Physical Activities, Nutritional Status, HDL-LDL Cholesterol Content and Physical Fitness of the Aerobic Calisthenics Exercising Women in Lubuk Pakam

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Abstract: Consistent calisthenics exercises are able to improve physical fitness. The excellent physical fitnessof Indonesianwere very low. There are several factors contributing the level of men physical fitness such as age, sex, heredity or genetics, food, cigarette addiction, exercises, physical activities and body fat. This researchis revealing the relation ofphysical activities, nutritional status, HDL and LDL cholesterol content with physical fitnessof women that regularly participating the aerobic calisthenics exercises. This researchperformed in Lubuk Pakamon January 2016. This research is an observational cross sectional design on 54 womenbetween 41 and 59 years of age. HDL and LDL cholesterol content were obtained in LubukPakam Public Hospital. The physical fitnessmeasured by five minutes of Harvard Step Test. Data were studied by correlation test. The resultshowssignificant relationbetween physical activities and physical fitness, that is, more physical activitieswill give fitter physic. There is also a significant negative relation between HDL cholesterol contentwith physical fitness, that is, a normal HDL cholesterol content tends to reduce the physical fitness.

Keywords: Physical activities, BMI, Body fat percentage, HDL cholesterol, Physical fitness

1. Introduction

Indonesian today have a live time of 69 years age, but in 2025 there will be 273.65 million people that might have longer live to reach 73.7 years. People could improve their health by managing their body fat, that is, by managing food intake, and exercising, with its true knowldge⁷.

More than two millionworld people are dieingeach year due to lack of physical activities. Sixty percent to 85% of most countries have no adequate physical activities⁶. Those countries are facing difficulties to manage their people’s physical fitness. Human activities are supported by its fitness⁵. A consistent exercise or physical activities could improve physical fitness.

Aerobic calisthenics is a kind of exercises. It employs most large musclescontinuously and rhythmically. Music in aerobic calisthenics helps to increase motivation and sustains the speed. A right aerobic calisthenicswill give benefit, that is, by gradual and consistent exercises⁵.

In Indonesia, people’s participationon sports were indicated in Sport Development Index (SDI). In the year 2005, the participation was 0.345, and 0.422 in 2006 ⁴. By the year 2014 it became 0.56 that was still a low level compare to normal participation represents by one ⁷. Base on the year 2006 SDI report, 1.08% of Indonesian have a excellencefitness, 4.07% categorized to good, 13.55% fair, 43.90% unfit, and 37.40% bad. These facts were frightening⁸.Factors that contributing dihysical fitnessare age, sex, genetics or heredities, food intakes, cigarette addiction, exercises, physical activities and body fat⁶.

According to data from basic medical research in 2013, revealed that proportionof physical activitieswas 26.1% that was categorized to be generally not-active. Meanwhile in North Sumatera the figure was 23.5%⁷. Physical activitiesis any movementof part of the body that need power or energy. The demandof energy werevaried as intensity and duration of the physical activities. Heavier and longer the activities, bigger energyneeded⁸.

Nutritional status represented by body mass index (BMI) and body fat percentage. BMIhave been widely used as a general weight indicatorof child, teen and adult. Nowadays, BMIs rather used as a proportion criterion of body shape instead of the tablethat directly comparesthе body heightwith ‘body weight’. Fat roles as energy and fat-base vitamins storage. Physically it protects organs against mechanical hits. Male or female needs fat as much as 3% of its body weight. Fat are situated under the skin, stomach shield, around kidney tissue, and outlying the hearth surface⁹.

Amelia (2013) revealed a weak negative correlation between physical activitiesand body fat percentage, and a significant relation between physical activities and body fat percentage. This negative correlationrefers to a condition that a higher intensity of physical activitieswill reduce the body fat percentageof aerobic calisthenics exercising women⁸.

Lipid profileis a conditionof blood fatthat referred to its total cholesterol contentin blood, LDL, HDL and Triglyceride. Concentration of blood lipid profilein an obese childis same as lipid profilein cardiovascular disorders. That child is also expose to a higher risk of blood hypertension. The accumulation of atherosclerosis related to the lipid inblood¹⁰. Elmukhsinur (2013) revealed that aerobic calisthenicscontributes to increaseHDL cholesterol content¹¹.
Sports is any physical activities performed as planned for various goals, such as physical healthy, recreational, fitness, education, and individual achievement. Sports is related with capacity of hearth system (hearth and vessels), neural and muscle system. The WHO studies on risk factors, states that lack of physical activities, for instance too much sitting during working, is a cause of human deaths or disabilities in the world.

The government of LubukPakam City performs an aerobic calisthenics in an open public court called LapanganSegitiga. Until now, they performed it weekly, joined by 200s people of various ages. The researchers wished to perform a study called Physical activities, Nutritional status, HDL-LDL. Cholesterol Content with Physical Fitness of Aerobic Calisthenics Participants in LubukPakam.

2. Method

This research was performed in LapanganSegitigaLubukPakam. Data were collected on January 2016. This is an observation research with cross sectional research design to reveal the relation of physical activities, nutritional status, and HDL-LDL cholesterol content with physical fitness of 186 aerobic calisthenics participants in the city of LubukPakam. Subjects were choose base on inclusion criteria, between 41 and 59 years of age. There were 54 samples that fulfilled these criteria: have joined the exercise continuously not less than three months, willing to be a sample, in good health, able to communicate.

Data were taken by interview by the researcher which assisted by some enumerators and analysts of the Public Hospital of Deli Serdang. The data included name, date of born, education, occupation, race, membership duration, address. Physical activities data were collected by interviews using quiz once every 24 hours within two days intermittently.

Nutritional status data were collected by measuring of the body fat percentage, using bioelectrical impedance analysis (BIA) tool. BMI data were obtained measuring of the weight and length of subjects. HDL-LDL cholesterol content data were obtained by taking the blood sample with GOD-PAP method using German LOT D393 Biocon tool. The blood were taken by some analysts of the Public Hospital of Deli Serdang and measured in the same hospital. Physical fitness were measured bya five minutes Harvard Step Test continuously.

Recall of physical activities datathan were converted to Physical Activity Ratio (PAR). Total calories used by subject during the 2 days intermittent physical activities were calculated based on the PAR table to obtain the Physical Activity Level (PAL) of each subject within 2 days. The formula to get the PAL is this: Sum of duration of each activitytimes PAR divide by 24 hours. The total of PAL within 2 days than divided by 2 to get its average. The categories are these: very light: 1.20 – 1.39 PAL; light: 1.40 – 1.69 PAL; fair: 1.70 – 1.99 PAL; heavy: 2.00 – 2.40 PAL. The categories of BMIare these: low: <18.5 kg/m²; normal: 18.5 – 25.0 kg/m²; over: > 25.0 kg/m². The categories of body fat percentage are these: high: > 30%; normal: 20 – 30%; low: < 20%. The categories of HDL cholesterol content are these: Low: <40 mg/dl; good: 40 – 60 mg/dl; high: >60 mg/dl. Categories of LDL cholesterol content are these. Good: <100 mg/dl; normal: 100 – 150 mg/dl; high: >150 mg/dl. Categories of fitness are these. Very good: > 90; good: 80 – 89; sufficient: 65 – 79; lack: 50 – 64; very lack: <50.

The correlation test was used by univariate to decripte the variable and the bivariate test the hypothesis. The result shows that if p<0.05 then Ho is rejected to erect a relation of physical activities, nutritional status, HDL-LDL cholesterol content with physical fitness of the aerobic calisthenics participants in LubukPakam.

3. Result

Subject Characteristics

Subjects of this research were 51 women of 41-59 years age. Table1 showing the data of subject characteristics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>41-50 years</th>
<th>51-59 years</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>34</td>
<td>17</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>66.7</td>
<td>33.3</td>
<td>100</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low School</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>23.5</td>
<td>23.5</td>
<td>47</td>
</tr>
<tr>
<td>Junior School</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>17.6</td>
<td>17.6</td>
<td>35</td>
</tr>
<tr>
<td>High School</td>
<td>19</td>
<td>19</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>37.3</td>
<td>37.3</td>
<td>76</td>
</tr>
<tr>
<td>University</td>
<td>11</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>21.6</td>
<td>21.6</td>
<td>43</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

Table 1 shows, by age, the larger members are from the age of 41-50 years, and by education, the larger members are high school. Half of aerobic calisthenics participants are house host, 70.6% were active as member for more than 1 year.

Physical Fitness

Table 2 shows that all calisthenics participants were not fit.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>51</td>
<td>100</td>
</tr>
</tbody>
</table>

Physical activities, BMI, Body fat percentage, HDL-LDL cholesterol content

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The result of correlation test reveals that there is a significant relation between physical activities and physical fitness (p<0.05), and the positive correlation meaning that the higher the physical activities the better the physical fitness, with fair correlation. HDL cholesterol content have a significant relation with physical fitness (p<0.05). The negative correlation meaning that the higher the HDL cholesterol content the lower the fitness. There is no significant relation between BMI, body fat percentage, LDL cholesterol content and triglyceride content with physical fitness (p>0.05), the negative correlation meaning that the higher the BMI the lower the fitness, and the higher body fat percentage the lower the fitness.

4. Analysis

Fitness

The fitness is related with daily activity performance, with power and the effort to minimize the risk of degenerative disorders. This research reveals that the fitness of all (100%) subjects were categorized in very low level. Even though more than 70.6% subjects have been exercising more than 1 year, their fitness were not automatically in good shape. Several earlier researches have come to similar result that the group have been dominated by the unfit subjects. Nurwidayastuti, in 2012 revealed that 88.7% of Architectures undergraduate students were categorized to unfit. Cendani in 2011 showed that 80% of students that studied in State High School-2 were categorized to unfit. Hermanto in 2012 revealed that 69.76% vegetarian women in Semarang were categorized to be very unfit.

Relation of Physical activities with Physical fitness

Physical activities refer to any body movement done by frame muscle that need an amount of kilo-calorie of energy. Such activity could be categorized to light, fair, or heavy that could improve health in long and consistency run. Lack of physical activities would enlarge the risks to several chronic diseases, and generally could put a person to death.

Pearson statistical test shows asignificant relation between physical activities and fitness, with fair relation level. This means that the higher physical activities the more the fitness. Hermanto in 2012 revealed a significant relation on vegetarian women. Nurwidayastuti in 2012 showed a significant relation between physical activities and fitness by the OR of 4.62, that is, the despondences of non-activities were tended to be 4.62 times unfit compared to the active.

Relation of Nutritional status (BMI and Body fat percentage) with Physical fitness

An adult’s (above 18 years of age) energy sufficiency is represented by body mass index (BMI). Theoretically, the higher the fitness, the higher the ability to do the physical activities, and the lower the BMI.

This research showed (table 2) that 100% subjects were very unfit, meanwhile the BMI and body fat percentage were categorized to be 64.7% obese and 82.4% were categorized to be over. This research supports Hermanto in 2012 that revealed no significant relation between BMI (r=-0.119; p=0.405) and body fat percentage (r=-0.139; p=0.330). A person with a good nutritional status could sustain his fitness and his health. Nurwidayastuti in 2012 said there was no significant relation between BMI and body fat percentage with physical fitness. Lubis in 2015 revealed a significant
negative correlation between BMI with fitness on medical students of Universitas Andalas.\textsuperscript{16}

Relation of nutritional status with fitness could be explained as this. Fitness is an ability of the body to bear the load of work. A good fitness could be achieved if the body have a sufficient energy. Energy is coming from oxidizing the carbohydrates, fat, and protein. The level of nutritional storageresponsible by the nutritional status.Sukmajatin\textsuperscript{15} stated that there is a significant relation between body fat with fitness on the students of UKM. Its negative relation revealed that the lower the body fat percentage the higher the fitness.\textsuperscript{17}

**Relation of HDL-LDL cholesterol content with physical fitness**

This research showing that 100% subjects were very unfit, with average HDL cholesterol content categorized to be normal (47.47), and LDL cholesterol content categorized to be normal (145.75). HDL cholesterol content with a negative significant correlation, showing that the higher HDL the lower the fitness. Meanwhile the LDL cholesterol content have no relations with fitness.

Except sports, there are factors contribute toolevel of HDL-LDL cholesterol content. Low fat diet, fibred food, and antioxidant could control LDL cholesterol content. HDL cholesterol content could be increased by sustaining the ideal body weight, balance menus, aerobic exercises, not smoking and not consuming alcohol.\textsuperscript{18-19}

This research supports Mamitoho\textsuperscript{16} 2016 revealed that there was no significant contributions to total cholesterol on the elder members of calisthenics that perform 24 exercises within 8 weeks.\textsuperscript{19} Contradicting with other researches, Innashin\textsuperscript{3} 2013 studied the relation of blood total cholesterol content with aerobic calisthenics among the medical students of UNISSULA. There was a significant relation between blood total cholesterol content with aerobic calisthenics by a correlation coefficient of -0.28\textsuperscript{10}. Elmukhsinur\textsuperscript{3} 2013 showing no differences of aerobic calisthenic of the participant group and the control group. Meanwhile the HDL cholesterol content were increased significantly by p 0.012 (P 0.05) on the aerobic calisthenics participant that perform 18 exercises within 6 weeks. That research also revealed that aerobic calisthenics were contributing to increase aerobic calisthenics\textsuperscript{5}. Leon and Sanchez in Mann\textsuperscript{20} (2014) have performed a 12 weeks intervention aerobic exercises, revealed that HDL cholesterol content was increased by 4.6\%, and LDL cholesterol content decreased by 5\%. Dunn in Mann\textsuperscript{20} (2014) studied the effect of 6 month program of aerobic exercises sports, reported that there was a significant decline of total cholesterol p<0.001. Lemurain\textsuperscript{4} (2014) reported an increasing HDL cholesterol content (p<0.05) following a 3 weeks exercises. Those data shows that short run intervention could be effective if the there is a sufficiently high quantity or intensity of exercises. There is an expected additional benefit if the frequency of exercises increased to be four times a week. Body fat percentage were decreased to be 13\% (p<0.05)\textsuperscript{21}.

Physical activities and sports could rectify the cholesterol content. A regular and consistence activity have proofed to increase the HDL cholesterol content, and maintained LDL cholesterol content. There was also a proof that increasing calories emission due to aerobic exercises by increasing of intensity duration have contributes the activity of lipaselipo protein, HDL and cholesterol content. This information could help people to control or to prevent dyslipidemia, and to minimize the risks of heart stroke, and coronary disorders.\textsuperscript{21}

**5. Results**

There are significant relation between physical activities with physical fitness, and a significant negative relation between HDL cholesterol content with physical fitness. There is no relations between BMI and body fat percentage with physical fitness. No significant relation between LDL cholesterol content with physical fitness.

**References**


