Analysis of food intake, physical activity, and physical fitness levels of education and health students

by Meirizal Usra

Analysis of food intake, physical activity, and physical fitness levels of education and health students

Hartati[1*], Iyakrus[1], M Usra[1], Destriani[1]
[1]Physical Education and Health Study Program, Universitas Sriwijaya, Palembang, Indonesia

Email: hartati@fkip.unsri.ac.id

Abstract. This study aims to determine the relationship between food intake, physical activity and physical fitness of students of Physical Education and Health. This type of research uses a cross sectional study. The variables observed included food intake, physical activity and physical fitness. The population of this research is the third semester students of Physical Education and Health, Faculty of Teacher Training and Education, Sriwijaya University, Palembang class. The subjects of this study amounted to 27 people. Data collection use characteristics on students diet, students physical activity and student physical fitness. While secondary data includes age, gender and socioeconomic which is obtained through filling out questionnaires. Data on students eating patterns were obtained through food recall 2x24 hours using a food model book. Based on the results of the discussion, it can be concluded that the nutritional status is normal (81.5 %), the level of physical activity is in the light category (45.28%) and the level of fitness is quite adequate (47.17%), this value is classified as very good. The results of the Spearman Rank relationship showed that there was no significant relationship (r=0.159, p>0.05) between age and pulse rate (body fitness level). Most of the examples who are around 17-19 years old still have a sufficient level of fitness. While the results of the chi square test showed that gender was not significantly related to the level of body fitness (p = 0.169). This is presumably because the sample variation with the female gender is too small so that it is not sufficiently representative.

1. Introduction

The world continues to progress from time to time and brings various forms of progress or development that help and facilitate humans. These developments or advances occur in various fields, including education, technology, transportation, education and so on. The various conveniences obtained from these advances cause humans to consciously or unconsciously experience changes in monotonous or limited behavior patterns, and fast and instant consumption behavior to save time.

Individuals with obese nutritional status tend to be reluctant to do activities so that their motor skills and physical fitness are reduced. Physical fitness can affect the body's resistance to disease and can determine a person's quality of life. Someone who has a good degree of physical fitness will be able to carry out a good task as well. Physical fitness is influenced by age, gender, physical activity, exercise intensity, nutritional intake and nutritional status [1].

Achievements achieved by Physical Education and Health students are influenced by various things, one of which is physical fitness. Physical fitness is the ability of a person's body to carry out daily work effectively and efficiently within a certain period of time without causing excessive fatigue [2]. Good physical fitness is characterized by the ability to carry out daily activities and activities well, so that active physical activity accompanied by proper and regular physical exercise to achieve optimal fitness [3].

A good level of physical fitness requires good nutritional status. The better the nutritional status, the higher the physical fitness [4]. The factors that affect physical fitness are age, gender, physical activity, energy intake, smoking, nutritional status, genetics, exercise intensity, exercise duration and exercise frequency.

The relationship between physical activity and lipid/lipoprotein levels and body composition among the pediatric population is not completely consistent in the literature, so in a study conducted [5] by analyzing lipid and lipoprotein profiles in daily physical activity and body composition in children and adolescents who were differentiated according to activity level. physical activity, so that every literature review is not always consistent, all based on the physical activity of each respondent.

Physical activity will run well if it is accompanied by adequate nutritional intake and adequate body composition [6]. The body's need for nutrients has an impact on good nutritional status if the nutrients are met in adequacy. [7] Based on the results of his research, he explained that by designing a learning model to make it easier to calculate the nutritional value of athletes or students, with these results it can be seen that it can make it easier for students to calculate nutritional values. For the level of physical fitness affects the high and low students learning achievement. Students who have a good level of physical fitness will have endurance, concentration power, and the availability of energy to carry out learning activities.

For students of physical education and health, physical fitness is an absolute requirement, because students of physical education and health in lectures are more in the field and use physical activity compared to theory in the classroom. Therefore, physical fitness is an absolute must-have factor. So that various efforts are made to maintain or improve physical fitness

But in fact, based on observations, it is known that there are many obstacles to physical fitness in physical education, such as environmental conditions, nutritional intake of food, facilities and infrastructure, gender, preferences/interests, implementation of learning. Improved physical fitness can be improved by exercise or routine activities. There have been many physical fitness improvement programs that have been carried out, both at a low cost and fun. Based on the research that has been done describes that based on this research the level of physiological ability at the age of adolescence is still in the less category so it should be improved again. It is important to study differences in body composition, physical fitness, and lifestyle behavior between students in order to develop a specific recommendation on health promotion to give to students [8]. The research conducted [9] aims to analyze differences in body composition, physical fitness, and lifestyle behavior between students so it is necessary to do research on the variables of food intake, physical fitness level, and physical activity.

A good level of physical fitness will lead to good physical abilities as well. Students who are always active will have good physical fitness, so that learning outcomes will be better than students with low levels of physical fitness. Based on the above background, it is necessary to conduct research with the title profile of food intake, physical activity and physical fitness level of Physical Education and Health students.

2. Method

This study use a cross-sectional study, which is a research design or can also be seen as a social research methodology by involving more than one case at a time and also involving several variables to see the pattern of the relationship.

The data collected can often be used to examine more than one case and the variables used more than two. A cross-sectional study is a research with an extensive dataset. This research design is called cross-sectional because the data collected can be analyzed between cases or between sections. The case in question is, the diet of students, physical activity that students do in their daily lives and the level of physical fitness of the students of Physical Education, FKIP Sriwijaya University as the research sample. The research design in Figure 1.
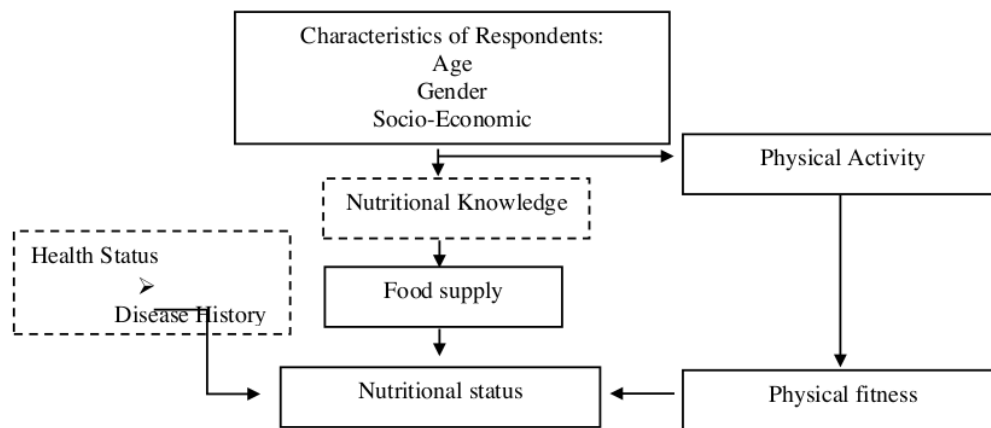
Figure 1. Research Design

3. Results and Discussion
3.1. Results
Characteristics of Respondents. Respondents in this study ranged from 17 to 22 years in general, which were generally classified as adults. Most of them are male (74.07%). While viewed from the socio-economic condition of all respondents ranged from Rp. 0-500,000 (3.7%), Rp. 500,500 – 1,000,000 (25.9 %), Rp. 1,000,500 – 1,500,000 (51.8%) and > Rp. 1,500,500 (18.5%). The results of this study are in line with [7] research in Brebes district which shows that the number of female physical education students is relatively small compared to male physical education teachers. This is because psychomotorically male students are faster, and have greater energy than female students, besides that the physical education teacher profession is one of the professions that drains sweat and requires extra physical conditions.

    Food supply. This study use anthropometric tests to determine or measure the nutritional status of students and compare the relationship between food intake and the level of physical fitness of students. At the initial stage before carrying out the nutritional status test, students were collected based on the serial number provided by the researcher, students were called one by one to carry out the test. The following is a distribution of examples based on nutritional status in Table 1

Table 1. Distribution by nutritional status

Nutritional status	n	%
Normal	22	81.5
Overweight	5	18.5
Obesity	0	0
Total	**27**	**100**

3.1.3 Physical Activity
Based on Table 2. most of the examples did light physical activity as much as 45.3%. The average level of physical activity or PAL samples of around 1.77±0.20 belonged to the moderate category. The following distribution of examples based on the level of physical activity can be seen in Table 2

Table 2. Distribution of Physical Education Students by Level of Physical Activity

Physical Activity Level	AF Work	AF Holiday	Average

	n	%	n	%	n	%
Light Activity (1.40-1.69)	14	55.6	10	37	13	46.3
Moderate Activity (1.70-1.99)	8	29.6	11	40.7	9	33.3
Strenuous Activity (2.00-2.40)	4	14.8	6	22.2	5	18.5
Total	27	100	27	100	27	100
PAL Average±SD	**1.73±0.23**		**1.79±0.27**		**1.77±0.20**	

3.1.4 Physical fitness
Distribution of Physical Education and Health Students by Physical Activity Level

Table 3. Distribution of Physical Education Students by Physical Fitness Level

Physical Fitness Level	n	%
Not enough	4	14.8
Enough	14	51.9
Heavy	9	33.3
Total	**27**	**100**

3.2. Discussion

Food supply

Most of the Physical Education students have obesity nutritional status (41.5%). Nutritional status is influenced by direct and indirect factors. Factors that affect directly are food intake and infection status, while factors that influence indirectly are household food availability, child care patterns, and the environment [10]. The older you get, the more your body mass index increases. Body mass index (BMI) may be able to describe an individual's level of adiposity through height and weight. A high body mass index can be caused by an increase in adipocyte tissue or other increases in body composition, for example, individuals with greater muscle or bone mass will have a higher body mass index as well. Body mass index is an indicator of overall fitness that is useful in measuring larger populations, but is less sensitive for determining individual health status.

The results of this study were similar to [11] in Korean adults who showed that body mass index increased with age in both men and women. The increase in body mass index (BMI) is also caused by increasing age and body fat mass.

Physical Activity

More than half of the samples had light physical activity on weekdays (55.7%). This is presumably because based on physical activity *recall* data on weekdays, some examples of doing sports lecture activities in the classroom (learning theory), but some examples also practicing sports in the field (warming up, giving examples of movement), after that the examples spend more time to sit down for meetings, sit back and chat, and write. Most of the examples choose to go to work by motorbike.

A total of 29.6% of the samples had moderate activity because they moved more after teaching such as gardening, walking around campus and the campus environment, after returning home the samples also did household chores. As many as 14.8% of the samples had strenuous activities because some of the examples did sports activities such as badminton, volleyball, fitness, futsal. Research [1] with a stratified sample of 456 participants, almost half of female students are not physically active. Women mostly exercise at home or alone without a certain time in the day. Judging from the majority of activities carried out, it is very influential on the fitness of female students.

Most of the examples on holidays had light activity (37%). This is presumably because most of the examples on holidays spend time off to rest and do other *sedentary* activities . As many as 40.7% of the samples have moderate activity, this value is almost the same as the example that has light activity, because the activities carried out by the example on holidays include community service, cooking, washing, ironing, cleaning the house, gardening, and driving to go shopping. As many as 22.2% of the

examples have strenuous activities because they still do routine sports activities such as jogging, badminton, gymnastics, pencak silat, futsal, workout (push-ups, sit-ups), and *fitness* .

Physical fitness
Physical fitness is an aspect of overall fitness (*total fitness*), a collection of *health or skill related fitness* attributes that are not identical with physical activity, exclusively fitness related to endurance related to maximum capacity in oxygen consumption [1] . Physical fitness shows a person's ability to do physical tasks without being tired which means [12].

Most of the examples have a moderate level of physical fitness of 51.19%. The level of fitness that is considered quite predictable because at the time of measuring the fitness test in the morning before noon 23 days, namely at 08.30-11.00, so students are still in a relaxed state and have not experienced stress conditions, so this can affect fitness results. Factors that affect the fitness test are age, weight, stress level, level of motivation for example in completing the test, sample rest time, test execution time, and the last meal before the test [13].

Analysis Between Age and Physical Fitness
The *Spearman Rank* correlation test analysis showed that there was no significant relationship (r=0.159, p>0.05) between age and pulse rate (body fitness level). Most of the examples who are around 17-19 years old still have a sufficient level of fitness. This is not in line with research [19] which showed that an elderly person will experience a decrease in physical fitness because many tissues are damaged. Increasing age is associated with a decrease in lung physiological function [14].

The level of physical fitness increases until it reaches the maximum age of 30 years, after that it will decrease due to the functional capacity of the whole body also decreases, 0.8-1% per year, but this decrease can be reduced by half if you are diligent in exercising. The value of the physical fitness component will decrease after the age of 30 years [15]. The meaninglessness of this relationship is presumably because the number of respondents is too small and the age variation does not adequately represent the actual age group of each.

Analysis Between Gender and Physical Fitness
The results of the *chi square* test showed that gender was not significantly related to the level of physical fitness (p = 0.169). This is presumably because the sample variation with the female gender is too small so that it is not sufficiently representative. The results of this study are not in line with [15]. which shows that there is a significant relationship between gender and physical fitness.

Men tend to have higher fitness scores than women, due to the influence of male sex hormones, which have 10 times more testosterone than women, which makes muscles bigger and stronger and more aggressive [16]. Research conducted [17] explains that during adolescence, health status is influenced by several factors, including diet and physical activity which are important elements of lifestyle in terms of prevention and treatment of metabolic and chronic diseases, so that the influence of disease on health status is very important. influential [18]. in his research showed that childhood obesity increased in children with development. The relationship between physical activity levels and components of physical fitness has not been objectively studied in this population but may have clinical implications for health development.

Several studies have shown that gender differences in lung function. Females have smaller lung volumes, lower maximal expiratory flow rates and smaller diffusion surfaces than males [19].

Analysis Between Physical Activity and Physical Fitness
The *Spearman Rank* correlation showed that there was no relationship between physical activity and pulse rate (r= -0.71, p>0.05). The negative correlation between physical activity and pulse rate in this study shows that although there is no relationship, there is a tendency for an inverse relationship to exist for examples with low PAL values (light physical activity) tend to have high pulse rates (low

fitness). There is no significant relationship which may be caused by the number of samples that are too small, the physical activity of most of the samples is classified as light, and the variation in pulse rate tends to be homogeneous.

Analysis of Food Intake with Physical Fitness
The *Spearman Rank* correlation showed that there was no relationship between the level of energy adequacy (r= -0.132, p=0.346), protein (r= -0.037, p=0.795), fat (r= 0.025, p=0.858), and carbohydrates (r= -0.248, p=0.074) with physical fitness (pulse). The negative correlation between energy and nutrient intake with pulse rate in this study showed that although there was no relationship (p>0.05) but there was a tendency for an inverse relationship, subjects who had high energy and nutrient intake tended to have a higher level of fitness (pulse). low. Statistically, no significant relationship was found, presumably because the intake of energy and nutrients in the samples tended to be homogeneous (most of the intakes of energy and nutrients in the samples were still lacking).

Research conducted [20] on 120 elementary school students, it can be explained that the nutrition and physical fitness of overweight students have low physical fitness. This is in line with research [21] which showed that there was no significant relationship between energy intake and fitness. The results of the study [22] showed that there was a significant relationship (r=0.089, p=0.430) between energy and carbohydrate intake (r=0.014, p<0.05) and VO2 max, but there was no significant relationship between protein intake (r=0.014, p>0.05) and fat intake (r=0.129, p>0.05) with VO2 max. Nutrient intake in the form of energy, carbohydrates, protein, fat, vitamins B1, B2, B6, B11, B12, Mg, Zn, and Fe has a significant relationship with cardiorespiratory fitness [11].

4. Conclusion
Based on the results of data presentation and data analysis that has been described, it can be concluded as follows, the firs most of the physical education students had normal status (81.5%). The average age of the sample was 19 ± 0.21 years. The socio-economic aspects of all respondents ranged from Rp. 0-500,000 (3.7 %), Rp. 500,500 − 1,000,000 (25.9 %), Rp. 1,000,500 − 1,500,000 (51.8%) and > Rp. 1,500,500 (18.5%). The average level of physical activity in the sample is in the light category (45.28%). The fitness level of the sample is sufficient at 47.17%.

The results of the *Spearman Rank* analysis showed that there was no significant relationship (r=0.159, p>0.05) between age and pulse rate (body fitness level). Most of the examples who are around 17-19 years old still have a sufficient level of fitness. While the results of the *chi square* test showed that gender was not significantly related to the level of body fitness (p = 0.169). This is presumably because the sample variation with the female gender is too small so that it is not sufficiently representative.

Suggestion
Based on the results of the study and the conclusions above, the suggestions in this study are as follows:
1) Exercising outside of class hours and maintaining the calculation of food intake needs according to the anthropometric calculations of each student
2) Students can make a program of tomb intake patterns in a circulation of 10 days, so this program can be used for food intake patterns in 1 month
3) Further research so that students can improve the results of research by using the *food recall* and *food record* method for 7 days in order to better describe the eating habits of students

References

[1]   Sharkey Brian J 2011 Kebugaran dan kesehatan Jakarta (ID): Rajawali Press

[2]   Depkes RI 2005 Undang-Undang Republik Indonesia Nomor: 23 tahun 2005 Tentang Kesehatan Jakarta Hal 1 Fisioterapi Indonesia Jakarta p 5

[3]   Sukmajati R P 2015 Hubungan Asupan Zat Gizi Mikro dan Komposisi Lemak Tubuh Dengan Tingkat Kebugaran Mahasiswa di UKM Sepakbola UNY (Doctoral dissertation Universitas Muhammadiyah Surakarta)

[4]   Pratiwi D & Lailatushifah S N F 2012 Kematangan emosi dan psikosomatis pada mahasiswa tingkat akhir Jurnal Psikologi Universitas Wangsa

[5]   Baran J Weres A Czenczek-Lewandowska E Wyszyńska J Łuszczki E Dereń K & Więch P 2018 Blood lipid profile and body composition in a pediatric population with different levels of physical activity Lipids in health and disease 17(1) pp 1-9

[6]   Vania E R Pradigdo S F & Nugraheni S A 2018 Hubungan gaya hidup status gizi dan aktivitas fisik dengan tingkat kesegaran jasmani (studi pada atlet softball perguruan tinggi di Semarang tahun 2017) Jurnal Kesehatan Masyarakat (Undip) 6(1) pp 449-457

[7]   Hartati H Yusfi H & Destriani D 2017 Designing The Scientific Characteristics of Learning Model to Improve The Mastery of Concept on Nutrition Science II of Prospective Teachers of Physical and Health Education atlantis Series: Advances in Social Science Education and Humanities Research p 174

[8]   Kusnanik N W Kusnanik N W & Hartati H 2017 Physical and physiological profile of junior high students in Indonesia Journal Sport Science p 10

[9]   López-Sánchez G F Radzimiński Ł Skalska M Jastrzębska J Smith L Wakuluk D & Jastrzębski Z 2019 Body composition physical fitness physical activity and nutrition in Polish and Spanish male students of Sports Sciences: Differences and correlations International journal of environmental research and public health 16(7) p 1148

[10]   Nurwidyastuti D 2012 Hubungan Konsumsi Zat Gizi Status Gizi dan Faktor-Faktor Lain dengan Status Kebugaran Mahasiswa Departemen Arsitektur Fakultas Teknik Universitas Indonesia Tahun 2012 Fakultas Kesehatan Masyarakat Program Studi Srjana Gizi: Depok P 2

[11]   Redjeki DS 2013 Aktivitas fisik sebagai faktor dominan kebugaran kardiorespiratori pada guru di Yayasan Asih Putera Kota Cimahi tahun 2013 [Tesis] Jakarta (ID): Universitas Indonesia Press

[12]   Alzamil H A Alhakbany M A Alfadda N A Almusallam S M & Al-Hazzaa H M 2019 A profile of physical activity sedentary behaviors sleep and dietary habits of Saudi college female students Journal of family & community medicine p 26(1)

[13]   Munger J Bennett B D Parikh A Feng X J McArdle J Rabitz H A & Rabinowitz J D 2008 Systems-level metabolic flux profiling identifies fatty acid synthesis as a target for antiviral therapy Nature biotechnology 26(10) pp 1179-1186

[14]   Setiawan F 2018 Pengaruh breathing retraining terhadap peningkatan kualitas tidur pada pasien penyakit paru obstruktif kronik (ppok) di RSUP Dr Kariadi Semarang (Doctoral dissertation Universitas Muhammadiyah Semarang)

[15]   Rachmawati 2013 Hubungan status sizi asupan zat gizi dan aktivitas fisik dengan kebugaran anak sekolah di SDN 2 Pasanggrahan Purwakarta [skripsi] Bogor (ID): Institut Pertanian Bogor

[16]   Nusi M M (2018) Hubungan Status Gizi Dengan Tumbuh Kembang Anak Kelas III Dan IV Di Sd N Karah I Kota Surabaya (Doctoral dissertation Universitas Merdeka)

[17]   Morelli C Avolio E Galluccio A Caparello G Manes E Ferraro S & Bonofiglio D 2020 Impact of vigorous-intensity physical activity on body composition parameters lipid profile markers and irisin levels in adolescents: a cross-sectional study Nutrients 12(3) p 742

[18]   Pan C Y Tsai C L Chu C H Sung M C Ma W Y & Huang C Y 2016 Objectively measured physical activity and health-related physical fitness in secondary school-aged male students with autism spectrum disorders Physical therapy 96(4) pp 511-520

[19]   Niedziocha Laura 2011 Gender vs level of cardiovascular fitness http //www livestrong com/arcticle/546912-gender-vs-levelofcardiovascular- fitness

[20] Hartati H Bayu Hardiyono B H Silvi Aryanti S A & Destriana D 2018 Nutrition and Physical Fitness of Primary School Pupils of Grades 5 and in Palembang City Scitepress

[21] Muizzah L 2013 Hubungan antara kebugaran dengan status gizi dan aktivitas fisik pada mahasiswa program studi kesehatan masyarakat UIN Syarif Hidayatullah Jakarta Jakarta (ID): UIN Syarif Hidayatullah

[22] Sugatani J Sadamitsu S Yamaguchi M Yamazaki Y Higa R Hattori Y & Shimizu T 2014 Antiobese function of platelet-activating factor: increased adiposity in platelet-activating factor receptor-deficient mice with age The FASEB Journal 28(1) pp 440-452

Analysis of food intake, physical activity, and physical fitness levels of education and health students