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SCOLIOSIS DEFORMITY AND CHILDS' FITNESS

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Abstract:

In a society, healthy living depends on many components of three inter oven dimensions- Physical dimension, Mental dimension and Social dimension. Among them good posture and fitness are complementary to each other. So, if the posture is deviated from its normal condition then it may affect the fitness. So, the purpose of the present study was to find out the effect of scoliosis on Childs' speed and agility ability. For conducting this study total 363 school going children [Boys Normal Posture- 182, Girls Normal Posture- 168, Boys having scoliosis deformity – 6 and Girls having scoliosis deformity- 7] of 10 to 13 years old were purposively selected, from rural area of Howrah District, West Bengal, India. Criteria measured for this study were age, height and weight as personnel data; scoliosis deformity, as postural deformity; speed and agility as fitness variables. To detect the scoliosis deformity plumb line test method was used. Speed and agility were measured by standard test 50 yard das and 4*10 meter shuttle run respectively. The data were analyzed using the Prism 3.0 version and the level of significance was chosen at 0.05 level. Mean and standard deviation (SD) were used as descriptive statistics. ANOVA and t-test were used to observe the significant differences between selected postural groups on selected fitness components. Result of the present study revealed that there were significant differences between the boys having normal posture and the boys having scoliosis deformity, and between the girls having normal posture and the girls

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having scoliosis deformity were the better performer than the students of general education. So, it can be concluded that incidence of postural deformity has negative influence on selected physical fitness components - speed and agility, indirectly on healthy living and partially on the creation of healthy nation.

Key-words: Healthy living, fitness, speed, agility, scoliosis.

INTRODUCTION:

Human being is a social being. Children are the future helmsmen of our society. So, for each and every children, remaining healthy and wealthy are common criteria for welfare of our society and also for the civilization. Remaining healthy depends on three inter oven dimensions like,

Physical dimension, Mental dimension and Social dimension.

These three dimensions include some components, like, Quantity and quality of individual's interpersonal ties, Emotional attitudes, Good physique, Attractive features, Well structured, Strong body parts & limbs, Well groomed posture, Functions of all systems of the human body etc. **[1].** To maintain and also to develop all these components of healthy living, a very basic level of fitness is required. Because this fitness level helps to carry out daily tasks with vigour and without undue fatigue and left ample energy to engage in leisure time pursuits as well as to meet unforeseen emergencies. Speed and agility are the important two components of physical fitness [**1**]. The basic criterion of having good speed and agility is the mobility of the nervous system [**2**]. Because, for better speed and agility, the skeletal muscles of the body have to contract and relax at maximal possible speed and this rapid contraction and relaxation of the muscles is possible only if the concerned motor centres in the CNS can undergo rapid excitation and inhibition [**3**]. But, Rogers Sperry (1981), discovered that 90% of the brains activity is used to balanced our body within the gravitational field. If our body is mechanically distorted, it will affect the other 10 % of the brain's activity, which controls all the other body functions such as breathing, digestion and cognition [**4**]. Because, the afferent neurons that carry sensory information to the brain and the efferent neurons that carry messages from the brain construct the spinal cord that is protected by the back bone [**5**] and when the body frame work (bone structure

and spine) is in an off balanced or misaligned position it can impede or block the electrical and chemical transmissions of the nervous system. This interference to the nervous system can cause or contribute to all kinds of symptoms and illness [**4**]. Normally a person's spine includes curves throughout the length of the spine. When viewed from the front, the spine is normally straight. But, when viewed from the side, a series of curves are demonstrated by the spine [**6**]. The overall result of these curves is that the head is balanced above the center of the pelvis. In the ideal state, minimal energy expenditure is necessary to maintain the head in this position when in relaxed, upright stance. The force of body weight is fairly evenly distributed between the disc in the front and the facet joints behind [**7**]. But, in scoliosis, the spine curves from side to side [**8**]. In scoliosis there have asymmetries in the vertebrae and discs of the spine [9]. As a result, the maximum wedging of the vertebrae and discs occurs at the apex of the curve this asymmetrical loading is due to gravitational forces acting on the deformed spine [**9].** Viewing all these difficulties, the investigator wants to found that the incidence of scoliosis have any effect or not any effect on children's physical fitness especially on speed and agility?

Methodology:

To study the effect of incidence of scoliosis on speed and agility, total 363 school going children [Boys Normal Posture (BNP)- 182, Girls Normal Posture (GNP)- 168, Boys having scoliosis deformity (BSP) – 6 and Girls having scoliosis deformity (GSP)- 7] of 10 to 13 years old were purposively selected, from rural area of Howrah District, West Bengal, India. The criteria measured for the study were scoliosis deformity, among postural deformity and speed and agility as physical fitness variables. To detect the scoliosis deformity plumb line test method was used [**10**]. Speed and agility were measured by standard test 50 yard das and 4*10 meter shuttle run respectively [**11**]. The data were analyzed using the Prism 3.0 version and the level of significance was chosen at 0.05 level. Mean and standard deviation (SD) were used as descriptive statistics. ANOVA and unpaired't'-test was used to observe the significant differences between selected postural groups on selected physical fitness components.

Results and Analysis:

Table 1: Mean and standard deviation of personal data of selected groups

Groups	Age		Height		Weight	
	Mean	SD	Mean	SD	Mean	SD
BNP	12.45	± 1.29	1.41	± 0.097	30.50	± 6.53
BSP	11.83	± 1.17	1.37	± 0.087	27.75	± 5.49
GNP	12.22	± 1.28	1.41	± 0.088	31.27	± 7.05
GSP	12.29	± 1.38	1.38	± 0.076	29.14	± 6.84
'F' vale	1.194 (ns)		0.6244 (ns)		0.9367 (ns)	

Table 1 showed the means and standard deviations (SD) of personal data (age, height and weight) of selected four groups. From table 1 it was found that there were no significant differences among the selected groups on their personal data.

Table 2: mean and standard deviation of speed and agility of four selected groups

Variables	BNP		BSP		GNP		GSP		'F' value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Speed	5.81	±0.47	6.72	±0.86	6.36	±0.47	6.95	±0.30	49.78*
Agility	12.29	±0.89	13.57	±0.91	13.07	±0.74	14.16	±0.35	36.82*

Table 2 showed the means and standard deviations (SD) of speed and agility of selected four groups. From table 2 it was found that boys having normal posture were better performer and girls having scoliosis deformity were poor performer among the selected groups. Their rank on both the physical fitness components boys having normal posture 1st girls having normal posture 2nd boys having scoliosis deformity 3rd and last was the girls having scoliosis deformity. Table 2 also showed the 'F' values of selected fitness components among the selected postural groups. From table 2, it was found that there were significant differences on speed and agility among the groups at 0.05 level of significant.

Fig1: Graphical representation of mean and standard error of speed of selected four groups

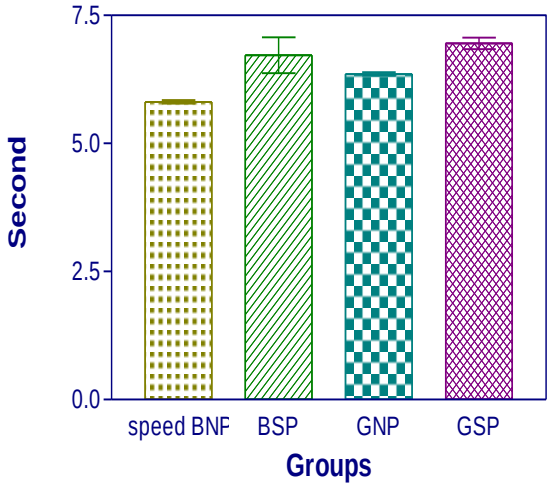

Fig2: Graphical representation of mean and standard error of agility of selected four groups

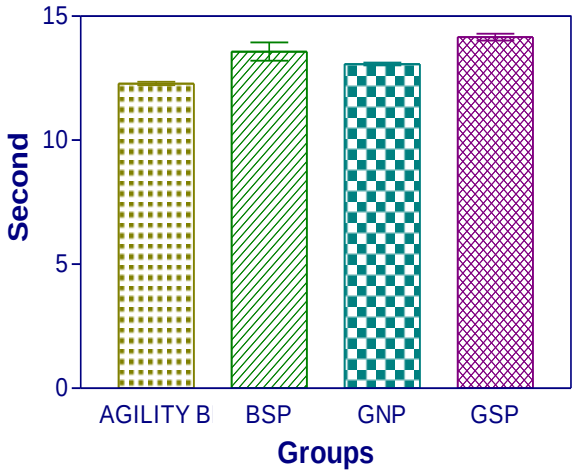

Table: 3. Comparisons of mean values of speed [**12**]

Inter groups	Degree of freedom	't' value	P Value	Table value
BNPvs GNP	348	10.74	P < 0.05	1.97 (0.05)
BNPvs BSP	186	4.619	P < 0.05	1.98 (0.05)
GNPvs GSP	173	3.264	P < 0.05	1.98 (0.05)
GSPvs BSP	11	0.8826	P > 0.05	2.20 (0.05)

Table 3 showed the comparisons of mean values of speed between the selected postural groups. From table 3, it was found that there were significant differences on speed ability between the groups of boys having normal posture and girls having normal posture; boys having normal posture and boys having scoliosis deformity; girls having normal posture and girls having scoliosis deformity at 0.05 level of significant. But there was no significant difference on speed between boys and girls having scoliosis deformity.

Table: 4. Comparisons of mean values of agility [12]

Inter groups	Degree of freedom	't' value	P Value	Table value
BNP vs GNP	348	8.979	P < 0.05	1.97 (0.05)
BNP vs BSP	186	3.801	P < 0.05	1.98 (0.05)
GNP vs GSP	173	3.446	P < 0.05	1.98 (0.05)
GSP vs BSP	11	1.282	P > 0.05	2.20 (0.05)

Table 4 showed the comparisons of mean values of agility between the selected postural groups. From table 4, it was found that there were significant differences on agility ability between the groups of boys having normal posture and girls having normal posture; boys having normal posture and boys having scoliosis deformity; girls having normal posture and girls having scoliosis deformity at 0.05 level of significant. But there was no significant difference on agility between boys and girls having scoliosis deformity.

Fowles et al. (2003)[**5**] provide evidence that some individuals with untreated scoliosis report shortness of breath during physical activities, chronic back pain, cosmetic concerns, and being self-conscious about appearance.

Elizabeth Shannon Kuhl (2006) found that if adolescent idiopathic scoliosis is not treated and growth of the curve exceeds 45 degrees, then the individual is at high risk for respiratory and heart problems due to compacting of the lungs and subsequent stress on the heart [**13**]. This is because of the patients with scoliosis have asymmetries in the vertebrae and discs of the spine, in the ribcage, in the lungs in stature i.e. spinal height and overall height and in muscle structure [9].

Present study also revealed that children with scoliosis deformity were poor performer on speed and agility than the children of same age having no any type of postural deformity.

Karen Williams [2009] found that if the spinal cord is damaged behavioral changes in physical movement will be impaired resulting from the brain's inability to send and receive message from

the damaged segment, or from the cord below the damage [**14**]. Rogers Sperry (1981), discovered that 90% of the brains activity is used to balanced our body within the gravitational field. If our body is mechanically distorted, it will affect other 10 % of the brains activity which controls all other body functions such as breathing, digestion and cognition. Due to the presence of scoliosis, the electrical and chemical transmissions of the nervous system is impeded or blocked [**4**] . For that reason speed and agility ability are hampered as these two components of physical fitness depends greatly on mobility of the nervous system.

Conclusion:

There were significant differences on speed and agility between-

Boys having normal posture and girls having normal posture;

Boys having normal posture and boys having scoliosis deformity;

Girls having normal posture and girls having scoliosis deformity.

But there were no significant differences on speed and agility between boys and girls having scoliosis deformity in both cases.

So, it can be concluded that the incidence of postural deformity- scoliosis has negative influence on selected physical fitness components i.e. speed and agility that helps for healthy living for betterment of nation.

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