

## Effect of ashtanga yoga on social skills development of children with high-functioning autism spectrum disorder

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### ABSTRACT

The present study aimed to find out the effectiveness of 'Ashtanga Yoga' in promoting the social skills of children with high functioning autism spectrum disorder (HFASD). The pre-test post-test control group design was adopted for the study wherein two convenient groups of children with autism (6-14 age group) having an IQ above 70, selected from Kozhikode district of Kerala. The participants in control group (n = 33) and experimental group (n = 36) were pre-tested for their social skills by administering the P-Version (for parents) and T-Version (for teachers) of the Social Skill Assessment Scale for Children with Autism. The experimental group was then exposed to 23 sessions of a month-long intervention with 'Ashtanga Yoga' class at the rate of one hour session per day, while the control group was restrained from getting any such experiences. Cessation of the experimental period is followed by post-testing of the social skills of the participants in both the groups. The significant difference estimated in the mean gain scores of social skills of control group and experimental group revealed the effectiveness of 'Ashtanga Yoga' in promoting the social skills of children with high-functioning autism.

**Keywords:** *Children with ASD, High Functioning Autism Spectrum Disorder, Social Skills, Ashtanga Yoga*

**A**utism Spectrum Disorder (ASD) is a pervasive developmental disorder which is characterized by social difficulties, communicative limitations, and a restricted range of interests and behaviors. Social skill deficits are central to the diagnostic criteria of ASD, as individuals with this disorder typically have difficulty initiating interactions, sharing enjoyment, maintaining eye contact, reciprocating conversation, taking another's perspective, lack of self-awareness, and inferring interests of others (American Psychiatric Association, 2000). Thus, individuals with ASD have difficulty communicating with others, processing and integrating information from the environment, establishing and sustaining social relationships with others, and participating in new environments (Krieger, Piskur, Schulze, Jakobs, Beurskens & Moser, 2018; Jing & Fang, 2014; Assouline, Foley & Dockery, 2012).

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Social skills training is a topic of great importance in the field of autism as social skill deficits are a prominent feature of ASD. Teaching social skills to children with ASD can be one of the most challenging and rewarding tasks that educators and psychologists undertake (Anderson, 2010). The social skills component of the educational program determines the functional success of every other goal. It is through social abilities that academic knowledge is conveyed in the real world. Even communication skills carry minimal power if social skills are not developed to ensure opportunities to communicate (Krasny, Williams, Provencal & Ozonoff, 2003). Throughout the years many strategies have been employed to support children with ASD in reducing challenging behaviors. Recently, yoga has become a topic of discussion as a positive and supportive approach to managing difficult behaviors in children with high functioning autism (Artchoudane, Bhavanani, Ramanathan & Mariangela, 2019; Ramanathan & Bhavanani, 2018). Yoga is a mind-body form of complementary and alternative medicines that has become increasingly popular in recent years. In recent years, non-medical programs and lay publications focused on delivering yoga to individuals with ASD have emerged in an effort to serve this growing patient population (Goldberg, 2013).

Children with ASD may experience heightened levels of anxiety and/or frustration due to many factors including heightened responses to sensory input, difficulty with communication and processing information in their environment and lack of coping skills to manage stressors in their day-to-day lives. Due to a highly sensitive nervous system, a child with autism experiences normal day-to-day interactions with an intensity that can lead to anxiety and upset. It is presumed that yoga will help children with ASD to learn self-control and self-calming techniques, and they are likely to grow confidence in interacting with other children and refine their social skills. A review of the available literature convinced the investigator that there is exists a research gap wherein no reports are available to show how far '*ashtanga yoga*' is effective in promoting the social skills of children with autism spectrum disorder. Hence the importance of this study.

### ***Objectives of the study***

The study has the following specific objectives in view:

1. To compare the experimental group and control group of children with autism with regard to the mean pre-test scores of social skill.
2. To compare the mean pre-test and post-test scores of social skill of experimental group of children with autism.
3. To compare the mean pre-test and post-test scores of social skill of control group of children with autism.
4. To compare the mean gain scores of social skill of experimental group and control group of children with autism.

### ***Hypotheses of the study***

The following null hypotheses were tested for the study.

1. There will be no significant difference between experimental group and control group of children with autism with regard to the mean pre-test scores of social skill.
2. There will be no significant difference in the mean pre-test and post-test scores of social skill of control group of children with autism.
3. There will be no significant difference in the mean pre-test and post-test scores of social skill of experimental group of children with autism.
4. There will be no significant difference between mean gain scores of social skill of experimental group and control group of children with autism.

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5. The 'Ashtanga Yoga' will not be effective in promoting social skill of children with autism.

### **METHODOLOGY**

#### ***Research Design***

Non-equivalent pretest-posttest control group design was adopted for the study.

#### ***Selection of Study Locale***

The researcher adopted convenient sampling method for selecting the children from Centre for Research and Development of Autistic Children (CRDAC), Kozhikode, under the Urban Resource Centre (URC), Sarva Shiksha Abhiyan (SSA), Kozhikode, as experimental group and autistic children enrolled to Block Resource Centres (BRC), at Perambra as control group.

#### ***Participants***

The participants were students in the age range 6 to 14, enrolled in different schools under of jurisdiction of Block Project Office for their normal education as per Inclusive Education Policy of the government. The participants of the present study comprised those children who have been diagnosed and certified as cases of autism by approved agencies. The inclusion criteria were (1) Children identified as autistic, (2) CARS (Childhood Autism Rating Scale) score between 30.5 and 37, (3) ISAA (Indian Scale for Assessment of Autism) score between 70 and 106, (4) between the ages 6-14 years, (5) studying in grade 1 to 9, (6) both boys and girls were included. The exclusion criteria were: (1) children with physical disabilities, (2) children suffering from severe ailments, (3) children with sensory defects, and (4) Autistic children with CARS score above 37 and ISAA score above 106.

#### ***Instrumentation***

The social skills of the participants were assessed with the help of two parallel forms of a rating scale viz., the Social Skill Assessment Scale for Children with Autism - Parents' Version (SASAC-P) and the Social Skill Assessment Scale for Children with Autism – Teachers' Version (SASAC-T), developed by Arjunan and Prameela (2014). They are Likert-type scales consisting of 40 items each, which describe some specific social behaviour across six selected dimensions of social skills: (i) Cooperation, (ii) Responsibility, (iii) Self-control, (iv) Assertion, (v) Communication, and (vi) Empathy. The SASAC-P was found to have an external validity of 0.63, and the split-half reliability of 0.84; and the validity and reliability coefficients for the SASAC-T were in the order of 0.68 and 0.84.

#### ***Procedure***

Pre-post measures were used to determine changes in social skills between the participants in the experimental group versus those in the control group. The study sequence was: (i) Pre-test conducted (for both control group and experimental group), (ii) Ashtanga yoga intervention of the experimental group, (iii) Monitoring and regulating the control group, and (iv) Post-test conducted (for both control group and experimental group).

#### ***Intervention***

The yogic intervention of the study made use of the Basic Training Module of Ashtanga Yoga for Children and Adolescents developed by Santhosh (2010). The package was mainly meant for differentially abled children and adolescents. So, the *asanas* and *pranayama* adopted for the package were in consonance with their age and developmental stage. The

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package comprises following *asanas*: *Prayer, Vajrasana, Sashankasana, Paschimottanasana, Parvatasana, Pavana muktasana, Bhujangasana, Dhanurasana, Naukasana, Makarasana, Savasana, Tadasana, Gomukhasana, Ardhapadmasana, Padmasana, Yoga mudra, Kapalabati, Anuloma viloma, Meditation*. The yogic intervention was made by a qualified and experienced trainer in imparting meditation and yoga to differentially abled children. The duration and frequency of each asana was varied according to the requirements of the participants. The experimental intervention was completed in 23 sessions of 1 hour duration and adequate suggestions for practice at home under the supervision of the parents.

### ***Analysis and interpretation***

The descriptive statistical indices like Mean (M), Median (Md), Mode (Mo), Standard Deviation ( $\sigma$ ), Skewness (sk), Kurtosis (ku), and Standard Error of Mean ( $SE_M$ ) were computed for the pretest scores of social skills of both the control group (N=32) and experimental group (N=36). The results of the analysis are given below in Table 1.

***Table 1: Statistical properties of the pre-test scores of social skills of the control and the experimental groups***

Groups	N	M	Md	Mo	$\sigma$	Sk	Ku	$SE_M$
Contrl. Group	33	99.18	102.00	102	11.11	-0.485	0.529	1.93
Exptl. Group	36	97.86	99.50	112	15.00	-0.234	-0.966	2.50

The distribution of both the experimental and control groups are normal as the value of skewness lies between  $-\frac{1}{2}$  and  $+\frac{1}{2}$ . Table 2 presents the data and result of the independent sample t-test performed to compare the control group and experimental group with respect to the pre-test scores of social skills.

***Table 2: Comparison of the pre-test scores of social skills of control and experimental groups***

Groups	Statistical Indices				t-value	Sig.
	N	M	SD	$SE_M$		
Contrl. Group	33	99.18	11.106	1.933	0.413	NS
Exptl. Group	36	97.86	14.999	2.500		

The t-value obtained on comparing the experimental and control groups with regard to the pre-test scores of social skills is not significant ( $t = 0.413$ ;  $p > 0.05$ ). The hypothesis formulated in this context, viz., Hypothesis-1 (*there will be no significant difference between experimental group and control group of children with autism with regard to the mean pre-test scores of social skill*) is, therefore, accepted.

The data and result of the paired sample t-test performed to compare the social skills scores of control group before and after the experiment is given in Table 3.

***Table 3: Comparison of the mean pre-test and post-test scores of social skills of control group***

Groups	Statistical Indices				t-value	Sig.
	N	M	SD	$SE_M$		
Pretest	33	99.18	11.11	1.93	0.33	NS
Posttest	33	99.39	10.51	1.83		

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Comparison of the mean pre-test and post-test scores of the control group with regard to their social skills produced a t-value which is not large enough to be significant at 0.05 level ( $t = 0.33$ ;  $p > 0.05$ ). The Hypothesis-2 (*there will be no significant difference in the mean pre-test and post-test scores of social skill of control group of children with autism*) is, hence, accepted.

Table 4 presents the data and result of the paired sample t-test performed to compare the pre-test and post-test scores of social skills of participants in the experimental group.

**Table 4: Comparison of the mean pre-test and post-test scores of social skills of experimental group**

Groups	Statistical Indices				t-value	Sig.
	N	M	SD	SE <sub>M</sub>		
Pretest	36	97.86	14.99	2.50	9.75	.01
Posttest	36	111.89	14.38	2.39		

The t-value estimated on comparing the mean pre-test and post-test scores of social skills of participants in the experimental group is significant at 99% confidence interval ( $t = 9.75$ ;  $p < .01$ ), revealing the presence of a true difference between social skills of the participants before and after treatment. The Hypothesis-3 formulated in this context (*there will be no significant difference in the mean pre-test and post-test scores of social skill of experimental group of children with autism*) is, consequently, rejected.

The control group and experimental group were compared with respect to the mean gain scores of the social skills of the participants so as to find out the significant difference, if any, between the groups. The data and result of the same is given in Table 5.

**Table 5: Comparison of the mean gain scores of social skills of the control group and experimental group**

Groups	Statistical Indices				t-value	Sig.
	N	M	SD	SE <sub>M</sub>		
Contrl. Group	33	.21	3.689	.642	8.504	0.01
Exptl. Group	36	14.03	8.634	1.439		

The t-value obtained in comparing the mean gain scores of social skills for the control group and the experimental group is significant at .01 level, revealing the presence of a true difference between the groups, after adjusting for their pre-test scores. The Hypothesis-4 (*there will be no significant difference between mean gain scores of social skill of experimental group and control group of children with autism*) is, therefore, rejected.

## **CONCLUSIONS**

The findings of the analysis showed that the control group and experimental group were almost alike before experimental treatment as no significant difference was observed between the groups with respect to the pre-test scores of their social skills. The control condition was not able to cause any significant effect on the social skills of children with autism. The experimental treatment has resulted in a significant hike in the social skill scores of participants in the experimental group. A significant difference was found to exist between the control group and experimental group with respect to the mean gain scores of

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social skills revealing the effectiveness of 'Ashtanga Yoga' in promoting social skills in children with high-functioning autism. The hypothesis formulated in this context, viz., Hypothesis-5 (the 'Ashtanga Yoga' will not be effective in promoting social skill of children with autism) is, hence, rejected.

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### Conflict of Interest

The author declared no conflict of interest.

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