

A COMPARISON STUDY FOR STRENGTH OF UPPER LIMBS IN INTELLECTUAL DISABLED CHILDREN LIVING IN ALBANIA

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Abstract

The hand strength test can be used to indicate problems of general health. Different studies have investigated the maximum hand grip strength in different groups of individuals such as adults, adolescents and children with and without disabilities. Moreover, the hand grip test has been shown to be a valid tool for measuring muscle strength in persons with some diseases and disabilities.

The aim of this study was to compare the actual level of strength of upper limbs in children with intellectual disabilities. In this study participated 33 children from different schools in Albania. Children were selected in city of Tirana, Shkoder, Përmet and Roskovec after having the approval of the local authorities and the consent of their parents conforming survey ethics of anonymity. The instrument used to measure strength of upper limbs in children with intellectual disabilities is the handgrip test.

Handgrip test used in this study is part of fitness battery 'FUN Fitness' which is validated and used internationally. The statistical analyses are performed via "IBM Statistics 22". The statistical analyses include descriptive analyses through statistical descriptive indicators, as well as the Independent Samples Test. Descriptive statistics shows comparison between the two genders for both left and right handgrip strength: i.e. right handgrip strength in boys = 13.1 N and in girls = 9.8 N, and left handgrip strength in boys= 13.8 N and in girls = 8.6 N.

Final results using Independent Samples Test show no statistical significance for the current level of upper limb strength (handgrip right $F=0.909$, $Sig=0.348$ and handgrip left $F=1.169$, $Sig=0.288$).

Keywords: Strength, Intellectual disabilities, Children, handgrip.

1. Introduction

Being differently abled is a complex phenomenon that reflects an interaction between the features of a person's body and the features of the society in which he or she lives. Such individuals are seen as being restricted in performing daily activities because of a complex set of interrelating factors, some pertaining to the person and some to the environment and social/ political arrangements (WHO, 2014).

Intellectual disability is characterized by significant limitation in intellectual functioning and adaptive behavior, as reflected in conceptual, social and practical adaptive skills. This disability originates during the developmental period, which is defined operationally as before the individual attains age 22 (Schalock, Luckasson & Tassé, 2021). The disorder usually occurs before the age of 18 (Buntinx & Schalock, 2010).

Compared to the general population, persons with Intellectual Disability (ID) are at an increased risk of health problems (Kinneer et al., 2019), have lower perceived health (Olsen et al., 2021), and have difficulties finding appropriate health care (Hermans et al., 2013).

Specifically, persons with ID have lower levels of physical activity than the general adult population (Hove, 2004), low scores on physical capability tests (Olsen et al., 2021), and a higher incidence of obesity (Kinneer et al., 2018).

Strength training, also known as weight training, is physical exercise that utilizes resistance to induce muscle contraction. Examples include push-ups, weightlifting, power lifting, as well as sports such as shot put, discus and javelin throwing. Benefits include increased muscle mass, stronger bones, weight control, better balance, improved attention, and reduced symptoms of chronic conditions such as back pain, arthritis, obesity, heart disease, and diabetes. Strength training exercises focus on major muscle groups and are often done in sets of ten to fifteen repetitions. To achieve benefits, at least one set of an exercise of each major muscle group should be performed at least two days per week. It is important to exercise muscles on both sides of a joint to prevent muscle imbalance (health-fitness).

‘World Vision Albania’ and ‘Save the Children’ have conducted the first national study to measure the prevalence of limited ability of children and young people in Albania. Where 13,000 people aged 2-17 years participated in this study and the following data were derived out of this study:

- 55.8% - i.e. more than half of the sampled subjects experience mild or greater difficulty (reporting “some difficulty” or higher) in functioning in at least one functional domain.
- 10.4% of the children experience a lot of difficulty or cannot do at all one activity in at least one functional domain. In other words, 1 in 10 children in Albania has a disability
- 45.4% of children aged 2-17 years old included in the research are reported to have at least one mild difficulty in one functional domain (but no difficulty greater than mild).
- 4% of children with disability in Albania have a medical certificate.
- 66% of children with disabilities live in families with low income, whereas 30% of them live in middle-income families. Prevalence is higher in low-income families.
- 58% of mothers and 33% of fathers are unemployed or work part-time/have a seasonal job. 78.8% of these families consist of four to six members. It is reported that unemployment rate of parents of children with disabilities is considerably high.
- 94.3% - i.e. the majority of the children with disabilities pursuing education (94.3%) attend nurseries, kindergartens or mainstream schools, 4.4% attend special educational institutions and 1.3% attend vocational schools.
- 7.8% of children with disabilities have received a social service in the last 12 months. Access to social services, such as specialized centers, day-care centers, mental health centers and social care residential centers is very low.
- 1 in 2 children with disabilities experiences discrimination in the community (52.9%), educational institutions (52.4%) and during play with peers (54.9%), whereas 1 out of 3 children with disabilities faces discrimination at other public services, such as health and social services. (World Vision Albania and Save the Children in Albania, 2018).

3. Methodology

The aim of this study was to compare the actual level of strength of upper limbs in children with intellectual disabilities as there are not many studies in this regard in this group of children in Albania. Besides finding out the mean handgrip strength in this group of children, it aims to confirm any significant changes between the two genders as well as typical children in this aspect.

We have used handgrip in order to find out strength of upper limbs in children with intellectual disabilities as this test is tested and widely used and on the other hand is a practical instrument to measure muscle strength. Moreover, handgrip test used in this study is part of fitness battery FUN Fitness validated that is used internationally.

In this study participated 33 children from different schools in Albania.

Children subject of this study were purposefully selected from cities located in different geographical regions of Albania, namely Tirana, the capital of Albania, Shkoder, located in the north region, Përmet and Roskovec in the south of the country. The test was carried out after having the approval from the local authorities and the parental consent as required by the research ethics as well as fulfilling all the administrative procedures to approach our aimed subjects.

Protocol of the test

Handgrip strength (HGS) is a simple and reliable measurement of maximum voluntary muscle strength. It is an important tool for diagnosing sarcopenia and is widely used as a single indicator to represent overall muscle strength (Chen et al., 2016; Cruz-Jentoft et al., 2019; Wisniowska-Szurlej et al., 2019; Miljkovic et al., 2015).

4. Results

Age	Males		Females	
	One Hand	Both Hands	One Hand	Both Hands
10	5.5	11	5	10
11	8	16	6	12
12	11.5	23	9	18
13	14	28	13	26
14	19.5	39	13.5	27
15	27.5	55	15.5	31
16	34	68	16.5	33
17	35	70	15.5	31
18	40.5	81	15.5	31
19	42	84	18	36

Table 1: Hand Grip Strength 10th Percentile Cut-offs By Age, measured in kilograms (kgs)

The statistical analyses are performed via “IBM Statistics 22”. The statistical analyses include descriptive analyses through statistical descriptive indicators, as well as the Independent Samples Test. Descriptive statistics is shown by gender for right handgrip strength: (boys = 13.1 N and girls = 9.8 N) and for left hand (boys= 13.8 N and girls = 8.6 N).

Final results using Independent Samples Test show no statistical significance for the current level of upper limb strength (handgrip right F= 0.909, Sig =0.348 and handgrip left F=1.169, Sig= 0.288).

The table below indicates that the minimum N force, as expected, is lower in the left hand and also lower in girls than in boys. Moreover, the maximum N force is also higher in the left hand.

Test	N	Minimum	Maximum	Mean	Std.Deviation
Handgrip_Right	34	1.70	32.20	12.0882	8.13588
Handgrip_Left	33	1.50	35.40	12.1091	8.28419
Valid (listwise)	N 33				

Table 2: Descriptive Statistics of minimum and maximum force for both hands

While the descriptive Table 3 below shows comparison between the two genders mean values for each hand right and left. The mean figures for right handgrip force is higher in boys i.e. 13.17 while in girls it is 9.8. It is the same in the left handgrip test when both genders are compared; boys have a higher force than girls, i.e. 13.84 versus 8.63.

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Handgrip_Right	Boys	23	13.1783	8.63734	1.80101
	Girls	11	9.8091	6.77207	2.04186
Handgrip_Left	Boys	22	13.8455	8.88861	1.89506
	Girls	11	8.6364	5.81331	1.75278

Table 3: Comparison of N-force for both hands at boys and girls.

4. Conclusions

In conclusion, this study aimed to identify the handgrip strength in a sample of 33 Intellectually Disabled children and at the end the study confirms that Intellectually Disabled children differ from average children even in this aspect at a certain range. The confirmation is at the results derived for both genders that specifically boys demonstrate a higher handgrip force than girls. A surprising result was the handgrip force of boys for both hands, as according to the processing of the data the force of the left hand is slightly higher in the mean value than that in the right hand. Whereas, in girls this force is higher in the right hand more

than in left hand. It needs to be highlighted that ID children go through development phases atypical to average children thus, the findings need to be compared to similar categories and separate age groups of children.

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