PHYSICAL AND PHYSIOLOGICAL PROFILE OF JUNIOR HIGH STUDENTS IN INDONESIA

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Abstract
The main purpose of the research was to evaluate physical and physiological of junior high school students in Indonesia. Five hundred and twenty students in West Java participated (240 girls and 280 boys) in the research. Data was collected by measuring physical including standing height, sitting height, body mass, and spam arm; and testing of physiological for an aerobic including sprint 40m, shuttle run, vertical jump, basketball throw, and for aerobic including multistage fitness test. Data was analyzed using mean and standard deviation. The results showed that mean of standing height was 151,29±6,55 cm (girls) and 156,31±9,86 cm (boys), sitting height was 79,58±5,10 cm (girls) and 81,81±5,14 cm (boys), body mass was 43,48±8,29 kg (girls) and 44,51±10,26 kg (boys), spam arm was 153,12±7,28 cm (girls) and 159,67±11,09 cm (boys) for physical measurement. Mean of sprint 40m was 8,14±0,95 seconds (girls) and 7,27±4,97 seconds (boys), shuttle run was 23,78±2,06 seconds (girls) and 21,12±2,26 seconds (boys), vertical jump was 31,49±9,12 cm (girls) and 39,79±10,82 cm (boys), basketball throw was 3,32±0,64 m (girls) and 4,07±0,86 m (boys), and multistage fitness test was 34,26±2,21 ml/kg/min (girls) and 42,12±4,31 ml/kg/min (boys) for physiological testing. The conclusion was that Junior High School in West Java Indonesia needs to be improved for their physiological performance.

Key words: *profile, physical, physiological, junior high school, students.*

Introduction

Physical and physiological performance of students in different levels have been an interesting area of research in sport science. Body size and body shape are apparent among different sports in specialist positions within the sports. There some students activities in sports where use height as a key determinant of success, such as basketball, volleyball, high jump, and swimming. Students in this sports generally higher than students who active in gymnastics . Students with higher height have beneficial for smashing, blocking, shooting, rebounding, etc. In many sports small increase in body size and mass can impact significantly on performance. Assuming constant body composition, increased body mass increases both the energy demand as well as energy supply in most sports activities. Performance of students that use an aerobic energy system relies heavily on the adenosine triphosphate-phopocreatine and glycolytic pathways, including students' movement that involved explosiveness such as jumping, sprinting, throwing, etc. Some activities demand a great deal of accelerative thrusting off with the legs in sudden bursts of jump, therefore, explosive power of the limps and hips are important for supporting students activities. On the other hand, the students' performance that uses aerobic energy system is important to have high aerobic power. Aerobic power is the rate at which oxygen is utilised by tissues during prolonged bouts of exercise. VO_2 max is one of the longest standing fitness indices established form the testing of human performance. Physical fitness is very important to support daily activities of students or youth such as going to school, playing some sports and other physical activities. In addition, physical fitness also important to support of students' growth and developed. Testing and measurement for physical and physiological performance for students is necessary in order to know how well or bad the condition of the students. Young people should have physically active in order to be a healthy youth. As clearly depicted by Chomitz, et al (2009)that statistically significant relationships between fitness and academic achievement. Another important finding, Calrson, et al (2008) showed that the overall exposure to physical education in this representative samples was much lower than the national health objective of daily physical education. In addition, Keeley and Fox (2009) found that there is insufficient evidence to conclude that additional physical education time increases academic achievement; however there is no evidence that is detrimental. Furthermore, there is no significant relationship between age, weight, height of students with each of the physical fitness factors. It has been proven for societies that better adapted with environment need to balance of physical fitness in individual (Sarvi, et al, 2014).It is very crucial to know that Depdiknas (2005) showed physical fitness of the Indonesian students were 11,75% very poor, 45,70% poor, 34,43% average, 5,93% good, and 0,17% very good. These findings were supported by Mutohir and Maksum (2007) that children in Indonesia tend to have poor and average categories for physical fitness. Another crucial finding from Centers for Disease Control and Prevention (2016) reported that nearly half of youths in America with aged between 12 to 21 years old are not vigorously active on a regular

basis. It also reported that 14% of young people no recent physical activity. Females is more inactivity 14% while male 7%. Furthermore, participation in all types of physical activities decreases strikingly as ages or grades in school increases. Physical activity levels of adolescents and young adults is clearly shows in Diagram 1.

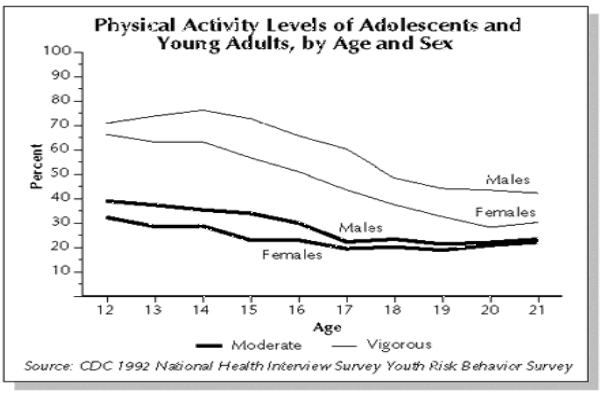

Figure 1. Physical activity levels of adolescents and young adults, by age and sex. (Source: Centers for Disease Control and Prevention, 2016)

American Alliance for Health, Physical Education, Recreation and Dance (1999) reported that there are some factors of children doing physical activities such as physical, social, psychological, and environmental. Daily physical activities with moderate intensity are recommended for children or youth for examples 30 minutes brisk walking, jogging or playing sports 15-20 minutes with more intense activities. Doing greater amounts of physical activities have even more benefit, it can lead to muscle injuries, menstrual abnormalities for girls, and bone weakening.

Department of Health New South Wales (2003) reported that program to improve physical fitness in Australia it's popular with Move It and Groove It or MIGI (The Australian Move It Groove It).

This program has been done 3 times a week with duration of 30-60 minutes a day in order to help children to be happy with doing physical activities. In addition, Ye and Chia (2008) reported that some physical fitness program that have been done in some schools in Singapore it's called PRIDE for PLAY. It's physical activities 5 times a week with 30-60 minutes per day that have been recommended by WHO.

People who are physically active have benefits such as help to build and maintain their muscles, joints, and healthy bones. In addition, it also help to control weight, reduce fat and blood pressure. The physical and physiological performance of students in different levels in many countries have been reported by some researcher. However, detailed analyses of physical and physiological performance of students in Indonesia are no much information, therefore, the purpose of the research was to evaluate physical and physiological performance of junior high school students in Indonesia.

Materials and methods

Five hundred and twenty students (240 girls and 280 boys) participated in the research. with aged range of 11-13 years old. The research was conducted at West Java Indonesia; data was collected by measuring physical including standing height, sitting height, body mass using a stadiometer, and measurement of spam arm using roll meter. Physiological testing for an aerobic including testing of speed using 40m sprint, agility using shuttle run test, legs explosive power using vertical jump (Jump DF), test for arms explosive power using basketball throw, and test for aerobic using multistage fitness test. Data was analyzed using mean and standard deviation.

Results

As clearly depicted in Table 1, the results found that mean of standing height was 151,29±6,55 cm (girls) with range of 145 – 163 cm and 156,31±9,86 cm (boys) with range of 144 – 166 cm. Mean of sitting height was 79,58±5,10 cm (girls) with range of 68 – 89 cm and 81,81±5,14 cm (boys) with range of 57 – 83 cm). Mean of body mass was 43,48±8,29 kg (girls) with range of 35 – 54 kg and 44,51±10,26 kg (boys) with range of 37 – 56 kg. Mean of spam arm was 153,12±7,28 cm (girls) with range of 132 – 163 cm and 159,67±11,09 cm (boys) with range of 137-174 cm. Mean of 40m sprint was 8,14±0,95 seconds (girls) with range of 9,57 – 6,32 seconds and 7,27±4,97 seconds (boys) with range of 8,44 – 5,51 seconds. Mean of shuttle run was 23,78±2,06 seconds (girls) with range of 26,17 – 20,52 seconds and 21,12±2,26 seconds (boys) with range of 25,47 – 18,52 seconds. Mean of vertical jump was 31,49±9,12 cm (girls) with range of 26 – 42 cm and 39,79±10,82 cm (boys) with range of 32-46 cm. Mean of basketball throw was 3,32±0,64 m (girls) with range of 2,28 - 4,37 m and 4,07±0,86 m (boys) with range of 3,52 – 5,19 m). Mean of multistage fitness test was 34,26±2,21 ml/kg/min (girls) with range of 26,4 – 37,5 ml/kg/min and 42,12±4,31 ml/kg/min (boys) with range of 27,6 – 49,0 ml/kg/min.

Table 1. Mean Physical and Physiological of Students

Instruments	Boys	Girls
Physical Measurements:		
Standing height (cm)	156,31±9,86 cm	151,29±6,55 cm
Sitting height (cm)	81,81±5,14 cm	79,58±5,10 cm
Body mass (kg)	44,51±10,26 kg	43,48±8,29 kg
Spam arm (cm)	159,67±11,09 cm	153,12±7,28 cm
Physiological Tests:		
Anaerobic:		
Sprint 40m (seconds)	7,27±4,97 seconds	8,14±0,95 seconds
Shuttle run (seconds)	21,12±2,26 seconds	23,78±2,06 seconds
Vertical jumps (cm)	39,79±10,82 cm	31,49±9,12 cm
Basketball throw (m))	4,07±0,86 m	3,32±0,64 m
Aerobic:		
Multistage Fitness Test (ml/kg/min)	42,12±4,31 ml/kg/min	34,26±2,21 ml/kg/min

Discussion and conclusion

A mean value for vertical jump of the girls was average category, while boys in below average category. It means that the leg power of the girls was better than the boys. Leg power is very important for the students in order to do physical activities explosively including jumping and sprinting. The mean values for sprint 40m, shuttle run and basketball throw of the girls and boys were in average category. The ability of speed, agility and arm power of the students need to be improved in order to do physical fitness such as fast running, changing of direction quickly, and throwing hardly. A mean value for tennis ball catch and throw of the girls was in below average category, while boys in average category. The coordination of boys was better than girls, however both male and female students need to have good coordination. A mean value for multistage fitness test of the girls and boys were in good category. 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 such as playing soccer, basketball, hockey, badminton, and hand ball. It seemed that girls had lower score not only for anthropometric measurements but also for physical fitness tests. Girls tend to have lower in standing height approximately 5cm than boys. And girls also have approximately 6 cm lower than boys for spam arm. But for sitting height and body mass, it seems to be the same in both girls and boys. Although the girls had lower score but they had better categories than boys especially in legs explosive power. In addition, the girls had the same categories as boys especially in speed, agility, coordination and endurance. Physical activities need to be created in order to promote young adults to participate with enjoyable and confidence. Social support such as from family, friends, and peers has positively impact related to do regular physical activities. It is also supported by Centers for Disease Control and Prevention (2016) that provide appropriate physically active role models for youth and provide access to school buildings and community facilities that enable safe participation in physical activity.

In addition, extracurricular program in schools must be provided in order to meet the needs and interests of specify young adult to do physical activities. It can be concluded that the students of junior high school in West Java Indonesia need to be improved for their physiological performance, especially explosive power of legs and arms. They have to maintain and increase their endurance in order to have better physical fitness. It is recommended that providing models and facilities of physical activities for youth in order to improve their physiological performance.

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FIZIČKI I FIZIOLOŠKI PROFIL UČENIKA TREĆEG RAZREDA SREDNJE ŠKOLE U INDONEZIJI

Sažetak

Glavni cilj istraživanja bio je procijeniti fizički i fiziološki profil srednjoškolaca u Indoneziji. Sudjelovalo je pet stotina i dvadeset učenika iz West Jave (240 djevojaka i 280 mladića) u istraživanju. Podaci su prikupljeni mjerenjem fizikalno uključujući visinu stojeći, sjedeću visinu, tjelesnu masu, i spam ruku, kao i ispitivanjem fiziologije za aerobik, uključujući sprint 40m, shuttle trčanje, skok u vis, košarku bacanja, te višestupanjski fitness test. Podaci su analizirani korištenjem prosjeka i standardne devijacije. Rezultati su pokazali da je srednja visina stojeći 151,29 ± 6,55 cm (djevojke) i 156,31 ± 9,86 cm (dječaci), sjedeća visina 79,58 ± 5,10 cm (djevojke) i 81, 81 ± 5,14 cm (dječaci), tjelesna masa bila je 43,48 ± 8,29 kg (djevojke) i 44,51 ± 10,26 kg (dječaci), raspon ruku bio je 153,12 ± 7,28 cm (djevojke) i 159,67 ± 11,09 cm (dječaci). Prosjek sprinta na 40m je 8,14 ± 0,95 sekundi (djevojke) i 7,27 ± 4,97 sekundi (dječaci), shuttle run bio je 23,78 ± 2,06 sekundi (djevojke) i 21,12 ± 2, 26 sekundi (dječaci), vertikalni skok je 31,49 ± 9,12 cm (djevojke) i 39,79 ± 10,82 cm (dječaci), bacanje u košarci je 3,32 ± 0,64 m (cure) i 4, 07 ± 0,86 m (dječaci) i višestupanjski fitness test je 34,26 ± 2,21 ml / kg / min (djevojke) i 42,12 ± 4,31 ml / kg / min (dječaci) za fiziološka ispitivanja. Zaključak je bio da učenici trećeg razreda srednje škole West Java Indonezije trebaju poboljšati svoju fiziološku izvedbu.

Ključne riječi: *profil, fizički, fiziološki, juniori u srednjoj školi, učenici.*

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