

Physical Fitness Level Vs Cumulative Achievement Index

Hartati¹, Iyokus², Destriana³, Lordinio A. Vergara⁴

^{1,2,3}Physical Education Department, Universitas Sriwijaya, Palembang, South Sumatra, Indonesia

⁴Physical Education Department, Philippine Normal University, Philippine

¹hartati@fkip.unsri.ac.id, ²Iyokus@fkip.unsri.ac.id, ³destriana@fkip.unsri.ac.id, ⁴Lordinioavergara@pnu.gmail.com

*Corresponding Author E-mail: hartati@fkip.unsri.ac.id

Abstract

This study aims to look at the relationship between physical fitness and the cumulative achievement index. This research used quantitative method with survey techniques with design correlation. The subjects of this study were Physical Education students from semester 1,3,5, and 7 with 120 students. The sampling technique used was random sampling. The instrument used in this study was TKJI (Indonesian Physical Fitness Test). The results the relationship between physical fitness and cumulative achievement index is very strong where R is valued at 0.891 so it is said to have a very strong relationship, and R square value of 0.795 this data shows that the effect of cumulative performance index on physical fitness was 79.5%, the statistical test of the coefficient of regression test can be seen in the Sig column with the Sig value P = 0,000 so at 5% absent physical fitness has a significant effect on the cumulative achievement index. Based on the t test = the value of t arithmetic (21,360) > t table (2.12) means that it can be concluded that physical fitness affects the cumulative performance index, so good physical fitness could contribute to improvement in cumulative performance index.

Keywords: Physical Fitness, Cumulative Achievement Index

Corresponding Author: Hartati

Physical Education Department, Universitas Sriwijaya,
Palembang, South Sumatra, Indonesia

E-mail: hartati@fkip.unsri.ac.id

INTRODUCTION

The degree of health is the main pillar together with education and economy which are very closely linked to the improvement of the quality of human resources, so that it is expected to create strong, productive and capable human resources to compete all the challenges that will be faced, so that the degree of health is very much determined by one's physical fitness. Physical fitness is needed to live this life as well as possible, without physical fitness in doing daily activities, people will get tired more quickly. Physical fitness is a quality of life in the form of the ability to do daily work without significant fatigue, as well as having the energy to enjoy leisure time and unexpected emergencies. Then, physical fitness also can be good for someone to be able to adapt all physical and psychological burdens. It receives so as to achieve optimal productivity / work performance, [8] Physical activity (PA) and cardiorespiratory fitness (CRF) both have inverse relationships to cardiovascular (CV) morbidity and mortality, recent position papers and guidelines have identified the important role of both of these factors in CV health. The benefits of PA and CRF in the prevention of CV disease and risk factors are reviewed. In addition, assessment methodology and utilization in the research and clinical arenas are discussed. Finally, the benefits, methodology, and utilization are compared and contrasted to better understand the two (partly) distinct components and their impact on CV health. Maintaining physical fitness needs to be continued to maintain physical fitness, [13] *the impact of anemia for elementary school-age children is that it can cause problems of child growth and development*, so a healthy lifestyle must be instilled so that it can continue to develop and become a culture. Physical fitness is very important 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 for all Indonesian people, through the process of education it is expected that attitudes and awareness of each individual will arise to improve and maintain physical fitness, it not for just Indonesian people in China with data [27] the Chinese school-aged population, about 3 in 10 children achieved an "excellent" or "good" fitness standard in 2016, and about 8% of this population did not meet CNSPFS, standards which subsequently become his habits and needs of life. Physical Education is an educational process that utilizes physical activities that are planned systematically aimed at developing and enhancing individuals organically, neuromuscularly, perceptually, cognitively, and emotionally within the framework of the national education system. Physical Education is a physical activity organized to be a medium for educational activities, the opinion [18] the cognitive domain(s) that were targeted, participant-specific characteristics, outcome measures, and study results. The present review resulted in 26 studies on the effects of exercise, physical activity, and physical fitness on cognition in persons with MS. This included 1 Class I study, 3 Class II studies, 8 Class III studies, and 14 Class IV studies. Of the 26 total studies, 6 were randomized controlled trials. Overall, there is conflicting evidence for the effects of exercise on cognition in MS, and overall positive, but not definitive evidence for the effects of physical activity and physical fitness, respectively, on cognition in this population. Collectively, there is insufficient well-designed research to definitively conclude that exercise, physical activity, and physical fitness are effective for improving cognition in MS. Education is an activity that is a process to develop spiritual abilities and attitudes which include mental,

Physical Fitness Level Vs Cumulative Achievement Index

intellectual and even spiritual aspects.

Sport is a series of regular and planned physical exercises to maintain movement (maintain life) and improve movement ability (improve quality of life), [16] the ability of students' endurance is better than other abilities of physical fitness, the beneficial of students with high cardiovascular endurance they are able to do physical activities with long duration, so it is important for students who active in some sports activities. Like eating, exercise is a necessity of life that is periodic, meaning that sport as a tool to maintain and foster health, cannot 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 and [5] the role of the teacher as a motivator is very important in educational interaction, because it involves the essence of educational work that requires social skills, concerning performance in personalization and self-socialization. Here are ten teacher competencies that are closely related to the task of shaping the learning motivation of students in schools, from the elementary school level (elementary), junior high school, senior high school, and even in college. Higher education, especially universities, in Singapore [1] results found that boys were significantly stronger than girls, whereas girls were significantly more flexible. In general, obesity rates in Singapore are kept at a low percentage, although youths should participate in higher amounts of physical activity and exercise. It is recommended that youths consume more nutrients and reduce their intake of night snacks, desserts, and fried food in their daily diet. If this health trend continues lifelong, there may be a low risk of cardiovascular disease. One of the State Universities in the Physical education (PE) study program in Sriwijaya University. The PE Study Program was established in 2004 which has graduated 12 batches and has been widely accepted as both civil servants and private. 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 percentage of health science is certainly more given to students because it matches the name of the physical education and health study program. One of them is physical education courses and various sports are taught in physical and health education study programs. The purpose of this Physical Education study program besides producing skilled and healthy Physical Education teachers, of course, the mental emotional aspects are also taught. Learning related to the practice and theory of sports is more taught starting from semester 1 to semester 5. Subjects are given from basic knowledge such as athletics 1, volleyball 1, gymnastics 1 subsequently increased to the understanding of techniques, tactics and proficiency in teaching or practice teaching as the end of the lecture. Thus of course students besides getting knowledge about student theory can also improve physical fitness and skills of each branch of sport the result research of [11] a majority of the research supports the view that physical fitness, single bouts of Physical Activity (PA), and PA interventions benefit children's cognitive functioning, limited evidence was available concerning the effects of PA on learning, with only one cross-sectional study meeting the inclusion criteria. Evidence indicates that PA has a relation to areas of the brain that support complex cognitive processes during laboratory tasks. While favorable results have been obtained from cross-sectional and longitudinal studies related to academic achievement, the results obtained from

controlled experiments evaluating the benefits of PA on academic performance are mixed and additional, well-designed studies are needed.

The aspect of physical fitness certainly indirectly increases for Physical Education students, this is because in learning sports practice students do physical activity for more than 60 minutes in one meeting if the practice. Thus the level of physical condition of students will certainly also increase along with the physical activity of students live while attending the study program in physical education and health, like result research [14] physical activity and four components of physical fitness were positively associated with physical and mental function. Path analyses suggested physical fitness mediated the relationship between self-reported physical activity and health-related quality of life (95%) as well as between pedometer-based physical activity and health-related quality of life (95%), results support the conclusion that enhancing children's physical fitness can facilitate positive outcomes including improved health related quality of life. A good physical condition certainly needs to be known by conducting tests on that person.

One way to find out the level of physical fitness of students is to do a physical fitness test, Then, this study will discuss correlation of physical fitness and the cumulative achievement index of Physical Education students in Sriwijaya University, [20] the essence of the concept of correlation, that of simultaneous variation of the values of two variables, provides a basis of a mutual prediction between those variables.

METHODOLOGY

This research method is Corelation. Corelational method where among certain actions and measures the theory cannot establish any relationship, the correlation method is one of the techniques that can fill this gap by processing experimental data [15, 21]. [2] Correlation method is used to analyze the links, which manifests dependencies between most mass phenomenon in real life [17,20,12,10,19] correlation will show how strong is the link, dependency between variables, while regression will help in explaining and predicting a factor based on the value of another (others) which, obviously, will reduce uncertainty regarding important but random phenomena. This study used the Indonesian Physical Fitness Test Instrument (TKJI), TKJI is a battery test consisting of 5 test items, namely: 1) sprint 60; 2) pull up 3) sit up; 4) vertical jump; and 5) running 1200 m. The test is done sequentially because TKJI is a battery test, starting from test item one, then test item two, then test item 3, then test item 4 and finally test item five and instrument documentation for got the cumulative pretation index. The research was conducted at the Sriwijaya University. This method divided the population into homogeneous groups 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 120 students, consisting of 80 men and 40 women. The dependent variable was physical fitness and independent variabel was cumulative achievement index, and the data analysis with regresion test.

RESULT

Physical Fitness Test, physical Fitness Test is a battery test that consist of:

Sprint

Physical Fitness Level Vs Cumulative Achievement Index

Sprint aims to measure speed. The distance category that must be traveled by each age group is different. Distance use 60 Meter because the age 16-19 years old.

Table 1. norm of 60 meter

Value	Age group 16-19 years old	
	Boys	Girls
5	Up to – 7.2 Sec	Op to – 8.4 Sec
4	7.3 – 8.3 Sec	8.5 – 9.8 Sec
3	8.4 – 9.6 Sec	9.9 – 11.4 Sec
2	9.7 – 11.0 Sec	11.5 – 13.4 Sec
1	11.1 or more	13.5 or more

Pull-up

Pull up aims to measure the strength of the arm and shoulder muscles. For ages 16-19, pull-up movements are performed for 60 seconds. The assessment for boys is calculated in frequency, while the girls is calculated in time, each assessment is as follows:

Table 2. norm of pull up

Value	Age group 16-19 years old	
	Boys	Girls
5	19 times or more	40 seconds or more
4	14 – 18 times	20 – 39 seconds
3	09 – 13 times	08 – 19 seconds
2	05 – 08 times	02 – 07 seconds
1	00 – 04 times	00 – 02 seconds

Sit-up

Situp the criteria for evaluating the age group of 16-19 years who perform sit-up for 60 seconds. (Table 3)

Vertical jump

This test aims to measure the explosive power of the leg muscles. The size of the scale board is 30 cm wide and 150 cm long, where the distance between measurement lines is 1 cm each. (Table 4)

Table 3. norm of sit up

Value	Age group 16-19 years old	
	Boys	Girls
5	19 times or more	40 seconds or more
4	14 – 18 times	20 – 39 seconds
3	09 – 13 times	08 – 19 seconds
2	05 – 08 times	02 – 07 seconds
1	00 – 04 times	00 – 02 seconds

Table 7. model summary

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

a. Predictors: (Constant), Cumulative achievement index

Table 7 above shows that the relationship between physical fitness and cumulative achievement index is very strong where R is valued at 0.891 so it is said to have a very strong

Table 8. anova

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

a. Dependent Variable: Physical Fitness
b. Predictors: (Constant), Cumulative achievement index

Table 9. coefficients^a

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

a. Dependent Variable: Physical Fitness

5	41 times or more	29 times or more
4	30 – 40 times	20 – 28 times
3	21 – 29 times	10 – 19 times
2	10 – 20 times	03 – 09 times
1	00 – 09 times	00 – 02 times

Table 4. norm of vertical jump

Value	Age group 16-19 years old	
	Boys	Girls
5	73 cm or more	50 cm or more
4	60 - 72 cm	39 - 49 cm
3	50 - 59 cm	31 - 38 cm
2	39 - 49 cm	23 - 30 cm
1	under 39 cm	under 23 cm

Medium distance running

Medium distance running was done to measure the endurance of the lungs, heart and blood vessels. The distance traveled depends on each age group. The distance use 16-19 years is 1200 m. While the assessment criteria are as follows:

Table 5. norm of 1200 m

Value	Age group 16 - 19 years old	
	Boys	Girls
5	Up to 3'14"	Up to 3'52"
4	3'15"-4'25"	3'53"-4'56"
3	4'26"-5'12"	4'57"-5'58"
2	5'13"-6'33"	5'59"-7'23"
1	under 6'33"	under 7'23"

The research results obtained physical research results of Physical Education students by conducting TKJI tests on students. The test was conducted on 120 students. The following test results are obtained as follows:

Table 6. classification norm

No	Total Value	Classification
1	22 – 25	Very Good
2	18 – 21	Good
3	14 – 17	Average
4	10 – 13	Poor
5	05 – 09	Very Poor

The results of the correlation between physical fitness and the cumulative achievement index are as follows:

relationship, and R square value of 0.795 this data shows that the effect of cumulative performance index on physical fitness was 79.5%.

FINDINGS

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 value $P = 0,000$ so at 5% absent physical fitness has a significant effect on the cumulative achievement index. Based on the t test = the value of t arithmetic $(21,360) > t$ table (2.12) means that it can be concluded that physical fitness affects the cumulative performance index.

DISCUSSION

Factors that influence the results of physical fitness level in this study because students are accustomed to running sports provided by Physical Education lecturers so that when doing TKJI tests students have no fear of fatigue, enthusiasm to do physical fitness tests, weather when doing physical fitness tests is very supportive, students Orderly in accordance with the instructions, adequate rest because one week before the TKJI test calls on students to take regular breaks. With all the possibilities that exist above students can get a level of physical fitness with a good category.

The physical fitness of students who are categorized as good cannot be obtained by them selves without a regular and systematic training effort, [7] the relationship between physical fitness and academic achievement has received much attention owing to the increasing prevalence of children who are overweight and unfit, as well as the inescapable pressure on schools to produce students who meet academic standards, this study examined 259 public school students in third and fifth grades and found that field tests of physical fitness were positively related to academic achievement, specifically, aerobic capacity was positively associated with achievement, where as BMI was inversely related. Associations were demonstrated in total academic achievement, mathematics achievement, and reading achievement, thus suggesting that aspects of physical fitness may be globally related to academic performance in preadolescents. The findings are discussed with regards to maximizing school performance and the implications for educational policies, same research [3] the results indicated a statistically significant positive correlation between fitness and standardized test scores in Language Arts and Math and a statistically significant negative relationship with school absences. The relationships remained significant while controlling for gender, race, and socioeconomic status. Given that students who were more fit had higher test scores and fewer absences, these findings warrant consideration in the educational policy making process, [9] these findings suggest differential relationships between components of health-related fitness and academic achievement as well as underlying neuro cognitive processes, without that [28] the relationship between actual motor competence and physical activity with bootstrap method it show physical have related with motor cpmptence. Future research regarding the effect of multiple aspects of health-related physical fitness on youth's academic achievement and adopting a neuro electric perspective is warranted. Based on this, the results of this study indicate physical fitness is very influential on cumulative achievement index, there are some studies which have found associations between physical activity and perceived cumulative achievement index, [26] poor academic performance was related to low overall physical fitness, the probability of having poor academic performance was significantly lower

among students with high physical fitness than those with low physical fitness, beside that therefore we took the advantage of our representative sample and included this analysis in our study. In line with previous findings [25,4, 23,6,22] higher fitness values were positively associated with better self-rated health in the studied elderly. It is necessary to know which aspects of physical fitness are most important for older people is necessary, since increasing those physical fitness capacities could contribute to improvements in their health-related quality of life, [24]so appears that rigorous attempts to promote positivechanges in physical activity and fitness are needed in young generation.

CONCLUSION

Conclusion of relationship physical fitness and cumulative achievement index is very strong where R is valued at 0.891 so it is said to have a very strong relationship, and R square value of 0.795 this data shows that the effect of cumulative performance index on physical fitness was 79.5%, the statistical test of the coefficient of regression test can be seen in the Sig column with the Sig value $P = 0,000$ so at 5% absent physical fitness has a significant effect on the cumulative achievement index. Based on the t test = the value of t arithmetic $(21,360) > t$ table (2.12) means that it can be concluded that physical fitness affects the cumulative performance index so good physical fitness capacities could contribute to improvements learning outcomes.

ACKNOWLEDGMENTS

Thank you to Universitas Sriwijaya for funding this research through an international collaboration scheme so that this research can run smoothly, in addition to the research members both colleagues and students who have helped in the research process.

REFERENCES

1. 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 of Sport Science (AJPESS)*, 5(1), 15-27.
2. Berenson, M., Levine, D., Szabat, K. A., & Krehbiel, T. C. (2012). *Basic business statistics: Concepts and applications*. Pearson higher education AU.
3. Blom, L. C., Alvarez, J., Zhang, L., & Kolbo, J. (2011). Associations between Health-Related Physical Fitness, Academic Achievement and Selected Academic Behaviors of Elementary and Middle School Students in the State of Mississippi. *ICHPER-SD Journal Of Research*, 6(1), 13-19.
4. Brovold T, Skelton DA, Bergland A. Association Between Health-Related Quality of Life, Physical Fitness and Physical Activity in Older People Recently Discharged from Hospital. *J Aging Phys Act*. 2013. 27;In press.
5. Cahyati, S., Sukoco, P., & Hartati, H. (2020, February). Implementation of Motivation Physical Education Learning in Elementary Schools. In *3rd International Conference on Learning Innovation and Quality Education (ICLIQE 2019)* (pp. 289-301). Atlantis Pres.
6. Carter ND, Khan KM, Mallinson A, et al. Knee extension strength is a significant determinant of static and dynamic balance as well as quality of life in older community-dwelling women with osteoporosis. *Gerontology*. 2002. 48(6):360-8.

Physical Fitness Level Vs Cumulative Achievement Index

7. 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.
8. 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.
9. 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.
10. Dinç, E., Baleanu, D., & Tokar, F. (2008). Simple mathematical resolution for binary mixture of oxfendazole and oxclozanide in bolus by bivariate and multivariate calibrations based on the linear regression functions. *Revue Roumaine de Chimie*, 4(53), 303-307.
11. 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.
12. 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.
13. Hartati, H., Marlina, M., & Muslimin, M. Factors Affecting The Event of Anemia On Students. *Journal Physical Education, Health and Recreation*, 4(2).
14. Hristian, L., Bordeianu, D. L., Iurea, P., Sandu, I., & Earar, K. (2014). Study of the tensile properties of materials destined to manufacture protective clothing for firemen. *Revista de Materiale Plastice*, 51(4), 405-409.
15. Karpínska, J., Sokół, A., & Rožko, M. (2009). Applicability of derivative spectrophotometry, bivariate calibration algorithm, and the vierordt method for simultaneous determination of ranitidine and amoxicillin in their binary mixtures. *Analytical Letters*, 42(8), 1203-1218.
16. Kusnanik, N. W., & Hartati, H. (2017). Physical and Physiological Profil Of Junior High Student In Indonesia. *Sports Science*, 10(1), 96-99.
17. Manea, L. R., Scarlet, R., Leon, A. L., & Sandu, I. (2015). Control of Nanofibers Production Process Through Electrospinning. *Revista de Chimie*, 66(5), 640-644.
18. Sandroff, B. M., Motl, R. W., Scudder, M. R., & DeLuca, J. (2016). Systematic, evidence-based multiplesclerosis. *Neuropsychology review*, 26(3), 271-294.
19. Pedrero-Chamizo, R., Gómez-Cabello, A., Melendez, A., Vila-Maldonado, S., Espino, L., Gusi, N., ... & Ara, I. (2015). Higher levels of physical fitness are associated with a reduced risk of suffering sarcopenic obesity and better perceived health among the elderly. The EXERNET multi-center study. *The journal of nutrition, health & aging*, 19(2), 211-217.
20. Popescu, V., Manea, L. R., & Amariei, N. (2009). Determination of the Factors Influencing the Flame Retardant Efficiency of the Protection-Dyed Cellulose Materials Using the Analysis of Variances. *Materiale Plastice*, 46(1), 95.
21. Roman Stan, F. (2013). Application Regression Method In The Calculation Of Indicators Economic Risk. *Romanian Statistical Review*, (8).
22. Sayer AA, Syddall HE, Martin HJ, et al. Is grip strength associated with health-related quality of life? Findings from the Hertfordshire Cohort Study. *Age Ageing*. 35(4):409-15.
23. Takata Y, Ansai T, Soh I, et al. Quality of life and physical fitness in an 85-year-old population. *Arch Gerontol Geriatr*. 2010. 50(3):272-6.
24. Vaara, J., Santtila, M., Koski, H., & Kyroläinen, H. (2017). Physical activity and physical fitness trends in Finnish reservists during 2003–2015. *Journal of Science and Medicine in Sport*, 20, S13.
25. Wanderley FA, Silva G, Marques E, et al. Associations between objectively assessed physical activity levels and fitness and self-reported health-related quality of life in community-dwelling older adults. *Qual Life Res*. 2011. 20(9):1371-8.
26. Zhai, X., Ye, M., Gu, Q., Huang, T., Wang, K., Chen, Z., & Fan, X. (2020). The relationship between physical fitness and academic performance among Chinese college students. *Journal of American College Health*, 1-9.
27. Zhu, Z., Yang, Y., Kong, Z., Zhang, Y., & Zhuang, J. (2017). Prevalence of physical fitness in Chinese school-aged children: findings from the 2016 Physical Activity and Fitness in China—The Youth Study. *Journal of sport and health science*, 6(4), 395-403.
28. Z, Khodaverdi,., Bahram, A., Stodden, D., & Kazemnejad, A. (2016). The relationship between actual motor competence and physical activity in children: mediating roles of perceived motor competence and health-related physical fitness. *Journal of sports sciences*, 34(16), 1523-1529.