

Clinical Applications of Yoga in Childhood Disorders: A Review

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Abstract—Yoga as a therapeutic modality has been found beneficial in childhood disorders. There is a progressive trend in use of yoga therapy as a means of improving overall health and achieving holistic development. This review briefs about yoga techniques used in studies for the childhood disorders including physiological, psychiatric and neurodevelopment disorders that may help practitioners in their clinical practice. Most of the studies suggest it as a no risk intervention with few dropouts or adverse effects. There were definite methodological limitations in many of the studies; systematic research studies are required to prove their efficacy.

1. INTRODUCTION

Yoga as a discipline offers a simple and practical way to regulate one's body and mind. It has evolved over several thousand years and now has become a household name worldwide. The basic aim of yoga is growth, development, and evolution of the human mind. It has a broad range of scope from gaining simple relaxation to achieving transcendental realization. In the present-day, children and adolescents are highly vulnerable and may face several physical, emotional and cognitive problems. A growing body of yoga based research on physical and mental health of children has been encouraging for medical professionals and other paramedical professionals. The researchers have also realized its importance and have been attempting to study it with the help of scientific acumen. Latest reviews on the studies based on yoga in children have found many positive outcomes, such as better birth and developmental results; significant positive impact on digestive functions, cardiac and pulmonary, muscular functioning; on psychological aspects and; on overall development of the children [1-3].

There are various systems of yoga. *Asthangha Yoga* also known as *Rajyoga* is a multidimensional approach

that includes eight aspects (Limbs). All the eight limbs of *Rajyoga* are necessary and contribute to our physical, mental, and spiritual health. The first two aspects, *Yama* and *Niyama* are the part of moral training and known as restraints and discipline respectively. The *yamas* include non-violence, non-lying, non-stealing, sexual abstinence, non-possession. The *Niyamas* are like cleanliness, contentment, simplicity, self-study and devotion to God. It is important for children to imbibe these values in the childhood for their personality development. The third aspect, *Asanas* are stable and comfortable body postures, which help in learning correct posture required for meditation. The next one, *Pranayama* is about breathing regulation. And the fifth limb, *Pratyahara* is blocking sensations from any external stimulus that may also include thoughts about ones interpersonal relationships. All the abovementioned five limbs are the part of preparatory yoga. The essential aspects of Yoga practice lie in *Dharana* (Concentration), *Dhyana* (Yogic meditation) and finally in *Samadhi* (Spiritual Immersion). Another type of Yoga is *Hatha yoga* that includes *kriyas*, *Asanas*, *mudras*, *Pranayama*, and *bandhas*. *Hatha yoga* impacts mind more than body. Besides the techniques, Yoga also checks the diet, inculcates appropriate social attitude and helps in development of personal habits.

This review article divides the childhood disorders into three categories and would explain each one by one.

2. NEURODEVELOPMENT DISORDERS IN CHILDREN

Children affected by neurodevelopment problems usually come with the complaints of academics and school adjustment related problems. The cognitive problems include Attention Deficit Hyperactivity Disorder

(ADHD), Specific Learning Disabilities (SLD), Autism Spectrum Disorders (ASD), slow learners and intellectual disabilities. For these children, medicines hardly work except initial benefits in ADHD. Yoga has emerged as a promising therapy for these children as it helps in gaining control over the mind and can be used for cognitive rehabilitation of children.

Yoga is hypothesized to affect attention span, impulsivity and hyperactivity- the three cardinal features of ADHD. Yoga postures help in improving vacillations in the body and concentration activities improve attention and concentration. Yoga has been found to be effective in the management of ADHD. It has been noted that yoga reduced scores on the Conners Parents Rating Scales [4,5], reduced in Child Symptom Inventory-4 scores [6], and also reported increase in time on task [7]. The study by Chaya et al (2012) on cognitive performance also discussed role of yoga in improving visual and kinesthetic skills in children with problems of learning difficulties [8]. The four studies reported significant improvement in Intelligence Quotient (IQ)[9-10]. However, all three studies used different modality of Yoga such as *Rajyoga* meditation of Brahmakumaris, transcendental meditation and Saral meditation. Autism spectrum Disorders (ASD) is the neurodevelopment disabilities characterized by socio-communication deficits and atypical, repetitive behaviors. Miriam (2006) did a pilot program and found increased ability to stay on a task and in the ability to switch from one activity to another, improvement in sensory processing, communication and interpersonal skills [11]. Other four studies also studied yoga on children diagnosed with ASD [12-15].

3. PSYCHOLOGICAL PROBLEMS OF CHILDHOOD

Children are also susceptible to the emotional disorders such as depression and anxiety. Yoga helps them to regulate their reserve of energy without paying attention to the negative thoughts. The science of yoga, in the first place, proposes to give them the opportunity to look inside their mind without getting distracted by the external environment. It clears their doubts and confusions about themselves and gives them a clear vision of their needs and desires. Proper guidance and practice of yoga also promotes moral & spiritual development in early childhood. Meditation ensures achievement of biological homeostasis with stimulation

of parasympathetic system. Yoga practice influences anxiety state. Yoga may help children to become more resilient to stressful conditions and thus lead to positive, well-being and positive mental health. There are sparse studies available to understand benefits of yoga on emotional problems of childhood. Studies reported decreased examination anxiety [16-20]. Khalsa (2013) reported decrease in rumination, intrusive thoughts and emotional arousal [21] and Platania-Solazzo et al(1992) found increase in positive affect [20]. Researchers also observed decrease in cortisol level after yoga in children [20,22].

4. PHYSIOLOGICAL PROBLEMS OF CHILDHOOD

Children may suffer from single physiological symptom such as headache, nausea, sleep problems, stomachache or may have a physical disease like respiratory diseases, diabetes, gastrointestinal problems, urinary problems, etc. There is also increase in childhood terminal illnesses including cancer. Hans Selye gave the general adaptation syndrome (GAS) to explain stress as an important causal factor in the occurrence of most of the physical illnesses [23,24]. It explains that our body alarms physiological arousal when it faces any stressor and consequently attempts to adapt to the stressor. If the body does not adapt to the stressor, it leads to exhaustion implying occurrence of disease and in extreme cases, death may occur. The body produces stress hormones in the process that helps in short run but in the case of prolonged presence of stress, it worsens the pathological responses of the body.

Yama and Niyama of Ashthanga yoga are phenomenal in controlling the physiological symptoms by restraining certain foods and lifestyles. *Asanas* and *Pranayama* help in relaxation of body and mind and also promote homeostasis. It is believed our body is made of energy and this energy is stored in the seven chakras present in our body. *Pranayama* ensures proper flow of energy in all chakras of the body leading hormonal balance and strong immune system. The other aspects, Pratyahara and Dharna contribute to inner peace and calmness. It means we can achieve holistic growth and keep us away from all the physical problems and diseases. Yoga focuses on controlled and deep breathing leading to improve cardiopulmonary functions of the body. In Bronchial asthma, studies reported significant decrease in breath rate and decrease in resting heart rate

[19], increased capacity in forced expiratory volume[25]. *Asanas* and breathing exercises motivate children to use their body muscles and help them to build muscular endurance. Three such studies observed increase in handgrip [26-28]. Yoga reports also suggested improvement in abdominal pain of children suffering from gastric problems including Irritable Bowel Syndrome [29,30].

Yoga also helps in the case of obesity that has been increasing at an alarming speed. Various researchers have reported improvements in Body Mass Index and body composition of children with over weight [31-33]. One such study on yoga intervention reported varying results like decreased symptoms of eating disorder such as food preoccupation, but not the BMI and weight [34]. Yoga has also been shown to be of effective in childhood Eating Disorders [35-38].

In some recent oncological studies, effectiveness of yoga programmers has been observed; improvement in quality of life and physical activity [39], increased energy, reduced nausea and less need for pain medication [40] and decreased anxiety[41].

We have summarized the methodology of the studies to help the researchers to draw a framework for further research in this area. The participants in most of the studies were from age group 7-18 years. In two studies, the starting age was 4 and 6 years [5,7]. The range of number of participants was 5-90. The studies used either yoga as a complete intervention and in some of the studies other therapeutic techniques were also included such as Relaxation, physical exercises, etc. The yoga intervention consisted postures, meditation and breathing exercises. The remaining three advanced aspects of yoga were not used in childhood disorders or may be not researched upon. The types of yoga practiced were *Asthangyoga*, *Hatha yoga*, *Sahaj Meditation*, and *Brahmkumaris meditation*. The studies did not describe types of *Asanas* except few [4,8, 30,31]. One specific study included themed discussion on ethics of yoga such as peace/non-violence [22].

The number of the sessions were not fixed and showed a very wide range, i. e. from 5 sessions to 120 sessions. Most of the studies were pilot studies and included both experimental and control group. The studies reported improvement in the target variables

most of the time, and also sometimes not much in the target variable but the other studied variables. Most of the sessions were an hour session. Some studies provided five sessions in a week to other studies giving two sessions in a week, and one study limit to one session.

5. LIMITATIONS OF THE STUDIES

Most of the studies were pilot studies with inherent limitation of small number of participants and poor methodology. Between group analysis was not done instead separate analyses were done for finding differences between pre intervention and post intervention scores for the yoga group and the control group (within-group analysis). However, many studies used the study sample as their own controls by incorporating a baseline period. Many studies did not use the randomization and were unblinded. Due to the nascent stage of yoga research, meta-analysis is not possible for any particular outcome of yoga. The outcomes of the studies were also susceptible to placebo effects and other sources of confounding. Only few studies report about the feasibility and adherence to the intervention. In the studies, children were supposed to practice yoga at home with the help of DVD given to them, pattern of which could not be tracked.

6. STRENGTHS OF THE STUDIES

The preliminary results are encouraging and yoga was observed to be cost-effective and low-risk intervention. Most of the studies did not report any dropouts or adverse side effects. Yoga was found to be feasible even for children going through intensive treatments such as chemotherapy. Children do not need to visit the centre daily as they can practice yoga with the help of videos. It does not require specific equipment and yoga session can be delivered anywhere. Only quiet and comfortable environment is required. It was well received by children giving them opportunity to relax from their otherwise hospital environment.

7. FUTURE DIRECTIONS

Large sample size is required to confirm the positive effects. The comprehensive protocol of yoga treatment should be reported. Regular attendance is also an important factor. Randomized controlled studies are needed, as well as, maintenance of observed outcomes should also be measured. The future studies should also report adverse effects. The other treatment modalities

should be compared with yoga. It is believed that if yoga and other relaxation-based therapies such as hypnosis have similar effect on the psychosocial responses of an individual, then why should we not achieve that effect with the help of less labour-intensive relaxation-based therapies. Hence, comparative studies are required to evaluate the specific effect of yoga.

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