



Cognitive Abilities in Relation to Anthropometry among Pre-School Children with and Without Attention Deficit Hyper Active Disorder (ADHD)

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ABSTRACT

Cognitive development is a high order mental process which includes abilities and skills like thinking, attention, creativity, memory, perception, problem solving, reading, abstraction etc. Cognitive development is a key component of early childhood development. Optimal brain development in early childhood is characterized by the emergence and growth of cognitive abilities. At times preschoolers may have difficulty paying attention, following directions, and waiting or taking their turn. The behaviors can be common and age appropriate or they may indicate Attention Deficit Hyperactive Disorder among children. Attention Deficit Hyperactive Disorder (ADHD) is one of the most prevalent disorders among children. Literature found relationship between the cognitive development scores and anthropometric measures of ADHD children. The present study was conducted to understand the relationship among the anthropometry indices and cognitive abilities of normal children and children with ADHD. The study sample were 100 children with ADHD and 300 children without ADHD. Cognitive development was measured using Pandey's cognitive development Test for pre-schoolers. The results revealed that there was significant association between anthropometry and cognitive abilities among children and children with and without ADHD.

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Key words; - Childhood, growth, cognitive development, anthropometry, ADHD children ,

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INTRODUCTION

Childhood is a fairly long period in the life span of an individual and during this period the growth and development are rapid. Early childhood is the period which extends from two to six years of age³. During this stage children exhibit significant development in growth ,as well as their cognitive abilities. Children of this age continue to advance their skills in observing and interacting with the world around them⁴.

Nutrition is found to be a decisive factor in almost all aspects of development of the child during early period .The pre-school age which is very important in the lifecycle of a child, also falls within this period. During early childhood the

child is vulnerable to diseases and under nutrition during this period affects proper growth and development as well as day -to day physical and psychological functions.¹⁰

Anthropometric examination is an almost mandatory tool to assess health and nutritional condition in childhood .Physical measurements like bodyweight, height, circumference of arm and calf , triceps skin fold of children have been extensively used to define health and nutritional status of communities (Srivastava 2012)⁸.

Cognitive development includes attention, reward response ,executive functioning and other cognitive processes¹ . Focusing on children`s cognitive profile at early age will help to attain



best academic or social functioning ability at later stage.²

Literature found relationship between the cognitive development scores and anthropometric measures of ADHD children⁷.

With this background to assess the relationship among the anthropometric indices and cognitive abilities of pre-school children with and without ADHD, the present study was conducted with the following objectives;

OBJECTIVES

- To measure basic anthropometric data of normal pre-school children and children with Attention Deficit Hyperactive Disorder (ADHD).
- To assess the cognitive abilities among normal pre-school children and children with and without ADHD.
- To assess the association between cognitive abilities and their anthropometric measurements of sample children with and without ADHD.

METHODOLOGY

Materials and Methods

The following tools and methods were used to collect the data.

1. Pandey’s cognitive development Test for pre-schoolers (PCDTP- Hema Pandey, 2011).
2. Anthropometric data (measurements according to standard procedures of WHO)

Scoring

1. The cognitive abilities of sample children were measured using Pandey’s Cognitive Developmental Test for Pre-Schoolers (Hema

Pandey, 2011). The test consists of items to measure cognitive ability of children by verbal and non-verbal methods. The scoring was given based on correct answers given by the child. The total scores constituted the raw scores of the subject. Considering the age of child, the obtained scores were converted into standard scores based on age norms given by the author. The test-retest reliability given by the author was 0.95 which was significant and it was also reported that the tool has high validity. The minimum score is 43 and maximum is 60. Higher the score indicates good cognitive abilities among children.

Sample

The sample of the study were normal children who were attending government and private schools and children with ADHD who were attending the Psychiatry ward in S.V.R.R Government Hospital, Tirupati and who were residents of Tirupati Town. Normal children were randomly selected from anganwadi centers and private schools at Tirupati town.

The data collected was pooled and appropriate stastical tests were applied to findout the relationship among variables.

Results and Discussion

The sample children’s anthropometric measurements like height, weight, head circumference and mid arm circumference were measured using standard procedures for measurements and the mean and SD against standard values are presented in table no.1

Table no 1 Distribution of Sample Children with and without ADHD according to Anthropometric data

Variables	Children with ADHD (mean and SD)	Children without ADHD children (mean and SD)	NHM standards (2014)
Height (Cms)	102.38±5.523	96.32±8.593	95-113 cms
Weight (Kgs)	19.62±2.884	20.35±3.066	14-20 kgs



Head arm circumference (Cm)	49.53±2.46	49.53±2.46	50 -50.8cms
Mid arm circumference((Cm s)	12.98±1.400	13.01 ± 1.1417	15-16 cms

** Source ;NHM standards (2014)¹¹

From table no 1 it is known that children with ADHD had the mean height of 102.38cm (SD =5.523) and same for normal children without ADHD was 96.32cm (SD=8.593) Both are in the range of the standard heights of Indian children , as per NHM standards (2014). This shows that comparatively , sample children with ADHD were having good posture, than children without ADHD .

The standard weight of pre-school children in the age of 3-6 as per standards was 14-20 kgs .The sample ADHD children’s mean weight was 19.62 kgs ± 2.884 and same for children without ADHD was 20.35kgs ±3.066 . Both the groups were having optimum weight for their age according to the Indian standards.

The standard head circumference of preschool children in the age range of 3-5 years as per standards is 50cm. Comparatively, The normal children were having a little less head circumference (49.53±2.46) than standard value and children with ADHD had a little more than standard value. (50.43± 2.46) .With regard to MUAC the data showed that MUAC of children

without ADHD was less when compared with children with ADHD. When data related to MUAC was observed for both normal children (13.01±1.1417) and for children with ADHD (12.98±1.400) it was less than the standard value given as per NHM standards (15-16 cms).

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Mehnaz Sheikh and Tehmeem Taseen⁶ (2015) ,in a study on children in the age range of 2 – 5 years reported that comparing standard height of both boys and girls , slight much difference was found between standard and average of both boys and girls.where as with regard to standard weight , it was found that average weight of both boys and girls was slight more than standards.

In the present study both children with and without ADHD were found to be according to the standards in height , weight ,head circumference , but were having less measurement in mid upper arm circumference

The cognitive development of sample children was assessed using Pandey’s test

Distribution of sample children with and without ADHD according to pandey’s test range values

S.NO	Scores on Pandey’s test				T –value	p- value
	Group	N	Mean	S.D		
1.	Normal	300	49.51	4.016	22.456**	0.000
	ADHD	100	39.41	3.505		

***Source; Hema’s pandey test manual ⁵

From the table 2 it is known that and children with and without ADHD differed significantly in their cognitive abilities. The t –

value was 22.456 which was highly significant comparatively children with and without scored



more (49.51±4.016) than children with ADHD (39.41±3.505).

To assess relation between anthropometry and cognitive abilities Karl Pearson’s coefficient of

correlation (r) was calculated for both children with and without ADHD and presented in table no. 3

Distribution of sample children with ADHD according to association Between cognitive and anthropometric values

	Normal (n=300)	Pandey’s score	R value	Pandey’s score	ADHD (n=100)	R value
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
Height	103.75 ± 6.529	20.75±2.489	0.439**0.000	18.61± 2.04	102.27 ± 5.8297	0.534**0.000
Weight	13.80 ± 2.192		0.279**0.000		14.86 ± 3.4998	0.580**0.000
Mid	13.01 ± 1.453		0.179**0.002		13.60 ± 1.477	0.028 @0.781
Head	46.03 ± 2.052		0.204** 0.000		50.09 ± 2.437	0.080@0.428

Correlation is significant at the 0.05 Level (2-tailed) * P < 0.05 **P< 0.01

From the table no 3 it is evident there is significant positive correlation between anthropometry indices and cognitive scores among children without ADHD the r values were significant for height ,weight, mid upper arm circumference and head circumference .where as ,for children with ADHD r values were significant for height and weight (ht = 0.534 and weight 0.5800 but not for mid upper arm and head circumference

Sandjaja, Poh⁹, et al., (2013) also found a relationship between anthropometric and cognitive performance of school going children . Much research in their aspect helps to understand the relationship among these two variables .

Conclusion

From this study the following conclusion can be drawn

1. Mid upper arm circumference of children without ADHD was less when compared with children with ADHD.
2. Comparatively children without ADHD scored more than children with ADHD.
3. Significant positive correlation between anthropometry indices and cognitive scores among children without ADHD.

Implication

The data helped to understand the difference in anthropometric measurements of normal pre - school children and children with ADHD. As significant relationship was fund between anthropometry and cognitive components providing good nutrition also helps to improve cognitive development and academic performance of children . As the problem of ADHD has been increasing globally much research in this area is needed to help children and parents.

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