

**Relationship between Physical Fitness and Academic Achievements of University Level  
Students of Vidarbha – A Critical Study**

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**Introduction**

Physical fitness in childhood and adolescence is beneficial for both physical and mental health throughout life. However, a growing body of evidence suggests that it may also play a key role in brain health and academic performance (Shepard, 1997). In a recent study, researchers studied the independent and combined influence of components of physical fitness on academic performance (Mo-Suwan et al., 1999); however, the results need to be corroborated with more studies (Grissom, 2005). Often, in the pursuit of academic success, students sometimes need a break from the classroom and an opportunity to release unexpressed energy. While academic success is no small feat, students who participate in at least one extracurricular physical activity are proven to reap more benefits than those who do not exercise regularly (Singh, 1991).

Physical activity can have an impact on cognitive skills and attitudes and academic behavior, all of which are important components of improved academic performance. These include enhanced concentration and attention as well as improved classroom behavior. And there's more. Active Living Research says, "In some cases, more time in physical education leads to improved grades and standardized test scores." In educational institutions that are under government mandates to bridge the achievement gap (and when those mandates encourage "teaching to the test), physical education can actually help improve the students' scores (Verma and Mokha, 1993).

Unfortunately, many schools cut physical education and PE funding with the belief that more rigid classroom time would somehow stimulate students to learn more. Exercise directly impacts the behavior and development of the brain (Tremblay et al., 2000). It is likely that the effects of physical activity on cognition would be particularly important in the highly plastic developing brains of youth. Charles Basch has summarized how exercise may affect executive functioning, i) increased oxygen flow to the brain; ii) increased brain neurotransmitters; iii) increased brain-derived neurotrophins that support neuronal differentiation and survival in the developing brain. Neurotrophins assure the survival of neurons in areas responsible for learning, memory, and higher thinking. Physical activity has benefits beyond improved grades, too. He extrapolates current research and connects physical activity to absenteeism, drop-out rates, and social connectedness (Kim et al., 2003).

In view of the above, this systematic study has been carried out to examine the relationship between physical fitness and academic performance of collegiate level students of Gondwana University Gadchiroli and Rashtrasant Tukadoji Maharaj Nagpur University Nagpur Students. There is a growing body of research on the positive effect of physical activity on physical and psychological health, but the relationship between academic performance and physical fitness has not been widely investigated.

**Research Methodology**

• **Selection of Subjects**

The subjects for this study were randomly selected from the Gondwana University, Gadchiroli and R.T.M. Nagpur University Nagpur. The age of the subjects ranged between 18 and 25 years. A total of 240 students were selected (120 from each of the university).

- **Tests for physical fitness and academic achievement measurements**

Aerobic capacity (cardiovascular endurance) was determined by using 1.5 mile run and walk test. However, the body composition (amount of body fat) was assessed using Skin fold caliper. The muscular strength (abdominal muscular strength) was studied using sit-ups test, while muscular endurance was assessed using pull-ups (for boys) tests (Mathews, 1973). Moreover, the flexibility was assessed using sit and reach test (Kansal, 1991). The academic achievement of the students was determined using a standard test, which was developed by the researcher to know the proficiency of students in reading English, mathematics and science subjects.

- **Administration of the tests**

Before administration of test a meeting of the subjects and scholar was held in the respective college grounds. The requirements of the testing procedure were explained to them in details so that there was no doubt in their minds regarding the effort and strain needed for providing the data. The necessary data related to the study was collected from the students of Gondwana University Gadchiroli and Rashtasant Tukadoji Maharaj Nagpur University Nagpur for the statistical analysis.

- **Reliability of data**

The reliability of data was made sure by establishing the instruments reliability, tester's competency and reliability of the test. To ensure that the investigator is well versed with the technique of conducting the test, the investigation had number of practice session in the testing procedure under the guidance of the expert. The tester's competency was also evaluated together with the reliability of the test.

- **Statistical techniques employed**

The data generated during the study was processed using various statistical tests with the aid of Statistical Package for Social Sciences 18.0 (SPSS 18.0) software. The data characteristics such as mean, standard deviation, range etc. were determined and the Pearson Product Moment Correlation coefficients were determined to assess the relationship between physical fitness and academic achievement of the students.

## Results and discussion

- **Aerobic capacity (Cardiovascular Endurance of students)**

**Table 1:** Comparative assessment of cardiovascular endurance of students of Gondwana University, Gadchiroli and RTM Nagpur University, Nagpur

Students from	Mean	±SD	Min.	Max.	MD	't'	P
Gondwana University	3.12	±0.21	2.54	3.58	0.59	2.084	<0.05
RTM Nagpur University	2.53	±0.12	2.11	3.43			

**SD:** Standard Deviation; **Min:** Minimum; **Max:** Maximum; **MD:** Mean Difference; **'t':** t value; **P:** Probability

Above **Table 1** present's results of comparative assessment of cardiovascular endurance of students from Gondwana University and RTM Nagpur University. The mean time needed for students belonging to Gondwana University was 3.12±0.21 mins. However, for students belonging to RTM Nagpur University, it was 2.53±0.12 mins. The comparative assessment showed that there is significant (P<0.05) difference in the cardiovascular endurance of students belonging to different universities.

- **Body composition (Body fat)**

**Table 2:** Comparative assessment of body fat of students of Gondwana University, Gadchiroli and RTM Nagpur University, Nagpur

Students from	Mean	±SD	Min.	Max.	MD	't'	P
Gondwana University	26.4	±2.9	22.3	29.4	1.1	1.008	NS
RTM Nagpur University	25.3	±2.4	21.9	27.6			

**SD:** Standard Deviation; **Min:** Minimum; **Max:** Maximum; **MD:** Mean Difference; **'t':** t value; **P:** Probability; **NS:** Not Significant

Above **Table 2** presents results of comparative assessment of Body Fat of students from Gondwana University and RTM Nagpur University. The mean percent body fat of students belonging to Gondwana University was  $26.4 \pm 2.9$ . Furthermore, the mean percent body fat of students belonging to RTM Nagpur University was  $25.3 \pm 2.4$ . The comparative assessment showed that though the percent body fat was higher in the students from Gondwana University, the difference was statistically not significant.

- **Muscular strength (Sit-ups)**

**Table 3:** Comparative assessment of muscular strength of students of Gondwana University, Gadchiroli and RTM Nagpur University, Nagpur

Students from	Mean	±SD	Min.	Max.	MD	't'	P
<b>Gondwana University</b>	19.2	±3.1	14	24	-4.5	1.846	NS
<b>RTM Nagpur University</b>	23.7	±2.8	17	29			

**SD:** Standard Deviation; **Min:** Minimum; **Max:** Maximum; **MD:** Mean Difference; **'t':** t value; **P:** Probability; **NS:** Not Significant

Above **Table 3** presents results of comparative assessment of Sit-Ups of students from Gondwana University and RTM Nagpur University. The mean no. of Sit-ups of students belonging to Gondwana University was  $19.2 \pm 3.1$ . Furthermore, the mean no. of Sit-ups of students belonging to RTM Nagpur University was  $23.7 \pm 2.8$ . The comparative assessment showed that there is no significant difference in the muscular strength of students belonging to different universities.

- **Muscular endurance (Pull-ups)**

**Table 4:** Comparative assessment of muscular endurance of students of Gondwana University, Gadchiroli and RTM Nagpur University, Nagpur

Students from	Mean	±SD	Min.	Max.	MD	't'	P
<b>Gondwana University</b>	12.6	±3.9	8	15	0.9	1.067	NS
<b>RTM Nagpur University</b>	11.7	±2.7	7	14			

**SD:** Standard Deviation; **Min:** Minimum; **Max:** Maximum; **MD:** Mean Difference; **'t':** t value; **P:** Probability; **NS:** Not Significant

Above **Table 4** presents results of comparative assessment of Pull-Ups of students from Gondwana University and RTM Nagpur University. The mean no. of Pull-ups of students belonging to Gondwana University was  $12.6 \pm 3.9$ . Furthermore, the mean no. of Pull-ups of students belonging to RTM Nagpur University was  $11.7 \pm 2.7$ . The comparative assessment showed that there is no significant difference in the muscular endurance of students belonging to different universities.

- **Flexibility**

**Table 5:** Comparative assessment of flexibility of students of Gondwana University, Gadchiroli and RTM Nagpur University, Nagpur

Students from	Mean	±SD	Min.	Max.	MD	't'	P
<b>Gondwana University</b>	4.8	±1.1	2	6	-1.1	0.948	NS
<b>RTM Nagpur University</b>	5.9	±1.6	2	8			

**SD:** Standard Deviation; **Min:** Minimum; **Max:** Maximum; **MD:** Mean Difference; **'t':** t value; **P:** Probability; **NS:** Not Significant

Above **Table 5** presents results of comparative assessment of Flexibility of students from Gondwana University and RTM Nagpur University. The mean flexibility score of students belonging to Gondwana University was  $4.8 \pm 1.1$  cm, while that of students belonging to RTM Nagpur University was  $5.9 \pm 1.6$  cm. The

comparative assessment showed that there is no significant difference in the flexibility of students belonging to different universities.

- **Academic Achievement**

**Table 6:** Academic performance of students of Gondwana University, Gadchiroli and RTM Nagpur University, Nagpur

Academic performance	Gondwana University		RTM Nagpur University	
	Nos.	Per	Nos.	Per
<b>Good</b>	12	10.0	20	16.7
<b>Satisfactory</b>	54	45.0	60	50.0
<b>Average</b>	36	30.0	26	21.7
<b>Below Average</b>	18	15.0	14	11.7
<b>Total</b>	120	100	120	100

Above **Table 6** presents results of comparative assessment of academic performance of students from Gondwana University and RTM Nagpur University. 10% students of Gondwana University and 16.7% students of RTM Nagpur university have good academic performance. In addition to it 45% of the Gondwana University and 50.0% students of RTM Nagpur University have satisfactory academic achievement, whereas 30% and 21.7% students of Gondwana University and RTM university performed averagely. Furthermore, 15% and 11.7% students of Gondwana University and RTM Nagpur university have below average academic performance.

- **Relationship between academic achievement and physical fitness variables**

**Table 7:** Relationships between academic achievement and physical fitness of the students from Gondwana University, Gadchiroli and RTM Nagpur University, Nagpur

Physical fitness variables	Correlation between Academic Achievement and physical fitness variables	
	Gondwana University	RTM Nagpur University
<b>Cardiovascular Endurance</b>	0.6523**	0.606**
<b>Body fat</b>	0.246	0.327
<b>Sit-ups</b>	0.648**	0.579**
<b>Pull-ups</b>	0.529*	0.423*
<b>Flexibility</b>	0.487*	0.391

\* : Significant at p 0.05 level      \*\* : Significant at p 0.01 level

Above **Table 7** presents results regarding the relationships between academic achievement and physical fitness of the students from Gondwana University and RTM Nagpur University. The study results indicated that there is significant positive relationship between academic achievement and physical fitness variables (especially, cardiovascular endurance, muscular strength and muscular power) of students belonging to Gondwana University, Gadchiroli as well as those belonging to RTM Nagpur University, Nagpur.

### Conclusions

- **Aerobic capacity (Cardiovascular Endurance of students)**

On the basis of the study results it is concluded that students belonging to RTM Nagpur University, Nagpur have better cardiovascular endurance.

- **Body composition (Body fat)**

In view of the study results it is evident that students belonging to Gondwana University, Gadchiroli have relatively more Body Fat than their peers from RTM Nagpur University, Nagpur.

- **Muscular strength (Sit-ups)**  
In view of the study results it is evident that students belonging to RTM Nagpur University, Nagpur have better muscular strength than the students from Gondwana University, Gadchiroli.
- **Muscular endurance (Pull-ups)**  
In view of the study results it is concluded that there is no significant difference in the muscular endurance of students belonging to RTM Nagpur University, Nagpur have and those from Gondwana University, Gadchiroli.
- **Flexibility**  
In view of the study results it is concluded that there is no significant difference in the flexibility of students belonging to RTM Nagpur University, Nagpur have and those from Gondwana University, Gadchiroli.
- **Academic Achievement**  
From the study results it is concluded that majority of students belonging to RTM Nagpur University, Nagpur and Gondwana University, Gadchiroli have satisfactory academic achievement.
- **Relationship between academic achievement and physical fitness variables**  
On the basis of study results it is concluded that there is significant positive relationship between physical fitness and academic achievement of students belonging to RTM Nagpur University, Nagpur as well as those from Gondwana University, Gadchiroli.

#### References

1. Grissom, J.B. (2005), "Physical fitness and academic achievement", Journal of Exercise Physiology, 8. 11-25.
2. Kansal, D. K., "Test and Measurements in Sports and Physical Education", 1996.
3. Kim H.Y., Frongillo E.A., Han S.S., Oh S.Y., Kim W.K., Jang Y.A., Won H.S., Lee H.S., Kim S.H. (2003), "Academic performance of Korean children is associated with dietary behaviors and physical status". Asian Journal of Clinical Nutrition, 12, p. 186-192.
4. Mathews, D.K., "Measurements in Physical Education", W.B. Scuders and Company, Philadelphia. 1973. p. 3-4.
5. Mo-Suwan, L., Lebel L., Puetpaiboon A., Junjana C., (1999). School Performance and weight status of children and young adolescents in a transitional society in Thailand. International Journal of Obesity, 23(3), p. 272-277.
6. Shepard, R.J. (1997), Curricular Physical activity and academic performance, Pediatric Exercise Science, 9, p. 113-126.
7. Singh H., (1991) "Science of Sports Training" p. 136-138.
8. Tremblay, M. S., Inman, J.W. and Willms J.D., (2000). The relationship between physical activity, self-esteem, and academic achievement in 12-year old children, Peadiatric Exercise Science, 12., p. 312-323.
9. Verma S.K. and Mokha R. "Healthier Living Series", for total well being, (April 1993), vol. II, p. 2.