



# Effect of Swissball Exercises and Aerobic Exercise to Reduce Stereotype Behavior in Children with Autism Spectrum Disorder- A Comparative Study

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## Abstract

**Background:** Autism is a sensory disorder. It is believed that the stereotypic behavior associated with ASD is an attempt on the individual's part to provide him or herself with sensory feedback. These stereotypic behaviors are self-stimulatory, non-functional, and repetitive in nature. The reduction in the stereotypic behavior is more important because interfere with social and learning situation in children with ASD. Stereotypic behavior may cause children to have anxiety when placed in social setting and can lead to inappropriate or withdrawal from participating in group situations and interactions with others. **Objective:** The objective of the study is to know the effect of swissball exercises and aerobic exercises to reduce stereotype behavior in children with autism spectrum disorder. **Methods:** 14 subjects with autism spectrum disorder are divided into two group. Group A (N-7) performed swiss ball exercises, group-B(N-7) performed Aerobic exercises for the duration of two months and the outcome was measured by Repetitive behavior scale. The effect was compared between the group. **Result:** The p value for group A-0.4422, group B-0.0292. **Conclusion:** both the group swiss ball exercise and aerobic exercise reduce stereotype behavior, but aerobic exercise found to be effective when compared to swiss ball exercises.

## Keywords

Autism, Stereotype behavior, Repetitive behavior scale, Aerobic exercise, Swiss ball exercise.

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## INTRODUCTION

According to the world health organization autism is defined as the neuro developmental disorder characterized by impaired verbal and non-verbal communication, restricted and repetitive behavior <sup>(1)</sup>. Cause of autism is genetic and environmental factors. But the exact patho mechanism of ASD is not known. While several factors have been implicated. Among these, the genetic cause has been long

implicated. Siblings of autistic offspring have a higher incidence of Autism than general population and twin studies have also indicated strong role of inheritance, This wide range of phenotype but most genetically homogenous ASD patients with less phenotypic heterogeneity <sup>(2)</sup>.

The first ever clinical account of the disorder was published by Leo Kanner in 1943. Kanner found out the clinical condition among 11 children 8 boys and 3

girls. Who had autistic disturbances of affective contact. Kanner study the rate of autism is made continues to be much higher in male than the rate in females <sup>(3)</sup>. Prevalence of autism in United States is 1 in 68 children, Surveillance study of disease control and prevention <sup>(4)</sup>. Prevalence of autism in India is approximately 1 in 500 or 0.20 percent or more than 2,160,000 people. Study from New York disease control and prevention estimated that overall, less than half of the children's identified with autism had received compressive developmental evaluation by age 3 <sup>(5)</sup>.

Children with autism spectrum disorder exhibit many behaviors among them the repetitive behavior or stereotypic behavior is the most common due to this behavior they find the world at a large challenge and behavior of other people may confuse them <sup>(6)</sup>.

## METHODOLOGY

|                    |   |                     |
|--------------------|---|---------------------|
| Study design       | : | comparative study   |
| Sample size        | : | 14 ASD children     |
| Study duration     | : | 2 months.           |
| Sampling technique | : | Convenient sampling |

## OPERATIONAL DEFINITION

### Aerobics:

Aerobics exercises is a type of moderate to intensity physical activity that you can sustain for more than just a few minutes with the objective of improving the cardiorespiratory fitness and health.

### Swiss ball exercise:

Ball exercises is performed in Swiss ball

### Stereotypic behavior:

Stereotype is a repetitive or ritualistic movement, posture, or utterance. Stereotypes may be simple movements such as body rocking or complex such as self-caressing, crossing, and uncrossing of legs and marching in place they are found in people with autism and intellectual disability.

### Repetitive behaviour scale:

The repetitive behavior scale is 43 items self-report questioners that use to measure the depth of repetitive behavior in children and adults with autism spectrum disorder.

### OUTCOME MEASURES:

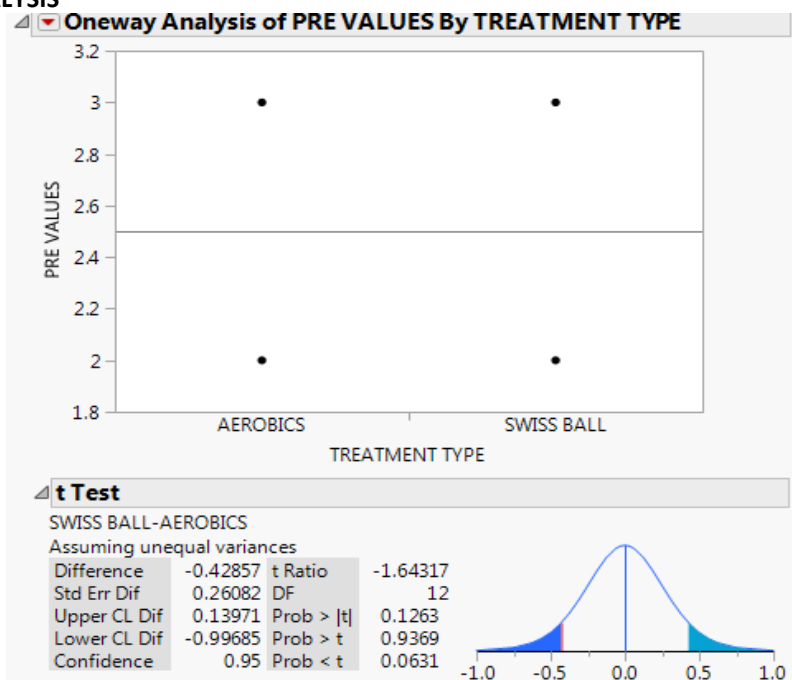
Repetitive behavior scale which contains 5 subscales include 43 items, (among that stereotypic behavior subscale is used as an outcome measure) scoring include 0 to 100. Where 1 is not a problem at all where 100 is as bad as you can imagine.

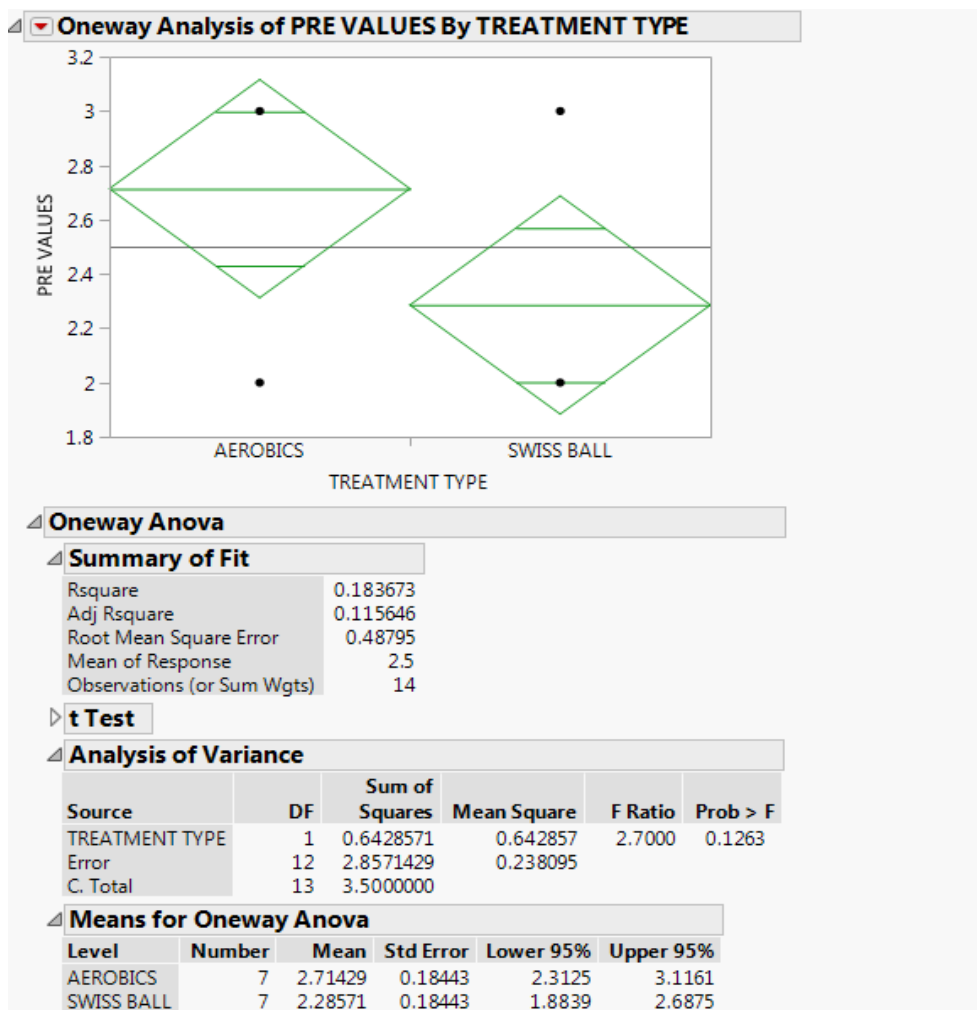
**TOOLS USED:** Stopwatch, Stethoscope, Swiss ball.

### DATA COLLECTION:

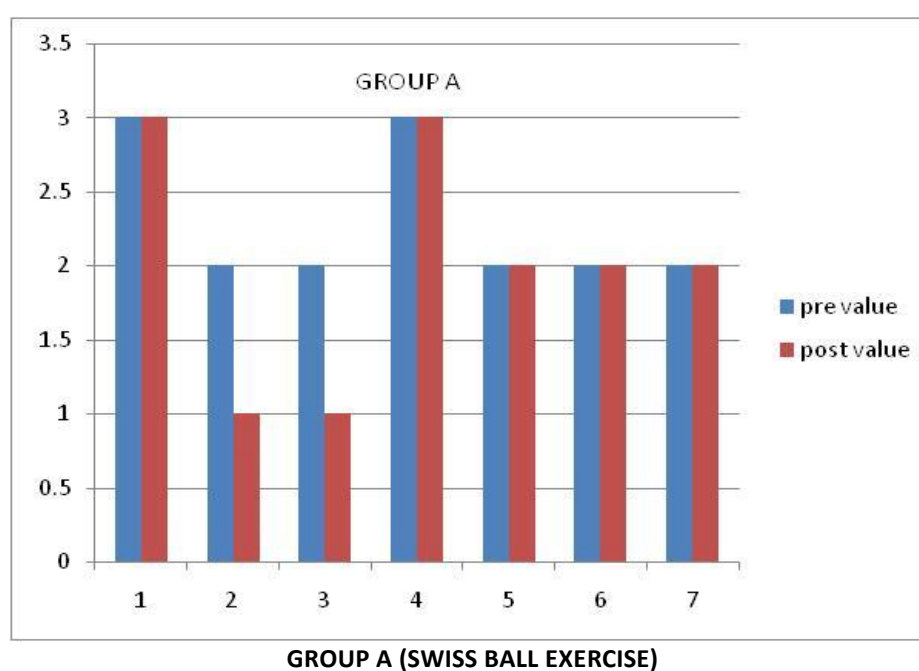
14 Autism spectrum disorder children with stereotypic behavior is divided in to two groups. Group A is performed with swiss ball exercises like Rolling, Sitting, Turning and Jumping on the Swiss ball. Group B is performed with aerobics exercises like Running, jumping on trampoline and static cycling. For a period of two months, the pre and post test values of repetitive behavior scale score noted.

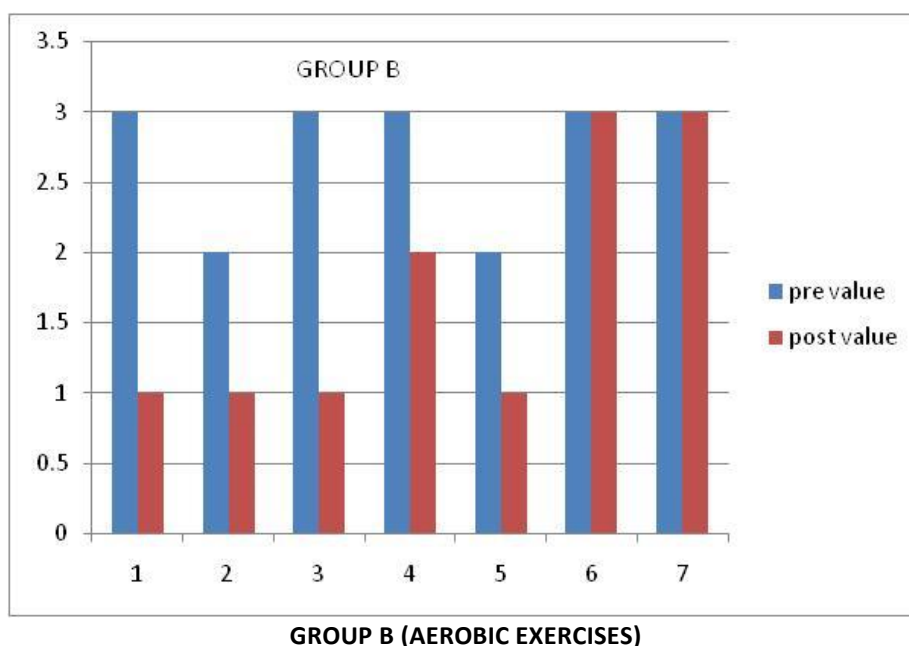
## STATISTICAL ANALYSIS





### GRAPHICAL REPRESENTATION





## RESULT

The p value for group A Swiss ball exercises (0.4422) and the p value for group B Aerobics exercises (0.0292) compared the values in ANOVA the p value overall for group A and B (0.1263) hence group B (AEROBICS EXERCISES) shows reduction in stereotypic behavior compared to group A (SWISS BALL EXERCISES)

## DISCUSSION

Stereotypic behavior is one of the most common problem faced by the autistic children this study is done in order to compare aerobics exercises and Swiss ball exercise in stereotypic behavior reduction from the analyzed data aerobics exercise reduce stereotypic behavior than the Swiss ball exercise .

The benefits of the study are Physical activity is easy to perform and improve general health in the autistic children. Jumping on the trampoline, static cycling, and Swiss ball exercise are fun filled activity for the children. With the data interpreted that particular type of physical activity which increase the heart rate surely influence the reduction in the stereotypic behavior but the exact mechanism how increased heart rate reduces the stereotypic behavior is not clear

But study by Gholamhosein Nazemzadegan effectiveness of Swissball exercises on reduction of stereotypic behavior in autism states that motor activity reduces the blood serotonin concentration in autistic children which is the major cause of stereotypic behavior<sup>(7)</sup>

Total intervention dosage is another important aspect to consider in the overall effectiveness of any

intervention. It is likely that exercises intervention with higher dosage and longer overall study duration implemented by Bahrami (2012 and Movahedis (2013) 56-h martial arts over four sessions week for 14 weeks may result in greater and long lasting improvements in behavior however, since no study has investigated the impact of dosage on behavioral outcomes it's difficult to establish an ideal dosage for optimal results. It is difficult to know whether this holds true regard to exercises and behavioral interventions, or whether there is a ceiling effect where benefits begin to plateau

In general exercise appears to have greatest benefit for children and youth with ASD by reducing stereotypic behavior and improving socio emotional functioning.

Levinson and Reid (1993) demonstrated that 15 minutes jogging session resulted in greater reductions in stereotypic behavior than 15 minutes of walking while also recording the exercise intensity pre – and –post intervention through heart rate taken via radial pulse however, their analysis of data did not account for changes in stereotypic behavior relative to heart rate changes<sup>(8)</sup>

Further research can include longitudinal follow up assessments to understand whether exercises have sustained effect on behavioral outcomes. Follow up assessment can also be conducted more frequently for outcomes such as stereotypic behavior that may have short term changes following exercises. Continuous and longitudinal follow up assessments will enable us to understand how exercises effects behavioral outcomes and for how long, thus providing valuable information that can be used in

creating community and home-based exercises programs for children and youth with ASD

### CONCLUSION

Both the groups showed reduction in stereotypic behavior. but aerobics exercises found to effective when compared to swiss ball exercises.

Exercises which increases the Heart rate can reduce the stereotypic behavior in Autism. Further studies should continue to examine the impact of exercise on the behavioral outcome of children and youths with ASD. Finally, it may be beneficial for further research to include measure of exercise intensity, activity, and physiological monitoring, to examine the relative impact of exercise intensity on behavioral outcomes.

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### CONFLICT OF INTEREST:

There is no conflict of interest.

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