. As the oil drips on the *agya chakra*, it is proposed that the meditation like effect is a consequence of tranquility of mindleading to adaptive response to the basal stress. Research study confirms a
stress-relieving effect as judged by the mean score on V. A. S, EEG changes andvital signs.

CONCLUSION

Being childless is the major curse, any couple can suffer. But having a child with neurological disorder is also miserable. Thus every effort should be made to raise awarness about these disorders and their prevention through preconceptional *shodhana*. The cure of these neurodevelopmental disease can be achieved through panchakarma in the form of *abhyanga, shiroabhyanga, shashtik shali pinda swedana, shirodhara, shirobasti, basti and nasya*.

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