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Effect of Structured Aquatic Activities on Touch Processing Among Special Need Population

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Abstract – Structured Aquatic Training Program was designed to test Children with Special Need (CWSN) touch processing, in which 25 children aged range of 7 -11 years with sensory needs children were purposely selected for the study and was divided into Experimental group and Control group. The data was collected from a special school at Delhi, India and statistically analyzed by employing two-way ANOVA. Findings indicate towards no accelerated change within the stipulated duration of the training, and directs towards contentious tough intervention for long term benefits. The scores obtained in touch processing also indicate some changes in the scores of questionnaire, with this it can be assumed that, may be longer duration of intervention will give better results.

Keywords – Special Need population, Endurance, Balance, Coordination, Autism Spectrum Disorder (ASD), Sensory Processing, Touch Processing, Structured Aquatic Training Program.

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INTRODUCTION

Special need population means anyone who has difficulties, physical disabilities or emotional and behavior difficulties (oxford dictionary) especially one that prevents a person from living a full, normal life and holding a gainful job. According to the Census 2011, it has been revealed that over 26.8 million people in India are suffering from disabilities, out of which sensory disability is around 43% of the total disable population in India. Children with sensory impairments have to face many problems apart from the sensory dis-functioning which are like - language delays, speech delays, delayed in fine motor skills, delays in self-feeding, lack of coordination, decreased muscle tone and having difficulty in listening in a noisy environment, etc. and also suffer from mood disorders, eating disorders, anxiety disorders, attention-deficit etc (Fink, Nov 6,2017). In various researches have proved that by regular physical activity human being can develop all aspects of human body (physical, mental, etc.), which can be land based or water based but both are beneficial with their own role & nature of significance. Aquatic activity is also a part of physical activity, which has a separate kind of benefits and on the other hand Water activity, can be a gateway to reduce and give them a better life (Ki-Hyeon Kim, 26 April 2018).

Due to the physical principles of water such as density, hydrostatic pressure, buoyancy, viscosity, and thermodynamics it is used in medical and recreational applications. Therefore, Aquatic programs can be effective and beneficial form of therapy for children and adolescents with sensory disorders. It is helpful particularly for those with significant movement limitations, where land based physical activity are quite difficult for them (Lidija Dimitrijevic, 2012 30 May). In addition other author says swimming or any kind of aquatic activity is extremely beneficial to improve physical exercise that can improve the motor skills and physical abilities among the children reducing all kinds of disabilities and sensory impairments (Aleksandrovic, 2016) (Hall, 2013).

With this understanding the author prepared a structured aquatic training program to check its effect on touch processing.

Research question

To test the research question following objectives were tested

- To see whether there is any change in touch processing through the structured aquatic training program.
- To understand weather the abilities of children improve on to the same scale.

METHODOLOGY

Participants

A total of 26 children from Asha AWWA School, Delhi Cant, India in summer 2018 with special needs and Developmental Disabilities, age range 7 to 11 years were identified as the subjects for this study. Participants were divided into two groups, 13 students each in experimental group and control group, during training one student dropped out from Control Group. Hence, final data was collected on 12.

Criterion measure

Questionnaire

A validated questionnaire- Sensory Profile, developed by Winnie Duun, in the year1999, this is the commonly used questionnaire for understanding the sensory profile of the children and is to be filed by parents/ teachers/ caregiver.

Preparation of training program

To structure the training program exercise were short listed according to the independent variable chosen for this study. By repeated discussion with all the five experts from similar field and experienced personal the training program were developed. This program was designed so that after every two week repetition and difficulty level was being gradually added to the training program. Further expert advice was again taken for the finalization of the Structured Aquatic Training Program.

Administration of the Structured Aquatic Training Program

Structured Aquatic Training Program: A nine week program was administered for three times a week for 40 minutes for each child per day. Each session was having two subject and coach. Further the experimental group of 13 subjects was split into two batches of 6 and 7 subjects who attended the training in alternative days. Sensory Profile Questionnaire has been filled two times once for pre data i.e. before starting the training program then again for post data after finishing the training program by the class Teachers/Parents/Caregiver in the post data collection**.**

Statistical analysis

In this study Two Way ANOVA is used to analyze the effect of touch processing within pre and post data of the questionnaire. Also Syntax of SPSS to test the intervention effects groups. Further the Sensory questionnaire assisted the analysis to understand the effect in an elaborate manner.

RESULTS

This presents the findings on the effect of Structured Aquatic Training Program on Touch Skill, on the basis of pre and post test conducted. Findings are presented in table no 1

Table 1: Descriptive statistics of total Touch Processing Score of Sensory Profile

Groups	Performance	Mean	Std. Deviation	N
Experimental	Pre	52.84	10.16	13
	Post	59.33	13.35	12
Control	Pre	45.91	11.71	13
	Post	48.92	11.56	12
Total	Pre	49.52	11.26	25
	Post	53.92	13.29	25

Table explains the descriptive analysis of the Touch Processing score in pre and post training between experimental and control group of purposively selected sample. Table represents mean of pretest of experimental group is 52.85 (SD 10.16) and posttest is 59.33 (SD 13.35). Among the control group, it shows no significant difference with pre and post scores of touch processing as 45.92 (SD 48.92) and 48.92 (SD 11.56) respectively.

The two way analysis was computed to check whether there is any significant difference between pre and post Touch Processing. Result is shown below in table no. 2

Table no 2: Analysis of Two Way ANOVA of Touch Processing within pre and post scores between Experimental and Control Group

Source	Sum of Square	Df	Mean Square	F	Sig.
Touch Score*groups	281.20	1	281.20	2.04	.15

*p<0.05

It is found that there is no significant difference the Touch Processing Scores with in pre and post test scores between groups as F (Df =1) 2.04, p>0.05. It means the score of Touch processing before and after training between experimental and control groups has no significant difference statistically.

As f value is insignificant, the check the exact difference in the mean of experiment and control group from pre to post test Syntax of SPSS was further computed to test the interaction effect of trial with groups of training. Findings are represented in table no. 3

Table 3: Pairwise Comparisons of Experimental and Control Groups for the Pre and Post Touch Processing Performance

Performance	(I) Groups	(J) Groups	Mean Difference (I - J)	Std. Error	Sig*	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Pre	Experimental	Control	6.92	4.69	.14	-2.51	16.37
	Control	Experimental	-6.92	4.69	.14	-16.37	2.51
Post	Experimental	Control	10.41	4.69	.03*	.969	19.85
	Control	Experimental	-10.41	4.69	.03*	-19.85	-.96

* P< 0.05

The table reveals that the pre performance of the experimental and control groups have no significant difference (p = 0.14). However the difference between the post-performance of the groups was found significant with p< 0.05 which indicates that the performance in experimental group is statistically higher (M = 59.33) and the control group (M = 48.92).

The adjusted p-value for the comparisons of experimental and control (each for pre and post-performance) is 0.05/2 = 0.03. by this criterion, the only difference, which is not significant, is pre performance between experimental and control group.

Thus findings are represented in Post Hoc test was computed, to check the difference between the pre and post scores of the experimental groups and controlled group's separately. The results are presented in table no. 4.

Table 4: Pairwise Comparisons among Experimental and Control Groups for Pre and Post Touch Processing Performance

Groups	(I) Performance	(J) Performance	Mean Difference (I - J)	Std. Error	Sig*	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Experimental	pre	Post	-6.48	4.69	.17	-15.92	2.95
	Post	pre	6.48	4.69	.17	-2.95	15.92
Control	pre	Post	-3.00	4.69	.52	-12.44	6.43
	post	pre	3.00	4.69	.52	-6.43	12.44

*p<0.05.

No significant difference was found in the pre and post-performance of Touch Processing within the experimental group as p<0.05.

The adjusted p-value for the comparisons of pre and post-performance (each for experimental group and control group). By this criterion, the on difference found, in between pre and post-performance. The graphical representation of results is presented in figure 1.

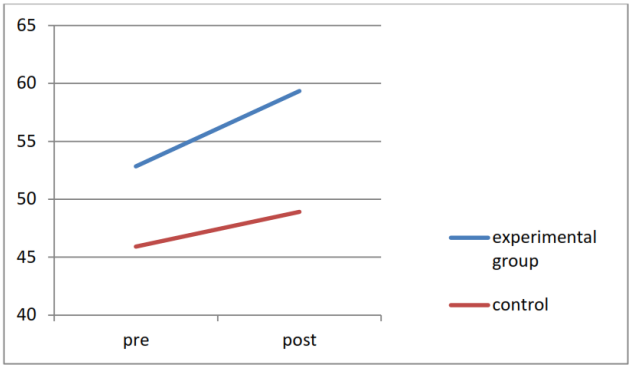

Figure 1: Graphical representation of Experimental and Control Pre and Post Touch Processing score Estimated Marginal Mean.

Theis graph represents the pre and post touch processing of experimental and control groups, it is shown by that there is improvement in both experimental and control group, but it is not significant statistically. Slight difference in the improvement can be observed the experimental group starts from appx. 53.00 and control group 46.00 in pre both has a improvement phase like experimental went till 59.00 whereas control till 49.00 in post. Hence we can conclude that experiment group has slightly greater improvement then control from the difference of improvement which is : experiment 6 and control is 3.

This table indicates the pre and post Touch Processing Scores obtained by participants. The number of participants falls on which category before and after the training according to the Sensory Profile, Questionnaire which is used for this study. Results are as follows in table no. 5

Table: 5 Touch Processing Scores before and after the Structured Aquatic Training Program of Nine Weeks

Groups	Performances	Typical Performance Good Condition (90 – 73 Scores)	Probable Difference Moderate (72 – 65 Scores)	Definite Difference Poor Condition (64 – 18 Score)
Experimental Group	Pre	0	3	10
	Post	1	6	6
Control Group	Pre	0	2	10
	Post	0	2	10

The table indicates pre and post score of Touch Processing of all the subject participated in this training program for nine weeks. It is clearly seen that experimental group has some improvement in pre 10 subjects were in Definite Difference, 3 in Probable Difference, nil in Typical Performance where as in post-performance 6 subjects were in Definite Difference, 6 in Probable Difference, 1 in Typical Performance. In pre no subjects were in typical performance but in post one subject improves to good condition. While no changes found in control group in both pre and post 2 subjects were in Typical Performance and 10 in Definite Difference. So we can conclude that there

is some positive changes by the Structured Aquatic Training Program.

DISCUSSION OF FINDINGS

Both the groups were undergoing regular individualized school programs. This can be a reason for insignificant difference on the touch processing in pre and post of both the groups. This population have weak grasping power, concentration, instruction following so may be a longer duration of training can be more effective (Dubois, may 2011) (Marandi SM, 2013). Most of the studies with aquatic exercise find that there is positive result in many ways to this population (Hall j. G., 2013) (Dubois, may 2011). In this study there is difference in the mean of both the groups of post performances in which experimental group performance is more than control group. If there is even a little change in the condition of child in nine weeks then it can be assumed that may be longer duration (like 12 weeks or complete session) intervention will give better results (Hall j. G., 2013) (Maria A. Fragala Pinkham, August 2011). According to (Dubois, may 2011) child improves in sensory processing as well as strengthening of muscles, which can help them in self-esteem, confidence, self-dependent and which are already discussed in introduction. It is also found that the scores obtained in touch processing from the questionnaire Sensory Profile in both groups performance reflects there is improvement among the subjects as they have shifted from Definite Difference to Typical, which may not be statistically significant but it is also not negligible.

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