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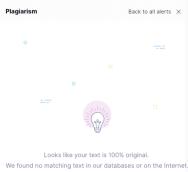
Effects Mixtures of Lemon and Virgin Olive Oil on The Cholesterol Levels of Hypertensive Patients

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The lipid profile, partly the blood cholesterol level, is critical in assessing cardiovascular risk in adults and addressing lifestyle habits like a healthy diet. Olive oil and lemon are believed useful in reducing inflammation and increasing endothelial function. This study evaluated short terms effect of those mixtures on the cholesterol level in hypertension patients. A quasi-experimental study, with a pretest-posttest without control group design, did on 18 purposively sampling hypertension patients in community. Besides their routine medication, samples received mixtures of 30 ml

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Effects Mixtures of Lemon and Virgin Olive Oil on The Cholesterol Levels of Hypertensive Patients D K Rukmi1,\*, R W Hidayati1, T S Adinugraha1 1Nursing Department, Jenderal Achmad Yani Yogyakarta University, Yogyakarta, Indonesia \*kartikarukmi@gmail.com The lipid profile, partly the blood cholesterol level, is critical in assessing cardiovascular risk in adults and addressing lifestyle habits like a healthy diet. Olive oil and lemon are believed useful in reducing inflammation and increasing endothelial function. This study evaluated short terms effect of those mixtures on the cholesterol level in hypertension patients. A quasi-experimental study, with a pretest-posttest without control group design, did on 18 purposively sampling hypertension patients in community. Besides their routine medication, samples received mixtures of 30 ml lemon squeeze and 30 ml virgin olive oil once a day 30 minutes before breakfast for 14 days. The cholesterol level was measured the day before (day 0) and the 14th days of administration. The pretest's mean cholesterol level was 228.67±55.14 mg/dl. Resulted from paired sample T-test, there were significant differences (p= 0.023;95%CI; p





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Methods Study design This research has passed ethical clearance from Jenderal Achmad Yani Yogyakarta University's ethics committee. This pre-experiment research was conducted on 18 hypertension patients using purposive sampling in Gilangharjo Village, Pandak, Bantul, Yogyakarta in August 2018. This research used one group pretest and posttest without control design. Sample Samples selected with inclusion criteria as hypertension patients with minimum age 30 years old who routinely seek treatment, have a cellular telephone with video features, have social or communication media to send videos, and do not take drugs to cholesterol/fat-lowering during the study. Samples who have a sensitive gastrointestinal tract and refused to drink the mixture before breakfast were excluded. Lemon and virgin olive oil mixture preparation The guidelines for making the mixture was adopted and modified from the research conducted by Hasan et al. and Khan et al.[10], [11]. The way to make the mixture is using a lemon (Citrus limon) and virgin olive oil (Olea europea). After the two ingredients obtained, the lemon then squeezed using a squeezing device. The lemon juice results are taken as much as 30 ml, and mixed with 30 ml of virgin olive oil. After being mixed, lemon and virgin olive oil are then stirred and taken immediately 30-60 minutes after breakfast. Data Collection Data obtained through the scheme: Day 0: In the afternoon, eligible samples got explaining the purpose and course of the study. Samples who are willing to participate in the study signed informed consent and taught how to make the mixture correctly. Samples were collected and checked for cholesterol levels before treatment (pretest). Before returning home, the sample provided with the mixture making guidelines, 500 ml virgin olive oil, orange squeezer, measuring cup, and five medium-sized lemons. Days 1 - 14: Respondents drank the mixture made according to the guidelines every morning 30 -60 minutes before breakfast for 14 consecutive days. When drinking the mixture, the respondent is obliged to record the activity then send the video recordings to the research or research assistant every day. Lemon preparations were given for five days of stocks. Every five days, researcher assistants come to the respondent's house to check the intervention needs (checklist and other ingredients) and possible obstacles (drop out, failure). Day 14: In the afternoon, samples who have carried out a complete intervention for drinking the mixture for 14 days without being missed are visited one by one and rechecked the cholesterol (posttest). Data Analysis Data were analysed using the Paired Sample T-Test because it met the data normality test requirements. Results The demographic data of the study presented in table 1. Finding the demographic data shows that the majority of respondents were women (83%) with BMI categories above average (44.4% Overweight and 11.2% Obesity), all of them have Type II Diabetes mellitus (100%), and the average age of 57. 1 ± 9.75 years. Table 1. Demographic Characteristics of Hypertension Patients in Gilangharjo (n-18) Characteristic ? % Gender Man 3 17 Woman 15 83 BMI Normal 8 44,4 Overweight 8 44,4 Obese 2 11,2 DM Yes 18 100 No 0 0 Mean Min-Max DS Age 57.1 44-81 9.75 Table 2. Pretest and Posttest of Cholesterol Levels in Lemon and Virgin Olive Oil Mixture Administration (n=18) Cholesterol Mean N Min-Max SD Pretest 265,83 18 200-400 53,52 Posttest 228,67 18 160-340 55,14 Table 2 shows that the average cholesterol level ahead of the mixture administration (pretest) was 265.83 ± 53.52 mg/dl and the average cholesterol level after the mixture (posttest) administration was 228.67 ± 55.14 mg/dl, meaning that there was a change in the form of reducing cholesterol levels by 37.17 mg/dl. Table 3. A paired t-test of Lemon and Virgin Olive Oil Mixture Administration (n=18) Variable Mean SD t df pv Cholesterol level 37.167 62.985 2.504 17 .023 Table 3 shows the results of the Paired Sample T cholesterol test along with the final result pv =0.023 (



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Discussion This research aims to determine the effects of a mixture of lemon juice and virgin olive oil on the reduction of cholesterol levels in hypertensive patients in Gilangharjo village, Pandak, Bantul, Yogyakarta. The results of the paired sample t-test statistical test proved that there were significant differences (p=0.023) of cholesterol levels in hypertensive patients in Gilangharjo Village, Pandak, Bantul, Yogyakarta before and after the treatment of a mixture of lemon and virgin olive oil. Several epidemiological studies have reported the use of olive oil on health accordingly. Virgin Olive Oil (VOO) contains many phytochemicals (natural plant chemicals), vitamins, antioxidants, and polyphenols that have been clinically proven to be useful for health through various methods [10]. A study by Covas et al. [9] outlined that the consumption of virgin olive oil can reduce the risk of heart disease. One way to avoid or minimize the risk of heart disease is to consume unsaturated fatty acids, and virgin olive oil is the best source of unsaturated fatty acids. Another study by Hasan et al. [10] highlighted a case about the importance of giving 30 ml of virgin olive oil every day for six weeks in 30 men who had hyperlipidemia. The results showed a significant decrease in LDL, triglycerides, and total cholesterol, as well as an increase in HDL levels. The oxidized LDL plays an essential role in the case of atherosclerosis. MUFA and some phytochemical contents in pure olive oil produce LDL, which is more resistant to the oxidation process. This results in a reduced effect of oxidation, thrombogenicity, and plaque formation that emerges to protect the body from atherosclerosis [10]. Three flavonoids (flavanones, flavones, and flavonols) and more than 60 other flavonoids have been identified from citrus/citrus fruits. Lemon (Citrus limon) is a family of citrus fruits that has long been known as healthy food. This is because lemon is a fruit that is rich in eriocitrin and hesperidin flavones[1]. Citrus limon (lemon) contains a crucial natural component, including citric acid, ascorbic acid, minerals, and flavonoid[11]. Flavonoids in lemons have several different biological functions, including antioxidants, anti-inflammatory, anti-allergic, antiviral, anti-proliferative, anti-mutagenic, and anti-cyanogenic drugs[11]. Lemon can be consumed directly by squeezing or making juice[1]. Research conducted on rats and rabbits showed that eriocitrin and hesperidin have antioxidant properties, and they can reduce the oxidation stress[8], [12]. The research conducted by Oboh et al[1] examined that administration of lemon juice in rats given high cholesterol food gave significant results in reducing the total number of cholesterol. triglyceride, and LDL and increasing HDL levels along with the mechanism of inhibiting angiotensin activity -1- converting enzyme (ACE). Considering the administration of lemon juice in rats with a high cholesterol diet intake for four weeks. Khan et al.[11] showed that taking 1 ml/KgWB of juice or lemon juice/day significantly reduced serum cholesterol levels, triglycerides, LDL, and increasing levels of HDL. In short sentences, lemon reduces the risk of heart disease through the content of eriocitrin and hesperidin, which has antioxidant properties. It can reduce the oxidation stress and its ability to reduce the total number of cholesterol, triglycerides, LDL, and increase HDL levels by inhibiting angiotensin-1- converting enzyme activity (ACE). The same combination of two functions between virgin olive oil and lemon can reduce the total number of cholesterol, LDL, triglyceride levels, and increase HDL levels. Thus, the cholesterol levels decreased by 37.17 mg/dl after respondents underwent lemon and virgin olive oil mixtures consumption during 14 days without interruption within 30-60 minutes before breakfast. Conclusion Our results showed that the average cholesterol level of the pretest was 265.83 ± 53.52 mg/dl, and the mean cholesterol level of posttest was 228.67 ± 55.14 mg/dl, meaning that there was a change in cholesterol levels by 37.17 mg/dl. Paired Sample T-Test results obtained p= 0.023 (