

FITNESS LEVEL EFFECT ON THE GRADE-POINT AVERAGE OF PHYSICAL EDUCATION MAJOR STUDENTS

Wahyu Indra Bayu¹, Destriana², Achmad Richard Victorian³, Herri Yusfi⁴,
Soleh Solahuddin⁵

^{1,2,3,4,5} Sriwijaya University, Palembang, South Sumatra, Indonesia
wahyu.indra@fkip.unsri.ac.id¹, destriana@fkip.unsri.ac.id²
richardvictorian@fkip.unsri.ac.id³, herriyusfi@fkip.unsri.ac.id⁴,
solehsolahuddin@fkip.unsri.ac.id⁵


Abstract

This study aims to perceive the relationship between physical fitness and the grade-point average. This study used a quantitative method with survey techniques with design correlation. The subjects of this study were 1st and 3rd semester physical education college students with total sample of 142 students (M: 97, F: 45). Random sampling was used as the sampling technique and TKJI (Indonesian Physical Fitness Test) was used as the instrument in this study was. The results show that 4 students (2,82%) were in very good, 68 students (47,89%) were in good, 58 students (40,85%) were in good fitness classification, 11 students (7,75%) were in less, and 1 students (0,7%) were in very less fitness classification. It means that the physical fitness of physical education college students mostly in good fitness classification. ANOVA was used to analyze the relationship between health-related physical fitness and grade-point average index. The statistical test shows that physical fitness has a positive correlation with the grade-point average index with Sig (P value) = 0,000 and 5% margin of error. Based on the t-test, the value of $t_{count} (21,360) > t_{table} (2.12)$ which can be concluded that physical fitness affects the grade-point average index.

Keywords: Physical Fitness, Grade-Point Average, Physical Education

Acceptance date: 9th of April 2021

Correspondence author: Wahyu Indra Bayu, Universitas Sriwijaya, Indonesia. E-Mail: wahyu.indra@fkip.unsri.ac.id

DOI: <http://dx.doi.org/10.31851/hon.v4i2.5239> 



Jurnal Halaman Olahraga Nusantara licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).

INTRODUCTION

Health status is the main pillar in improving the quality of human resources along with education and economy, so that it is expected to create strong, productive and capable human resources to compete in all the challenges that will be faced. The degree of health is very much determined by one's physical fitness. Physical fitness is necessary to live this life to its fullest. Without physical fitness, people will get tired faster in doing daily activities. Physical fitness is a quality of life in the form of the ability to do daily work without any significant

fatigue, as well as having the energy to enjoy leisure time and unexpected emergencies. Then, physical fitness also can be beneficial for someone to adapt to all physical and psychological burdens. It is needed to achieve optimal productivity / work performance (DeFina et al., 2015). Physical activity (PA) and cardiorespiratory fitness (CRF) have inverse relationships with cardiovascular (CV) morbidity and mortality. Recent studies have identified the important role of these two factors. The benefits of PA and CRF in the prevention of CV disease and risk factors have been previously reviewed. Furthermore, assessment methodology and its utilization in the research and clinical field were discussed. Finally, the benefits, methodology, and utilization were compared and contrasted to comprehend both distinct components and their impact on CV health.

Maintaining physical fitness needs to be continued in order to maintain physical health, so a healthy lifestyle must be instilled so that it can continue to develop and become a culture. Physical fitness is pivotal as an integral part of efforts to improve the quality of life of Indonesian people, one of which can be done through the process of education and civilization. It is expected that attitudes and awareness of each individual will arise to improve and maintain physical fitness through the process of education, which subsequently become habits and needs of life. Physical fitness is an important indicator of healthy status in children and adolescents, and certainly a good predictor of health status in life (Cvejić, Pejović, & Ostojić, 2013).

Physical Education is an educational process that utilizes physical activities that are planned systematically and aimed at developing and enhancing physical fitness, motor skills, critical thinking and social skills for healthy and active living, sportsmanship, and emotional intelligence. Physical Education is a physical activity organized to be a medium for educational activities. (Sandroff, Motl, Scudder, & DeLuca, 2016) stated that the cognitive domain's targeted are participant-specific characteristics, outcome measures, and study results. The study became the basis of twenty six further studies on the effects of exercise, physical activity, and physical fitness. Six of the total twenty six studies were

randomized controlled trials. Overall, there is conflicting evidence for the effects of exercise on cognition in multiple sclerosis, and overall positive, but not definitive, evidence for the effects of PA and physical fitness, respectively, on cognition in this population. Collectively, there are no adequate well-designed research to definitively conclude that exercise, PA, and physical fitness are effective in improving cognition in multiple sclerosis. (Fisher et al., 2011) founds that physical education of sport and health intervention significantly positively affects the concentration of student attention. (Chomitz et al., 2009) suggested that based on the results of his research the value of Mathematics and English tests are increased when the students' physical fitness is also increased. Education is an activity that is a process to develop spiritual abilities and attitudes which include mental, intellectual and even spiritual aspects.

Sport is a planned and structured PA that involves repeated body movements to improve physical fitness. Sport can also improve mental health by producing certain hormones through PA. Sport and exercise is a necessity of life that is periodic, meaning that sport as a tool to maintain and foster health, can not be abandoned. If it is seen from its purpose, sport can be a place to look for achievement, it can also aim as recreation, besides sport is also a tool used to carry out education in Indonesia. From the elementary school level, junior high school, senior high school, and even in college. A study of (Balasekaran et al., 2017) on higher education, especially universities, in Singapore, found that boys were significantly better than girls in the term of strength, while girls were significantly better than boys in the term of flexibility. In general, obesity rates are maintained at a low percentage in Singapore, because students have to participate in higher amounts of PA and exercise. The students are recommended to consume more nutritious food and reduce their calory intakes by avoiding snacks, desserts, and fried food. The risk of cardiovascular disease may be decrease if this health trend continues. One of the State Universities in Indonesia that provide physical education (PE) study program is Sriwijaya University. The PE departement was established in 2004 which has graduated 12 batches and has been widely accepted as civil servants or worked in private sectors. The courses taught in the physical

education study program cover various aspects of science related to health science, sports training, sports coaching and other social sciences.

The health science, physical education and various sports courses are taught because it is appropriate with the name of the physical education and health study program. The purpose of this Physical Education study program is not only producing skilled and healthy Physical Education teachers, but also teaching the mental emotional aspects. Learnings which related to the practice and theory of sports are taught more in early semesters. The subjects that covers basic knowledge such as athletics, volleyball, and gymnastics subsequently improve the knowledge of techniques, tactics and proficiency in teaching or practice at the end of the learnings. Thus, besides getting knowledge about the theory, the students can also improve physical fitness and skills of each branch of sport. The research results of (Donnelly et al., 2016) show that a majority of researchs support the perception that physical fitness and children's cognitive functions are benefits of PA interventions. Limited evidence was available regarding the effect of PA on learning. Some evidence indicate that PA has a relation to areas of the brain that support complex cognitive processes during laboratory tasks. While favorable results related to academic achievement have been obtained, the results from controlled experiments that evaluate the benefits of PA on academic performance are needed.

The physical education students do PA for more than 60 minutes in one class session, therefore, the level of physical condition of students will also increase as the effect of the PA that students “forcefully” do in practical courses of physical education and health department. (Gu, Chang, & Solmon, 2016) found that four physical fitness components and PA were positively related with physical and mental functions. Path analyses suggested physical fitness mediated the relationship between self-reported and pedometer-based PA and health-related quality of life (95%). Some results support the conclusion that enhancing children’s physical fitness can facilitate positive outcomes including improved health related quality of life. Certain tests needs to be conducted to find out

individual or group physical condition. One of the tests that can measure students' physical fitness is physical fitness test. Physical fitness is related with many traits and attributes required for resilience (Deuster & Silverman, 2013). Some of previous studies associated PA and academic achievement (Åberg et al., 2009), (Middleton, Barnes, Lui, & Yaffe, 2010), (Jakobsson, Lundvall, Redelius, & Engström, 2012). Then, this study will discuss the relationship between physical fitness and grade-point average index of Sriwijaya University Physical Education students.

METHOD

This study used quantitative research method. Quantitative research emphasizes more objective phenomena and maximizes objectivity. The design of this study is carried out using numbers, statistical processing, compilation and controlled experiments. This type of study is correlational research which is a causal relationship. This study used the Indonesian Physical Fitness Test Instrument (IPFTI), which is a battery test consisting of five test items, namely: 1) 60m sprint; 2) pull up 3) sit up; 4) vertical jump; and 5) 1200m run. The tests are done sequentially because IPFTI is a battery test, starting from test item number one, then test item number two, three, four, five respectively. The instrument documentation was intended to obtain the grade-point average data. The research was conducted at Sriwijaya University in February 2020. This method divided the population into homogeneous groups (strata) disproportionately, where the number of samples for each stratum did not depend on the ratio of the actual number in the population. The total sample of the study was 142 students, consisting of 97 men and 45 women. Descriptive statistics were used to describe data in general.

RESULTS AND DISCUSSION

Descriptive data of GPA and physical fitness are as follows:

Table 1. Descriptive Data

Data	GPA	Physical Fitness	
N		142	
Mean	3,29		17
St. Deviasi	0,31		2,70
Minimal	2,04		8,00
Maximal	3,85		22,00
Very Good		4	2,82%
Good		68	47,89%
Average		58	40,85%
Less		11	7,75%
Very Less		1	0,70%

Tabel 1 shows that mean of GPA and physical fitness is 3,29 and 17 (average category). The results show that 4 students (2,82%) were in very good, 68 students (47,89%) were in good, 58 students (40,85%) were in good fitness classification, 11 students (7,75%) were in less, and 1 students (0,7%) were in very less fitness classification.

The results of the correlation between physical fitness and the grade-point average index are as follows:

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,891a	0,795	0,793	0,14741

Table 1 shows that the relationship between physical fitness and grade-point average index is very strong, where R value is 0.891 and R square value is 0.795, which means that they have a very strong relationship. This data shows that the effect of cumulative performance index on physical fitness was 79.5% .

The ANOVA and coefficient results respectively can be seen at table 2 and 3 below:

Table 3. ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9,914	1	9,914	456,244	0,000b
	Residual	2,564	118	0,022		
	Total	12,479	119			

Tabel 3. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1,401	0,264		-5,300	0,000
	GPA	1,704	0,080	0,891	21,360	0,000

Based on the significance of the results of the statistical test of the coefficient of regression test can be seen in the Sig column with the Sig (P value) = 0,000, so at 5% margin of error, physical fitness has a a positive correlation with the grade-point average index. Based on the t test = the value of t_{count} (21,360) > t_{table} (2,12) which can be concluded that physical fitness affects the grade-point average index.

Some factors that influence the results of physical fitness level in this study are: 1) students are accustomed to running sports provided by Physical Education lecturers so that when doing IPFTI students have no fear of fatigue, 2) the students were enthusiastic to do physical fitness tests, 3) the weather when the IPFTI occured was very supportive, 4) the students obey the instructions of the examiners obediently, 5) there were adequate rest because the students were on one week regular break before the IPFTI. All of the factors above were believed to support students to get good category of physical fitness.

The physical fitness of students who are categorized as good can not be obtained by themselves without a regular and systematic training. (Keeley & Fox, 2009) argue that before impacting on academic achievement, physical or fitness activity has allegations of some potential mechanism, e.g. specific high-level cognitive abilities such as decision-making, concentration, thinking speed, memory, and alertness. The literatures from (Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Donnelly et al., 2009; Hillman, Castelli, & Buck, 2005) reported

that the amount of time spent on physical education, sport, and health subjects has no detrimental effect on more "academic" subjects and can even improve academic achievement. Based on (Bayu & Hasmara, 2018) research results, there is a relationship between physical fitness and academic achievement which has become a concern due to the increasing prevalence of overweight and unfit children, as well as the inevitable school pressure to create students who meet academic standards. This study examined third and fifth grades 259 public school students. The field tests of physical fitness, specifically aerobic capacity which was positively associated with academic achievement, whereas Body Mass Index (BMI) was inversely associated (Castelli, Hillman, Buck, & Erwin, 2007). Associations were expressed in total academic achievement, mathematics achievement, and reading achievement, suggesting that the physical fitness aspects may be globally related to academic performance in preadolescents. The findings are discussed in order to maximize school performance and the implications for educational policies. A research from (Blom, Alvarez, Zhang, & Kolbo, 2009) indicated a positive correlation between fitness and standardized test scores in Language Arts and Math and a negative relationship with school absences. The relationships remained significant while controlling gender, race, and socioeconomic status. This is supported by the results of a study conducted by (Wittberg, Northrup, & Cottrel, 2009) which indicated that there is a significant relationship between aerobic exercise and general fitness training on academic ability.

Some literature stated that there is a positive relationship of physical fitness and cognitive ability. The results can be explained from physiological and psychological mechanisms (Chomitz et al., 2009). High level physical fitness improves circulation, improves blood flow to the brain, maintains levels of norepinephrine and endorphins (which reduce stress level), elevates mood, stimulates calmness after exercise, and improves academic achievement (Taras, 2005). In addition, a high level of physical fitness sustain a better association with neurocognitive processes in children (Hillman et al., 2005). These findings require

consideration in the educational policy making process considering the students who were more fit had higher test scores and fewer absences. (Chu, Chen, Pontifex, Sun, & Chang, 2019) findings stated different relationships between health-related fitness components and academic achievement as well as underlying neurocognitive processes. Further studies may consider multiple aspects of health-related physical fitness effect on youth's academic achievement and require neuroelectric perspective. However, the results of this study indicate that physical fitness is very influential on grade-point average index. Maintain physical fitness, it has an excellent academic achievement is not difficult. Structured exercises such as HITT and Tabata Workout can maintain and improve physical fitness (Arisman & Noviarini, 2021; Syamsudin, Herawati, Qurnianingsih, & Wungu, 2021).

CONCLUSION

Data analysis shows that the Physical Education students of Sriwijaya University in general students physical education has an average of good fitness level. Based on the statistical analysis, it can be concluded that physical fitness has a positive correlation with grade-point average index. It is also shows that physical fitness affects the grade-point average index. This means that the higher the level of a student's physical fitness, the higher the grade point average (academic achievement). Therefore, students, lecturers, and parents can control the physical activity of the students, so that their physical fitness can be controlled and their academic achievement can be maintained or even improved. Based on this literature, it can be suggested that academic achievement and physical fitness will not be improved if the lecturers, the parents, or the students themselves limit the physical activity. Further studies may consider multiple aspects of health-related physical fitness effect on youth's academic achievement and require neuroelectric perspective.

REFERENCES

- Åberg, M. A. I., Pedersen, N. L., Torén, K., Svartengren, M., Bäckstrand, B., Johnsson, T., ... Kuhn, H. G. (2009). Cardiovascular fitness is associated

- with cognition in young adulthood. *Proceedings of the National Academy of Sciences of the United States of America*, 106(49), 20906–20911. <https://doi.org/10.1073/pnas.0905307106>
- Arisman, & Noviarini, T. (2021). Tabata workout dalam meningkatkan kebugaran atlet panahan. *Halaman Olahraga Nusantara (Jurnal Ilmu Keolahragaan)*, 4(1), 22. <https://doi.org/10.31851/hon.v4i1.5093>
- Balasekaran, G., Hui, S. S.-C., Ng, Y. C., Govindaswamy, V. V., Lim, J., & Boey, P. (2017). Fitness Index on Physical Fitness, Obesity and Dietary Intake of Youths in Singapore. *Asian Journal of Physical Education and Sport Science*, 5(1), 15–27. <https://doi.org/10.24007/ajpess.2017.5.1.002>
- Bayu, W. I., & Hasmara, P. S. (2018). *The Relationship between Physical Fitness and Academic Achievement in Physical Education, Sport, and Health*. *I(Icsshpe 2017)*, 124–128. <https://doi.org/10.5220/0007056301240128>
- Blom, L. C., Alvarez, J., Zhang, L., & Kolbo, J. (2009). *Associations between Health-Related Physical Fitness, Academic Achievement and Selected Academic Behaviors of Elementary and Middle School Students in the State of Mississippi*. 6(1), 13–19.
- Castelli, D. M., Hillman, C. H., Buck, S. M., & Erwin, H. E. (2007). Physical fitness and academic achievement in third- and fifth-grade students. *Journal of Sport and Exercise Psychology*, 29(2), 239–252. <https://doi.org/10.1123/jsep.29.2.239>
- Chomitz, V. R., Slining, M. M., McGowan, R. J., Mitchell, S. E., Dawson, G. F., & Hacker, K. A. (2009). Is there a relationship between physical fitness and academic achievement? Positive results from public school children in the Northeastern United States. *Journal of School Health*, 79(1), 30–37. <https://doi.org/10.1111/j.1746-1561.2008.00371.x>
- Chu, C. H., Chen, F. T., Pontifex, M. B., Sun, Y., & Chang, Y. K. (2019). Health-related physical fitness, academic achievement, and neuroelectric measures in children and adolescents. *International Journal of Sport and Exercise Psychology*, 17(2), 117–132. <https://doi.org/10.1080/1612197X.2016.1223420>
- Coe, D. P., Pivarnik, J. M., Womack, C. J., Reeves, M. J., & Malina, R. M. (2006). Effect of physical education and activity levels on academic achievement in children. *Medicine and Science in Sports and Exercise*, 38(8), 1515–1519. <https://doi.org/10.1249/01.mss.0000227537.13175.1b>

- Cvejić, D., Pejović, T., & Ostojić, S. (2013). Assessment of physical fitness in children and adolescents. *Facta Universitatis - Series: Physical Education and Sport*, 11(2), 135–145.
- DeFina, L. F., Haskell, W. L., Willis, B. L., Barlow, C. E., Finley, C. E., Levine, B. D., & Cooper, K. H. (2015). Physical Activity Versus Cardiorespiratory Fitness: Two (Partly) Distinct Components of Cardiovascular Health? *Progress in Cardiovascular Diseases*, 57(4), 324–329. <https://doi.org/10.1016/j.pcad.2014.09.008>
- Deuster, P. A., & Silverman, M. N. (2013). Physical fitness: A pathway to health and resilience. *U.S. Army Medical Department Journal*, 24–35. Retrieved from https://www.researchgate.net/publication/258065513_Physical_fitness_A_pathway_to_health_and_resilience
- Donnelly, J. E., Greene, J. L., Gibson, C. A., Smith, B. K., Washburn, R. A., Sullivan, D. K., ... Williams, S. L. (2009). Physical Activity Across the Curriculum (PAAC): A randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children. *Preventive Medicine*, 49(4), 336–341. <https://doi.org/10.1016/j.ypmed.2009.07.022>
- Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., ... Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. *Medicine and Science in Sports and Exercise*, 48(6), 1197–1222. <https://doi.org/10.1249/MSS.0000000000000901>
- Fisher, A., Boyle, J. M. E., Paton, J. Y., Tomporowski, P., Watson, C., McColl, J. H., & Reilly, J. J. (2011). Effects of a physical education intervention on cognitive function in young children: Randomized controlled pilot study. *BMC Pediatrics*, 11, 1–9. <https://doi.org/10.1186/1471-2431-11-97>
- Gu, X., Chang, M., & Solmon, M. A. (2016). Physical activity, physical fitness, and health-related quality of life in school-aged children. *Journal of Teaching in Physical Education*, 35(2), 117–126. <https://doi.org/10.1123/jtpe.2015-0110>
- Hillman, C. H., Castelli, D. M., & Buck, S. M. (2005). Aerobic fitness and neurocognitive function in healthy preadolescent children. *Medicine and Science in Sports and Exercise*, 37(11), 1967–1974. <https://doi.org/10.1249/01.mss.0000176680.79702.ce>
- Jakobsson, B. T., Lundvall, S., Redelius, K., & Engström, L.-M. (2012). Almost

- all start but who continue? A longitudinal study of youth participation in Swedish club sports. *European Physical Education Review*, 18(1), 3–18. <https://doi.org/10.1177/1356336X11430660>
- Keeley, T. J. H., & Fox, K. R. (2009). The impact of physical activity and fitness on academic achievement and cognitive performance in children. *International Review of Sport and Exercise Psychology*, 2(2), 198–214. <https://doi.org/10.1080/17509840903233822>
- Middleton, L. E., Barnes, D. E., Lui, L. Y., & Yaffe, K. (2010). Physical activity over the life course and its association with cognitive performance and impairment in old age. *Journal of the American Geriatrics Society*, 58(7), 1322–1326. <https://doi.org/10.1111/j.1532-5415.2010.02903.x>
- Sandroff, B. M., Motl, R. W., Scudder, M. R., & DeLuca, J. (2016). Systematic, Evidence-Based Review of Exercise, Physical Activity, and Physical Fitness Effects on Cognition in Persons with Multiple Sclerosis. *Neuropsychology Review*, 26(3), 271–294. <https://doi.org/10.1007/s11065-016-9324-2>
- Syamsudin, F. (2021). HIIT for Improving Maximal Aerobic Capacity in Adults Sedentary Lifestyle. *Halaman Olahraga Nusantara (Jurnal Ilmu Keolahragaan)*, 4(1), 1. <https://doi.org/10.31851/hon.v4i1.5139>
- Syamsudin, F., Herawati, L., Qurnianingsih, E., & Wungu, C. D. K. (2021). HIIT for improving maximal aerobic capacity in adults sedentary lifestyle. *Halaman Olahraga Nusantara (Jurnal Ilmu Keolahragaan)*, 4(1), 11. <https://doi.org/10.31851/hon.v4i1.5139>
- Taras, H. (2005). Physical activity and student performance at school. *Journal of School Health*, 75(6), 214–218. <https://doi.org/10.1111/j.1746-1561.2005.00026.x>
- Wittberg, R. A., Northrup, K. L., & Cottrel, L. (2009). Children's Physical fitness and Academic Performance. *American Journal of Health Education*, 40(1), 30–36. <https://doi.org/10.1177/145507259801500106>