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EVALUATION OF PHYSICAL FITNESS BEFORE AND AFTER WEIGHT TRAINING EXERCISE

Chandrakant Jawale*

Associate Professor, D. P. Bhosale College, Koregaon, Satara Maharashtra, India.

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***Corresponding Author**
Chandrakant Jawale
Associate Professor, D. P. Bhosale College, Koregaon, Satara Maharashtra, India.

ABSTRACT

Regular exercise, yoga and recreation play very important role in developing and maintaining an optimal level of good health, performance and appearance. It also have beneficial effects on most of the organ system and helps to prevent many health problem and diseases. Government of India has launched the B.Sc. I students organization in 198 to Channelist the young energy in constructive works and to mould their character, spirit of sponsorship and create force of disciplined and trained manpower which help in national emergency.

INTRODUCTION

Exercise physiology in India is relatively new development. Teaching of physiology as a basic science was started in the year 1913 at Calcutta University preliminary research was carried out on energy metabolism, measurement of body surface area and changes in blood chemistry (Sen 1954, Banerjee & Sen 1955). During the 1960's various scientists started research work on work physiology, respiratory physiology, metabolic changes and biochemical changes related to exercise and stress. International scientific congress of sports science was held in Patiala in 1982. Scientist from all over the world took part in discussion. The scientist on National Institute of sports discussed variety of topics related to sports performance, physical variables, influence of training load and recovery, physiology changes at altitude etc. physiology has always been the basis for clinical medicine. In the same manner, exercise physiology has provided essential knowledge for physical fitness and health promotions.

The present study has been carried out to evaluate physiological profile, training and adoption in B.Sc. I students in response to exercise and their routine N.C.C. activities. The present

investigations will be useful for all sports persons in general and for N.C.C. cadets in particular from the point of view of assessment of physical fitness as well as specific training present study has great physiological significance with respect to the selection criteria for entry in all branches of non commissioned officers of all the three wings of Indian Army. The observations made in present study will be useful for coaches, instructors int the Army and sports training centre's.

MATERIAL AND METHOD

The present study was undertaken from selected Sixty B.Sc. I students from our college (D.P.Bhosale College, Koregaon.). These sixty B.Sc. I students assessed for their socio economic information by a standard questionnaire. A questionnaire was used to collect information of B.Sc. I students concern with age, class, habit, parents economic status and history health status. A control subjects were also studies from same class as other students.

The B.Sc. I students selected form the 1st year of enrolment record of their entry in N.C.C. training. Along with weekly routing N.C.C. parade; the physical training including 2.4 km. run, 5 meter shuttle, 20 sit up and 30 push up given to the cadet from July 2009 to March 2010.

Physical examination and laboratory investigation

A) Anthropometric measurements

Height and weight were recorded with standard techniques by measuring scale and weighing machine.

B) Physiological Responses

The physiological responses of individual changes with the exercise. So physiological responses were studied before and after the completion on two years N.C.C. and physical training.

1. Lung function test: Peak expiratory flow rate (PEER) of Non B.Sc. I students recorded by using peak flow meter. The basis of peak expiratory flow rate for monitoring of ventilator function was established by Wright and McKerrow (1959). To find out Peak Flow Expiratory Rate; the mouth piece was attached to mouth of cadet. The peak flow meter was brought in front of mouth in standing posture and held in the hand with grip. Mouth piece was inserted in mouth, lips were tightly closed and cadets was told to fill up lungs by deep breath taken

forcefully and asked to expire the air form the lungs to peak flow meter. The procedure was repeated three time and value was recorded in liter/min.

2. Grip strength: The grips strength of right and left hand and horizontal position were recorded.

3. Physical fitness: Physical fitness of B.Sc. I students as control were recorded by standard Harward step test. The cadets were asked to step on up and down from the bench 30 times per minute for 5 minute of until to fatigue by steps. Immediately after the exercise cadets were asked to sit down. The pluses rate counted from 1 to 11/2 minute after exercise. The fitness index (F.I.) was calculated after exercise from the following formula.

$$\text{Fitness Index} = \frac{\text{Duration of exercise in sec. X100X0.8}}{\text{5.5 X pulse counted}}$$

The grading score was calculated and done as follows:

Grade	Fitness Indes
Poor	Below 50
Lower Average	50 – 60
High Average	65 – 80
Good	80 – 90
Excellent	Above 90

D) Hematological examinations

1. Haemoglobin concentration: The haemoglobin concentration of B.Sc. I students and Non B.Sc. I students as control was estimated before and after N.C.C. training. The haemoglobin concentration was studied by Satili's Haemometer.

OBSERVATIONS AND RESULTS

National cadet corps is considered as second ling of defiance; by keeping in view in mind; the youth of the country trained and motivated to fulfill the need of nation. Mostly the N.C.C. cadets join as commissioned and non commissioned cadet of Indian Army, Rigorous training during their school and college life help to improve their overall body development, personality, discipline etc. which also helpful to them in other various jobs than army. Along with the N.C.C. training, exercise like running, push up, sit up and 5 meter shuttle help to develop the muscles strength, flexibility and speed in body movements.

The questionnaire survey has recorded that all the B.Sc. I students are physically fit for their weekly routine N.C.C. training. Most of the cadets are from rural area and their socio-economic conditions are very poor.

1) Physiological profile of B.Sc. I students

Table No.1

Sr.No.	Name	Age	Height in Cms.	Weight in Kg.
1.	BNV	18	178	64
2.	KMP	18	173	49
3.	JSM	18	167	50
4.	LJR	18	173	51
5.	BMA	18	184	67
6.	CMS	18	175	57
7.	DSD	18	171	56
8.	BAL	18	180	57
9.	RNS	18	175	59
10.	MVB	18	174	51
11.	CRV	18	167	50
12.	SAG	18	170	55
13.	GAV	18	177	56
14.	GGP	18	165	47
15.	PBV	18	170	60
16.	IRP	18	166	52
17.	JDV	18	166	45
18.	CVS	18	167	68
19.	GVB	18	172	55
20.	KPA	18	170	55
21.	BVR	18	171	56
22.	PAA	17	174	47
23.	GVB	18	170	64
24.	JMS	18	176	52
25.	SAB	18	168	64
26.	JSS	18	167	56
27.	KPS	17	172	50
28.	MSB	18	168	56
29.	GSR	18	166	61
30.	GRA	18	168	53
31.	GVS	18	166	65
32.	YMY	18	168	57
33.	KVK	18	169	53
34.	PDH	18	166	54
35.	GKG	18	170	54
36.	GSB	18	170	52
37.	KAR	18	169	58
38.	GSR	18	170	50
39.	KSD	18	175	55

40.	WPS	18	170	74
41.	JSR	18	177	51
42.	PNP	18	177	67
43.	JRR	18	177	58
44.	JSV	17	164	55
45.	PSB	18	167	54
46.	JKS	18	180	66
47	TGB	18	171	54
48.	PSA	18	177	55
49.	SPT	18	172	54
50.	PYM	18	175	55
51.	KNS	18	170	55
52.	MVS	18	169	49
53.	BDR	18	174	57
54.	DAM	18	167	55
55.	PAS	18	175	54
56.	ZSS	18	171	60
57.	SAD	18	179	68
58.	BSP	18	1469	52
59.	MAS	18	171	52
60.	SSS	18	169	48
	Mean Values	18	187.86	55.69
	CONTROL STUDENT			
1.	VSB	18	170	62
2.	TSV	18	172	60
3.	SKT	17	174	68
4.	GRJ	18	180	64
5.	AEP	19	184	58
6.	VNB	18	176	56
7.	RYV	18	172	56
8.	CNN	18	176	50
9.	CRA	18	184	54
10.	MAD	18	175	57
	Mean Values	17.95	189.04	56.07

Table No. 1 indicates data regarding age, and physical characteristic like height and weight. It is observed that overage age of B.Sc. I students. Selected 60 cadet is 18 yrs. The average values of height and weight was 187.86 cm. and 55.64 kg. respectively.

Table No. 2: Physical fitness score of b.sc. i students before and after weight training.

Sr.No.	Name	Fitness before Training	Classification	Fitness after Training	Classification
1.	BNV	67.13	H.A.	79.33	H.A.
2.	KMP	68.18	H.A.	80.80	Good
3.	JSM	58.96	Poor	68.18	H.A.
4.	LJR	54.54	Poor	75.55	H.A.
5.	BMA	67.13	H.A.	79.33	H.A.
6.	CMS	76.55	H.A.	85.70	Good
7.	DSD	66.11	H.A.	77.92	H.A.
8.	BAL	63.33	L.A.	72.72	H.A.
9.	RNS	69.26	H.A.	82.33	Good
10.	MVB	74.00	H.A.	89.05	Good
11.	CRV	71.53	H.A.	85.56	Good
12.	SAG	63.33	L.A.	72.72	H.A.
13.	GAV	63.24	L.A.	73.95	H.A.
14.	GGP	87.27	Good	109.09	Excellent
15.	PBV	67.13	H.A.	79.33	H.A.
16.	IRP	66.11	H.A.	77.92	H.A.
17.	JDV	85.86	Good	91.88	Excellent
18.	CVS	61.00	L.A.	70.38	H.A.
19.	GVB	76.55	H.A.	92.84	Excellent
20.	KPA	63.33	L.A.	72.72	H.A.
21.	BVR	72.72	H.A.	104.06	Excellent
22.	PAA	61.00	L.A.	74.40	H.A.
23.	GVB	70.38	H.A.	83.91	Good
24.	JMS	62.86	L.A.	74.40	H.A.
25.	SAB	72.72	H.A.	106.66	Excellent
26.	JSS	67.13	H.A.	96.96	Excellent
27.	KPS	62.20	L.A.	72.40	H.A.
28.	MSB	66.11	H.A.	78.24	H.A.
29.	GSR	63.33	L.A.	72.70	H.A.
30.	GRA	64.17	L.A.	75.23	H.A.
31.	GVS	62.33	L.A.	84.01	Good
32.	YMY	68.74	H.A.	98.66	Excellent
33.	KVK	70.72	H.A.	106.66	Excellent
34.	PDH	63.33	L.A.	74.72	H.A.
35.	GKG	79.33	H.A.	96.96	Excellent
36.	GSB	84.01	H.A.	98.89	Excellent
37.	KAR	85.56	Good	106.43	Excellent
38.	GSR	72.72	H.A.	104.66	Excellent
39.	KSD	77.55	H.A.	90.90	Excellent
40.	WPS	70.38	H.A.	83.91	Good
41.	JSR	58.96	Poor	68.18	H.A.
42.	PNP	55.23	Poor	83.24	Good
43.	JRR	94.86	Excellent	108.21	Excellent
44.	JSV	81.00	H.A.	99.17	Excellent
45.	PSB	62.33	L.A.	84.01	Good

46.	JKS	75.55	H.A.	96.43	Excellent
47	TGB	70.72	H.A.	87.27	Good
48.	PSA	77.55	H.A.	90.90	Excellent
49.	SPT	87.27	Good	109.09	Excellent
50.	PYM	66.11	H.A.	77.92	H.A.
51.	KNS	71.53	H.A.	85.56	Good
52.	MVS	85.56	Good	96.43	Excellent
53.	BDR	72.72	H.A.	87.27	Good
54.	DAM	70.38	H.A.	93.91	Excellent
55.	PAS	73.02	H.A.	94.86	Excellent
56.	ZSS	63.24	L.A.	72.72	H.A.
57.	SAD	66.10	H.A.	78.14	H.A.
58.	BSP	79.33	H.A.	96.96	Excellent
59.	MAS	60.18	L.A.	74.22	H.A.
60.	SSS	63.33	L.A.	72.72	H.A.
	Mean Values	72.15	H.A.	88.66	Good
	CONTROL STUDENT				
1.	VSB	67.13	H.A.	76.12	H.A.
2.	TSV	63.33	L.A.	72.72	H.A.
3.	SKT	85.56	Good	91.88	L.A.
4.	GRJ	63.40	L.A.	74.40	H.A.
5.	AEP	54.54	L.A.	64.30	H.A.
6.	VNB	63.33	L.A.	72.72	L.A.
7.	RYV	68.26	H.A.	72.33	H.A.
8.	CNN	58.96	L.A.	64.33	Excellent
9.	CRA	64.17	L.A.	75.23	H.A.
10.	MAD	62.33	L.A.	74.10	H.A.
	Mean Values	65.13	H.A.	73.81	H.A.

Table No. 2 shows physical fitness score before and after training, which was measured by using Hayward step test. The average fitness score index was 72.15 which can be classified as good fitness score, before the training. The average fitness score index observed after training was 88.60 which can be classified as excellent.

Table No. 3: Peak expiratory fow rate of b.sc. i student before and after weight training exercise.

Sr.No.	Name	PEER in 1/min before training	PEER in 1/min before training
1.	BNV	530	600
2.	KMP	440	500
3.	JSM	415	520
4.	LJR	560	620
5.	BMA	530	600
6.	CMS	540	600
7.	DSD	460	510
8.	BAL	545	620

9.	RNS	505	540
10.	MVB	555	590
11.	CRV	495	540
12.	SAG	465	490
13.	GAV	515	550
14.	GGP	480	520
15.	PBV	385	450
16.	IRP	530	580
17.	JDV	480	520
18.	CVS	565	590
19.	GVB	575	620
20.	KPA	460	510
21.	BVR	555	610
22.	PAA	460	490
23.	GVB	385	430
24.	JMS	415	460
25.	SAB	625	650
26.	JSS	520	600
27.	KPS	440	500
28.	MSB	450	500
29.	GSR	480	540
30.	GRA	545	600
31.	GVS	415	495
32.	YMY	510	600
33.	KVK	570	610
34.	PDH	400	480
35.	GKG	525	580
36.	GSB	475	520
37.	KAR	505	560
38.	GSR	460	500
39.	KSD	465	490
40.	WPS	5604	600
41.	JSR	585	630
42.	PNP	535	560
43.	JRR	500	560
44.	JSV	520	580
45.	PSB	580	640
46.	JKS	460	510
47	TGB	410	480
48.	PSA	425	500
49.	SPT	390	440
50.	PYM	480	530
51.	KNS	485	530
52.	MVS	445	500
53.	BDR	580	620
54.	DAM	440	480
55.	PAS	450	485
56.	ZSS	440	490

57.	SAD	460	520
58.	BSP	450	500
59.	MAS	445	570
60.	SSS	480	530
	Mean Values	494	548
	CONTROL STUDENT		
1.	VSB	520	540
2.	TSV	540	565
3.	SKT	480	520
4.	GRJ	405	445
5.	AEP	410	564
6.	VNB	515	580
7.	RYV	485	540
8.	CNN	420	460
9.	CRA	505	520
10.	MAD	545	540
	Mean Values	483	518

Table No.3 indicates peak expiratory flow rate (PEER) of B.Sc. I students before and after training. The average PEER values are 494 μ/min before training and 518 μ/min after training.

Table No. 4: Physical fitness score of b.sc. I students before and after weight training exercise.

Sr.No.	Name	Grip Strength in kg before Training		Grip Strength in kg after Training	
		Right hand	Left hand	Right hand	Left hand
1.	BNV	36	29	44	42
2.	KMP	29	29	56	58
3.	JSM	26	25	38	36
4.	LJR	26	34	56	53
5.	BMA	40	30	58	52
6.	CMS	39	38	52	52
7.	DSD	36	37	52	50
8.	BAL	39	41	52	48
9.	RNS	26	24	40	36
10.	MVB	37	35	40	42
11.	CRV	39	35	48	42
12.	SAG	32	24	52	48
13.	GAV	32	35	45	42
14.	GGP	35	28	34	41
15.	PBV	35	34	42	40
16.	IRP	35	31	48	42
17.	JDV	30	32	48	52
18.	CVS	38	40	52	48
19.	GVB	29	29	56	58

20.	KPA	33	34	48	47
21.	BVR	31	30	42	40
22.	PAA	25	25	40	38
23.	GVB	34	32	49	45
24.	JMS	35	35	52	50
25.	SAB	42	38	54	46
26.	JSS	44	45	56	54
27.	KPS	30	32	40	46
28.	MSB	39	34	47	44
29.	GSR	41	34	52	46
30.	GRA	29	27	56	53
31.	GVS	31	30	42	40
32.	YMY	39	39	56	58
33.	KVK	29	27	44	40
34.	PDH	35	33	45	49
35.	GKG	38	33	47	43
36.	GSB	38	30	47	45
37.	KAR	41	42	56	58
38.	GSR	29	26	44	42
39.	KSD	33	37	44	48
40.	WPS	43	42	50	48
41.	JSR	32	29	44	38
42.	PNP	35	30	46	42
43.	JRR	30	34	40	46
44.	JSV	36	39	58	56
45.	PSB	35	30	49	46
46.	JKS	47	44	56	54
47	TGB	38	36	47	46
48.	PSA	43	43	53	52
49.	SPT	4o	32	49	46
50.	PYM	29	31	47	52
51.	KNS	27	20	56	53
52.	MVS	29	29	36	34
53.	BDR	40	34	58	54
54.	DAM	38	35	47	52
55.	PAS	30	39	42	45
56.	ZSS	47	41	54	48
57.	SAD	38	40	47	52
58.	BSP	31	35	44	48
59.	MAS	35	26	42	34
60.	SSS	35	37	54	57
	Mean Values	35	33		47
	CONTR30OL STUD29ENT				
1.	VSB	38	42	42	44
2.	TSV	29	26	30	32
3.	SKT	30	34	40	42
4.	GRJ	30	32	36	40
5.	AEP	36	37	38	44

6.	VNB	26	24	36	48
7.	RYV	37	35	38	46
8.	CNN	31	34	38	42
9.	CRA	29	20	38	40
10.	MAD	35	30	40	44
	Mean Values	32	31	38	42

Table No. 4 indicates the Grip strength of B.Sc. I students before and after training. The average grip strength values for right hand left hand are 35 and 33 in kg. for before training, while the average grip strength values for a right hand and left hand are 48 and 47 in kg for after training.

Table No. 5: Peak expiratory fow rate of b.sc. i student before and after weight training exercise.

Sr.No.	Name	PEER in 1/min before training	PEER in 1/min before training
1.	BNV	12.00	13.00
2.	KMP	11.80	12.40
3.	JSM	11.80	13.20
4.	LJR	12.80	14.20
5.	BMA	12.60	13.60
6.	CMS	11.80	12.60
7.	DSD	12.00	13.20
8.	BAL	11.80	12.40
9.	RNS	13.20	14.40
10.	MVB	12.80	13.00
11.	CRV	11.20	13.20
12.	SAG	10.80	12.20
13.	GAV	11.20	13.00
14.	GGP	10.80	12.60
15.	PBV	11.20	13.00
16.	IRP	14.20	14.00
17.	JDV	11.60	12.40
18.	CVS	12.40	14.20
19.	GVB	11.20	12.40
20.	KPA	11.20	12.40
21.	BVR	12.40	13.20
22.	PAA	10.80	11.40
23.	GVB	12.40	13.80
24.	JMS	11.60	13.20
25.	SAB	13.20	14.60
26.	JSS	12.80	13.20
27.	KPS	13.20	13.60
28.	MSB	12.40	13.80
29.	GSR	12.40	13.00
30.	GRA	11.20	13.80

31.	GVS	12.00	13.40
32.	YMY	1080	12.60
33.	KVK	11.80	12.670
34.	PDH	12.40	13.20
35.	GKG	12.20	14.20
36.	GSB	12.40	12.60
37.	KAR	12.00	13.20
38.	GSR	12.40	13.60
39.	KSD	11.00	12.60
40.	WPS	11.20	13.20
41.	JSR	14.00	14.40
42.	PNP	12.10	14.20
43.	JRR	12.80	13.60
44.	JSV	14.00	14.20
45.	PSB	12.80	13.40
46.	JKS	14.20	14.40
47	TGB	13.40	14.00
48.	PSA	13.00	14.40
49.	SPT	14.00	14.20
50.	PYM	13.80	14.40
51.	KNS	13.10	14.20
52.	MVS	13.10	14.40
53.	BDR	11.00	13.20
54.	DAM	14.00	14.80
55.	PAS	11.40	12.60
56.	ZSS	13.00	14.20
57.	SAD	14.80	16.20
58.	BSP	14.00	14.20
59.	MAS	12.00	13.20
60.	SSS	14.20	15.60
	Mean Values	12.32	13.35

Table No.5 shows haemoblobin level of B.Sc. I students before and after training. The average haemoglobin values of B.Sc. I observed before training are 12.32 gm/dl. While the average haemoglobion values observed after training are 13.55 gm/dl. as compare to the normal control students.

DISCUSSION AND RECOMMENDATION

The physical exercise is an important health improving behavior which is beneficial for many individuals in all states of health. Caster (1970) suggested that; the basic structure of body must be present to achieve success in different sports. Pamell (1958) indicated that the choice of sportsman for the particular event is largely determined by the inborn characteristics. The other factors shcu as physical training and excursive can improve the performance upto a certain limit that is set up by his genotype, Monchard & Malina (1983). The level of physical

fitness in general depends on many factors, of the these age, height and weight are very important.

In present investigation, it has been found that; the average age is 18 years as per the the N.C.C. selection criterion; as compared to control student is 17.95 yrs. The average height observed among the N.C.C. cadets was 187.86 cms. As compared to that of control student height is 189.04 cms. And the average weight observed was 55.69 cms. and the average weight observed was 55.69 kg.

In present study average physical fitness score observed is 72.5 before training the fitness index. It means that; the before training the fitness index of B.Sc. I student shows higher average and after training it improves to the good level; some students showed excellent physical fitness performance after the two years training, along with suggested exercise as compared to the control students it has shown in Table No.2.

The mean PEER values observed are 494 1/min before training as compared to the 548 1/min after training as compared to the control student 518 1/min after two years; so it has been concluded that, physical exercise along with N.C.C. training lung capacities with fulfill the need of oxygen for physical activities, it has shown in Table No.3.

The grip strength values of B.Sc. I student showed rising level from before training to after training as compared to the control; so it has been concluded that; physical training particular sit up will improve the muscle strength of fore arm; which ultimately help in other activities.

The red blood cells plays a vital role in transport of gases. It contains approx. 34 gm of HB per 100 milliliters of whole blood. The composition of blood changes as the individual goes from a resting to an exercising state. Dubal 1995. Gaikwad 1997 observed that; size of RBC decreases as the body is exposed to prolonged exercise. Blood plasma is reduced with fluid loss and this causes an increase in the relative no. of red blood cells which ultimately improves the haemoglobin level of blood. In present study; the haemoglobin levels found to be raised after the two years training with physical exercise live running, sit up, push up and 5 meter shuttle.

While concluding the present minor research project, studies on physical fitness of college students with reference to N.C.C. training; it should be noted that, the objective of particularly fulfilled. But future research is possible; if the following points are considered.

1) In present investigation, only some selected physiological parameters are practiced for screening the fitness of cadets, the better pictures may explored the fitness of by modern techniques such as tread mill test of bicycle ergo meter.
2) The research can be undertaken to formulate balanced diet for B.Sc. I student.
3) Such physical fitness index may be used for selection of Reunites in Army.
4) Newly designed training programmes can be assessed scientifically by carrying out systematic research.

Now it is the time train our coaches about modern methods of exercise by giving information regarding the basic training, effects of training and nutrition as well as effects of environmental factor on training to achieve excellent results in N.C.C. training.

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