

EMPOWERMENT MODEL TO ESTABLISH MUTUAL TEACHING MOVEMENT IN SENIOR HIGH SCHOOL TO HANDLE OBESITY PROBLEMS

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Abstract

Obesity becomes a health problem worldwide. WHO even states that obesity is already a global epidemic, so obesity has become a health problem that must be addressed. Obesity is a problem should be aware of because prolonged obesity causes various problems. Basically, obesity in children will cause socio-psychological impact. Overweight children tend to refrain themselves from social interactions, are limited in carrying out physical activities in school, and will increasingly immersed in the habit of eating with large portions.

The aim of this research is to get the model of Addesants children's empowerment through the Formation of Nutrition Awareness Movement in High School in order to implement the strategy of handling Obesity problem in Tomohon City and whether the developed model was effective to overcome obesity problem in adolescent. This research was a quantitative analytic research, with a prospective research design with a sample size of 90 high school students who are obese and 16 teachers. The data were collected from July to September 2017, began with training of teachers on Lifestyle (diet and eating behavior, physical activity, anthropometry, nutrition consultation and recording and reporting). suffer from obesity for 1 month.

Data analysis. The tested data is normally distributed or close to the normal distribution, in order to find out: 1). Knowledge change at the time of training was measured with two tools, i.e. pre-training level (pre test) and final level after getting the training (post test). There is a difference of knowledge on the pre-test for the teachers and post test after being given nutrition education and training, there is significant increase of knowledge after getting the training, which is statistically significant, that p value $<0,000$ or $\alpha <0,05$. Likewise, there was weight loss in all intervention groups based on test results i.e. diet, physical activity and nutrition counseling based on paired t test results. There was a significant weight difference before and after four weeks of intervention with p value = $0,000$ at $\alpha <0.05$ with weight gain ranging from 2.5. - 3.5. kg.

It is concluded through this research with the presence of trained teacher personnel to intervene on obesity samples giving impact of weight loss so that the model of adolescent child through the Formation of Nutrition Awareness Movement in High School as the implementation of obesity management strategy in Tomohon City can be developed because it has effectiveness in overcoming obesity problems among adolescents.

Keywords, Obesity, Addesants Empowerment, Conscious Nutrition.

Background

Obesity is one of the health problems occur in modern times. Obesity is a disorder or disease where excessive fat accumulation occurs. The prevalence of obesity in Indonesia according to the Basic Health Research (Riskesmas) 2013 increased compared to Riskesdas 2010. The obesity rate in males in 2010 was 15% and increased to 20% in 2013 (Balitbangkes 2013).

Obese and obesity occur due to higher energy intake than energy released. High energy intake is caused by the consumption of food high in energy and fat, while energy expenditure is low due to lack of physical activity and sedentary life style.

The problem of obese and obesity in Indonesia occurs in all age groups and in all socioeconomic levels. In children, the incidence of obese and obesity is a serious problem because it will continue until adulthood. Obese and obesity in children are at risk of continuing into adulthood, and are risk factors for various metabolic and degenerative diseases such as cardiovascular disease, diabetes mellitus, cancer, osteoarthritis, etc. In children, obese and obesity can also lead to various health problems that are very detrimental to the quality of life of children such as growth disorders of the legs, sleep disturbances, sleep apnea (stop breathing momentarily) and other respiratory disorders.

School-age children (AUS) in the stage of growing period are at risk of various health problems such as nutritional problems. Allender and Spardley (2005) explain that one of the health problems in AUS is more nutrition. Characteristics of AUS that support the occurrence of more nutrients are inappropriate food choices such as the tendency of a diet high in fat

and sugar, less fruit intake (Maurer and Smith, 2005); do not like to consume vegetables (Muscary, 2001); increased consumption of soft drinks and unhealthy snacks (Edelman and Mandle, 2010) and increased pockets tendency (Stanhope and Lancaster, 2004).

Another cause of obesity is the lack of physical activity both daily activities and structured physical exercise. Physical activity done from childhood to the elderly will affect lifelong health (Maffeis, et al 1998). Obesity in childhood will increase the risk of obesity in adulthood. The cause of obesity is seen as 'multicellular' and highly multidimensional because it does not only occur in high socioeconomic groups, but also in the middle to lower middle socioeconomics. Obesity is influenced by environmental factors compared to genetic factors. (Haines, et al 2007) If obesity occurs in children before the age of 5-7 years, then the risk of obesity can occur when they grow up. Obese children usually come from families who are also obese. (Maffeis, et al 1998) Many nutritional problems experienced by nutritional-prone groups that require nutrient sufficiency for growth. The group of children up to early adolescence (about 10-14 years old) is a group of age that is at risk of having nutritional problem both malnutrition and excessive nutrition problems.

Based on the Basic Health Research 2013 for North Sulawesi, obesity prevalence based on Body Mass Index (BMI) for children aged 5-12 years was 84% and for Tomohon City was 92.4%. Age 13 - 15 years was 2.7% and for Tomohon City was 10.4%. Adolescents aged 16 - 18 years was 2.6% and Tomohon City was 6.5% /. The incidence of obesity in North Sulawesi based on BMI in men was

18.4% and in Tomohon City was 23.6%, lower than in women in North Sulawesi which was 30% and in Tomohon was 42.7%. One indicator is the lack of physical activity where the data of North Sulawesi was only 31.7% and Tomohon was only 38.4%.

The objective of this research is to get a model of empowering adolescent through Formation of Nutrition Awareness Movement in High School as an implementation of strategy of handling obesity problem in Tomohon City and whether the developed model has been effective to overcome obesity problem in adolescent.

RESEARCH METHODS

The type of research is quantitative analytic, with prospective research design. This research was conducted in July - September 2017 with the location of this research at SMU Negeri I Tomohon City with the population 1,354 students, in the screening of obesity category there were 221 students that 90 students were selected as follows:

1. Group A with intervention: Pattern and Eating Behavior
2. Group B with Intervention: Physical Activity
3. Group C with intervention: Nutrition Consultation
4. Group D without treatment

The study was conducted in the following manner; the teachers were provided with training for 3 days and in the evaluation of Pre Test and Post Test. Trained educational personnel intervene through assessment of students in each school by weighing weight and measuring body height to determine the students who fall into the IMT category $\geq 25 \text{ kg/m}^2$. Students who were categorized as obesity by the teachers will conduct a test survey which is a trial activity including pre test, post test

and treatments. Component of pre-test is weight measurement before intervention or treatment, whereas treatments or interventions are treatments in the form of consultation with materials healthy lifestyles on diet and eating behavior, physical activity and weekly weight monitoring for one month. Post Test as the end result was gained by weighing the weight to determine whether or not the students made changes.

Statistical Analysis

Statistical analysis was performed using SPSS software, version 16.0. Status changes in body weight that occurred during the treatments in the analysis by using paired t test for pre test and post test data, the test used for the sample with the same subject, conducted with two measurements, i.e. preliminary level before treatment (pre test) and final content after getting treatment (post test). At a significant level of $\alpha 5\%$ ($\alpha = 0.05$) with $dk = n - 1$, then it is stated there is a significant decrease if t arithmetic $< t$ table or significant level $\alpha < 0.05$

Results and Discussion

A. Results

I. Intervention of Diet, Counseling and Physical Activity

Intervention program was held for 4 weeks, conducted by the teachers in order to guide the change in eating behavior and increase daily activities through counseling. From the results obtained can be described from the body weight before and after intervention. The first step taken from the results of data screening of the sample before testing the hypothesis is to test the normality of data from each intervention group. The data normality

test is conducted in order to obtain information about the data is normally distributed or not. In addition, the data normality test will also determine what steps to take next, which statistical analysis should be used, whether parametric or non parametric statistics.

Normality test was using Shapiro-Wilk that two tests were used. Each intervention was participated by less than 50 samples using Shapiro-Wilk

and for all interventions using Kolmogorov-Smirnov. The analysis is based on the probability value (sig) compared to the significant level of α 0.05. Based on table 16, the results obtained for the normality test using Shapiro-Wilk shows that all data is normally distributed because the value of p value is greater than α 0.05, complete data can be seen in table 1 below.

Table 1 . Normality Test Results

Intervention Group	Uji Shapiro-Wilk				Conclusion
	statistics	Mean	SD	sig	
Dietary habit					
Pre Test	0.966	75.2	7.9	0.438	normalized
Post Test	0.959	72.5	8.1	0.294	normalized
Physical Activity					
Pre Test	0.132	79.3	12.2	0.167	normalized
Post Test	0.121	76.8	12.2	0.133	normalized
Counseling					
Pre Test	0.963	77.9	11.9	0.370	normalized
Post Test	0.962	74.1	11.6	0.354	normalized

II. Overview Weight Pre-Test and Post Test on Intervention Diet Group

The following is the presentation and interpretation of the statistical tests analyzed using paired t tests (pre-test and post test) in the Dietary intervention group. Average weight of pre-test is 75.2000 kg with standard deviation of 7.87576 kg. Post-Test measurements

are found on the average of 72.4667 kg and body weight with standard deviation of 8.11441 kg. The mean difference of mean difference between Pre-Test and Post-Test is 2.7333 with standard deviation of 1.04826 and standard error 0.19139. Based on paired t test result there was significant weight difference before and after intervention during four weeks with p value = 0,000

Table 2. Weight Distribution of Weighted Eating Group Interventions Means Pre-Test and Post-Test measurements

Weight	Statistical Test Results			
	Mean	SD	SE	P Value
Pre Test	75.2000	7.87576	1.43791	< 0.000
Post Test	72.4667	8.11441	1.48148	

III. Overview Weight Pre-Test and Post Test on Physical Activity Intervention Group

The following is the presentation and interpretation of the statistical tests analyzed using paired t tests (pre-test and post test) in the Physical Activity intervention group. Mean weight of Pre-Test is 79.3000 kg with a standard deviation of 12.16028 kg. Post-Test measurement shows weight average is 76.8333 kg with standard deviation of

12.21385 kg. It can be seen that mean difference of Pre-Test and Post-Test is 2.46667 with standard deviation 1.00801 and standard error 0.18404. Based on paired t test result there is significant weight difference before and after intervention during 4 weeks with p value = 0,000

Table 3. Weight Distribution of Weighted Group Weights of Physical Activity Intervention by Pre-Test and Post-Test Measurements

Weight	Statistical Test Results			
	Mean	SD	SE	P Value
<i>Pre-Test</i>	79.3000	12.16028	2.22015	< 0.000
<i>Post-Test</i>	76.8333	12.21385	2.22993	

IV. Overview Weight Pre-Test and Post Test on Counseling Group Intervention

The following is the presentation and interpretation of the statistical tests analyzed using paired t tests (pre-test and post test) in the intervention Counseling group. From table 4, the average weight gain in Pre-Test is 77.8667 kg with standard deviation of 11.83430 kg. Post-Test measurements

show a weight average of 74.4333 kg with a standard deviation of 11,56297 kg. It can be seen that mean difference of Pre-Test and Post-Test is 3.4333 with standard deviation 3.13691 and standard error 0..57272. Based on paired t test result there was significant weight difference between before intervention with after intervention during 4 weeks with p value = 0,000

Table 4. Weight Distribution of Weighted Group of Counseling Interventions by Pre-Test and Post-Test Measurements

Weight	Statistical Test Results			
	Mean	SD	SE	P Value
<i>Pre-Test</i>	77.8667	11.83430	2.16064	< 0.000
<i>Post-Test</i>	74.4333	11.56297	2.11110	

Discussion

I. Weight Loss Pre Test and Post Test on Diet Intervention Group

A diet is the behavior of a human or a group of people in fulfilling the need for food, including the attitude,

beliefs, and food choices that describe the consumption of food (type, amount and frequency). Almost all of the students have unbalanced diet because they are from upper middle class families, so that the parents able to provide the nutritional intake they need.

According to Hadju (2005), a decision whether a food is nutritious or not sometimes become the last consideration in food choice. The first consideration is often personal favorite menu. Another factor that makes people unaware about the knowledge of nutrition and its effects is the social pressure that they are unable to reject the food offered.

In this study explorations were also conducted in relation to dietary patterns of which all the samples in the intervention group taking for consumptins, 3-4 times within a day with the most preferred feeding treatment being fried and from feeding frequency of samples using food frequency forms that the samples in all intervention groups consumed sourced carbohydrates from rice, noodles and corn more than three times a week. The most frequent consumed sources of protein is dominated by chicken eggs, duck eggs, pork, chicken meat and meatballs. Types of vegetables eaten by all intervention groups every day such as long beans, beans, squash, spinach and cassava leaves. Fruits consumed more than three times a week are avocado, orange, watermelon, papaya and apple. Meanwhile, fast food and soft drink were consumed 1-2 times a week.

Dietary patterns in the study can be assumed as one of the triggers of obesity. Research conducted in Bitung City by Mokolensang, et al (2016) showed an association of diet and obesity, in which the adolescent in the study tended to consume more macro

nutrients, from the analysis of nutrient intake compared to the number of nutritional adequacy recommended for adolescents age 13-17 years old.

II. Weight Loss Pre Test and Post Test on Group Intervention Physical Activity

Based on the results of the study listed on Table 2, weight loss in the Dietary intervention group is 2.5 kg. with the intervention of changes in physical activity patterns conducted by the teachers to change the thinking patterns of the students so that they have the willingness to involve in physical activities outside home such as doing sports, walking up and down the stairs instead of spending time only on playing computer games, watching television and other electronic media that only limit the energy output.

In this study, exploration related to the physical activity of the sample in daily life was 47% or 798.8 calories in a day with the level of eating consumption (90 – 119) of daily energy intake. The intervention to change the pattern of daily physical activity by adding hours of exercise is not limited only during school hours but at home, taking time walking to school with the intensity of at least 10 minutes away and go home, avoid sleeping too long, watching television and using electronics devices has impacted to reduce weight. Over nutrition is caused by imbalance incoming calorie compared to the output. Calories are obtained from food while expenditure through body and exercise activities. Most calories (60-70%) are used by the body for basic life such as breathing, heartbeat and basic cell functions. Physical activity and exercise can increase the total number of calories consumed. Other factors cause

overweight are psychology and lifestyle.

Excessive energy intake and not balanced with balanced energy expenditure (with less physical activity) will lead to weight gain. Lifestyle changes lead to changes in the diet of people that refers to a diet high in calories, fat and cholesterol, and not offset by physical activity can lead to more nutritional problems (Hidayati et al, 2010). Surya and Siti (2019) who studied dietary differences and physical activity among obese and non obese adolescents concluded that there was a significant difference in physical activity levels among adolescents in obese and non obese groups, where most obese teenagers had only mild activity, while non obese adolescents have moderate activity. This is also in line with the research conducted that more efforts needed to prevent obesity by reducing risk factors, including healthy eating and adequate physical activity. There is a relationship between physical activity and risk of more nutritional incidence in urban adolescents (SMA Kesatrian 2 Semarang). Musralianti et al (2016) published in the journal *Journal of Pharmaceutical Sciences* showed that physical activity is a risk factor for obesity where adolescents with mild physical activity are 0.016 times more likely to be obese than those with moderate physical activity.

The theory of obesity concerning low physical activity is the intake of incoming energy is only slightly used for the activity and mostly stored as body fat, in other words obesity group only use small energy to perform the activities (Proverawati, 2010). The physical activity of teenagers tends to decline, more teenagers play computers, play stations and watch TV. The same

thing happened to most of the subjects of this study.

Most research subjects have a habit of watching TV and playing games for more than two hours a day, both in obese and non obese groups. This is in line with research that the loss of physical activity due to watching television or playing games more than one hour every day has a significant contribution to childhood obesity (Simatupang, 2008).

III. . Weight Loss Pre Test and Post Test on Intervention Counseling Group

Based on the results of the study listed in Table 12 weight loss in the intervention group Counseling show a weight loss of 3.5 kg. with nutrition counseling interventions through the teachers to provide better understanding of the impact of obesity, the steps to overcome obesity problems, to provide healthy eating and to determine the amount and type to be consumed by the sample.

Research Stettler et al 2002 states that several factors causing obesity in children include excessive food intake derived from the type of processed food, soft drinks, snack foods such as fast food (burgers, pizza, hot dogs) and other fast food available at food outlets. Another cause of obesity is the lack of physical activity both daily activities and structured physical exercise. The main risk factors that cause obesity are behavioral factors that are unhealthy eating patterns coupled with inadequate consumption of fiber (fruits and vegetables), less physical activity, and smoking. Research Queen queue 2011 showed respondents who do not exercise regularly have an obesity risk of 1.35 times compared to respondents who exercise regularly.

Intensive and structured nutrition counseling can help clients to change

behavior, from wrong to good behavior. Nutrition counseling of overweight and obese teenagers is expected to alter high energy, high-saturated and low-fiber dietary habits and eating habits, and increase physical activity. Research conducted by Podojoyo et al (2008) in Palembang, showed that there was significant difference ($p < 0.001$) of dietary intake of overweight adolescent and obesity after nutrition counseling.

Eni (2016) concluded that peer nutrition counseling done as much as 6 times expected to be able to change adolescent eating behavior by increasing fiber intake and decreasing saturated fat. This is based on previous research, Prahastuti and Brian, 2009, research showed that counseling and peer education proved to be effective in increasing the knowledge and attitude of female adolescent to prevent anemia in Subang Regency. In this research, peer nutrition counseling is effective to decrease saturated fat intake but has not succeeded in increasing fiber intake.

IV. Limitations of Research

1. The researcher did not ensure precisely for the physical activity questionnaire and Recall The eating consumption was not based on the actual respondent's circumstances and the deep excavation by the teachers considering that they were only trained within 3 days.
2. Researchers cannot control the seriousness of the sample in carrying out physical activity and consumption patterns through the teacher. So, the data might not as it is expected.
3. Research also cannot control all activities performed by the teachers because the activities are carried out during the break of school hours.

Conclusions and recommendations

A. Conclusion

1. Description of factual model of teen empowerment through formation of trained teacher personnel can intervene on obesity samples give impact of weight loss so that model of adolescent child through the Formation of Nutrition Awareness Movement in High School as implementation of obesity handling strategy can be developed because it has effectiveness in overcoming obesity problems in adolescents.
2. Development model of organizing the establishment of trained teacher personnel and Nutrition Awareness Movement in schools through nutrition education and training that can overcome obesity problem with conceptual model in the form of organizing consist of 2 (two) steps, the first step was making draft model of organizing education and training nutrition-based student (adolescent) to overcome obesity problem; the second step of organizing involves integrating human resources, setting goals, organizing, organizing guides, preparing materials, preparing facilities, preparing instructors;
3. The effectiveness of the development model Teenagers Aware of Nutrition is very effective in overcoming obesity problems among adolescents. From the results of this study obtained the results that there are differences in knowledge on pre-test teacher and post test given nutrition education and training significantly there is increased knowledge after getting the

training statistically significant where p value <0,000 or α <0,05 was obtained. Likewise, there was weight loss in all intervention groups based on test results i.e. diet, physical activity based on paired t test results. There was a significant weight difference between before intervention with after intervention for 4 weeks with p value = 0,000 at α <0, 05 or down 2.5. - 3.5. Kg weight.

B. Recommendations

1. Schools can make policy in overcoming obesity problems in changing eating behavior patterns, increase physical activity and nutrition counseling groups among students to be more healthy and productive in receiving lessons at school
2. Schools can intensify monitoring of nutritional status of students to monitor the development of body weight
3. Need support from parents to be more wise to provide healthy meals and monitor the frequency of eating out.
4. Relevant Parties, Health Service, Education Service and Local Government can establish a Nutrition-Based Teenagers Movement in Schools-in order to improve the health of students gain ideal body weight.
5. For further research the researcher suggests to be able to do research on other variables that have not been meticulously (genetic factor, social economy, and physical appearance and health orientation with social pride

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