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The Wellness Program for Physical Fitness and Decreasing Metabolic Syndrome Risk Factors

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Abstract

Indonesia is currently facing a double burden of disease. The high rate of communicable diseases has been followed by high rates of non-communicable diseases (NCD) such as hypertension, heart disease, cancer and diabetes mellitus. This study aims to produce a holistic approach model in the form of a Wellness Program in an effort to improve physical fitness and decrease of metabolic syndrome for civil servants. This study was designed with an experimental design. Subjects were members of civil servants in Klungkung Regency, Indonesia who have one or more of syndrome metabolic risk. Subjects were divided into two groups, namely the treatment group and the control group. The treatment group is a group that is given a wellness program model in the form of physical exercise according to the rules of frequency, intensity and duration, balanced nutrition education and smoking behavior control. The results show a significant increase in nutritional knowledge ($p<0.05$), the implementation of physical activity rules with a frequency of 3-5 x/week in 78%, duration 20-60 minutes in 76% of light-moderate exercise, decreased smoking habit significantly $p=0.042$ ($p<0.05$), increased physical fitness with VO2max value $29.28 + 7.68$ (treatment group) vs $24.28 + 5.91$ (control group) with $p<0, 05$, decreasing of blood sugar was $118.08 + 35.81$ mg/dl (treatment group) vs. $124 + 42.22$ mg/dl with p value = 0.001 ($p <0.05$) with t- independent test. Meanwhile, the risk factor variables for the metabolic syndrome (obesity, cholesterol and blood pressure) showed a decrease but were not significantly different.

Keywords: Wellness Program, Nutrition, Physical Activity, Risk Factor

1. Introduction

Lifestyle is one of the important causes of non-communicable diseases (NCD). Smoking habits, excess nutrition, sedentary lifestyle and stress are problems closely related to NCD such as metabolic syndrome. The results to Riskesdas, (2007), smoking behavior increased from 32.0% to 33.4% and increased to 36.3% in 2013 (Kemenkes RI, 2013). While the prevalence of metabolic syndrome in adult population is around 21.8%. The prevalence of metabolic syndrome is directly proportional with the increasing age by about 10% in the population aged 20 years and reaches 40% at the age of 60 years. According to (Dwipayana *et al.*, 2011) stated that the prevalence of Metabolic Syndrome in Bali Province is increasing, as much as 18.2% (men 16.6% and women 20.0%). The condition of this metabolic syndrome occurs in many productive ages, and it may influence the productivity.

The prevalence of metabolic syndrome is 11. 28% for men and 20. 38% for women. Metabolic syndrome is one of the risk factors for changes in consumption patterns towards high-fat consumption patterns. Food consumption excess of nutritional needs has an impact on overweight and obesity (Wiardani and Arsana, 2011; Toti et al., 2019). The obesity rate in Indonesia reaches 14.8%. The sedentary lifestyle in the metabolic syndrome is caused by a lack of physical activity. As much as 26.1% of the Indonesian population lacks physical activity. There are 22 provinces in Indonesia with population of less doing of physical activity classified as less active which is above the Indonesian average, specifically DKI Jakarta (44.2%), Papua (38.9%), West Papua (37.8%), Southeast Sulawesi and Aceh (37.2% each). The high prevalence of metabolic syndrome will affect a person's level of physical fitness (Lee, Ko and Lee, 2020). It is necessary to design a holistic program to help prevent or improve metabolic syndrome, especially in civil servants. One of the lifestyle modification efforts is Wellness Program which includes nutrition management, physical exercise and smoking cessation for civil servants. This study aims to improve physical fitness and decrease of metabolic syndrome for civil servants in Klungkung Regency.

2. Method

This study is a true experimental study with a randomized pre-test-post-test control group design. The study population was civil servants in Klungkung Regency with inclusion criteria including male or female, 25-60 years old, there were of 1 or more metabolic syndrome, domiciled in Klungkung regency and willing to be respondents. The sample was divided into two treatment groups, who were given the Wellness Program approach (regulating physical activity, balanced nutrition education with nutritional counseling and smoking control approaches), while the control group was without Wellness Program. Wellness Programs were conducted for 8 weeks or 2 months. The sample size using the Pocock formula (Pocock, 2008), with $\alpha = 0.05$ and $\beta = 0.2$, F = 7.9, $\mu 1 - \mu 2 = 2.1$ kg. m^2. Based on the calculation, the results obtained 42 people and 20%, so the sample per group is at least 48 people, rounded off by 50 people, so the total sample in both groups is 100 people. Sampling technique is done by simple random sampling and selected from 2 civil servants (SKPD) then carried out a screening process in accordance with the inclusion criteria to obtain the expected number of samples. The sample selected in each SKPD was determined by the control and treatment groups by simple random sampling.

The types of data collection in this study include characteristic, food consumption patterns, physical activity, smoking behavior, physical fitness, body mass index, metabolic syndrome status (obesity, blood pressure, blood sugar levels and blood cholesterol/triglyceride levels). Identity data samples were collected by interview using a sample identity form, data on food consumption were collected using the 2x24 hour recall method. Meanwhile the BMI data was measured using a stepping scale, and height was measured using a microtoise. Metabolic syndrome data were collected by measuring blood pressure using a blood pressure meter, blood sugar and cholesterol/triglyceride levels with Multi Check Parameters. Physical fitness with the Rockport method test was done through the SIPGAR application by walking or running of 1.6 Km distance. Smoking control data is carried out by interviewing and assessing with two indicators including the category of good (stop smoking), and not good (still smoking). Data were compiled, processed and analyzed by statistical of univariate, bivariate and multivariate including *Kolmogorov-Smirnov* test, *Levene* test, paired t-test and independent t-test.

3. Results

3.1 Characteristics

The research subject were civil servants of Klungkung Regency, as many as 100 people where 50 people are the treatment group and 50 people are the control group. The proportion of male gender is 80% in treatment group and 54% in control group. The average of age in the treatment group was 43 years (± 10.2 years), with the highest age being 58 years and the lowest being 22 years. The average of age in control group is 43.26 years (± 9.3 years), the highest is 58 years and the lowest is 22 years.

Table 1: Sample Characteristic

Variable	Group				Total	
	Treatment		Control			
	n	%	n	%	n	%
Gender						
Male	40	80.0	27	0.54	67	0.67
Female	10	20.0	23	0.46	33	0.33
Total	50		50		100	100
Age						
20 – 30 years	8	16.0	5	10.0		
31 – 40 years	10	0.0	14	28.0	29	⌐.5
41- 50 years	16	2.0	19	38.0	31	⌐.9
51- 60 years	16	2.0	12	24.0	24	⌐.6
Total	50	00.0	42	100.0	84	)0.0

3.2 Wellness Program Implementation

There are 3 activities in the implementation of the Wellness Program such as first, nutrition education (balanced nutrition, diet counseling). The diet counseling was given are weight loss diet for obesity/overweight, DM diet (if blood sugar levels >140 mg/dl), low cholesterol diet (if cholesterol level >200 mg/dl, and hypertension diet (blood pressure > 140/90 mmHg. Second, arrangement of physical activity according to the FITT concept (frequency, intensity, time and type) of physical fitness. Third, controlling of smoking behavior that the subjects were expected to stop smoking in their life.

a. Nutritional knowledge

Knowledge of the subject is related to balance and dietary regulation in metabolic syndrome disorders and physical activity. Figure 1 shows the level of nutritional knowledge of the subject.
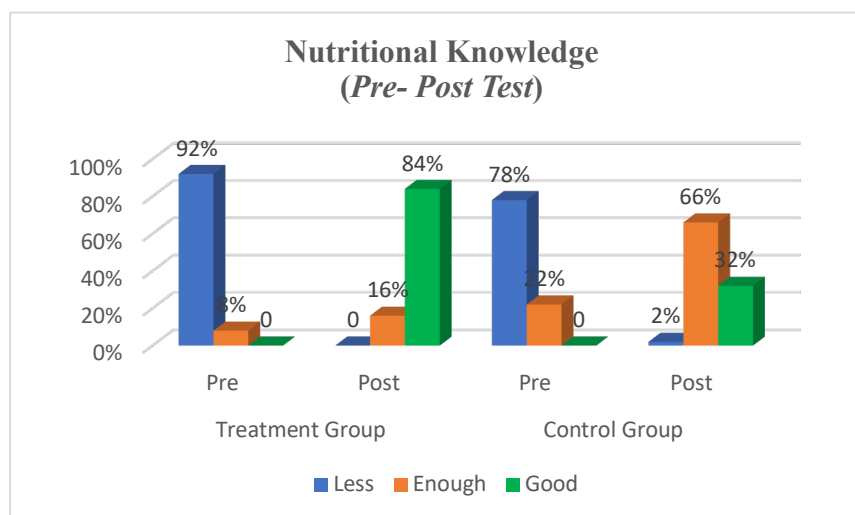

Figure 1: Nutritional knowledge

There is a sharp increase of nutritional knowledge in the treatment group from the less category (92%) to the good category (84%). Meanwhile in the control group there is a change from the less category (78%) to the good category (66%). Some of the questions that have been answered correctly include the function of nutrients for the body, the concept of balanced nutrition, the importance of reducing sugar and oil salt, and following the food pyramid concept. There were questions that had the lowest answered correctly such as serving's portions of various food and glycemic index food for blood sugar levels. The average score of nutritional knowledge in the treatment group is 85.10 + 3.71% and 77.10 + 7.89% in control group. Mann-Whitney analysis was applied to

assess the difference in the level of nutritional knowledge because the data is not homogeneous variance (p<0.05). Mann-Whitney test results obtain p value = 0.001 (p <0.05) which means that there is a significant difference in the level of nutritional knowledge in the treatment group (Wellness Program) compared to the control group.

b.   Physical Activity or Exercise

Physical Fitness Training Program to achieve fitness success is largely determined by the quality of the exercise which includes: training objectives, selection of exercise models, use of training facilities and more importantly the dose or dose of exercise described in the FITT concept; Frequency), Intensity , Time and Type (Fitri et al., 2014).

1) Exercise Frequency

Figure 2 shows the exercise frequency distribution. According to exercise frequency in the treatment group, the subject who did exercise in <1 – 2 times/week is 7 people (16%), while the recommended frequency 3 – 5 times/week was accomplished by 39 subjects (78%). On the other hand in the control group, the exercise frequency in <1 – 2 times/week was done by 35 subjects (70%), and the recommended frequency of exercise in 3-5 times/week were performed by 10 subjects (28%)
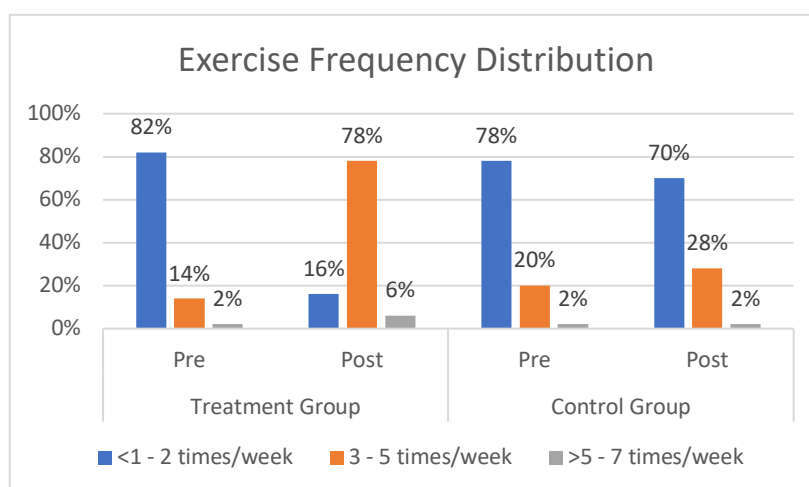

Figure 2: Exercise frequency distribution

2) Exercise Duration

Exercise duration is an essential factor in increasing physical fitness. According to figure 3, in the treatment group, the exercise duration <20 minutes was performed by 70% of the subject (pretest) decreased to 20% (posttest), while the recommended duration of 20-60 minutes increased from 26% (pretest) to 76% (posttest). Exercise duration in control group <20 minutes was done by 70% of the subject (pretest) decreased to 46% (posttest), while in the 20-60 minute duration, there is an increase from 28% subject to 32%. Based on this, the treatment group leads more to the recommended exercise duration of 20-60 minutes.
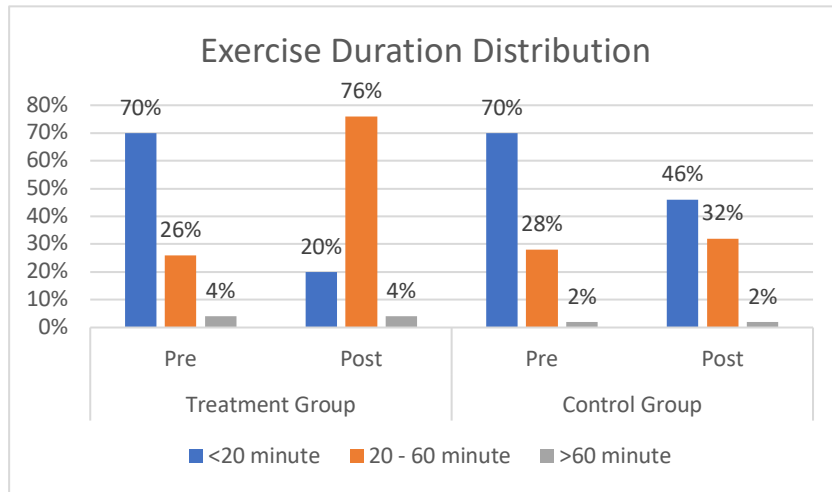
Figure 3: Exercise duration distribution

3.3 Type of Exercise

In the treatment group, the type of exercise that was carried out the most was jogging with 29 subjects (58%) and running at least 2 subjects (4%), and in control group, the subjects chose the most at jogging with 21 subjects (42%) and the least chose to run as much as 4 subjects (8%). Other types of exercise carried out by the two groups included yoga, gymnastics and cycling.

a.   Smoking Behavior Controlling

Figure 4 shows the smoking behavior distribution where the results show that 18% of the treatment group and 10% of the controls had a history of smoking. Wellness programs have decreased of smoking behavior in the treatment group from 9 subjects (18%) to 4 subjects (8%). In control group there is no change in the subject's smoking behavior that still in 5 (10%). The results of the Mann-Whitney test obtain p = 0.042 (p <0.05) which means that there is a significant difference in the decrease in smoking behavior in the two groups.
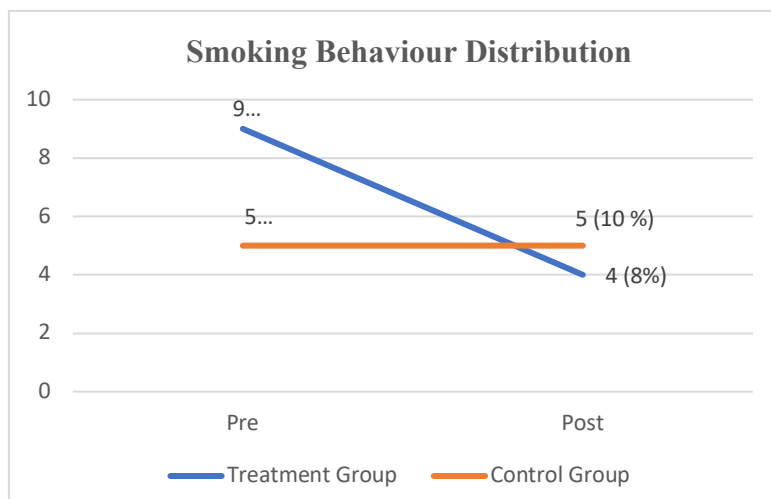

Figure 4: Smoking behaviour distribution

3.4 Physical Fitness

Physical fitness assessment was carried out through the Rockport method based on the SIPGAR application using of Android type mobile phone. The Rockport method was carried out by running or walking for 1.6 km distance. The SIPGAR application would be reported of speed time, VO2Max level and physical fitness category. The physical fitness of the treatment group from the less category (70%) in pretest decreased to 30% in posttest. In the good category starting from 0 (zero) increase to 42%. In the control group, the fitness less category (78%) in the pretest, there was relatively no decrease, which is 76% in the pretest. The average VO2 max in the treatment group is 29.28 + 7.68 (ml/kg/minute) and in the control group is 24.28 + 5.91 (ml/kg/minute). The results of the t-independent test obtain t value = 4.156 and p value = 0.001 (p <0.05). The results show that there is a significant difference in the mean VO2Max in the treatment group and the control group. This means that the wellness program is effective in improving the physical fitness of the civil servants.
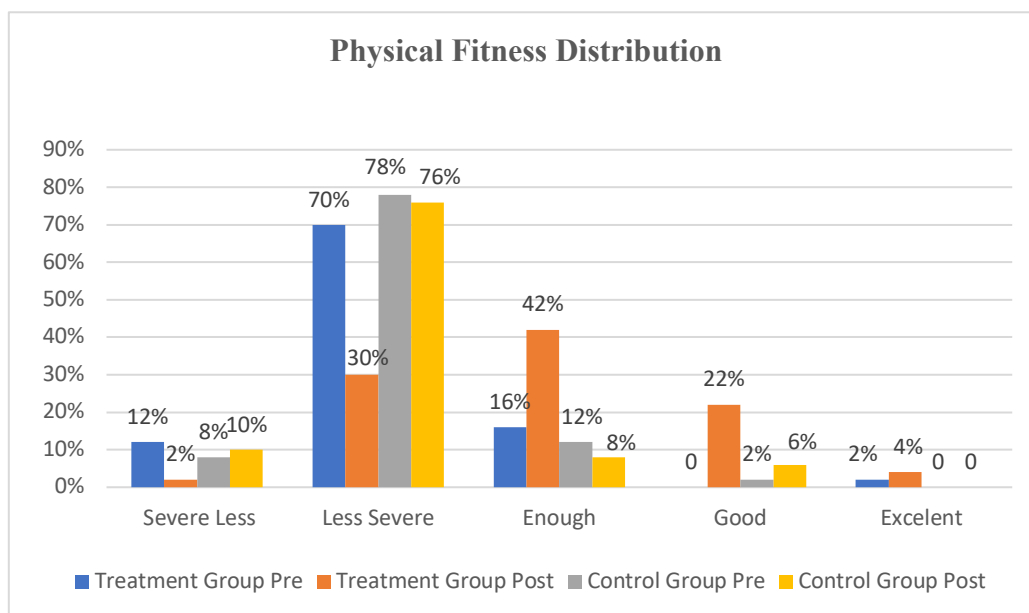

Figure 4: Distribution of subjects by category of physical fitness

3.5 Metabolic Syndrome Risk Factors

a. Obesity

Figure 5 shows the body mass index status. The obesity number decreased in the treatment group from 20% to 14%. But in the control group there is an increase from 14% to 18%. The average body mass index in the treatment group is $26.77 + 4.57$ kg/m^2 and in the control group is $26.05 + 4.46$ kg/m^2. The results of the t-independent test obtain p = 0.428 (p>0.05). There is no significantly different in BMI between two groups
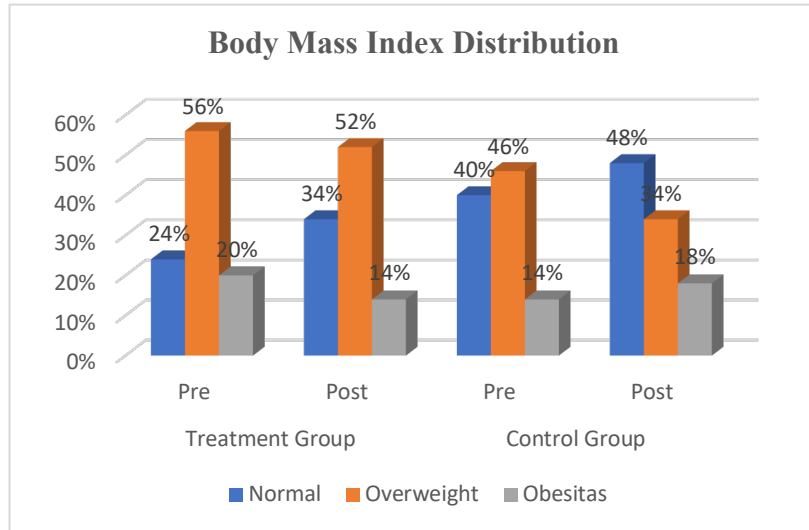
Figure 5: Body Mass Index distribution

b. Blood Pressure

According to figure 6, the average of blood pressure in the treatment group is 119.2/78.54 + 14.85 mmHg (pretest) and 115.2/77.2 + 8.02 mmHg (posttest). On the order hand, in control group is 115.9/77.8 + 9.8 mmHg to 116/80 + 9.84 mmHg. The results of the t-independent test show that $p = 0.911$ ($p > 0.05$). Hence, there is no significant difference of blood pressure in two groups.
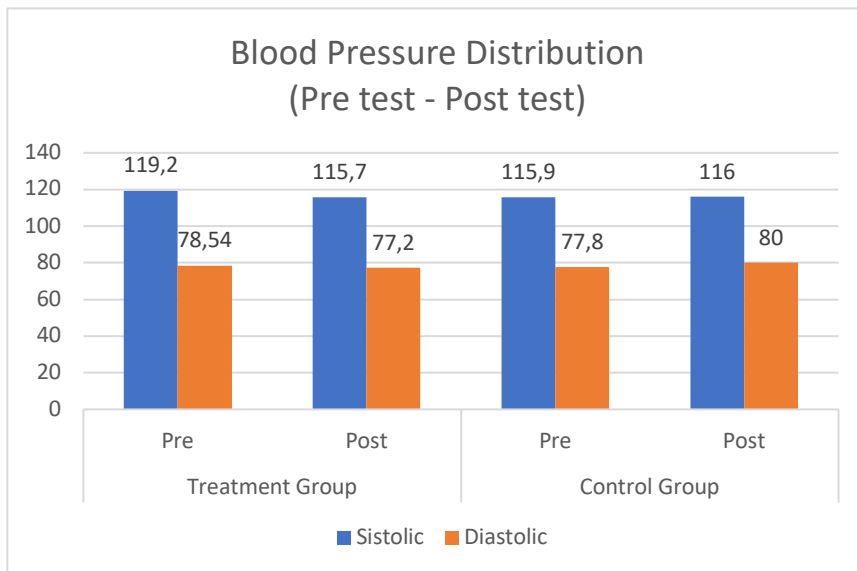

Figure 6: Blood pressure distribution

c. Blood Glucose

Figure 7 indicates that blood sugar levels in the treatment group decrease sharply from 135.78 + 62.57 mg/dl to 118.08 + 35.81 mg/dl. Meanwhile, in control group is 126.24 + 38.41 mg/dl (pretest) to 124 + 42.22 mg/dl. The results of the t-independent test obtain $p = 0.001$ ($p < 0.05$),so, there is a significant difference in blood sugar levels between the treatment and control groups.
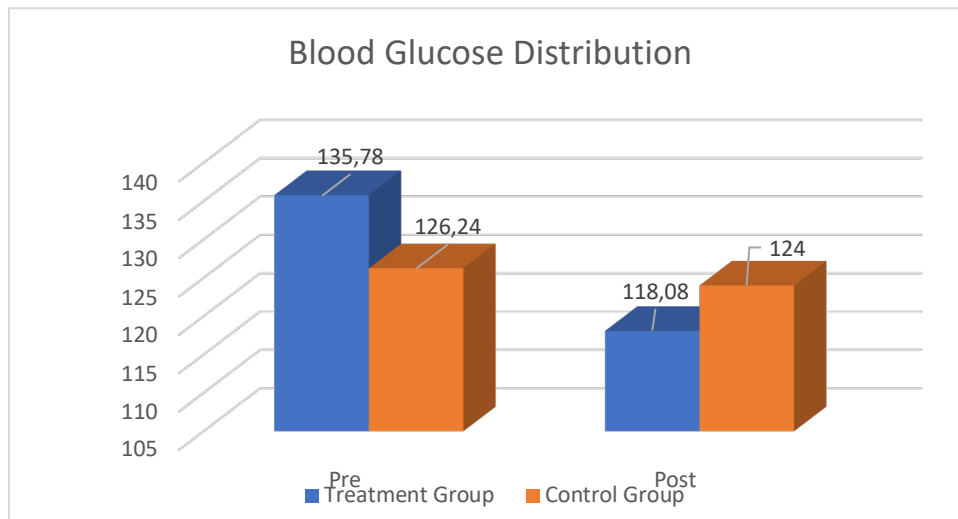
Figure 7: Blood glucose distribution

d. Cholesterol

The average of cholesterol levels in the treatment group is 196.38 + 39.09 (pretest), decreasing to 193.80 + 50.76 (posttest) after given wellness program intervention. Meanwhile in the control group is 185.18 + 38.53 (pretest) increased to 196.82 + 40.41 mg/dl. The results of t-independent test show that p value = 0.743 (p>0.05), so, there is no significant difference of cholesterol levels between two groups.
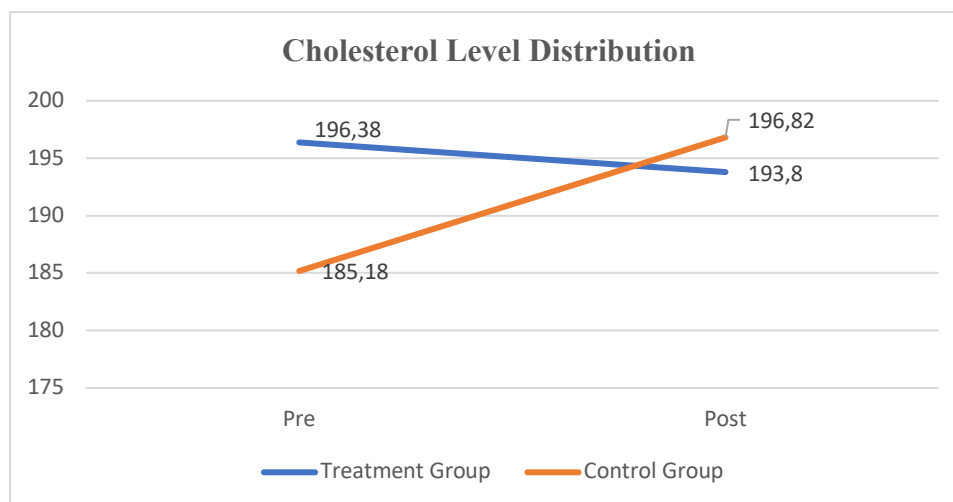

Figure 8: Cholesterol level distribution

4. Discussion

The results show that the Wellness Program approach gave significant results on the health condition of civil servants which is seen from several variables including nutritional knowledge, regulating of physical activities based on FITT, decreasing of smoking behavior and decreasing of blood glucose as one of the risk factors for the occurrence of metabolic syndrome. The difference in nutritional knowledge in the treatment group compared to the control group is due to information being repeatedly conveyed through counseling or WhatsApp Group which was made with the permission of the head of civil servants. The higher nutritional knowledge level, the better one's management in quality and quantity of food that must be consumed (Hamulka *et al.*, 2018; Eze *et al.*, 2017). Increasing the nutritional knowledge will have an impact on the regulation of eating and minimize of metabolic syndrome risk. Increasing nutritional knowledge in the intervention of Wellness Program has given an impact of

reducing blood glucose levels significantly. The results of this study are similar to the research by (Friedrich and Goluch-Koniuszy, 2017), that providing nutrition education to 56 pre-menopausal women in Poland regularly every week has an impact on increasing nutritional knowledge, regulating diet, and controlling blood sugar. Meanwhile the results of (Wiardani and Kusumajaya, 2018) on obese women show that education followed by training or mentoring can increase knowledge, skills and the application of balanced nutrition.

The Wellness Program intervention is able to reduce the percentage of blood pressure categories from pre-hypertension to the normal category but does not show a significant difference. This is probably due to the fact that 2 (two) months of the wellness program is not enough time. The results of this study are similar to (Blackford *et al.*, 2016) research result that application of healthy lifestyle modifications such as changes in diet and physical activity can reduce blood pressure by 30 mmHg for 6 months.

The administration of Wellness Program intervention for 8 weeks along with the guidelines for civil servants in carrying out of physical activities with a frequency of 3-5 times/week, intensity 60-75% maximum pulse rate, duration of 20-60 minutes with aerobic type of exercise is able to improve physical fitness through increasing physical fitness indicator such as VO_2 max. This is in accordance with the research from (Pescatello, 2014) which states that the time required for each exercise is 20-60 minutes / exercise with aerobic type of exercise. The results of the exercise will increase cardiopulmonary endurance after exercising for 6-12 weeks and stable after 20 weeks. The increasing physical fitness is marked by a significant increase in VO_2Max in the Wellness Program. It is because of applications like SIPGAR that make people more easily to do of exercise, besides, it can also provide information on the importance of a healthy lifestyle, can be used as monitoring when running an exercise program, provide evaluation of cardiovascular endurance test results, provide body mass index output values from user profile data, provide education to users regarding information about fitness (Putro et al., 2018).

According to (Ford *et al.*, 2005) states that regular physical activity can prevent the occurrence of metabolic syndrome. Employees was encouraged to be an active at all times doing physical activities such as stretching, not always being in front of the computer, or in front of the television, as it will tend to reduce the risk of metabolic syndrome. The wellness program intervention can decrease of smoking behavior, increase physical fitness (VO2max) and reduce blood glucose levels significantly. Such improvement is due to a togetherness approach in the government environment, such as support from leader to always give motivation to the employees in implementing of Wellness Program and that become sustainability program including of eating arrangements, certain diets and physical activities through social media by forming WhatsApp groups. This is in accordance with the results of research by (Lemstra and Rogers, 2015; Budreviciute *et al.*, 2020) which states that the support of social groups, family, close friends, superiors in a workplace can have positive implications in preventing and minimizing the risk of Non-Communicable Disease (NCD) including metabolic syndrome and improve quality of life.

Acknowledgments

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