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Occupational Therapy and Yoga for Children with Autism Spectrum Disorder for Rehabilitation Professional

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ABSTRACT

Introduction: Autism spectrum disorder (ASD) is being identified in an ever-increasing number of countries,¹ Research to date children with these disorders will have poor gross motor skills and the rate of fall risk are increase among these children, an effective intervention for understudied Autism Spectrum Disorder is needed. Therefore, we investigated to find out the effectiveness of Occupational Therapy along with Yoga intervention including gross motor skill and fall risk for children with Autism Spectrum Disorder.

Objective: To find out the effectiveness of gross motor skill for children with Autism Spectrum Disorder and to educate and train the children with Autism Spectrum Disorder who are prone to fall.

Methods: Nine children with Autism Spectrum Disorder who are prone to fall were selected for this study. Gross Motor Functional Measure scale (GMFMs) and Modified Berg Balance Scale (BBS - M) Pediatric Balance Scale were used for the objective measurement of children fall risk. The pre and post-therapy values were statistically analyzed on the effect of Occupational Therapy and Yoga intervention for children with Autism Spectrum Disorder.

Results: The statistical analysis of Gross Motor Functional Measure scale (GMFMs) mean value is 86.7777 vs post-treatment mean value is 121.444 (t = -8.95182; p<0.00001). The Statistical analysis of Berg Balance Scale between pre-treatment mean values is 24.777, S.D is 3.18948 and post-treatment mean value is 40.222, S.D 4.7088, t-test value of BBS is 7.68085 and p-value is < .00001. Based on the statistical report it is suggested that the gross motor skills were improved and the rate of fall was comparatively reduced for children with Autism Spectrum Disorder.

Conclusion: Occupational Therapy and Yoga can be used effectively as one of the interventions as an integrated therapy to improve gross motor skills and to prevent falls in children with Autism Spectrum Disorder. Therapists may consider these interventions when treating children with Autism Spectrum Disorder.

Key Words: Occupational Therapy, Yoga, Fall prevention, Berg Balance Scale (BBS-M) Pediatric Balance Scale, Gross Motor Functional Measure scale (GMFMs), Autism Spectrum Disorder

INTRODUCTION

Autism is a neurodevelopment syndrome that is defined by deficits in social reciprocity and communication, and by unusual restricted, repetitive behaviours (American Psychiatric Association 2000). Autism is a disorder that usually begins in infancy, at the latest, in the first three years of life. Autism is caused by a combination of genetic and environmental factors. Risk factors include certain infections during pregnancy such as rubella as well as valproic acid, alcohol, or cocaine use during pregnancy.¹⁻³ Controversies surround other proposed environmental causes; for example, the vac-

cine hypotheses, which have been disproven. Autism affects information processing in the brain by altering how nerve cells and their synapses connect and organize; how this occurs is not well understood. In the DSM V, autism is included within the autism spectrum (ASDs), along with Asperger syndrome which is less severe, and a pervasive developmental disorder, not otherwise specified (PDD-NOS).⁴⁻⁶

Autism symptoms range in presentation and severity. Autism children commonly have an intellectual disability, but in some cases, autistic children will have average intelligence. Children with autism may also have motor abnormalities,

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fear, anxiety, seizures, sleep cycle disturbances, gastrointestinal problems, immune dysfunction and sensory disturbances. Not all the features are present in every child. Instead, a subset of features underlies autism in each individual.^{7,8}

Gross Motor Functional Measure scale (GMFMs) and Modified Berg Balance Scale (BBS) / Pediatric Balance Scale as a Standardized screening tool to assess gross motor function and fall in children with Autism Spectrum Disorder, the score of less than 0-20 are indicative of a high fall risk that may have limited activities of daily living (ADL) skills and demonstrates increased risk of fall.⁹ The ability to maintain balance during activities of daily living is essential functional independence and safety of these children with Autism Spectrum Disorder.¹⁰

Yoga is a popular and now common form of exercise for children with Autism Spectrum Disorder. It helps teach calming techniques, building muscle, and increasing flexibility, balance, and more. Occupational Therapy helps students organizing sensory systems and increase body awareness. Occupational therapy and yoga have a natural affinity for one another. Both disciplines promote improved physical and functional outcomes and used together create a dynamic state of improved wellness. Yoga has emerged as a potential and valuable tool to boost a child's ability to focus, as well as control anxiety and sensory-related ecological by Radha Krishna, Rosenblatt. Yoga as an effective behavioural treatment for children diagnosed with an Autism Spectrum Disorder by triggers, Porter and Jennifer.^{11,12}

Literature suggests that gross motor and balance training of both yoga and occupational therapy helps to improve gross motor skills and to prevent falls in children with Autism Spectrum Disorder, only a few studies have mentioned the fall prevention training programme and children education for Autism Spectrum Disorder.⁹⁻¹³ Therefore, in this study, evaluation is done on the effectiveness of gross motor skills and fall prevention training programme for children with Autism Spectrum Disorder.

MATERIALS AND METHODS

Participants

Participants of this study were a convenience sample of children diagnosed with Autism Spectrum Disorder. All children were between ages 4-8 [*Mean*] age 5.97) and attended 22-week Occupational Therapy and yoga program. A total of 9 patients included, 5 Male Children and 4 Female Children diagnosed with Autism Spectrum Disorder participated in this study. All children attended the intervention phase of the study, for both Occupational Therapy and Yoga program. This study was ethically approved by the Institutional Ethical Committee (IEC) with Ref No: 000113/ 0207/2018 Dated 4/07/2018.

Procedure

The participants were randomly assigned for occupational therapy and yoga program, pre and post-test were done in front of parents/caregivers. Standardized assessment tool which includes Gross Motor Functional Measure scale (GMFMs) and Modified Berg Balance Scale (Pediatric Balance Scale) to assess Gross Motor function and Fall in children with Autism Spectrum Disorder and intervention was provided for 22 weeks training program with appropriate occupational therapy management such as peg-board activities, dexterity, puzzles, balancing, ball play and yoga program such as for children with Autism Spectrum Disorder. The entire children received the intervention of 45 min each over 22 weeks, for both occupational therapy and yoga intervention.

Criteria for selection

Children with Autism Spectrum Disorder for both male and female those who are prone to fall and poor gross motor skills were selected for this study.

RESULTS

The statistical analysis of Gross Motor Functional Measure scale (GMFMs) mean value is 86.7777, SD 7.89905 and post-treatment mean value is 121.444, S.D 7.5881, t-test value of GMFM is -8.95182 and p-value is < .00001. The Statistical analysis of Berg Balance Scale between pre-treatment mean values is 24.777, S.D is 3.18948 and post-treatment mean value is 40.222, S.D 4.7088, t-test value of BBS is 7.68085 and p-value is < .00001. Table 1 shows the Mean and SD value of Pre and Post-therapy Management of the Gross Motor Functional Measure scale (GMFMs) for Children with Autism Spectrum Disorder.

Table 1: Pre and Post-therapy Management of the Gross Motor Functional Measure scale

	Mean	SD	T Value	P Value
Pre -Therapy Value	86.7777	7.89905		
Post-Therapy Value	121.444	7.5881	-8.95182	< .00001

Table 2 shows the Mean and SD value of the Pre and Post-therapy Management of Berg Balance Scale (BBS) for Children with Autism Spectrum Disorder.

Table 2: Pre and Post-therapy Management of Berg Balance Scale

	Mean	SD	T Value	P Value
Pre -Therapy Value	24.777	3.18948		
Post-Therapy Value	40.222	4.7088	7.68085	< .00001

This statistical analysis shows that there is a significant difference between pre and post-therapy values of both GMFM and BBS score. Hence, it is suggested that the gross motor skills were improved as well the rate of fall was comparatively reduced for children with Autism Spectrum Disorder.

It is observed that the t value is greater than the table values hence, the null hypothesis is rejected. It implies that there is a significant difference in the mean values before and after treatment. Hence, it is concluded that the treatment significantly shows improvements in children with Autism Spectrum Disorder. We can recommend that the period of treatment might increase and further studies are warranted to increase the sample size.

CONCLUSION

Throughout this study, I have concluded that Occupational Therapy and Yoga can be used effectively as one of the techniques to improve gross motor skills and to prevent fall in children with Autism Spectrum Disorder. Therapists may consider these interventions when treating children with Autism Spectrum Disorder.

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Conflict of Interest and: This work has done my interest.

Source of Funding: Done, my own cost

APPENDIX

a. Name of the participants' gender with age group

Sl No	Name of the patient	Age	Gender
1	R.K	4.0	FC
2	S.P	5.5	FC
3	D.S	6.0	MC
4	K.T	5.8	MC
5	V.K	7.6	MC
6	K.D	5.4	FC
7	S.R	5.0	FC
8	M.N	6.5	MC
9	S.M	8.0	MC
MEAN VALUE		53.8 - 5.97	

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b. Pre and Post-therapy value of the Gross Motor Functional Measure scale (GMFMs) for children with Autism Spectrum Disorder

Sl. No	Name of the Participant / Initial	Pre Therapy Value	Post Therapy Value
1	R.K	74	107
2	S.P	82	113
3	D.S	80	118
4	K.T	91	130
5	V.K	98	128
6	K.D	88	125
7	S.R	93	119
8	M.N	79	122
9	S.M	96	131

c. Difference Scores Calculations

Pre -Treatment	Post - Treatment
$N_1: 9$	$N_2: 9$
$df_1 = N - 1 = 9 - 1 = 8$	$df_2 = N - 1 = 9 - 1 = 8$
$M_1: 86.78$	$M_2: 121.44$
$SS_1: 561.56$	$SS_2: 518.22$
$s_1^2 = SS_1 / (N - 1) = 561.56 / (9-1) = 70.19$	$s_2^2 = SS_2 / (N - 1) = 518.22 / (9-1) = 64.78$

T-value Calculation

$$s_p^2 = ((df_1 / (df_1 + df_2)) * s_1^2) + ((df_2 / (df_2 + df_1)) * s_2^2) = ((8/16) * 70.19) + ((8/16) * 64.78)$$

d. Pre and Post-therapy value of Berg Balance Scale (BBS) for patients with stroke survivor

Sl No	Name of the Participant / Initial	Pre Therapy Value	Post Therapy Value
1	R.K	21	42
2	S.P	30	45
3	D.S	22	48
4	K.T	23	41
5	V.K	26	43
6	K.D	29	38
7	S.R	21	32
8	M.N	24	35
9	S.M	27	38

Diff (X - M)	Diff (X - M) ² Sq.
-3.78	14.27
5.22	27.27
-2.78	7.72
-1.78	3.16
1.22	1.49
4.22	17.83
-3.78	14.27
-0.78	0.60
2.22	4.94
M: 24.78	SS: 91.56

Difference Scores Calculations

Pre -Treatment	Post - Treatment
$N_1: 9$	$N_2: 9$
$df_1 = N - 1 = 9 - 1 = 8$	$df_2 = N - 1 = 9 - 1 = 8$
$M_1: 24.78$	$M_2: 40.22$
$SS_1: 91.56$	$SS_2: 199.56$
$s_1^2 = SS_1 / (N - 1) = 91.56 / (9-1) = 11.44$	$s_2^2 = SS_2 / (N - 1) = 199.56 / (9-1) = 24.94$

T-value Calculation

$$s_p^2 = ((df_1 / (df_1 + df_2)) * s_1^2) + ((df_2 / (df_2 + df_1)) * s_2^2) = ((8/16) * 11.44) + ((8/16) * 24.94) = 18.19$$

Patient informed consent:

Parent consent form, parental permission for children participation in research were approved by the institutional ethical committee (IEC), Post Graduate & Research, Department of Rehabilitation Science, Holy Cross College, (000113), which was obtained from all the participants of this study.

Ethical committee approval and consent to participate:

We would like to inform you that, our research has been approved by institutional ethical committee (IEC), Post Graduate & Research, Department of Rehabilitation Science, Holy Cross College, (000113), which was obtained from all the participants of this study and which is enclosed

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