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Effectiveness of Pedometer Use to Reduce Obesity Risk And Blood Cholesterol Level (Total, Trigliceride, HDL, and LDL) in Obesity Population at Perkamil Paal Dua of Manado City in 2016

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Background: Pedometer functions using daily monitoring steps. It motivates people to do daily activities. The pedometer is equipped with a watch timer to calculate the steps number. Good daily steps to lose weight are usually 1500 steps when applied regularly. Obesity as a risk factor causes non-infectious disease e.g.; diabetes mellitus, hypertension, cardiovascular disease, and so on. Therefore, the use of pedometer can motivate everyone to prevent of some non- infectious diseases.
Objective: Purpose of the research is to analyze effectif use of pedometer in reducing obesity risk and total cholesterol level. This research type is true experimen with pre and post test control design. Location of the research was in Perkamil of Paal Dua Sub-district of Manado City. Time of research was from August to October. The sample was 40 respondens, comprising 20 treament respondens and 20 control respondens.
Result of Research: Based on the analysis result using statistic test with paired t-test, showing that Body Mass Index (BMI) of treatment group, there were differences mean value between pre and post test as many as 14,6, p0,000<p0,05. Differences mean value of total blood cholesterol between pre and post test as many as 1,56, p,0,002<p,0,05. That was influenced very significantly between pedometer with decreasing of BMI and total cholesterol blood levels on treatment respondens. Control groups showed that there were differences mean value of BMI between pre and post test as many as =0,7, p0,007<p0,05. Differences mean total of cholesterol blood pre and post test as many as =1,393,p0,002<p0,05. Differences mean value of LDL levels pre and post test as many as =19, p0,013<p0,05. It was influenced signicantly between BMI pre test with BMI post test, total cholesterol blood pre test and post test, and LDL levels pre test and post test without pedometer use.

Conclussion: The researh result concluded that pedometer has significant influence towards reduction of body weight within obesity population and total cholesterol blood and LDL levels. Suggested on respondents using pedometer application to monitor amount of steps everyday to reach normal body weight and blood cholesterol.

Key Words: Pedometer Use, Obesity, and Total Cholesterol.

Preface

Along with the development of science and technology, including in agriculture technology, transportation, and information, there is a change in physical activity, diet pattern, body composition, and lifestyle. Changes in diet pattern and physical activity resulted in more and more people experiencing more nutritional problems such as overweight and obesity (Almatsier, 2009).

Nutrition problem is a health disorder and welfare of a person, group of people or society as a form of imbalance between intake with the body needs resulting in less nutrition and more nutrition. Other factors affecting people's nutritional status are health care, economy, education, socio-culture, and lifestyle (Cakrawati, 2013).

More nutritional status that has an impact on obesity will lead to increase risk of hypertension, resistance insulin of diabetes mellitus type 2, coronary heart disease (CHD), and dyslipidemia. The components of dyslipidemia include level of high total

cholesterol, level of high triglyceride, cholesterol-high density lippoprotein (HDL) low, and low-density cholesterol lippoprotein (LDL) is high, has a role major in increased atherosclerosis and cardiovascular disease. Total cholesterol includes one of the indicators to determine the risk of cardiovascular disease.

Hypercholesterolemia or elevated levels of total cholesterol generally does not cause symptoms, so check for prevention and regular examination of levels cholesterol is needed as an action prevention for high risk individuals (Shah et al., 2008).

Increased of cholesterol level is a risk to heart disease and stroke is estimated world mortality of approximately 2.6 million people. The highest death rate of about 54% occurred in Europe, then America 48%. The regions of Africa were 22.6% and South East Asia were 29.0% (World Health Organization (WHO, 2013).

Research conducted by Shah et al (2008) in both community groups (obese and non obese), in Pakistan urban shows that total high cholesterol levels> 200 mg/dl are present in 37% of obese people and 29% of non-obese people. This shows significantly that high total cholesterol levels trend to be experienced by people who are obese.

Based on the data from the Ministry of Health Indonesia (2010) regarding basic health research, the national nutritional status of the adult population over 18 years shows the category of underweight 12.6%, and obesity 21.7%. Body Mass Index (BMI) of urban population is categorized as obesity by 29,2%, while in rural population 16,7%, with highest percentage of obesity in North Sulawesi is 37,1% and lowest is 13,0% in East Nusa Tenggara.

In accordance with the results of research conducted on teachers in State Senior High Vocational School 1 of Amurang using a cross-sectional study design, indicate that there is a significant influence between nutritional status and total cholesterol levels with significance value p=0,003<p0,05 (Kaleb, 2010).

According to data from Health Service of Manado City in 2012, cardiovascular is one of ten diseases with the most prominent incident in Manado. The number of sufferers in 2012 was recorded as many as 16,709 sufferers (Dinkes Manado, 2012). The number of patients with cardiovascular disease who visited public health center of Ranomuut in 2014 was 150 patients (Profile of Ranomuut Puskesmas, 2014).

Based on the above problems, the researchers are interested to study of: "Effectiveness Pedometer Using to Reducing the Risk of Obesity and Total Blood Cholesterol in Obesity and Non Obesity in Perkamil Sub-district of Paal Dua Manado City".

Pedometer is now popular as a monitoring tool and a motivator of daily exercise progress, can encourage individuals to empower themselves in gaining fitness and losing weight. Pedometers are designed to calculate the number of steps taken each day (Zao, 2010). conduct research based on the problems in the background above, then the formulation of the problem that can be put forward as follows: "Is there any influence between the Status of More Nutrition Cholesterol levels of blood in Obesity and Non Obesity community in Perkamil District of Paal Dua Manado City".

Research methods and data collection.

This research aims to analyze the effectiveness of pedometer use in reducing the risk of obesity and total blood cholesterol (Total, HDL, LDL, and Triglicerides) in the community obesity and non-obesity at Perkamil Sub-district of Tikala Manado. The research method used is analytical research is true experimental design with hhe pre and post test control group design. The obese respondents were divided into two groups, namely the group using a pedometer and a group without pedometer as many as 40 respondents that is 20 treatment respondents

and 20 respondents respectively. This research was implemented in Perkamil Sub-district of Paal Dua Manado City started from August to October 2016. The available population is 250 people sampling by the surveys way that measure weight and the height of the population then determined Body Mass Index (BMI). Sampling technique in this study uses purposive sampling method. Sampling and implementation of research for 8 weeks. Interview and filling out the questionnaire done by researchers and assisted by trained personnel enumerator students of the Departement of Health Analyst. After the interview, sign informed consent, and approval to be respondent, then done measurement of body weight and height for all communities in Perkamil Sub-district of Paal Dua Manado City. After that, weight assessment is done using the mass index formula body (BMI) to determine the classification weight. Then the treatment group used a pedometer and a group non-treatment without pedometer, after three weeks performed of monitored physical activity and effective use of a pedometer, then blood sampling and examination of total blood cholesterol.

Before using a pedometer, the body weight was measured using the body mass index (BMI) formula to determine body weight classification for obesity and non-obesity groups. Then blood sampling was taken to examine the blood cholesterol with total cholesterol, HDL, LDL, and triglyceride parameters for two groups. The next obesity group as treatment group using a pedometer and non-obesity group as non-treatment without a pedometer. After three weeks, physical activities were monitored using pedometer effectiveness with a manner of measuring body weight for two groups and taking of blood samples for examination of the total blood. cholesterol levels for total cholesterol, HDL, LDL, and Triglyceride. Sample number has to be accomplished research procedure began with pre-test and ended with post-test as many as 40 samples consist of 20 respondents in treatment group and 20 respondents in control group.

Steps by steps data processing including: Cleaning and editing, Coding, and Entry. Analyzing data using computerized system consisted of: univariate analyze, toexplained characteritics describes of each variables is investigated. Bivariate analysis to analyze effectiveness of using a pedometer on each of research variables using paired T-test, the first to be performed data normality test using Kolmogorv-smirnov to knowing normal distribution from each of variables to determine statistical test is used.

Research Result

Based on data collected of pedometer using effectiveness in the decreased obesity risk and and blood cholesterol parameters of total blood, HDL, LDL, and Triglyceride was to be done in Perkamil Sub-district of Paal Dua Manado City of I,II, and V areas, data was collected related to respondens as many as 47 respondens, but as many as 7 respondens incompleted accomplish going on research procedure beginning started from pre-test to post-test, so this research involved only 40 respondents participated acticvely.
The research result describes some data, including location, illustration Data of research, subject characteristics and univariate analysis, and analysis variables bivariate independent that affected dependent variables, as following:

1. Univariate Analysis

Univariate analysis was performed to describes characteristics of age, gender, education, occupation, pre- and post-test total cholesterol, pre- and post-test triglyceride, pre- and post-test HDL, pre- and post-test LDL.

Based on respondents characteristic on table 1 above showing as follow: Respondents age as many as is age group 31 years to treatment group as many as 18 respondents (90%) and control group as many as 15 respondents (75%).

Respondens gender majtority is female. Treatment group as many as 18 respondents 90%), and control group as many as 16 respondents (80%). The majority of respondents' education is elementary school until high school, treatment group as many as 16 respondents (80%), and control group as many as 20 respondents (100%).

Table 1. Distribution of Respondents Based On Respondents Characteristics

Variable	Treatment		Control	
	f	%	f	%
Ages				
a. 20-30 years	2	10	5	25
b. >31 years	18	90	15	75
Gender				
a. Male	2	10	4	20
b. Female	18	90	16	80
Education				
a. Elementary	16	80	20	100
b. High School				
c. University	4	20	0	0
Occupation				
a. IRT	14	70	17	85
b. PNS/Karyawan	3	15	3	15
c. Swasta	3	15	0	0
BMI_1				
a. 25-30 (Overweight)	9	45	16	80
b. >31 (Obecity)	11	55	4	20
BMI_2				
a. 25-30 (Overweight)	14	70	14	70
b. >31 (Obecity)	6	30	6	30
Steps average				
a. < 4000 Steps	7	35	10	50
b. 4000 Steps	9	45	10	50
c. >4000 Steps	4	20		

Majority of the respondents' ccupation is household work of women, treatment group as many as 14 respondents (70%), and control group as many as 14 respondents (70%), and control group as many as 17 respondents (85%). Body Mass Index (BMI) measuring result treatment group of pre-test majority is obecity group 11 respondents (55%) dan majority BMI post-test is overweight group as many as 14 respondents (80%), and post test group is overweight group as many as 14 respondens (70%). Average steps recorded by a pedometer were 4250 steps. Steps of the majority treatment group are 4000 steps, as many as 9 respondents (45%).

2. **Bivariate Analysis.**

Bivariate analysis performed on the pedometer using effect of obesity risk within obesity community in Perkamil sub-district of Paal Dua Manado City. The first data normality test with scale ratio (pre- and post-test BMI, Total cholesterol HDL, LDL, and Triglyceride).When not normally distributed, data not followed in the parametric test (Paired T-test).

a. Normality data Treatment Group.

Data normality test presented on the table 2 below. According to result of data normality test on treatment group (BMI, Total Cholesterol, Triglyceride, HDL, and LDL) data are normally distribution. BMI pre- and

post-test, Total Cholesterol pre- and post-test, pre- and post-test Triglyceride, pre- and post-test HDl, can refer to p value>0,05. It means that data is normally distributed.

b. Result of Data Normality Test on Control Group

Result of data normality presents in the table below 3. In according to result of data normality test on control group (BMI, Total Cholesterol, Triglyceride, HDL, LDL), normal distribution data that is: BMI Pre and Post Test, Pre and Post Test Total Cholesterol, Pre and Post Test HDL, and Pre and Post Test LDL as refer to p value>0,05. It's meaning that distribution data is normal.

c. Analysis result on effectivenees using pedometer on BMI and Blood Cholesterol Parameters of Obesity Treatment Group.

d. Table 2. Result of data normality test of BMI and Cholesterol on Treatment Group of Obesity.

Variables	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistics	df	Sig.	Statistical	df	Sig.
BMI Pre-Test	0,132	20	0,200	0,898	20	0,037
BMI Post-Test	0,123	20	0,200	0,920	20	0,099
Total Cholesterol Pre-Test	0,141	20	0,200	0,912	20	0,70
Total Cholesterol Post-Test	0,970	20	0,200	0,980	20	0,936
Triglyceride Pre-Test	0,146	20	0,200	0,898	20	0,037
Triglyceride Post-Test	0,132	20	0,200	0,942	20	0,266
HDL Pre -Test	0,143	20	0,200	0,946	20	0,312
HDL Post -Test	0,308	20	0,200	0,830	20	0,002
LDL Pre-Test	0,197	20	0,040	0,900	20	0,040
LDL Post-Test	0,122	20	0,200	0,946	20	0,312

*This is a lower bound of the true significance.

a. Liliefors Significance Correction

Table 3. Result of Data Normality t and Cholesterol Test on Obesity Control Group

Variables	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistical	Df	Sig.	Statistical	df	Sig.
BMI Pre-Test	0,211	20	0,020	0,878	20	0,016
BMI Post-Test	0,181	20	0,086	0,942	20	0,266
Total Cholesterol Pre-Tes	0,101	20	0,200	0,979	20	0,915
Total Cholesterol Post-Test	0,115	20	0,200	0,946	20	0,309
Triglyceride Pre-Test	0,181	20	0,000	0,810	20	0,000
Triglyceride Post -Test	0,285	20	0,083	0,691	20	0,001
HDL Pre test	0,165	20	0,155	0,955	20	0,453
HDL Post Test	0,187	20	0,065	0,890	20	0,027
LDL Pre test	0,094	20	0,200	0,972	20	0,800
LDL Post Test	0,124	20	0,200	0,965	20	0,648

*This is a lower bound of the true significance.

a. Liliefors Significance Correction

Table 4. Result of Analysis Effectiveness Using Pedometer on Treatment Group Obecity Risk and Blood Cholesterol

Variabel	Mean	Std. Deviasi	t-tabel	pValue
BMI Pre Test	30,06	3,520	4,464	0,000
BMI Post Test	29,20	3,458		
Total Cholesterol Pre Test	183,75	26,801	-3,524	0,002
Total Cholesterol Post Test	197,65	22,429		
Triglyceride Pre Test	101,25	27,476	-1,045	0,309

Triglyceride Post Test	108,50	25,241		
HDL Levels Pre Test	46,55	1,538	0,639	0,530
HDLLevels Post Test	46,35	1,599		

Based on the result of using pedometer effectiveness on obecity risk and blood cholesterol parameters on treatment group, showing that pre test BMI value mean = 30,06 + Std.Deviation = 3,520. Post test BMI meanvalue = 29,20 + Std.Deviation = 3,458, p 0,000 < p0,05. There is mean value difference = 14,6. It means that there is very signicant effectiveness between using pedometer with respondents' and body weight decreasing. Cholesterol levels of mean value post-test = 183,75 + Std.Deviation = 26,801, and mean value post-test = 197 + Std.deviation = 22,429, p 0,002 < p 0,05. There is mean difference of 1,56. That means it is very significant between using pedometer and decreasing of total cholesterol level of respondents. There is no effectiveness using pedometer for pre-test and post-test triglyceride levels, and blood HDL levels pre-test or post-test.

Table 5. Result of Obesity Risk of Control Group and Blood Cholesterol Without Pedometer Application

Variabel	Mean	Std. Deviasi	t-tabel	pValue
BMI Pre Test	28,900	2,673	3,036	0,007
BMI Post Test	28,200	2,397		
Total Cholesterol Pre Test	212,90	39,979	3,185	0,005
Total Choletserol Post Test	188,35	38,586		
HDL Levels Pre Test	44,950	2,460	- 0,709	0,487
HDL Levels Post Test	45,300	1,895		
LDL Levels Pre Test	142,75	42,021	2,740	0,013
LDL Levels Post Test	123,75	34,744		

The result of obesity risk and blood cholesterol parameters on control group showed that mean value pre-test BMI=28,90+Std.deviation=2,673. Mean value post-test BMI=28,20+Std.deviation=2,397, p0,007<p0,05, table-t=3,306. There is difference of mean value pre- and post-test BMI=0,7. That means there is significant effectiveness on decreasing of respondents' body weight without pedometer application.

On the control group total cholesterol levels of mean value pre-test = 212,90 + Std.deviation = 39,979, and mean value post-test = 188,35 + Std. Deviation = 38,586, p 0,002 < p0,05, a counted table = 3,185. There is mean value difference as much as = 1,393. That means there is significant effectiveness without application pedometer with decreased of respondents' total cholesterol levels. Mean value pre-test LDL levels = 142,75 + Std. Deviation = 42,021. Mean value post-test LDL levels = 123,75 + Std. Deviation = 34,744, a counted table = 2,740, p 0.013 < p 0,05. There is difference of mean value pre- and post-test LDL levels as much as=19. That means there is significant effectivenesss between using pedometer and decreasing LDL levels. But there is no significant effectiveness between without application pedometer and HDL levels according to pre-test or post-test.

Disscussion

This research was conducted within obesity communities in Perkamil Sub-district of Paal Dua, Manado City, from August until first of October 2016. Prior to research, research preparation was made, including: securing permission and location, survey on obesity respondents by measuring body weight, body height and BMI levels. Respondents who were classified overweight and obesity became sample or respondents and the research was carried out afterwards. After criteria of number of respondents been fulfilled, the researchers asked for the respondents' willingness to take part into the treatment, to use a pedometer tools, to give

blood sample to examine the blood cholesterol parameters (total blood, triglyceride, HDL, and LDL) as much as two times of blood taking.

Most of respondents were ready to participate in the research, but in the last period of research there were 10 respondents who did not accomplish or complete the blood sample taking, so they were excluded from the sample.

The weakness of this research is the time limit that most of the respondents do not yet understand about the research utility, especially using pedometer as new things for respondents. lacking of using pedometer for respondens is occurring unregulated in application because routine activity as household mother. Forget factor and unfamiliar in it application.

Research result of the effectivness application pedometer in the decreasing of obecity risk and total blood kolesterol with it parameters (total cholesterol, HDL, LDL, and Triglyceride).

1. **Respondents' Characteristics.**

Majority of ages respondents middle adult over 31-50 years old (90%) in treatment group and control group (75%). This research result is in line with the research made by Silitonga, (2008) indicated that level I obesity has suffered by respondents aged 20-30 years old (39,62%) followed by those >30 years old (32,07%). This is according to research made by Haryadi (1986) who said that percentage of body fat increases due to advancing years, usually between 20-30 years old and an a research in Austria found that obesity incidence starts over 40 years old than below 40 years old (Suyono, 1994). Obesity prevalence tends to rising up after the women has entered menopause. In the same manner as can be refer to in this research, women respondents experienced obesity in treatment group (90%) and in control group (80%).

Majority of gender is female in treatment group (90%) and control group (80%). The majority of respondent's educational background is elementary and high school as many as (80%). Education is a teaching and learning process, which means growing proccess, developing or changing to achieve the purpose of being an adult, becoming more mature personally and collectively. It implies that someone transforms from not knowing about health to be knowing, from unable to overcome the health problems to be able, and so on.

Most of the respondents' occupation is housewife in the treatment group (70%) and in control group (85%). According to Oxford Dictionary and Oxford English (2008), "work" as a verb means to do something that need effort while physical or mentally a apart from a working. Working is to be done individually, especially to getting money for support one's life. Working class or group related to social group where their members do not have much money, and they usually do household work. Type of occupation has a main role in the occurance of disease. There are a number of enviroment factors that can directly cause illness, such as chemical material, poisoning gas, radiation, physical material which can cause accident and so on; stressful working condition, lackness of "body sport" during work (Sutrisna,2010).

Result of BMI measurement on pre-test treatment group, those which majority is obesity group as many as 11 respondents (55%), and post test BMI majority is overweight group as many as 14 respondents (70%). Avarege steps recorded by pedometer is 4250 steps. Nine respondents (45%) in the treatment group were able to do 4000 steps.

2. **Effective Application of Pedometer to decrease BMI of Treatment and Control Obesity Group.**

Based on the analysis result using statistic test with paired t-test, showing that Body Mass Index (BMI) in treatment group, there was differences mean value between pre- and post-test as many as 14,6, p 0,000<p0,05. Differences of mean value of total blood cholesterol pre- and post-test as many as 1,56, p,0,002<p,0,05. There was

significant influence between pedometer used to decrease the BMI and total blood cholesterol levels of treatment respondents. Control group showed that there was differences mean value of BMI between pre- and post-test as many as =0,7, p0,007<p0,05. Differences of mean total blood cholesterol pre-and pos-test as many as =1,393,p0,002<p0,05. Differences of mean value of LDL levels pre- and post-test as many as =19, p0,013<p0,05. There was significant influence between BMI pre-test with BMI post-test, total blood cholesterol pre-test and post-test and LDL levels pre-test and post-test without using pedometer.

This research result is in accordance with research result from Clemes, et al (2007), which indicated that normal BMI group is able to make significant steps up to 10247 per day than overweight and obesity groups that are 2000 steps per day. Increasing obesity prevalence in the United Kingdom caused by the changing of activity level. Issue of emphasizing pedometer application especially during week activity, to be in initial could not overcome obesity problem in the United Kingdom. This research result is in line with research result made by Listiyana, et al (2013), which showed that 61,7% respondents have experienced obesity and 16% respondents have total blood cholesterol level including hypercholesterolemia. Data analysis result showed that there is relationship between central obesity and total blood cholesterol level (p0,001). It means that there is relationship between central obesity with total blood cholesterol level. Although control group did not use the pedodemeter, but based obesity has contribution on blood cholesterol parameters.

Conclussion: The researh result concluded that pedometer use has influenced very significantly toward the reduction of body weight of obesity population and total blood cholesterol and LDL levels. It is suggested that the respondents use the pedometer application to monitor number of steps made everyday to reach normal body weight and blood cholesterol parameter in normal range.

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