Progressive Research – An International Journal
Vol. 4 (Special Issue) : 451-453 (2009), ISSN : 0973-6417

Society for Scientific Development in Agriculture and Technology, Meerut (U.P.) INDIA

MINIMUM MUSCULAR FITNESS IN RURAL SCHOOL CHILDREN (5-15 YEARS) IN VARANASI DISTRICT (U.P.)

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ABSTRACT

The study included 524 -rural school children, 244-girls and 280-boys (5-15 yr) hailing from poor socio-economic group. The Kraus—Webers Test (KWT) was administered to assess their minimum muscular fitness status. A very poor muscular strength was observed in both sexes at all ages. A maximum of 15.35 per cent girls and 13.33 per cent boys had minimum muscular fitness in the series. The younger boys and girls (5-9 r) had better fitness level than older ones (9-12 yr). The abdominal and lower back. psoas and back hamstring muscle groups were better at all ages in both sexes. The girls had better fitness in the upper back and hamstring muscles while the boys had better fitness in abdominal, psoas and lower back muscles than the girls. The overall poor muscular fitness in both could be attributed to low nutrition and lack of appropriate physical exercises since the beginning which resulted in lower body weights and heights and poor physical growth. Planned physical activities and balanced nutrition were recommended in the school set-ups to improve the muscular fitness in school children.

Key words : *Rural school children, poor socio-economic group KWT, minimum muscular fitness.*

Muscular fitness is regarded as the most important component of physical fitness. Conditions of under nutrition, poor nutrition, disease states and sedentary life styles are predisposing factors to low physical fitness. A subnormal fitness (Mathews, 1973) results in health hazards like back pain, headache and easy fatigability leading to emotional imbalances in human beings. Children having frequent illness, constant strains and maladjustments are reported (Seltzer, 1985) to have low muscular fitness.

Therefore the muscular fitness tests are considered important for screening healthy and unhealthy children. Further systematic exercises and balanced nutrition are required regularly to maintain this fitness. In order to understand this, the Kraus Webers Test (KWT) was devised in 1954 and implemented for American school children (Mathews, 1973). The KWT represents a level of strength and flexibility in the six key muscles below which the functional efficiency of the body is endangered. Unfortunately the importance of minimum muscular fitness and KWT has not yet been adequately felt and the data in Indian population are almost scanty (Gharote and Hanguly, 1975). The present study has been conducted to assess the minimum muscular fitness in a group of Varanasi School Children (5-12 y) having usual, physical activities and hailing from a poor socio-economic segment of the population.

MATERIALS AND MEHODS

The study was conducted on 524-rural school children (244 girls and 280-boys) within 5-12 y and residing in Varanasi District (U.P). Measurement of weight to the nearest 0.1 kg was taken with a spring-balance and heig'-)t to the nearest 0.1 cm was taken with a non-stretchable measuring tape in attention position.

Then the KWT (Mathews, 1973) was administered to each subject strictly following the rules and regulations laid down for it.

(a) Abdominal plus psoas muscles (A+)

(b) Abdominal minus psoas muscles (A-)

(c) Psoas muscles (P)

(d) Upper back muscles (UB)

(e) Lower back muscles (LB)

(f) Back and hamstring muscles (BH)

The children who could perform the tests for a scheduled time of 10-seconds were regarded as 'Passed' and those could not, were 'Failed' in the scoring system the data were then subjected for

statistical analysis i.e. mean, ± SD. Body Mass Index and per cent pass.

RESULTS AND DISCUSSION

The results were summarized in Table 1 The overall muscular fitness in children was very poor at all ages. A maximum of 15.35 per cent girls (5-6 y) and 13.33 per cent boys (6-7y) only had passed in the KWT. However, better fitness in younger children was noted than older children of both sexes.

When the individual tests were considered, the maximum pass rate in abdominal muscles (A-) was 30.7% for girls and 53.33% for boys: for lower back muscles it was 23.05% for girls and 40.00% for boys showing very poor muscle strength in children, but their strength at Psoas, UB and BH muscles were better at all ages, considering gender differences, boys had better abdominal P and LB -muscles while girls had better UB and BH- muscles & girls had better fitness at younger ages while- boys had increasing fitness with increasing ages.

The children were hailing from a lower socio-economic groups that has been characterized by lower weights, heights and BMI (Table-1). Similar results were also reported by earlier workers (De et al, 1978). Then their physical growth' in terms of bone, muscle and fat was also expected to be lower (Tanner, 1962). The hormonal factor in this case might not influence the muscle growth as it is counted in such a group only after the age of 13 y (Gupta *et al,* 1990). Therefore the poor muscular growth/fitness in our children might be mainly due to poor dietary factors and lack of adequate physical exercises. Such reports were also available in the literature (More house & Miller, 1976) that shows the influence of systematic exercises and nutrition on body musculature and muscles strength.

Table-1 : General physical characteristics and muscular fitness of children.

Sl. No.	Total No. Female (F) Male (M)		Age (Years)	Weight mean	(kgs) ± S.D.	Height mean	(Cm) ± S.D.	Sitting (SH) mean	Height (Cms) ± S.D.	BSA (m^2) mean	± S.D.	Overall PEFR (1/min) mean	± S.D.
1	F	19	(5-6)	15.35	2.57	103.25	8.13	53.56	3.48	0.66	0.02	80.00	25.27
	M	29		15.35	2.00	105.37	6.16	54.55	2.36	0.68	0.02	91.43	37.02
2	F	14	(6-7)	15.29	2.77	106.38	7.37	55.07	3.45	0.68	0.03	99.09	26.61
	M	26		14.82	2.17	103.52	6.85	54.63	2.72	0.60	0.01	91.25	31.30
3	F	16	(7-8)	17.95	1.65	115.00	3.48	59.09	2.17	0.78	0.03	119.09	26.25
	M	32		16.32	2.52	110.50	7.79	57.07	3.59	0.72	0.04	143.33	21.87
4	F	17	(8-9)	19.00	3.10	116.14	8.67	59.85	3.37	0.78	0.02	152.50	21.44
	M	30		17.60	5.58	115.65	13.5	58.76	4.35	0.76	0.01	167.20	24.72
5	F	10	(9-10)	20.80	2.74	118.60	9.74	59.10	4.81	0.84	0.01	126.00	33.02
	M	39		19.42	3.05	114.52	9.22	57.50	4.51	4.51	0.78	180.28	45.50
6	F	13	(10-11)	19.82	2.24	120.21	7.29	59.92	2.96	0.82	0.04	172.31	45.15
	M	35		20.98	2.67	120.73	7.04	60.09	3.17	0.84	0.01	207.14	46.80
7	F	13	(11-12)	21.26	2.88	125.71	7.89	61.35	3.66	0.88	0.03	199.23	42.91
	M	27		22.73	2.87	126.21	8.02	61.64	3.79	0.90	0.01	220.24	49.04
8	F	18	(12-13	23.78	3.39	126.14	7.86	61.80	3.28	0.92	0.03	177.78	53.51
	M	29		25.89	3.29	131.47	7.24	64.29	3.22	0.98	0.01	245.52	36.72
9	F	13	(13-14)	24.66	3.00	130.56	5.93	63.13	2.71	0.96	0.05	225.38	49.60
	M	32		25.34	3.43	132.93	6.80	64.19	3.34	1.00	1.01	275.63	48.19
10	F	9	(14-15)	29.50	4.03	138.20	4.85	64.80	2.60	1.08	0.05	257.78	41.16
	M	38		29.53	4.09	139.25	7.07	66.82	3.60	1.08	0.04	317.37	59.57
Total (F+M) = 543 (162+381)													
Correlation value(r)			F	0.95	0.96	0.97	0.97	0.60					
			M	0.99	0.97	0.99	0.97	0.98					

However the relatively improved muscular fitness in children at younger ages was probably due to better muscle growth, when the fat growth was perhaps not so marked. This was again substantiated from their lower BMI at corresponding ages

Similarly their lower muscular fitness at older ages might be due to the higher BMIs at those ages.

The fitness status at A^+ and LB – muscles was very very poor at all ages; this is probably because the usual daily activities of those children were not adequate to involve these muscle groups to the optimum level. Such a long and continued weakness might result in poor motor co-ordination and disturb the body dynamic equilibrium (Willgoose, 1950).

Discussing the gender wise differences in muscular fitness, the boys were superior at the abdominal, P and LB- muscles while the girls were superior at UB- & BH muscles. This could be due to their involvement in daily cores of activities. Again the girls were having lower fitness than the boys towards the older ages probably because of their psycho-social limitations i.e., social consciousness, lack of interest, motivation etc those are being normally seen in lower socio-economic population groups as the girls enter into higher adolescent ages.

In conclusion, the poor muscular fitness was primarily due to lack of suitable physical exercises and balanced diet from the very beginning, which resulted in low physical growth in children. Therefore, provisions should be made to introduce regular and systematic exercises for children in the school curricula alongwith, the role of balanced nutrition and the role of physical activities in improving the muscle status and maintaining requisite physical fitness should be taught to the children so that the positive health status is acquired and retained at the younger stage of the life.

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