Original Research

Efektifitas Aktivitas Peer Group terhadap Penurunan Berat Badan dan Persen Lemak Tubuh pada Remaja Overweight

Effectiveness of Peer Group Activity on Reducing Body Weight and Body Fat Percentage in Overweight Teenagers

Mohammad Jaelani, Meirina Dwi L, Ana Yuliah R, Ria Ambarwati
Jurusan Gizi Politeknik Kesehatan Kementerian Kesehatan Semarang

ABSTRAK

Diet rendah energi dan peningkatan aktivitas secara individual belum efektif dalam penurunan berat badan. Oleh karena itu, perlu dicari metode lain atau memodifikasi metode dengan membentuk kelompok peer group aktivitas. Tujuan penelitian ini adalah menganalisis efektivitas aktivitas peer group terhadap kepatuhan aktivitas fisik, kepatuhan diet, penurunan berat badan dan persen lemak tubuh pada remaja overweight. Desain penelitian menggunakan Randomized Controlled Trial dengan rancangan eksperimental ulang pre-posttest control group design. Subjek penelitian adalah remaja putri overweight sebanyak 13 orang kelompok kontrol dan 13 orang kelompok perlakuan. Subjek dilakukan intervensi berupa jogging minimal 30 menit dan naik turun tangga sebanyak 10 kali per hari selama empat minggu. Ukuran kepatuhan diet diambil setiap minggu berdasarkan hasil recall 2x24 jam selama 4 minggu. Perbedaan kepatuhan aktivitas fisik dan kepatuhan diet diuji menggunakan Chi Square Test sedangkan perubahan berat badan dan persen lemak tubuh menggunakan ANOVA Repeated Measure Test. Ada perbedaan yang signifikan antara kepatuhan aktivitas fisik (p=0,000) dan penurunan berat badan (p=0,004) antara kelompok perlakuan dan kontrol namun tidak ada perbedaan yang signifikan antara kepatuhan diet (p>0,05) dan penurunan persen lemak tubuh (p=0,382) antara kelompok perlakuan dan kontrol. Peer group efektif dalam meningkatkan aktivitas fisik dan menurunkan berat badan pada remaja overweight.

Kata Kunci: Aktivitas, penurunan berat badan, lemak tubuh, peer group

ABSTRACT

Individually, low-energy diet and increased activity have not been effective in weight loss. Therefore, it is necessary to find other methods or modify the method by forming groups of peer group activities. The purpose of this study was to analyze the effectiveness of peer group activities on adherence to physical activity, dietary compliance, and weight and body fat percentage loss in overweight adolescents. The study design used was Randomized Controlled Trial with re-experimental designed pre-posttest control group design. Subjects were overweight female teenagers as many as 13 people in the control group and 13 in the treatment group. Subjects were intervened in the form of jogging for at least 30 minutes and going up and down stairs 10 times per day for four weeks. A measure of dietary compliance was taken every week based on 2x24 hours recall results for 4 weeks. Differences in compliance with physical activity and dietary compliance were tested using Chi Square Test, while changes in body weight and body fat percentage were using ANOVA Repeated Measure Test. There is a significant difference between physical activity adherence (p=0.000) and weight loss (p=0.004) between the treatment and control groups, but there is no significant difference between dietary compliance (p>0.05) and a decrease in body fat percentage (p=0.382) between treatment and control groups. Peer groups are effective in increasing physical activity and losing weight in overweight teenagers.

Keywords: Activity, body fat, peer group, weight loss

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INTRODUCTION
The national obesity prevalence in 2013 among women was higher than men, namely 32.9% and 19.7% respectively. The prevalence of obesity in women aged more than 18 years kept increasing in 2007 to 2013 which was originally 13.9% to 32.9%. (1). Body weight and body shape are usually subjects to consider among adolescents, and those are associated with unhealthy weight control behavior (2).

Young women tend to have problems with weight and eating control strategies (3). Usually, adolescents have been able to determine the food they want and often undergo the wrong diet such as skipping eating breakfast, preferring to consume fast food which is high in energy but low in micronutrients, and consuming low amount of fiber (4) and often dine out. This habit causes adolescents to consume energy-dense foods and is worsened by low physical activity, thus they are potentially vulnerable to overweight (5.6) and at risk of suffering from overweight as adults. This is also associated with health complications such as hypertension, diabetes mellitus, dyslipidemia, and cardiovascular diseases (7).

A method commonly used to lose weight is by individually going on a low-energy diet or increasing activity, but this method has not been consistent and effective for losing weight. Therefore it is necessary to look for other methods or modify the existing method, including by forming a group or a peer group activity. A peer group is a group of sharing the same feeling in meeting common needs and goals. Peer groups are related to social support for changes in health behavior (8). Peer groups can also influence to increase the physical activity and are related to weight regulating among adolescent (8,9). The peer group also determines adolescent health-related factors (10) which have an impact on the prevention and treatment of obesity in adolescents (11).

The influence of peer groups is important in developing body image and is related to body satisfaction among adolescents and has been shown to increase physical activity and motivate exercise (7). This is following the opinion of Woolford et al. that body weight regulation among adolescent is influenced by exposure to information, physical activity, and support from peer groups (12). Effective methods of weight loss are not yet clear. Efforts to losing weight such as eating control accompanied by an increase in individual physical activity have not been able to provide maximum results, so the strategy taken is a modification of peer group support (13). The role of the peer groups is expected to have a positive influence on dietary behavior and nutritional knowledge in achieving an ideal body (14). The purpose of this study was to analyze the effectiveness of peer group activities on physical activity compliance, diet compliance, and reducing body weight and body fat percentage in overweight adolescents.

METHOD
This study was a randomized controlled trial using a repeated experimental design of the pretest-posttest control group design. The population in this study were all late adolescents in one of the public universities in Semarang. The research subjects were part of the population with the following inclusion criteria, i.e. female, BMI ≥23 kg/m², at the late adolescents 18-21 years old, and willing to be the subject of research. The classifications of adolescence according to MOH 2009 are early adolescence at the age of 12 to 16 years and late adolescence at the age of 17 to 25 years (15). The reason for choosing this age range was considering that this is a period with a very large possibility of experiencing dissatisfaction with body shape because of the self-disclosure phase so that the focus is on paying attention to self-appearance and being selective in looking for peers (14). The number of subjects in this study was 26 people consisting of 13 in treatment group and 13 in control group. The decision of the number of research subjects was calculated using the Lemeshow formula with Zα confidence level as much as 1.96, and the Zβ strength test was 0.842. The average weight loss in the treatment group was 71.42 and the control group was 52.1 with a standard deviation of weight loss as much as 17 grams (16).

The treatment group was given peer group intervention by means of increasing physical activity in the form of jogging for at least 30 minutes every day at 5:00 and going up and down stairs as many as 24 stairs in between lecture activities with a frequency of 10 times; and reducing energy intake by at least 300 kcal/day from the individual need by replacing morning, afternoon, and evening snacks with one portion of unprocessed fruit for four weeks. The control group was given the same treatment but independently conducted.

Subject identity data were collected by interviewing using forms. Data on body weight and height were used as the basis for calculating BMI. The nutritional status categories based on BMI according to the Asia Pacific are underweight (<18.5 kg/m²); normal (18.50-22.99 kg/m²); overweight (23.00-24.99 kg/m²); obesity I (25.00-29.99 kg/m²); and obesity II (> 30 kg/m²). Percentage of body fat data was measured using the Body Composition Analyzer and then classified as normal if body fat percentage was ≤26.7% and high if >26.7% (17). Data on physical activity was collected using forms, and then they were classified as sufficient if carrying out physical activity more than three times a week and insufficient if below 3 times. Data on diet compliance were based on results of random 2x24 hour recall every week for 4 weeks. Energy intake was categorized as sufficient if the level of consumption (ratio between intake and need) ≤100% and excessive if >100%. Measurement of physical activity compliance, dietary compliance, changes in body weight and percent body fat were repeated every week for four weeks.

Differences in physical activity compliance and dietary compliance between the treatment group and the control group were analyzed using Chi-Square Test (18). The difference on the declining body weight and body fat percentage between the treatment group and the control group was analyzed using the ANOVA Repeated Measure Test.

RESULTS
The characteristics of the research subjects before treatment are presented in Table 1. Most of the research subjects as many as 22 people (84.6%) had a habit to exercise less than three times a week and the rest as many as four people (15.4%) exercised more than three times a week.
Energy intake of most subjects as many as 23 people (88.5%) was more than 100% of the needs, and three people (11.5%) were less than 100% of the needs. Nutritional status according to body mass index (BMI) of the majority of subjects as many as 21 people (80.8%) were included in the obese category, and the rest as many as five people (19.2%) were in the overweight category. The results of the measurement of body fat percentage showed most subjects were included in the high category as many as 20 people (77.0%) and the rest, six people (23.0%), were in the normal category.

Table 1. Characteristics of subjects before treatment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment (n=13)</th>
<th>Control (n=13)</th>
<th>Total (n=26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sufficient (&lt;3 times)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Insufficient</td>
<td>12</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Energy Intake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sufficient</td>
<td>1</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Insufficient</td>
<td>12</td>
<td>92.3</td>
<td>102.3</td>
</tr>
<tr>
<td>Body Weight Index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>2</td>
<td>15.4</td>
<td>3</td>
</tr>
<tr>
<td>Obesity</td>
<td>11</td>
<td>84.6</td>
<td>22</td>
</tr>
<tr>
<td>Body Fat Percentage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>2</td>
<td>15.4</td>
<td>4</td>
</tr>
<tr>
<td>High</td>
<td>11</td>
<td>84.6</td>
<td>22</td>
</tr>
</tbody>
</table>

The analysis results using the Chi-Square Test showed that there was a significant difference between the level of compliance of physical activity in the treatment group and the control group in the first, second, third, and fourth week (p <0.00). On the contrary, there was no significant difference between the level of diet compliance in the treatment group and the control group on the first, second, third, and fourth week (p = 1,000, p = 0.619, p = 0.691, and p = 0.431).

Table 2. Differences in physical activity compliance and dietary compliance between the treatment and control groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Treatment</th>
<th>Control</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obey</td>
<td>13</td>
<td>100</td>
<td>7</td>
<td>0.015</td>
</tr>
<tr>
<td>Disobey</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>46.2</td>
</tr>
<tr>
<td>Week 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obey</td>
<td>13</td>
<td>100</td>
<td>4</td>
<td>0.000</td>
</tr>
<tr>
<td>Disobey</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>69.2</td>
</tr>
<tr>
<td>Week 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obey</td>
<td>13</td>
<td>100</td>
<td>4</td>
<td>0.000</td>
</tr>
<tr>
<td>Disobey</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>69.2</td>
</tr>
<tr>
<td>Week 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obey</td>
<td>13</td>
<td>100</td>
<td>2</td>
<td>0.00</td>
</tr>
<tr>
<td>Disobey</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>84.6</td>
</tr>
<tr>
<td>Diet Compliance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obey</td>
<td>11</td>
<td>84.6</td>
<td>11</td>
<td>84.6</td>
</tr>
<tr>
<td>Disobey</td>
<td>2</td>
<td>15.4</td>
<td>2</td>
<td>15.4</td>
</tr>
</tbody>
</table>

The analysis results using the ANOVA Repeated Measure Test showed that there were significant differences in weight loss between the treatment group and the control group (p = 0.004) as presented in Figure 1. Since the second week, the adolescents in the treatment group showed greater weight loss than control. At the end of the observation, the weight of adolescents in the treatment group had decreased by 2.5 kg, while in the control group the maximum decrease was only 0.5 kg.

Figure 1. Comparison of subjects' weight loss in week 1, 2, 3, and 4 between the treatment and control groups

Figure 2. Differences in the decline of body fat percentage in week 1, 2, 3 and 4 between the treatment and control groups
Figure 2 is the analysis results using the ANOVA Repeated Measure Test that showed no significant differences between the decline in body fat percentage in the treatment group and the control group (p = 0.382). The picture shows fluctuations, in the first week the two groups experienced a decline, but there was an increase in the control group in the third week. The final results show a much greater reduction in body fat percentage in the treatment.

DISCUSSION

One effort to regulate body weight among adolescents is related to physical activity and eating behavior (10). Physical activity is associated with physical and mental health in adolescents. The decrease in physical activity in young women is related to the characteristics of adolescents, interpersonal, romance, and lack of exercise (8). The monitoring results of physical activity compliance measured every week showed compliance (100%) in the treatment group from the first week to the end of the period, while in the control group there was a decrease in the compliance level in the first week as much as 53.8% and in the fourth week only 15.4% were obedient (Table 2). After the intervention, there were significant differences between the adherence level and physical activity in the treatment and control groups in the first, second, third and fourth week of intervention. The results of the study indicated that peer group activity affects the adherence of subjects in carrying out recommended sports activities, namely in the form of jogging every day with a minimum duration of 30 minutes. Empowerment of peer groups in motivating to carry out activities was quite effective for adolescents because peer groups provided a stronger adoption influence on the group behavior and became the main key to physical activity in adolescents (8). Caccavale et al. also stated that peer groups are important in body image development and have been proven to increase physical activity and motivate to exercise (7). Peer education provides a more secure and comfortable feeling for adolescents than those provided by adults. Research showed that adolescents feel secure when telling their problems to their peers than to adults because adults often do not respect the confidentiality of the problems that adolescents tell (19). This means that peer group activities are quite effective in maintaining compliance with physical activity (11).

The results of study by Septiana et al. showed that late adolescents only consumed an average fiber of 3.91 grams followed by high energy and low micronutrients intake thus become a risk factor for central obesity (4). Therefore, in this study, a suggestion to reduce energy intake by at least 300 kcal by replacing morning, evening, and evening snacks in the form of junk food with vegetables or fruit was recommended in this peer group. Increased consumption of vegetables and fruit as a source of fiber is related to weight loss in young women (20,21). The results of statistical tests showed no significant differences between the level of dietary compliance in the treatment group and the control group. This is probably due to the weakness of the recalling method used in measuring dietary compliance, i.e. the tendency to report underestimate (less intake) in obese subjects. Until the fourth week, the level of adherence of subjects in the control group decreased significantly (46.2%), compared to the treatment group (61.5%). This shows that the role of friends in maintaining adherence to the diet is quite high compared to the control group that experienced decreasing compliance. Environmental influences, such as peers, affect adolescents in dietary behavior or weight control behavior (10,12,19). Related to the efforts to maintain long-term compliance including a new dietary habit into lifestyle, group or peer support is highly recommended. Non-compliance in implementing a diet can be influenced by several factors, namely the activity factor, environmental factor, family and social media exposure (2) and can affect someone in acting, including dieting. Oktaviani et al. also stated that friends have a very strong influence on food selection. Adolescent behavior starts to be influenced by friends, including eating behavior. Adolescents tend to choose foods that are acceptable among peer groups (22).

The results of monitoring the body weight of the research subjects conducted every week showed a decrease in body weight between the first, second, third and fourth weeks in the treatment and control groups. The average weight loss at the beginning and end of the fourth week in the treatment group was 2.00 kg while in the control group it was 0.59 kg, so the decrease was higher in the treatment group. The results of the analysis using the ANOVA Repeated Measure test showed that there were significant differences between weight loss in the treatment and control groups. Figure 1 gives a conclusion that peer group activity is quite effective for groups of adolescents to lose weight, but through time the decline becomes slower. Cherrington et al. stated that peer group activity support could be one of the strategies for losing weight and maintaining ideal body weight especially in women (23). The existence of peer group groups is very helpful in motivating someone to make efforts to lose weight by sharing the same feeling in meeting common needs and goals in influencing eating habits in young women and overcome the feelings of insecurity or depression in obese teenagers (24). Peer groups also provide strong support for adolescents, both individually and in groups that are indispensable for making behavioral changes (25). This means that peer group activity is quite effective in reducing the subject’s weight.

Body fat percentage decreased in the treatment group, but statistically the ANOVA Repeated Measure test showed no significant differences between the decrease in body fat percentage in the treatment group and the control group (p = 0.382). Significant decreasing body fat percentage occurred after the fourth week of treatment, this occurred because at a moderate activity level and light reduce in energy intake which was 300 kcal per day does not let the body to break down fat in a short time, lack of energy in the first week until the third did not make the body disassembles large amounts of fat to use as an energy source. Decreasing body fat percentage in the first and third weeks was only slightly compared to the fourth week. This shows that weight loss is very large at the beginning of the observation by reducing food intake, then the weight loss is getting slower through time (26). This study is in line with Narayani et al. that a significant reduction in body fat and cholesterol is after the sixth week (27).

The decrease in body fat is caused by increased physical activity in subjects who initially exercise only once a week to 3 or more times in a week in low intensity in which the energy source needed comes from burning fat reserves in the body. The body will use glycogen reserves, protein, and...
body fat to meet energy needs when the body does physical activity. Physical activity carried out at low to moderate intensities within 30 minutes or more will burn fat. This means that peer group activities effectively reduce body fat percentage after the fourth week. The results of this study conclude that peer group activity is effective in increasing adherence to physical activity and weight loss in overweight adolescents as argued by Salvy et al. (28), but it is less effective at maintaining dietary compliance and reducing body fat percent in overweight adolescents. Peer group activities can be used as a way or to complete the existing methods to overcome overweight or obesity in adolescents.

**REFERENCE**


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