



Original Research Article

To Compare the Attention Span of Down Syndrome Children with Healthy Children of Same Age Group

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Abstract:

Introduction: Down syndrome is the most common congenital chromosomal disorder. In terms of genetic causes of mental impairment, this condition is the most prevalent. The typical characteristics of students with intellectual disability, such as down syndrome are limited attention span and motor skills. Attention is the first stage in information processing. It collects parts of the environmental information for later processing. However, there are dearth of studies which compares attention span of down syndrome children with healthy children of same age group.

Aim: The aim of the study is to examine the attention span of down syndrome children and comparing their attention span with healthy children of same age group.

Materials and methods: The present study had a cross-sectional comparative research design. 20 subjects were taken conveniently which included 10 down syndrome and 10 healthy children (8-14 years old). The attention span was measured by using Stroop color and word test and analyzed with independent t-test.

Results: Independent t-test indicated a significant difference between the attention span of down syndrome and healthy children.

Conclusion: This research evaluated that down syndrome children have less attention span than healthy children of same age group. Therefore, down syndrome children need more attention training.

Keywords: Attention span, Down syndrome, healthy children, Comparison.

Introduction

The most prevalent congenital chromosomal disorder that is always associated with mental impairment is down syndrome. According to statistical studies conducted in various nations,

this condition affects 1 in 700 to 1 in 900 live births [1]. This incidence rate is increasing with increase in pregnant age [2]. Down syndrome is the most common type of mental

impairment, which is estimated to affect 5 to 6 percent of the population [3]. Down syndrome is caused by the overexpression of normal genetic material, usually an extra chromosome 21. Down syndrome is also known as trisomy 21, which is caused by the presence of an extra copy of the 21st Chromosome. Instead of the typical pair, baby is born with three 21 chromosomes. In other words, it is a portion of chromosome 21 that is in early stages of meiosis [4]. In most of the cases of down syndrome mother transfers the extra chromosome. There are some cases of paternal nondisjunction are also reported, but most of the cases are due to maternal nondisjunction [5]. Down syndrome is a genetic condition that can be identified by physical characteristics, intellectual disability ranging from mild to severe, and deficits in academic performance. The typical characteristics of students with intellectual disabilities, such as down syndrome are limited attention span and motor skills [6]. Attention gathers a portion of environmental data for processing later. In fact, paying attention is crucial to learning and education. Children with down syndrome struggle with attention [7]. These children typically have motor skill deficits or delays, which can cause forced immobility. This delay affects movement, balance, and practical skills like working, playing games, and performing daily tasks [8]. These children may also have some other problems, such as respiratory illness, cardiovascular diseases, muscle weakness, ligamentous laxity, hypermobility and skeletal deformities [9]. Studies showed that attention span of students with intellectual disability are either poor or considerably delayed [5]. According to research, children with down syndrome have lower levels of attention span and motor skills than children without the condition [10]. Another research shows that down syndrome children have more chances to develop Attention-Deficit Hyperactivity Disorder (ADHD) [11]. Studies have shown how the physical and cognitive

performance of students with intellectual disabilities related to each other [12]. Additionally, although down syndrome children go through identical phases of motor development in the same order as typical students, some stages may be delayed and some activities and skills may not develop as they would for a typical student. Therefore, this study aimed to investigate the attention span of down syndrome children and also comparing their attention span with healthy children of same age group.

Methods

A cross-sectional study with comparative design was conducted. Children with down syndrome children and healthy children of same age group were included in the study. The sample was selected by convenience sampling method. 10 healthy children were assigned in Group 1 and 10 down syndrome children were assigned in Group 2. The inclusion criteria were children diagnosed with down syndrome (group 2), age between 8-14 years old. The exclusion criteria were having severe mental retardation, severe cardiovascular disorders (endocardial cushion defects), severe gastrointestinal disorders (duodenal atresia), orthopedic disorders (atlanto-occipital subluxation), severe hearing defects and uncontrolled hyperthyroidism. The importance of this study was explained to the parents/guardians of the subjects or the school counselors. Informed consent was signed from the parents.

The Stroop color and word test was used to assess children attention span. This test was originally proposed by Stroop in 1935. Subjects were required to read four different tables as fast as possible, three tables of them represent the congruent condition and one table of incongruent condition. There are 30 different color names or patches in each table. In congruent condition subjects are required to read name of colors printed in black ink and name different color patches or color name

with same ink. In incongruent condition subjects are required to name the color ink instead of color name that is the color name is written in different ink (red color is written in blue ink) [13].

The correct responses, incorrect responses, no responses, reaction time of congruent words and reaction time of incongruent words were calculated. This test is reliable and valid test for measuring attention span. The reliability for individual administration is 0.86, 0.82 and 0.73 [14]. The demographic data including age,

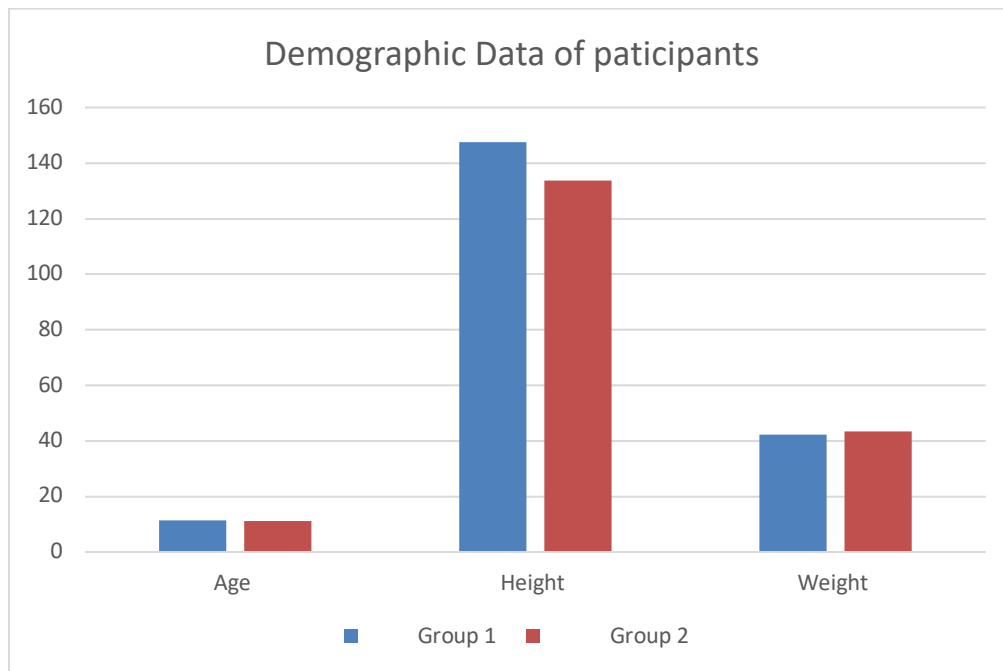
weight, height was presented in mean and standard deviation. The obtained data of Stroop color and word test was analyzed by using independent sample t test.

Results:

The mean age of Group 1 and Group 2 was 11.40 and 11.20 years, and the mean weight was 42.30 and 43.40 respectively. The demographic data of Group 1 and Group 2 is shown in Table 1 and Figure 1. The descriptive indices of attention span for the Group 1 and 2 are shown in Table/Figure 2.

[Table/Fig 1]: Demographic data of participants in both groups

	Group 1 Mean	Group 1 SD	Group 2 Mean	Group 2 SD
Age	11.40	1.89	11.20	2.04
Height	147.60	5.12	133.80	8.57
Weight	42.30	2.45	43.40	10.40



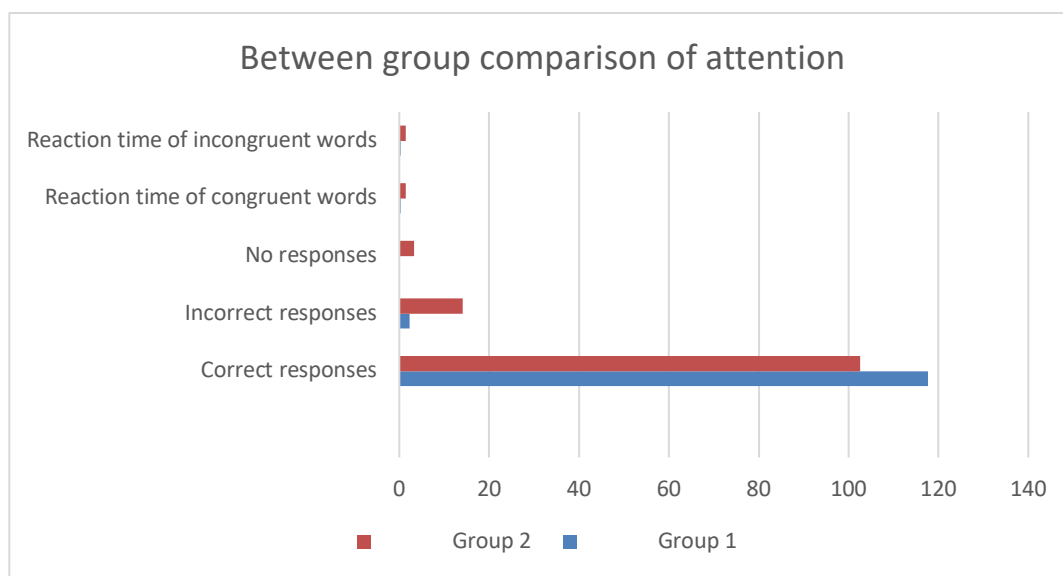
Graph 1: Demographic representation of data

According to table/fig 2 there is a significant difference in the scores of attention subscales between the two groups ($p < 0.0001$). there is a significant difference in correct responses ($t = 11.18$, $P < 0.0001$), incorrect responses ($t = 5.31$, $P < 0.0001$), no response ($t = 26.3$, $P < 0.0001$), reaction time of congruent words ($t = .30$, $P < 0.0001$) and reaction time of incongruent words ($t = .22$, $P < 0.0001$).

Table 2: between group comparison of participants for attention variables

Variables	Group 1 Mean	Group 1 SD	Group 2 Mean	Group 2 SD	P value	T value
Correct responses	117.70	0.82	102.60	3.56	0.000	13.05
Incorrect responses	2.30	0.82	14.10	2.68	0.000	13.28
No responses	0.00	0.00	3.30	2.00	0.000	5.21
Reaction time of congruent words	0.24	0.04	1.39	0.06	0.000	48.53
Reaction time of incongruent words	0.33	0.04	1.49	0.05	0.000	52.52

P value was calculated by independent t-test
P value <0.05 is significant



Graph 2: attention span comparison between groups

Discussion:

The aim of this study is to compare the attention span of down syndrome children with the healthy children of same age group. The results of independent t-test states that, down syndrome children have less attention span as compared to normal children of same age group. Learning is a process of assessing knowledge acquired via interaction with the environment. The key to learning is paying attention, which involves acquiring and processing all the information needed from a situation in order to construct a memorable experience. Moving from one developmental milestone to the next requires having such

memorable experiences. Growing children attention span aids in their understanding and interaction with their surroundings. In order to evaluate the continuous inputs from the visual and auditory systems as well as other sensory systems in children, attention span is crucial. A study by Hallahan, Kauffman and Pullen (2015) on special children found that the motor activities of students with intellectual disability are either poor or considerably delayed [10]. Another study by Mashhadi (2009) on the comparison of response inhibition and interference control in ADHD and normal children show that these children have weak levels of attention span and motor skills as compared with normal children [11]. There are

many researches on various therapies given to down syndrome children to increase their attention span [1,4]. There are very limited studies on the normative data of attention span of the down syndrome children. Furthermore, a very few research works compared their attention span with normal children of same age group. The present research shows a significant difference in the attention span of down syndrome children when comparing it with normal children of same age group. But as the sample size is very small to generalize this data on whole population. So, more researches with large sample size should be conducted.

Conclusion:

Our study concludes that Down Syndrome children have less attention span as compared to normal children of same age group. Thus, Down Syndrome children need more attention training to improve their attention span.

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