

Chapter 9

Yoga Therapy on Cognitive Function in Neurodevelopmental Disorders

Artchoudane Soccalingam

 <https://orcid.org/0000-0002-7826-0430>

Center for Yogic Sciences, Aarupadai Veedu Medical College and Hospital, India & Vinayaka Mission's Research Foundation, India

Meena Ramanathan

Centre for Yoga Therapy Education and Research, Sri Balaji Vidyapeeth, India

Ananda Balayogi Bhavanani

Centre for Yoga Therapy Education and Research, Sri Balaji Vidyapeeth, India

ABSTRACT

Neurodevelopmental disorders (NDDs) are birth imperfections that cause dysfunction in cognitive and sensory processes and impairment in motor function, communication, and behavior. The major factors responsible for increasing incidence of NDDs are genetic, psychosocial, and excessive use of drugs. Yoga alleviates neurological problems and NDDs. Asana is a physical movement with breath awareness that facilitates the development of body awareness, concentration, and memory and provides vital energy for children with neurodevelopmental disability. Yoga therapy improves sensory coordination and motor imitations that enable persons with cognitive disabilities to make meaningful response by the integration of senses and functions of central nervous system.

INTRODUCTION

The global estimate for disability is raised due to increasing stress, chronic illness or chronic psychological distress in parents. World Health Organization estimates that 15% of the world's population live with some form of disability, of whom 2-4% experience significant difficulties in cognitive function (Suresh,

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2019). Cognitive impairments is a major part of neurodevelopmental disorders (NDDs) which include disabilities in the functioning of the brain that affect a child's behaviour, memory or ability to learn. The characteristics of neurodevelopmental disorders are dysfunction in cognitive and sensory processes and impairment in motor function, communication and behavior. Presently, there is no biomarker to diagnose, assess or differentiate between NDDs, rather it is categorized into discrete disorder entities based on clinical presentation e.g. intellectual disabilities, attention deficit hyperactivity disorders (ADHD), autism spectrum disorder (ASD), dyslexia, learning disabilities and motor disorders. There is no intervention that completely treats NDDs since the causes are unknown.

SIGNIFICANT KNOWN CAUSES FOR NDDs

Attention-deficit hyperactivity disorder is a neurological disorder disruptive behavior characterized by symptoms of inattention, hyperactivity, impulsivity occurring more severely than typical for other individuals in the same stage of development (American Psychiatric Association, 2000). Pastor and Reuben (2008) have reported that children with ADHD frequently have other states of neurological disorders, half of the children with ADHD have a learning disability and one fourth have a conduct disorder. Other disorders, including anxiety disorders, depression and cognitive impairments can be expressed with signs and symptoms that resemble those of ADHD.

Origin of Neurodevelopmental Disorder in Various Phases (Stromland, 1994)

1. Preconception (from genetic)
 - a. period of dividing zygote, implantation and bilaminar embryo (up to 2 weeks);
 - b. common sites of action (also highly sensitive to teratogens; 3 to 7 weeks)
 - i. central nervous system and heart
 - ii. eye, heart, arm and leg
 - iii. ear and teeth
 - iv. palate
2. Gestation (emotional health of mother and also less sensitive to teratogens from environment like thalidomide, diethylstilbestrol, ionizing radiation, methylmercury, lead; 8 to 38 wk)
 - i. Central nervous system
 - ii. Eyes
 - iii. External genitalia
 - iv. Ear, teeth and palate
 - v. Heart
 - vi. Arms and legs
3. Postnatal (from second-hand tobacco smoke and lead)

Cognitive dysfunction (CD) is a generalized NDD characterized by significantly impaired intellectual and adaptive functioning. Mullin et al. (2013) suggested that an individual with NDD has genetically defective proteomes and defined NDD mechanisms at levels of complexity higher than the traditional single genes or proteins. However genetic defects are associated with one or multiple genotypes and the problems intrinsic to categorical NDD. Yasin et al. (2018) found that reduced effect of complex protein

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