



Effect of IAYT on Physical, Behavioral and Social Communicative Functions in Autism

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ABSTRACT

Background: Autism is a neurological and developmental disorder caused due to malfunction in brain development. In India, this is an emerging field in child psychiatry with only limited awareness and diagnosis. The role of therapy in the treatment of autism is to consider the individual needs and skills which are fulfilled by yoga interventions. **Aim:** To evaluate the effect of IAYT (the Integrated approach of Yoga Therapy) on physical, behavioral and social communicative functions in Autism. **Methods:** An IAYT (Integrated approach of Yoga Therapy) module of 45 minutes duration was conducted on 30 autistic children (yoga group-15 and control group -15) for 3 months of age group from 5 to 9 years old including both the gender. Physical parameters like pulse, blood pressure, and weight, BHR (Breath holding rate) along with behavioral questionnaires like ISAA (Indian Scale of assessment of Autism), ABC (Aberrant Behavior Check-list) and SCQ (Social Communication Questionnaire) were assessed before and after the intervention. **Results:** BHR has been increased and ISAA has been decreased with significance in the yoga group. Yoga group has improved better than that of the control group. Diastolic blood pressure and scores of ABC has been improved significantly in the yoga group as compared to the control group. **Conclusion:** IAYT is effective to reduce physical, behavioral and social communicative symptoms in Autism.

Keywords: IAYT, Autism, BHR

INTRODUCTION

Autism is a neurodevelopmental disorder of unknown etiology that affects approximately 1% to 3% of children. The occurrence is 4 times more in boys. Its prevalence is global and its social impact is devastating [1]. About 1 in 59 children has been identified with Autism Spectrum Disorder (ASD) according to estimates from CDC's Autism and Developmental Disabilities Monitoring Network [2]. Though no convincing causative factors are determined, the disease is attributed to impaired neurophysiology in certain areas of the brain. Initial 6 months are uneventful but sometimes the parents recognize the impaired response to verbal/visual stimuli. Full features take time to appear and vary in severity. By 2 years, a significant delay in social development and language skills are noted as the imitation response with which a child learns to respond is affected. The symptoms wax and wane but never disappear making them difficult to adjust in the school. Difficulty in dealing with these children is a general observation of the teachers at school, parents, and friend.

Autism is characterized by deficits in communication, social interaction, and a limited range of interests with repetitive stereotypical behavior because of abnormalities in the brain both anatomically and functionally [3]. The number of evidence-based clinical interventions that address, both core ASD symptoms and co-morbid symptoms are limited. Different medications like risperidone and aripiprazole work to reduce the irritability but are unable to control other symptoms effectively [4]. Other non-medicinal therapies like applied behavioral analysis (ABA) and early intensive intervention (EI), can be difficult to access, due to the complexity of triaging available resources [5-9]. Yoga practices like pranayama and breathing exercises appear to alter autonomic responses to breath holding time probably by increasing vagal tone and decreasing sympathetic discharges in healthy individuals [10]. Anxiety and hyperactivity are one of the common associated feature found in autistic children. Yoga proves to be effective in managing it which can be accessible by breath holding time. Social communication and aberrant behavior is also an important affected domain in these children.

Yoga may offer benefits as an effective tool to increase imitation, cognitive skills and social-communicative behaviors in children with ASD [11]. The conditions treated successfully with yoga include ADHD, anxiety, insomnia, depressive symptoms, aggressive behaviors, and impaired executive functioning. These conditions being comorbid to autistic symptoms are accessible by yoga. Yoga is a widely accepted intervention used in school across [12].

The United States as a way to have an impact on and enhance the students' behavioral and academic functioning, such as their attention, concentration or focusing ability, impulse control, strength, motor coordination, and social skills. Most of the available research studies have been able to illustrate the positive effects of yoga as a promising education-based intervention. The weaknesses in study design include small sample size, lack of a comparison group have made it difficult to draw definitive conclusions. Many of the studies addressed multiple practice patterns, making it difficult to distinguish the sole effects of yoga on a specific impairment. The intervention period is often limited to 1 or 2 times per week, which may not be of enough intensity to produce significant changes.

The aim of the current study is to evaluate the effect of IAYT (the Integrated Approach of Yoga Therapy) on physical parameters, behavioral and social communicative functions in autism. The need for intervention with autistic children is repetition, structure, and continuity, as established in IAYT sessions, which seem to increase critical skills. Decreased coordination, body awareness, and sensory integration are commonly found with them. We hypothesize that guided imitation of therapist practices will result in an improved sense of communication and coordinative skills.

MATERIALS AND METHODS

Admissions and medical records of children enrolling in the academic year of 2017-2018 in Sheeshyaa Academy, Wakad, Pune, India were examined. Total of 45 children with established ASD was profiled. Diagnosis of autism was assessed according to ISAA (Indian Scale of Assessment of Autism). About 30 children including both the gender within the age group of 6-14 years with a middle-class socio-economic background of parents were included in the study. Children with other neurological disorders of known etiology; significant sensory or motor impairment; major physical abnormalities; history of head injury or neurological disease were excluded. These 30 children were randomly divided into 2 groups, yoga (n=15) and control group (n=15).

One hour IAYT module based on authentic and modern texts of yoga was conducted with a yoga group for 5 days a week for 12 weeks. Prime yoga therapist was assisted by 4 other shadow teachers who were closely associated with children. IAYT module included loosening, breathing practices, Sanskrit chanting, a simple set of Asanas and Pranayama. Pulse rate, systolic blood pressure, diastolic blood pressure, breath holding time, ISAA (Indian scale of Assessment of Autism), ABC (Aberrant Behavior Checklist) and SCQ (Social Communication Questionnaire) were assessed before and after the intervention. The complete study was passed through the ethical committee of S-VYASA, Bangalore.

Data Analysis

Complete data collection was assessed by trained research team and trainers along with interaction with parents or guardians or caregivers. Data analysis was done with SPSS version 20 in which within the group and in between group analysis tests were conducted.

RESULTS

Variables like Systolic Blood Pressure (SBP) of the control group and the Social Communication Questionnaire (SCQ) were not normally distributed. All other variables were normally distributed.

Pulse rate in both the group was increased without significance. The percentage of increment was more in the yoga group than that of the control group. Systolic and diastolic blood pressure was decreased in both the group without significance. Percentage of decrease of systolic blood pressure was more in control group than that of yoga group and reverse condition was observed with diastolic blood pressure with significance (p=0.05). Breath holding time is increased in both groups with significance (p=0.01). Percentage of increment was more in the yoga group (59.34%) than that of the control group (38.47).

Indian scale of assessment of autism scores was decreased in yoga group with significance (p=0.01) and in a control group without significance. Percentage of decrement was more in the yoga group than that of the control group. Aberrant Behavior Checklist scores were decreased in the yoga group (5.06%) without significance but that of the control group has been increased (0.27%) with significance (p=0.03) (Table 1).

Table 1 Showing within-group analysis of yoga (n=15) and control (n=15) group

| No. | Variable | Group | Mean Pre | Mean Post | t value | p-value (Sig.) |
|-----|--------------|---------|----------------|---------------|--------------------|-----------------|
| 1 | Pulse Rate | Yoga | 93.93 ± 12.10 | 97.66 ± 10.44 | 0.995 ^a | 0.33 |
| | | Control | 100.2 ± 17.35 | 102.33 ± 9.62 | 0.483 ^a | 0.63 |
| 2 | Systolic BP | Yoga | 99.2 ± 20.52 | 97.4 ± 15.30 | 0.244 ^a | 0.81 |
| | | Control | 107.33 ± 20.81 | 93.8 ± 10.70 | 2.734 ^b | 0.08 |
| 3 | Diastolic BP | Yoga | 64.2 ± 11.82 | 61.53 ± 9.53 | 1.028 ^a | 0.32 |
| | | Control | 71.6 ± 9.97 | 69.53 ± 9.96 | 1.371 ^a | 0.19 |
| 4 | BHT | Yoga | 4.6 ± 2.35 | 7.33 ± 2.58 | 9.620 ^a | 0.01* |
| | | Control | 4.86 ± 1.59 | 6.73 ± 3.34 | 2.794 ^a | 0.01* |
| 5 | ISAA | Yoga | 104.06 ± 22.54 | 67.33 ± 26.38 | 5.416 ^a | 0.01* |
| | | Control | 99.73 ± 22.77 | 87.86 ± 23.88 | 1.897 ^a | 0.07 |
| 6 | ABC | Yoga | 32.2 ± 15.53 | 29.8 ± 16.04 | 0.712 ^a | 0.48 |
| | | Control | 42.2 ± 20.33 | 50.46 ± 22.48 | 2.406 ^a | 0.03* |
| 7 | SCQ | Yoga | 48.4 ± 11.18 | 46.53 ± 13.11 | 0.063 ^b | 0.95 |
| | | Control | 57.57 ± 3.27 | 53.66 ± 9.17 | 1.618 ^a | 0.13 |

^aPaired sample t-test; ^bWilcox test; *significance at 0.05; BHR: Breath Holding time; ISAA: Indian scale of Assessment of Autism; ABC: Aberrant Behavior Checklist; SCQ: Social Communication Questionnaire

Social communication questionnaire scores were decreased in both groups without significance. Percentage of decrement was more in the yoga group than that of the control group with significance (p=0.02) (Table 2).

Table 2 Showing in the between-group analysis of yoga (n=15) and control (n=15) group

| No. | Variable | Mean Post | Mean Post | % of Improvement | | f-value | p-value |
|-----|--------------|----------------|---------------|------------------|---------|---------|---------|
| | | (Yoga Gr.) | (Control Gr.) | Yoga | Control | | |
| 1 | Pulse Rate | 97.66 ± 10.44 | 102.33 ± 9.62 | 3.97 | 2.12 | 0.022 | 0.88 |
| 2 | Systolic BP | 97.4 ± 15.30 | 93.8 ± 10.70 | 1.81 | 12.6 | 0.085 | 0.77 |
| 3 | Diastolic BP | 115.53 ± 193.4 | 69.53 ± 9.96 | 4.15 | 2.89 | 3.984 | 0.05* |
| 4 | BHT | 7.33 ± 2.58 | 6.73 ± 3.34 | 59.34 | 38.47 | 1.316 | 0.26 |
| 5 | ISAA | 67.33 ± 26.38 | 87.86 ± 23.88 | 34.89 | 10.12 | 0.044 | 0.83 |
| 6 | ABC | 29.8 ± 16.04 | 50.46 ± 22.48 | 5.06 | 0.27 | 1.876 | 0.18 |
| 7 | SCQ | 46.53 ± 13.11 | 53.66 ± 9.17 | 5.38 | 2.17 | 6.076 | 0.02* |

*significance at 0.05; BHR: Breath Holding time; ISAA: Indian scale of Assessment of Autism; ABC: Aberrant Behavior Checklist; SCQ: Social Communication Questionnaire

DISCUSSION

Our observations confirm that yoga has a significant influence on physical, behavioral changes in ASD children. Aberrant behavior checklist scores were decreased in yoga group without significance but that of the control group has been increased with significance. The aberrant immune activity might have been regularized. Immune and nervous systems begin to interlink in the embryo. Successful neurodevelopment depends on a balanced immune response. Autistic child reports symptoms are consistent with poorly regulated immune response [13]. Growth factors and hormones may be unstable. Some studies quote genes associated with autism but probably in fewer cases [14]. Stress has a negative impact on neuron growth in the hippocampus leading to memory dysfunction [15]. Stimulation exercises like loosening and Sanskrit chanting might have helped increase hippocampus cells. Yoga being relaxative therapy, the children become more focused and organized. Yoga is a perfect balance of stimulation and relaxation practices which stimulates functions of higher centers like hypothalamus at the same time providing deep rest to the system which results in less aberrant behavior.

Breath holding time is increased in both groups with significance. Percentage of the increase was more in the yoga group than that of the control group. Increased tolerance to higher pCO₂ and low pO₂ achieved due to intervention could also prolong BHT in children with yoga group. Autistic children are more sensitive to sensations from muscles and joints than eyes and ears [15].

Because of over or under-arousal the central nervous system in these children processes information abnormally. Repetitive stereotyped behavior may be a result of neutralizing effort for over-arousal [16,17]. Repetitive procedures

in IAYT might have provided more relaxation like stereotype repetitive behavior reducing the need for it.

We have provided one shadow teacher for each 2 to 3 children which had been a very useful technique to learn yoga for children. The children were more comfortable with them as compared to a yoga therapist. This could have resulted in the improvement of the social communication of the children which was significantly increased with yoga group. So, specially designed IAYT for autism helped autistic children to decreased aberrant behavior, increase breathe holding time and social communication as a result of which ISAA scores were also reduced significantly with yoga group.

CONCLUSION

IAYT is effective to manage physical, behavioral and social communicative symptoms in autism. In long term practice, it enhances normal physiological and behavioral functions of the brain leading to better social life in children with autism.

DECLARATIONS

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Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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