

Original Research/Systematic Review**Identification Of Physiotherapy Student Fitness At Poltekkes
Kemenkes Surakarta****Herdianty Kusuma Handari^{1*}, Mei Kusumaningtyas²**^{1,2} Faculty of Physiotherapy of Poltekkes Kemenkes Surakarta**ABSTRACT**

Background: *The convenience provided by technology makes a person tend to reduce physical activity. In a long time it will certainly have an impact on one's fitness. This will also affect adolescents to young adults, where the average circle is students in college. Fitness is very important to support daily activities, without fitness someone will easily experience fatigue. Currently, students tend to do less physical activity because they lie too much or are sedentary as a result of technological advances. As a physiotherapy student who will treat patients later, fitness needs to be maintained since in the college. So far, fitness identification has never been done for students in health institutions, especially in physiotherapy students in the Poltekkes Kemenkes Surakarta, so this study aims to determine the fitness condition of physiotherapy students.*

Methods: *this research is a descriptive study by measuring 8 fitness components namely flexibility, balance, strength, explosive power, speed, agility, coordination and endurance in 226 physiotherapy students and the data analyzed descriptively using Ms. Excel.*

Results: *Based on the measurement results, it was found that flexibility, balance and strength were included in the good category, explosive power, agility and coordination were in the very poor category, speed and endurance were in the excellent category. The physiotherapy student fitness index shows an average value of 3.125, which means that student fitness is included in the fair category.*

Conclusion: *there is efforts should be made to maintain and improve the fitness of physiotherapy students in the Poltekkes Kemenkes Surakarta.*

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INTRODUCTION

Fitness is related to someone health. It is the body's ability to perform activities without causing significant negligence or causing health problems (Kementerian Kesehatan, 2015). This shows that fitness is related to physical activity. Fitness is

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CONTACT

Herdianty Kusuma Handari

kusuma.herdianty@gmail.comFaculty of Physiotherapy of
Poltekkes Kemenkes Surakarta

important to support daily activities, without fitness someone will easily experience fatigue. Based on data from the Indonesian Ministry of Health in 2015, the level of physical activity students in college was 71.8% while in high school was 75.2%. This shows that there is a decrease in the level of physical activity in college. The decrease in physical activity can affect student fitness. In fact, students need good fitness, including physiotherapy students.

The more often a person does physical activity, the fitter the person's condition, but along with the development of technology it can have an impact on the physical activity itself. On the one hand, the rapid development of technology can make it easy for everyone. On the other hand, the convenience provided by this technology has a negative impact, which makes a person tend to reduce physical activity. In a long time, it will certainly have an impact on one's fitness, making it easy to cause fatigue. The negative impact can also affect adolescents, including students. Based on data, 26,1% in 2013 more people over 10 years are become lazy to move and increased to 33,5% in 2018 (Kementerian Kesehatan, 2015).

This data has the potential to increase in the coming years if many teenagers are lazy to move or do physical activities that are will affect fitness. Several factors caused this decline in students, including excessive use of gadgets and lecture activities that sat too much. Based on the literature, to increase physical activity is to avoid sitting too much, because it emits less energy than standing or even walking (Whyte, Greg P; Loosemore, Mike; Williams, 2015). So far, there has never been any identification of fitness for students in health institutions, especially for physiotherapy students at Poltekkes Kemenkes Surakarta, so researchers need to find out more about the fitness conditions of physiotherapy students. If the fitness level of the physiotherapy student is not good are needed to improve the fitness level, if the fitness level is good then it takes effort to maintain that fitness.

Physiotherapy is a form of health service aimed at individuals and / or groups to develop, maintain, and restore movement and body function throughout the life span by using manual handling, increased movement, treatment (physical, electrotherapeutic, and mechanical), function training, communication (Kementerian Kesehatan RI, 2007). Based on this understanding, physiotherapists really need good fitness to support their duties, so that identification of fitness needs to be done since students. The components of fitness to support activities include flexibility, balance, coordination, strength, muscle explosive power, speed, agility and VO₂ max. Fitness can be divided into fitness related to physical health (health related fitness) and fitness related skills (skill related fitness) (Sukamti, Zein, & Budiarti, 2016).

MATERIALS AND METHOD

This research is a descriptive study with data collection using survey methods with test and measurement techniques for fitness. The sampling technique used purposive sampling and non random. This research was conducted in August to September 2019 and all the examinations carried out have passed the ethical clearance. The subjects used in this study were 226 physiotherapy student in Poltekkes Kemenkes Surakarta who fulfill the inclusion and exclusion criteria. Inclusion criteria include: (1) physiotherapy student of Poltekkes Kemenkes Surakarta in 1-6 semesters, (2) do not have a history of serious illness or illness that can recur due to fatigue / stress, (3) willing to take part in the research program. Drop out criteria include: (1) the subjects

suffered an injury so that he stopped the research program, (2) the subjects cannot participate in the research program because of illness.

The implementation of this research includes (1) dividing the subjects according to their classes (2) the research subjects fill in the information concern, (3) the subjects take turns according to a predetermined schedule carrying out 8 tests, there is flexibility, balance, coordination, strength, explosive power, speed, agility, and VO₂ max test. Flexibility measured using sit and reach test. Sit and reach test are mainly carried out to measure flexibility from the back, hips to the hamstring muscles. This measurement used flexibility box placed in the wall. The subject sitting on the floor, straightening the legs and push the box then bending the body with the hands try to reach box as far as possible, then the final result will be obtained in centimeters (Mayorga-Vega, Merino-Marban, & Viciano, 2014).

Balance is the ability to remain stable with every change in body position (Kisner, 2007). Balance measured using stork balance test (Tambe, 2015). The subject stand on tiptoe on one leg, another leg placed on inner thigh the opposite leg and hands palced on hips for one minute. Coordination is a combination of motion aspects includes balance that allows movement to occur freely, with purpose, accurately, with directed speed, rhythm and muscle tension (O'Sullivan, Schmitz, & Fulk, 2014). Measuring coordination can be done in various ways, one of which used a ladder drill use icky shuffle technique.

Strength is the ability of a muscle or muscle group to generate tension and power during maximum effort (T. Bompa & Buzzichelli, 2005). One of the ways to measure strength is sit ups to measure the strength of the abdominal muscles for one minute and record how many the subjects do sit up (Mayorga-Vega et al., 2014). Speed is the body's ability to perform movements performed in a short period of time (T. Bompa & Carrera, 2015). Speed measurements using a 30 meters sprint and record the time (Smirniotou et al., 2008). Agility is the body's ability to change direction quickly and precisely when moving without losing balance (T. O. Bompa & Buzzichelli, 2019). One of the measures of agility is by using the shuttle run (Felipe et al., 2017).

The subject should run back and forth 4 times on a 10 meters track between 2 cone or mark and record the time. Explosive power is the muscle's ability to exert maximum force in a short period of time and is a combination of speed and strength (T. O. Bompa & Buzzichelli, 2019). A common measurement of explosive power is a vertical jump to measure the explosive power of the lower leg muscles (Darmiento, Galpin, & Brown, 2012). The starting position is done by squatting slightly close to the wall, arm raised up to give mark on the wall, then jump as high as possible while marking the wall again, so that the highest mark can be measured. Then calculate the difference between first and second mark. Take the measurement 3 times and take the highest score.

Cardiorespiratory resistance can be determined by VO₂ max. VO₂ max is the maximum capacity for oxygen uptake during activities. This measurement is carried out using the Harvard step test method by going up and down stairs following the metronome rhythm for a maximum of 5 minutes (Adidharma, 2016).

RESULTS

The subjects in this study were physiotherapy students at Poltekkes Kemenkes Surakarta, both D3 and D4 degree. Of the 250 students as research subjects, there were 24 drop out subjects, so that the total subjects until the end of the study were 226. In this

study, it was found that the male gender was less than the female with the details of male gender as many as 63 subjects and as many as 163 women. Based on the age of the subject, it was found that the age of the subject was at most 19 years old with a total of 94 (41.6%) and there is one 32 year old students who is a study assignment student. Based on the results of research conducted with 8 tests, namely flexibility, balance, strength, explosive power, speed, agility, coordination and endurance, the following results were obtained. The assessment of each test adjust the fitness index that divided into five category, namely (1) very poor, (2) poor, (3) fair, (4) good, and (5) very good.

Table 1. Characteristic of Responce

Variables	Frequency	Percentage
Sex		
Male	63	28%
Female	163	72%
Age		
16	1	0.4%
17	7	3.2%
18	67	29.6%
19	94	41.6%
20	48	21.2%
21	8	3.5%
32	1	0.4%
Flexibility		
Very poor	10	4.4%
Poor	21	9.3%
Fair	33	14.6%
Good	95	42%
Very good	67	29.6%
Balance		
Very poor	10	4.4%
Poor	4	1.8%
Fair	71	31.4%
Good	101	44.7%
Very good	40	17.7%
Strenght		
Very poor	14	6.2%
Poor	57	25.2%
Fair	28	12.4%
Good	71	31.4%
Very good	56	24.8%
Explosive power		
Very poor	137	60.6%
Poor	49	21.7%
Fair	24	10.6%
Good	8	3.5%
Very good	8	3.5%
Speed		
Very poor	0	0%

Variables	Frequency	Percentage
Poor	0	0%
Fair	4	1.8%
Good	3	1.3%
Very good	219	96.9%
Agility		
Very poor	94	41.6%
Poor	87	38.5%
Fair	31	13.7%
Good	12	5.3%
Very good	2	0.9%
Coordination		
Very poor	82	36.3%
Poor	43	19%
Fair	58	25.7%
Good	38	16.8%
Very good	5	2.2%
Cardiorespiration fitness		
Very poor	33	14.6%
Poor	30	13.3%
Fair	43	19%
Good	34	15%
Very good	86	38.1%

The highest score of flexibility test is in a good category (4), the highest score of balance test is in a good category (4), highest score of strenght test is in a good category (4), the highest score of explosive power test is in a very poor category (1), the highest score of speed test is in a very good category (5), the highest score of speed test is in a very good category (5), the highest score of agility test is in a very poor category (1), the highest score of coordination test is in a very poor category (1), the highest score of cardiorespiratory fitness level is in a very good category (5). Based on each measurement of the fitness component, then an analysis is carried out to obtain a fitness index which is divided into 5 categories, namely 1) very poor=1, 2) poor=2, 3) fair=3, 4) good=4 and 5) very good=5. The percentage of the largest category in each test is converted into a fitness index, then averaged and interpreted. The results of the fitness index showed an average fitness index of 3.125 which means that the fitness of the research subjects was in the fair category.

Table 2. Fitness Index

Fitness components	Category	Result
Flexibility	Good	4
Balance	Good	4
Strenght	Good	4
Explosive power	Very poor	1
Agility	Very poor	1
Speed	Very good	5
Coordination	Very poor	1

Fitness components	Category	Result
Endurance	Very good	5
Total		25/8
Average		3.125

DISCUSSION

Based on the results of the fitness index, it was found that the fitness of the physiotherapy students at Poltekkes Kemenkes Surakarta was in the fair category. Fitness is measured through several components there is flexibility, balance, strength, explosive power, speed, agility, coordination and endurance. The components of fitness in the form of flexibility, balance and strength fall into the good category. This is in line with the growth phase where the younger age has better flexibility than the older age. Flexibility can be influenced by several factors including (1) muscle elasticity, namely the ability of the muscles to move freely and the ability to return to their original size, (2) tendons and ligaments which are influenced by the level of body temperature and the environment, the higher the temperature, the higher the temperature will be relatively elastic, (3) bone structure, bones as a passive propulsion device and a place for muscle attachment to straighten the body, (4) age, the more a person ages, the flexibility decreases and (5) gender, women are relatively more flexible than men (McArdle et al., 2000).

In this study, the average age range of the subjects was included in the young adult category, so that muscle flexibility is influenced by several factors such as muscle size, tendons, ligaments and joint types. Physical activity that uses joint space (ROM) is an important thing that also affects flexibility. In this age range, the more joints are trained, the more flexible they will be to perform movements (Kisner, 2007). In terms of balance, the age range for young adults is better than those for older people. A good balance is influenced by the work of the neuromuscular system and musculoskeletal factors as well as the environment (O'Sullivan et al., 2014). In terms of strength, muscle mass in young adults is better and denser than in older people, so it will affect the level of balance and strength which is also better.

The fitness components in the form of explosive power, agility and coordination fall into the very poor category. Explosiveness, agility and coordination fall into the category of physical fitness related to skills, which are important for dealing with emergencies related to agility (ACSM, 2018). In this case, the subjects generally rarely face conditions related to emergencies, so that the level of explosive power, agility and coordination are in the very poor category. The components of speed and endurance fall into the excellent category. The speed test, which was carried out within 30 meters, was able to be carried out in a very fast time, thus showing an excellent level.

The endurance component which aims to measure cardiorespiratory endurance can actually be used as a direct guide in assessing a person's fitness level by calculating the maximum oxygen uptake during physical activity. The ability to take up oxygen during physical activity shows the ability of metabolism. The greater the VO₂ max of a person, the greater the cardiorespiratory fitness level (Guyton & Hall, 2006). Based on the research about physical fitness level of first year exercise science students shows that 3% of 275 student met all the standarts of physical fitness, because college students generally report a decline in physical activity. Measurement of the research used Cooper 12 min run, wall sit and reach test, 1 minute sit up, and YMCA bench press test (Reeves, Barwick, & Maghrabi, 2018).

Although there is different in the measurement, but all of this are basically the component of physical fitness, each research can measure different components depending on the needs of the researcher. The similarity between these two studies is that when the level of fitness does not reach the standard, an increase in physical activity is needed.

CONCLUSION

The research that has been carried out with the aim of identifying the fitness of physiotherapy students in Poltekkes Kemenkes Surakarta shows that the fitness level of the students is in the fair category. Based on the research that has been done, there are several suggestions, including: (1) designing research with a large number of subjects to be more organized, (2) conducting further research to improve the fitness level of physiotherapy students, and (3) conduct research that aims to determine the relationship between fitness and academic achievement.

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