

## “Physical and Intellectual Development of Children (9-12 Years) in Child Labour Schools in Relation to Nutrition and Labour with Special Reference to Durg District”

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**ABSTRACT:** *The systematic and scientific study of child's over all development is the relatively need of the present era. Childhood is perhaps the most blessed stage in human life. It is that phase of life where children are not really aware of any form of worldly responsibilities, they are free from all the tensions and they can learn a whole lot of new things. Children constitute a very large segment of our society are undeniably our valuable assets and our future. They can contribute a lot in the development of our country if they are taken care of and nurtured properly.*

*Physical Development is development of the body. The state of physical development implies the notion “Perfect functioning” of the body. It conceptualizes development biologically as a state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of the body (K. Park 1986).*

*According to Weckler intelligence is the aggregate of global capacity of the individual to act purposefully to think rationally and deal effectively with his environment.*

*Intellectual development means the capacity to learn, remember and symbolize information and to solve problem. Capacity for empathy and the understanding of social rules begin in the preschool period. Piaget (1962) showed that intelligence is the result of a natural sequence of stages and it develops as a result of the changing interaction of a child and its environment.*

*Physical and intellectual developments are dynamic constructs influence by diverse biological, psychological, nutritional, social and environmental factors. A good deal of research have been conducted on physical and intellectual development and were found to be appearing as an important factors in the prediction of all round development of children. Therefore, this study was undertaken to identify various physical and intellectual development regarding various environmental, biological, social and nutritional factors.*

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### INTRODUCTION

The systematic and scientific study of child's over all development is the relatively need of the present era. Childhood is perhaps the most blessed stage in human life. It is that phase of life where children are not really aware of any form of worldly responsibilities, they are free from all the tensions and they can learn a whole lot of new things. Children constitute a very large segment of our society are undeniably our valuable assets and our future. They can contribute a lot in the development of our country if they are taken care of and nurtured properly.

Development can be defined as the changes in the structure, thought or behavior, of a person that occur as a function of both biological and environmental influences. Usually these changes are progressive and cumulative. Some developments primarily biological while other depends highly on the environment. Child development refers to the biological, psychological and emotional changes that occur in human beings between birth and the end of adolescence then through adulthood, as the individual progresses from dependency to increasing autonomy.

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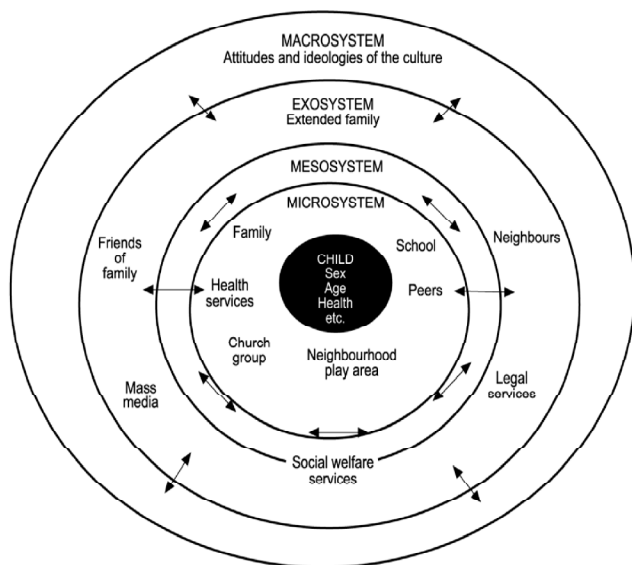
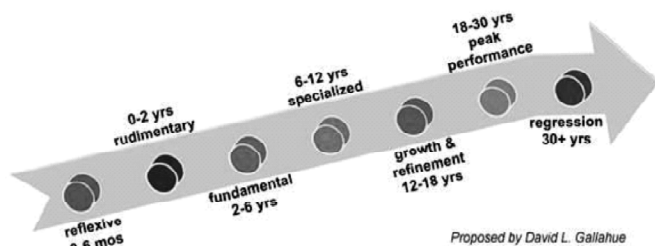
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### Domains of Development

- Physical Domain** - The physiological processes and changes that occur in the human body such as puberty.
- Intellectual Domain** - Changes to the way we think, our intelligence, memory capabilities etc.
- Social Domain** - Changes that occur between an individual and other people including development of social skills and high self esteem.

### Stages of Physical Development



Source: Dockrell and Messer (1999, p. 139)

### Bronfenbrenner's Ecological Model of Human Development

### AREA OF THE STUDY

Proposed work will be carried out in the Durg District. The study will be conducted in all the 40 child Labour school of the district.

In the present study it was felt necessary to control certain extraneous variables viz. age, socioeconomic status, education attainment of children, education of parents, and type of family etc. to overcome their expected influence on physical and intellectual

development. The remaining possible factors were left to get under control through randomization. As such Children of class 3 to 5 and of age group 9 to 12 years were selected from all the 40 child labour schools of Durg District. In all 480 subjects (240 boys and 240 girls) were purposely selected as sample for the study (after applying Q1, Q3) belonging to more or less similar socio-economic status. Here stratified random sampling is ranked suitable and more advantageous over simple random sampling. On the basis of opposite extreme group techniques (Q1 and Q3) the Ss were divided into:

- Nutrition - Has two levels - Good and Poor Nutrition
- Sex - Has two levels - Boys and Girls
- Labour - Has two levels - Sedentary and Heavy labour

Thus in this 2 x 2 x 2 factorial design having 60 subjects in each cell, a total number of 480 subjects were randomly drawn, adhering to the purposive stratified random sampling technique.

Particulars of the samples

Groups	Sex		Labour		Total
	Boys	Girls	Sedentary	Heavy	
Good Nutrition	(S <sub>1</sub> ) 60	(S <sub>2</sub> ) 60	(S <sub>3</sub> ) 60	(S <sub>4</sub> ) 60	240
Poor Nutrition	(S <sub>5</sub> ) 60	(S <sub>6</sub> ) 60	(S <sub>7</sub> ) 60	(S <sub>8</sub> ) 60	240
Total	120	120	120	120	480

N = 480, n = 60

### DEPENDENT VARIABLES MEASURES

#### To assess the physical development

Physical development was assessed by anthropometric measurements. These Anthropometric measurements are the best parameters to assess the physical development and growth. Anthropometric measures simply refer to the measurements of body size. Measuring body weight and height provide useful data for analysing development and growth. Measuring body circumference facilitates identification of the muscles in the body. Three body measurements such as height (cm) and mid upper arm circumference (cm) were taken by using flexible tape and weight (kg) by weighing machine with standard measuring procedures carefully (Which serve as high indicators of nutritional status).

### Standard Height, Weight and MUAC (Children 9-12 Years)

Sex	Height (cm)	Weight (kg)	MUAC (cm)
Boys	139.18	32.80	23.83
Girls	140.12	33.35	24.13

Height and weight as per NCHS & MUAC as per national health statistics report

### VARIABLES AND THEIR STATISTICAL PROPERTIES

Before applying statistical techniques, it is essential for a researcher to check whether the samples and continuously measurable variables drawn from the population are normally distributed or not? The application of parametric or nonparametric statistical devices depends upon the nature of the distributions of variables. If the sampled variables are not normally distributed, application of statistical devices based on normality assumptions (parametric statistics) are vitiated (**Kerlinger, 1978**). Therefore, in the present study, an attempt has been made to check the nature of the distribution of scores by computing the indices of skewness (SK) and Kurtosis (Ku) before giving any specific statistical treatment to the data. Since, in the 2x2x2 factorial design, each of the **pqr** treatment cells constitute 'n' dependent random sample drawn from the basic population, so homogeneity of the each independent cell is tested over all physical development through anthropometric parameters i.e. height, weight and mid arm circumference as well as intellectual development through Raven's progressive matrices test scores, to find out the homogeneity of the distribution of scores in the present study.

A population of score can depart from normal distribution in terms of either Skewness or Kurtosis, or in both. A distribution is skewed when the mean and the median fall at the different points in the distribution and the balance is shifted to one side or the other side.

Kurtosis refers to the peakedness or the flatness of frequency distribution as compared to normal distribution. The more nearly to a normal distribution closer to zero are the indices of skewness (**Garrett, 1971**).

Skewness and Kurtosis of the scores pertaining to the dependent measures i.e. height, weight, mid arm circumference and intelligence scores are presented in table.

In order to examine the role of nutrition in predicting physical development of child labours the ANOVA statistics was used. Nutrition was taken in

two levels i. e. high and low. Subjects were taken from both the sexes and therefore sex was also considered as one of the independent variable. Similarly as the subjects were taken from two different labour class i.e. Heavy work and sedentary work therefore type of labour is also considered as the third independent variable. For dividing the subjects in to low and high nutrition status group, the nutritional score of all the subjects (n=480) were calculated.

### Physical Development (Height)

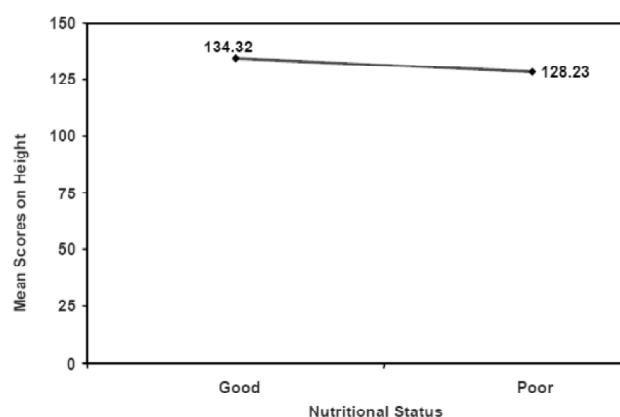
It was hypothesized that the child labours with good nutritional intake will be significantly taller as compared to subjects with low nutritional intake. In order to verify this hypothesis, a comparison of mean scores on height between subjects belonging to high and poor nutritional intake group was made.

### Comparison of height between subjects with good and poor nutrition

Groups	n	M	F-ratio	Level of Significance
Good Nutrition (a <sub>1</sub> )	240	134.32	50.71	.01
Poor Nutrition (a <sub>2</sub> )	240	128.23		

F (A) (1,472) = 50.71; P < 0.01

It is clear that the child labours with good nutritional intake are significantly taller than their counterparts with poor nutritional intake beyond 0.01 levels of significance.



### Graphical representation of the main effect of Nutrition on height

This fact is statistically verified by the obtained F-ratio 50.71, which is significant beyond 0.01 levels. The results are also depicted in above fig.

### Hypothesis II

In hypothesis II, it was hypothesized that the boys engaged in child labour will be significantly taller as compared to girls engaged in child labour. In order to verify this hypothesis, a comparison of mean scores on height was made between groups consisting of boys and girls engaged in child labour. The results are presented in table.

#### Comparison of height among child labours on the basis of sex

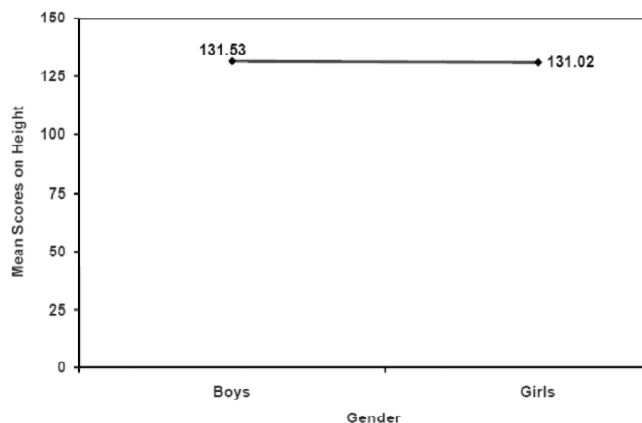
Groups	n	M	F-ratio	Level of Significance
Boys (b <sub>1</sub> )	240	131.53	0.34	NS
Girls (b <sub>2</sub> )	240	131.02		

F (B) (1,472) = 0.34; P – not significant

It is clear that the height of selected boys and girls engaged in child labour, did not differ significantly with each other. This fact is statistically verified by the obtained F-ratio 0.34, shown in table, which is not statistically significant at acceptable level of significance. The results are also depicted in fig.

#### Graphical representation of the main effect of sex on height

Since height of selected boys and girls engaged in child labour did not differ significantly with each other, it is clear from the above figure that the average height i.e. physical development scores are 131.53 and 131.02 respectively. When the difference of these two groups was tested in F-ratio, the obtained F-ratio was not found to be significant at any level. Hence the differential hypothesis II stating that “boys engaged in child labour will be significantly taller as compared to girls engaged in child labour” stands rejected.



### Hypothesis III

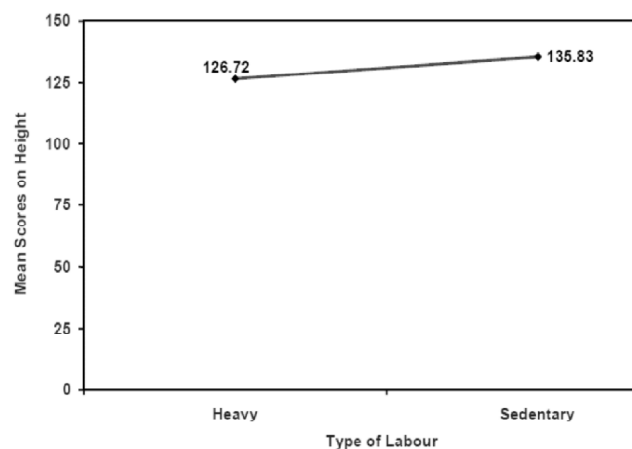
In hypothesis III, it was hypothesized that the child labours engaged in sedentary work will be significantly taller as compared to their counterparts engaged in heavy work. In order to verify this hypothesis, a comparison of mean scores on height was made between groups consisting of child labours engaged in heavy and sedentary work respectively. The results are presented in table.

#### Comparison of height of subjects on the basis of labour

Groups	n	M	F-ratio	Level of Significance
Heavy Work (c <sub>1</sub> )	240	126.72	113.47	.01
Sedentary Work (c <sub>2</sub> )	240	135.83		

F (C) (1,472) = 113.47; P < 0.01

#### Graphical representation of the main effect of labour on height

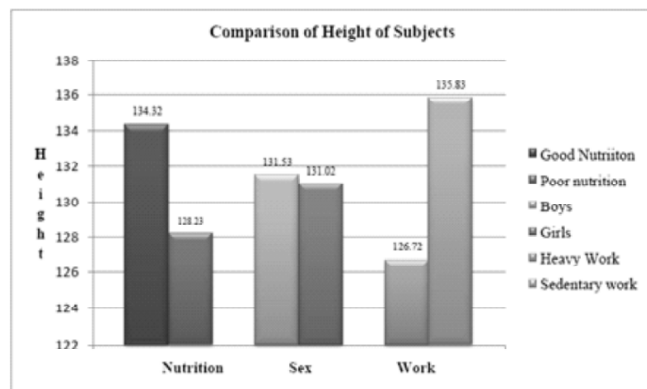


Since child labours engaged in sedentary work are found to be significantly taller than the child labours engaged in heavy work, It is clear from the above figure that the average height i.e. physical development scores are 135.83 and 126.72 respectively. When the difference of these two groups was tested in F-ratio, the obtained F-ratio was found to be significant at very high level. The significant F-ratio therefore confirms the differential hypothesis III stating that “the child labours engaged in sedentary work will be significantly taller as compared to their counterparts engaged in heavy work” stands accepted.

### Physical Development - Scores of mean Height of subjects

Scores	Nutrition		Sex		Labour	
	High	Low	Boys	Girls	Heavy	Sedentary
Height	134.32	128.23	131.53	131.02	126.72	135.83

### Graphical representation of mean Scores of Height



### SUMMARY AND CONCLUSION

The systematic and scientific study of over all child development is relatively the need of the present era. 'Development' can be defined as the changes in the structure, thought, or behavior, of a person that occur as a function of both biological and environmental influences. This results in increased size of a person, increased complexity of activity and integration of organization and function. Some developments are primarily biological while other depends highly on the environment.

#### Physical Development

Physical Development is development of the body. The state of physical development implies the notion of "Perfect functioning" of the body. It conceptualizes the development biologically as a state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of the body (K. Park, 1986).

#### Concept of physical Development

Physical development has been defined as anatomic ontogenesis. The physical development of the human organism has been shown to comprise changes in the kind, number, position, size, shape, and composition of its structural parts."

Physical development refers to the physical and biological changes that occur in human beings between birth and the end of adolescence. It involves the growth of the brain and body of the child.

According to **W.M. Krogman, (1976)** - physical development is equated with the sequential sum total of anatomic modifications that an individual organism undergoes throughout its entire life span.

As per the biologists, physical development is a biological process, a process occurring in living organisms "Development is the progressive production of the phenotypic characteristics of an organism through the process of cellular differentiation, morphogenesis, and growth" (**Levy 1978**).

#### Physical Growth & Development in Middle Childhood

Physical development is very important aspect of developmental age of 7 to 11 years which comprises middle childhood. There will be significant differences in height weight and built among children of this school age range. Most girls experience a preadolescent growth spurt around age of 9 or 10, while most boys experience the same growth spurt around age 11 or 12 years.

#### Physical changes in middle childhood

Throughout most of middle childhood, girls are smaller than boys and have less muscle mass. As girls enter puberty, however they may be considerably larger than boys of the same age who enter puberty a few years later. Once boys begin sexually maturing their heights and weights eventually surpass the heights and weights of girls of the same age. Girls and boys grow about 2 to 3 inches and gain about 7 pounds per year until puberty and the average well-nourished child will be around 70 pounds by age of 10. It is important to remember that genetic background as well as nutrition and exercise may influence a child's growth.

#### Factors affecting physical development

Factors which affect the physical development are: Individual differences, Genetic and Heredity, Proper nourishment, Socioeconomic status, Family, Sports and Physical Activities, Stress, Education and family income, Role of endocrine glands and Hormones, Castes and classes, Cultural factors, Impact of sex differences, Impact of chronological order of birth and Environment, Role of sunlight and pure air, Accidents and diseases, Nature of mother, Discipline and

attitude of parents, Bodily abnormalities and Immunization at proper time which saves the child from various diseases.

## REFERENCES

- Amin, Shahina, M. Shakil Quayes and Janet M. Rives (2004), "Poverty and Other Determinants of Child Labour in Bangladesh", *Southern Economic Journal*, Vol. 70, No. 4 (April), pp. 876-892.
- Amin, Shahina, M. Shakil Quayes and Janet M. Rives (2006), "Market Work and Household Work as Deterrents to Schooling in Bangladesh", *World Development*, Vol. 34, No. 7 (July), pp. 1271-1286.
- Amin, Shahina, M. Shakil Quayes and Janet M. Rives (2006b), "Are Children and Parents Substitutes or Complements in the Family Labor Supply Decision in Bangladesh?", *The Journal of Developing Areas*, Vol. 40, No. 1 (Fall), pp. 15-37. 42, No. 5 (September - October), pp. 80-93.
- Basu, Kaushik and Tzannatos Zafiris (2003), "The Global Child Labour Problem: What Do We Know and What Can We Do?" *World Bank Economic Review*, Vol. 17, pp. 147-173. India and SAARC Countries (New Delhi, India: Decent Books).
- David and Parker (1993), "Health and economics effects" Friedrich Huebler - Division of policy and practice" UNICEF, Newyork, Furio Rosati and Lorenzo Guarcelo 'Child labour and youth employment"- Ethiopia country study. Social protection discussion paper no 0704, Publication date 3/7/11.
- Kaur, Ramanjeet : Analisis of Human Biology, Volume 33, Sharda Sindu Reader "Navdeep Kaur". Development, Cambridge, MA: MIT Press.
- Piaget's theory of cognitive development: <http://www.healthofchildren.com/C/Cognitive-Development.html>
- Kerlinger, Fred N.: Foundations of Behavioural Research, p.701.
- Kerlinger, Fred N.: Ibid, p. 26.
- Khair, Sumaiya (2005), Child Labour in Bangladesh: A Forward Looking Policy Study (Geneva, Switzerland: International Labor Office, April).
- & Khanam, Rasheda (2006), "Child Labour in Bangladesh: Trends, Patterns and Policy Options" *Asian Profile*, Vol. 34, No. 6, p. 593-608.
- Khanam, Rasheda (2008), "Child Labour and School Attendance: Evidence from Bangladesh", *International Journal of Social Economics*, Vol. 35, No. 1-2, p.77-98.
- Khanam, Rasheda and Ross Russell (2005): "Child Work and Other Determinants of School Attendance and School Attainment in
- Lemma, A. (2007), "Psychodynamic Therapy - The Freudian Approach", in Dryden W., *Handbook of Individual Therapy* (5 ed.), Sage publications.
- Park, K: Preventive and social medicine. & Patterson, C. (2008), *Child Development*, New York, McGraw-Hill.
- Walker, J. S. and J. A. Lourie (1969), *Human Biology - a guide to field methods*. IBP Handbook No.9 Philadelphia: Davis.
- Waters, E., Ikemura K Kondo, G. Posada and J. Richters (1991), "Learning to Love: Mechanisms and Milestones", in M. Gunnar and L. Sroufe, *Minnesota Symposia on Child psychology*, 23, Self-Processes and Development, Hillsdale, NJ: Erlbaum, p. 217-255.