HealthTech & Wellness Journal
Desember 2024; Volume 1 Number 1
https://journal.rifapublisher.id/index.php/JSH
ISSN: 0000-0000 (Print); ISSN: 0000-0000 (Online)

THE EFFECT OF GIVING YOUNG COCONUT WATER ON REDUCING CHOLESTEROL IN MENOPAUSE WOMEN

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ABSTRACT

Background: Estrogen is a hormone that plays an important role in preventing the oxidation process of bad cholesterol (LDL). This hormone also plays a role in balancing the levels of bad cholesterol (LDL) and good cholesterol (HDL) in the body. Therefore, when a woman enters menopause, she will lose this balancing function, so that cholesterol levels in her body will be more difficult to control. The benefits of young coconut water for health are still poorly understood by the Indonesian people, the results of the study reported that young coconut water can increase HDL concentration and reduce total cholesterol levels. Objective: The purpose of this study was to prove that young coconut water can reduce total cholesterol levels in menopausal women. Method: This research method uses a Pre-Experimental design with a one group pre-post test design. This research was conducted for approximately 1 month, namely December 2023-January 2024 in the Air Sugihan Health Center Work Area. The sample in this study was 30 respondents and the sample selection was carried out using the purposive sampling method. Results: The average cholesterol value of menopausal women before being given young coconut water was ≥200 mg/dl, as many as 30 respondents (100%). The average cholesterol value of menopausal women after the intervention showed that normal cholesterol levels <200 mg/dL were 19 respondents (63.3%) and abnormal cholesterol levels ≥200 mg/dL were 11 respondents (36.7%) with a total of 30 respondents. Based on the Wilcoxon test for cholesterol levels at post-intervention 0.001 <0.05. Conclusions: It can be concluded that there is an effect of giving young coconut water on reducing cholesterol levels in menopausal women.
Keywords: cholesterol, menopausal women, and young coconut water

Introduction

The World Health Organization (WHO) estimates that by 2030 there will be around 1.2 billion women over the age of 50. Most of them, around 80%, live in developing countries and every year the population of menopausal women increases by around three percent, meaning that women's health in particular deserves attention so that it will increase life expectancy and achieve happiness and psychological well-being (Nurlina, 2021).

Menopause is the permanent cessation of menstruation caused by ovarian failure, this can be diagnosed a year after the last menstrual period and is retrospective. The period leading up to this change is called perimenopause. It is characterized by biological and endocrine changes that cause symptoms and irregular bleeding, about 80% of women have at least one symptom of menopause and 45% are found to be menopausal women in the average age of menopause is 52 years, or in the age range of 45-58 years (Pratiwi, 2021).

Based on data from the Ministry of Health of the Republic of Indonesia (Kemenkes RI, 2021), the number of women aged 55-59 years is 6,666,503, women aged 60-64 years are 5,159,517 people (Kemenkes RI, 2021). Based on data from the South Sumatra Provincial Health Office, the number of women aged 50-54 years is 214,077 people, women aged 55-59 years are 175,429 people, women aged 60-64 years are 128,101 people. (South Sumatra Provincial Health Office, 2020)

Vito (2018) said that estrogen is a hormone that plays an important role in preventing the oxidation process of bad cholesterol (LDL). This hormone also plays a role in balancing the levels of bad cholesterol (LDL) and good cholesterol (HDL) in the body. Therefore, when a woman enters menopause, she will lose the "balancing" function, so that cholesterol levels in her body will be more difficult to control. The results of research in the e-Clinic Journal (eCl) by Prisilia (2016) showed that HDL cholesterol levels in menopausal women were significantly lower than in women with regular menstruation.

The effect of estrogen during menopause is related to the release of LH (Luteinizing Hormone) which is likely due to low circulating estrogen levels, resulting in failure of the feedback mechanism. These menopausal symptoms are not a disease, but the chaos when menstruation stops and menopause occurs permanently in elderly women brings physical and mental suffering that is not light and physical and mental health consequences that are sometimes severe and need to be treated seriously. Many things need attention since the last menstruation. Vulnerability to degenerative diseases due to the disappearance of the estrogen hormone that is no longer produced by the body. The absence of estrogen hormone production will cause many health vulnerabilities. Therefore, it is necessary to maintain a lifestyle by implementing a healthy diet, regular and measured exercise, staying active/socializing, getting enough sleep/rest and so on. Many people think that when entering old age is a time to rest. Not only the elderly, even the closest people to the elderly actually create an environment that makes the elderly passive. In fact, maintaining quality of life in old age is very good for the health of the elderly.

Increasing age can reduce the body's metabolic system which is marked by decreased hormone production, thus affecting the increase in blood LDL cholesterol levels (Sihadi, 2005). Total cholesterol levels in women in the blood increase with age, especially at the age of 40 years and above who have the highest risk, because they are influenced by hormonal factors, namely the decreasing function and production of estrogen hormone levels. Decreased estrogen hormone causes lipid products or total cholesterol levels to increase and experience changes in body fat composition related to hypercholesterolemia (Khomsan, 2002 in Muslimatul Akhfiya. 2017).

Hypercholesterolemia is a condition in which the concentration of cholesterol in the blood increases beyond normal values (>200 mg/dL) (Guyton & Hall, 2008; NCEP, 2011). Factors that cause hypercholesterolemia include genetic disorders, lack of physical activity, high intake of saturated fat and cholesterol, smoking habits, stress, and increasing age (M.Akhfiya, 2018)

Based on Radna Safitri's research, in Musi Rawas, South Sumatra, regarding the description of total cholesterol levels in premenopausal and menopausal women in Purwodadi District, Musi Rawas Regency in 2017, it was found that out of 48 respondents who had normal cholesterol levels, there were 36 women (75%), the upper limit was 8 women (16.7%) and high cholesterol levels were 4 women (8.3%). Based on this, it can be seen that there are still cholesterol levels above normal in premenopausal and menopausal women (Safitri, 2017). This statement is reinforced by research conducted (Sumoked, PD, Tendean, HM, & Suparman, 2016) at Panti Werdha Damai Manado in menopausal women, which resulted in average total cholesterol and LDL cholesterol values above the reference value, while the average HDL cholesterol and triglyceride values were in accordance with the reference value. Research by Kairani and Sumiera on the lipid profile of elderly people in Jakarta found that elderly women had total cholesterol levels ≥240 mg/dl, LDL cholesterol ≥160 mg/dl and triglycerides ≥200 mg/dl more when compared to men. In addition, based on

research (Swapnali RK, Kisan R, 2011) on menopausal women in India, the average values of total cholesterol, triglycerides and LDL cholesterol increased except for HDL cholesterol which decreased when compared to premenopausal women.

Herbal therapy using medicinal plants is one of the alternative therapies in dealing with hypercholesterolemia. Efforts to lower total cholesterol levels that have been used so far are drugs from chemical substances, so it is necessary to make efforts to lower total cholesterol levels through prevention efforts with substances from nature that are abundant in Indonesia, namely young coconut water (Zulaikha T, et al. 2016). The purpose of this study was to prove that young coconut water can lower total cholesterol levels in menopausal women.

Young coconut water is a refreshing drink made from coconuts. The composition of young coconut water contains many vitamins, minerals, amino acids, carbohydrates, antioxidants, enzymes, hormones and phytonutrients, so young coconut water is called a "powerhouse of nutrition" (Fife, 2008). The benefits of young coconut water for health are still poorly understood by the Indonesian people, research results reported that young coconut water can increase HDL concentration and reduce total cholesterol levels (Sandhya, 2006). Hypercholesterolemia is a condition characterized by an increase in blood cholesterol levels above 180 mg/dL. A person with hypercholesterolemia has a high risk of suffering from coronary heart disease (CHD) (Lister Hill National Center for Biomedical Communications, 2015). Coronary heart disease (CHD) is a common terminology to describe the formation or accumulation of plaque in the blood vessels of the heart that causes heart attacks (American Heart Association, 2014).

Based on a preliminary study, in the Air Sugihan Health Center work area in 2023, there were 8 people who fell into the criteria of menopausal women who experienced high cholesterol levels. Like menopausal women in general, several menopausal women in the Air Sugihan Health Center work area experienced various physical and psychological complaints, especially menopausal symptoms. Based on the phenomena mentioned above, young coconut water is quite effective in preventing various complaints experienced by menopausal women, especially for high cholesterol. Young coconut water can not only overcome cholesterol problems but can also overcome other problems, so researchers are interested in conducting further research entitled "The Effect of Giving Young Coconut Water on Reducing Cholesterol Levels in Menopausal Women in the Air Sugihan Health Center Work Area".

Method

This research method uses a Pre-Experimental design with a one group pre-post test design. Where in this study the sample was given a pretest (initial observation) before being given an intervention, after which the intervention was given, then a posttest (final observation) was carried out. In the initial stage of this study, field observations were carried out in the Air Sugihan Health Center Work Area, then the sample was determined using a purposive sampling technique, then the selected respondents were explained in advance about the objectives and procedures of the study. In the second stage (pretest), the respondents' cholesterol was measured using an easy touch measuring instrument in menopausal women, then an intervention of giving young coconut water was given to reduce cholesterol in menopausal women. In stage 3, the post-test, the respondents' cholesterol was measured again using an easy touch measuring instrument in menopausal women.

This study was conducted for approximately 1 month, namely December 2023-January 2024. The population to be used in this study was 171 menopausal women with high cholesterol levels. The sample in this study was 30 respondents and the sample selection was carried out using the purposive sampling method, namely the sample determination technique based on the researcher's considerations regarding which sample was most appropriate, considered to be able to represent a population. The sample criteria of this study were menopausal women aged over 50 years, patients

who could communicate well, and patients with cholesterol levels ≥200. The exclusion criteria in this study were patients who had complications of the disease, patients who were not willing to be respondents, patients who drank young coconut water and patients who consumed cholesterol-lowering drugs.

Results

This study was conducted for 1 month starting from December 2023 to January 2024 in the Air Sugihan Health Center work area. The sample obtained was 30 menopausal women. This study began by submitting a letter to the Air Sugihan Health Center work area to collect data on the number of menopausal women and then meeting the head of the health center to record menopausal elderly according to the researcher's criteria. Then conduct a preliminary study to determine the phenomenon of problems in menopausal elderly in the RT. After that, conduct research by collecting samples according to the inclusion criteria, then conducting a cholesterol examination on the samples, after all cholesterol has been checked, then remove samples that do not meet the inclusion criteria. After that, provide knowledge about cholesterol in menopause, one of which is how to overcome cholesterol in menopausal women by drinking young coconut water. Then conduct a demonstration of giving young coconut water to overcome cholesterol. After that, contract time to the sample again for the next meeting, namely on the 6th day. To monitor drinking this young coconut water at home, the researcher asked for a telephone number so that he could follow up via WhatsApp phone. After that, we met again on day six to do a cholesterol check after the intervention.

Univariate analysis was made based on descriptive statistical distribution with a sample consisting of 30 menopausal women with cholesterol ≥200. This chapter will discuss the results of univariate tests, normality tests and non-parametric tests, namely the T test. Univariate analysis in this study uses the frequency distribution and percentage of respondent characteristics consisting of menopausal women's cholesterol before the intervention.

Table 1
Frequency Distribution of Respondents' Age Characteristics

Respondent characteristics	Frequency	Percentage
Age Middle age (middle age) 45-59 years old	15	50
Elderly age 60-74 years	15	50
Total	30	100

Based on table 1, the age of the respondents is known. Age characteristics are divided into 2, namely 45-59 years old as many as 15 respondents (50%), Elderly (elderly) aged 60-74 years as many as 15 respondents (50%). In the sample, the researcher did use a sample with a menopause age starting from 45 years.

Table 2
Frequency Distribution of Cholesterol Levels after Intervention (H6)

Cholesterol Levels	Frequency	Percentage
Normal = 200	0	0
Abnormal ≥200	30	100
Total	30	100

Based on table 2, data was obtained that the cholesterol of menopausal women before the intervention was ≥200 mg/dL, as many as 30 respondents (100%) where the researcher was looking for samples with cholesterol levels ≥200 mg/dL.

Table 3
Frequency Distribution of Cholesterol Levels after Intervention (H6)

Cholesterol Levels	Frequency	Percentage
Normal 200	19	63.3
Abnormal ≥200	11	36.7
Total	30	100

Based on table 3, data was obtained that cholesterol levels after the intervention had decreased significantly, where menopausal women with normal cholesterol levels <200 mg/dL were 19 respondents (63.3%) and abnormal cholesterol levels ≥200 mg/dL were 11 respondents (36.7%) with a total of 30 respondents.

Before the analysis with the t-test, the data must meet the requirements of the normality test. The normality test in this study used the Shapiro-Wilk test because the number of data <50. Data is said to be normally distributed if the significant value (2-tailed) > 0.05. The following are the results of the normality test on cholesterol levels before and after the intervention of giving young coconut water to menopausal women in the Air Sugihan Health Center work area.

Table 4
Shapiro-Wilk Normality Test Results of Average Cholesterol Levels Before and After Being Given Young Coconut Water to Menopausal Women in the Air Sugihan Health Center Work Area

Average Cholesterol Levels	SD	Mean	Shapiro Wilk Statistics	P.Value
Cholesterol value Pre intervention	0,000	2.00	0.721	0,000
Cholesterol value Post Intervention	0.612	1.37	0.739	0.001

Based on table 4 above, the normality test with Shapiro Wilk shows that the significance value based on the cholesterol value before the intervention obtained a p.value of 0.000 and the cholesterol value after the intervention obtained a p.value of <0.000. The significant values of both are <0.05 so it can be said that the cholesterol value is not normally distributed.

This analysis was conducted on cholesterol values in menopausal women in the Air Sugihan Health Center work area before and after the intervention of giving young coconut water with statistical tests in accordance with the research objectives. In this case, the pre-intervention and post-intervention cholesterol value variables were not normally distributed, so the data analysis used the Wilcoxon test with a significance level of α = 0.05 where the provisions are if the p value> α (005) means there is no and if the p value <α (005) means there is an effect.

The number of respondents in this study was 30 respondents. In this bivariate analysis, it was used to determine the effect of giving young coconut water on reducing cholesterol in menopausal women. After obtaining data from univariate analysis and calculations using the Wilcoxon test, it was obtained:

Table 5
The Effect of Cholesterol Levels After the 6th Day of Intervention of Giving Young Coconut Water to Menopausal Women

Variables	Wilcoxon Paired T Test			
	Mean	Negative Ranks	Positive Ranks	P.value
Cholesterol Value Before - Cholesterol value After	10.00	19	0	0.001

Based on table 5, it can be seen that the mean value of cholesterol levels in menopausal women after the intervention of giving young coconut water is 10.00 which is a classification of normal cholesterol values. The results of cholesterol values before and after are 19, meaning that there is a decrease in cholesterol values before and after giving young coconut water. While the value of 0 means that 0 respondents experienced an increase in cholesterol values.

Based on the table above, a significant value was obtained based on the Wilcoxon test for cholesterol levels at post-intervention 0.001 <0.05. It can be concluded that there is an effect of giving young coconut water on reducing cholesterol levels in menopausal women.

Discussion

Cholesterol value before the intervention of giving young coconut water.

From table 2, data is obtained that the cholesterol value of menopausal women before the intervention was an abnormal value of ≥200 mg/dL, as many as 30 respondents with a total of 30 respondents. This is in accordance with the inclusion criteria of respondents, namely menopausal women with cholesterol levels ≥200 mg/dL. An increase in cholesterol levels within certain limits is a natural thing that occurs in the aging process. In other words, the older you get, the higher your blood cholesterol levels will be in both men and women. Age can affect a person's total cholesterol levels. At an older age, the total cholesterol levels are relatively higher than the total cholesterol levels at a young age, this is because the older a person is, the less LDL receptor activity there is. The results of a study conducted by Naue, et al. found that people over 40 years of age have cholesterol levels in the risk category compared to those under 40 years of age (Naue, 2016).

Cholesterol is an essential substance, a type of substance that is most important in the body. Fat or lipid is one group of compounds found in plants, animals or humans that are very useful for human life. The general nature of fat is hydrophobic, meaning it cannot dissolve in water but dissolves in one or more organic solvents (Poejadi, 2007). Lipids are insoluble in water therefore they must be bound to proteins (in the form of lipoproteins) in order to be transported in the bloodstream (Hardjoeno, 2003). Lipoprotein is a water-soluble protein that functions to bind cholesterol and triglycerides internally. There are 4 groups of lipoproteins that have been identified, namely chylomicron, very low density lipoprotein or VLDL (very low density lipoprotein), low density lipoprotein or LDL (low density lipoprotein), and high density lipoprotein or HDL (high density lipoprotein) (Toth, 2005). HDL is a lipoprotein that functions to transport excess cholesterol deposited in blood vessels and other body tissues to the liver to be eliminated through the gastrointestinal tract. The higher the HDL level, the greater the capacity to move cholesterol and prevent dangerous blockages (atherosclerosis) from developing in blood vessels (Parkeni, 2005).

Hypercholesterolemia is triggered by several things, such as body weight, age, lack of exercise, emotional stress, metabolic disorders, genetic disorders, and a diet high in cholesterol and saturated fatty acids. Hypercholesterolemia can also occur in women who lack estrogen

hormone (Budiatmaja, AC, & Noer, 2014). Aging and the menopausal transition period are associated with changes in adipose tissue metabolism that contribute to the accumulation of body fat. This is due to the influence of fluctuations in sex hormone levels on the expansion of adipose tissue. Menopause is the permanent cessation of menstruation. This is related to the production of estrogen hormone produced by the ovaries decreasing to less than 12 pg/ml. Estrogen hormones consist of estadiol, estrone, and estriol. Estradiol has the strongest estrogenic potential and is the largest part of estrogen. As a result of the loss of ovarian function, it will cause a reduction to the loss of the estradiol hormone it produces. Loss of estradiol will cause a decrease in the function of body organs, metabolic disorders including cholesterol metabolism. These metabolic changes will cause an increase in lipoprotein lipase activity, so that cholesterol will accumulate so that menopausal women are susceptible to hypercholesterolemia (Setianingrum, 2018). Physiological, psychological and hormonal changes will be experienced by women related to menopause. Various complaints that may occur during menopause are caused by a lack of estrogen and progesterone hormones, which are produced by the ovaries, as well as an increase in LH (luteinizing hormone) and FSH (follicle-stimulating hormone) produced by the anterior pituitary gland. However, the most clinically influential on the body is the loss of estrogen. With estrogen, bad cholesterol (LDL) decreases, and conversely good cholesterol (HDL) increases which can prevent deposits in the blood vessels (Hutabarat, 2009).

High HDL cholesterol levels are protective because increased HDL has a beneficial effect on the blood vessel system, because the role of HDL itself is to remove excess cholesterol from the tissue and bring it back to the liver to be reprocessed and/or disposed of. High HDL cholesterol levels are protective because HDL particles play a role in removing cholesterol from the tissue and returning it to the liver (Arneson and Brickell, 2007). Conversely, if there is a decrease in HDL levels, plaques will form from the accumulation of cholesterol in the blood vessels which will cause heart disease and stroke (Nurrahmani and Kurniadi, 2015).

According to Rampengan (2015) there are several things to increase HDL levels in the body including by regulating diet, namely reducing the amount of calorie intake and regulating the composition of the food we eat. Substitution of unsaturated fats consumed, in general, can lower LDL cholesterol without lowering HDL cholesterol. Exercise can also increase HDL cholesterol levels and lower LDL cholesterol. For someone who is obese, limiting calorie intake accompanied by regular exercise can be beneficial in increasing HDL cholesterol. Someone who consumes drugs that are intended to maintain cholesterol levels in the blood can also increase HDL levels in the blood.

From the discussion above, researchers can assume that cholesterol levels in menopausal women are influenced by a lack of estrogen and progesterone hormones, which are produced by the ovaries, as well as an increase in LH (luteinizing hormone) and FSH (follicle-stimulating hormone) produced by the anterior pituitary gland. Menopause is preceded by a period of progressive ovarian failure characterized by a decrease in estrogen levels. Ovarian estrogen production decreases from 300 mg per day to almost zero. However, postmenopausal women do not have no estrogen at all because fat tissue, liver, and adrenal cortex continue to produce up to 20 mg of estrogen per day. The loss of estrogen production by the ovaries causes many changes. In the Healthy Women Study, it was found that almost every woman experiences an increase in cholesterol during menopause. In the 2-year interval since their last menstruation, their average LDL increased by about 9% and cholesterol increased by about 6%. The high prevalence of coronary heart disease in menopausal women can be prevented by cardiac rehabilitation and lifestyle changes.

The effect of cholesterol levels after the intervention of giving young coconut water

From table 3, it is obtained data that cholesterol levels after the intervention have decreased significantly, where menopausal women with normal cholesterol levels <200 mg/dL were 19

respondents (63.3%) and abnormal cholesterol levels ≥200 mg/dL were 11 respondents (36.7%) with a total of 30 respondents. The results of giving young coconut water after 6 days can be seen that the results of cholesterol values before and after were 19 respondents, meaning that there was a decrease in cholesterol values before and after giving young coconut water. While the value of 0, means that 0 respondents experienced an increase in cholesterol values. Based on the table above, a significant value was obtained based on the Wilcoxon test for cholesterol levels at post-intervention 0.001 <0.05, it can be concluded that there is an effect of giving young coconut water on reducing cholesterol levels in menopausal women.

Loss of estrogen in the body often causes physiological changes in body function often causes physiological changes in body function, tightness, anxiety, and reduced strength and calcification of bones throughout the body in the long term estrogen hormone deficiency will increase the risk of osteoporosis, breast cancer, and the risk of cardiovascular disease. Decreased estrogen levels can increase the risk of atherosclerosis due to increased levels of total cholesterol, triglycerides, low density lipoprotein (LDL), and decreased levels of cardioprotective High density lipoprotein (HDL) blood. In the healthy women study it was found that almost every woman experienced increased cholesterol during menopause. In the 2-year interval since their last menstruation, their average LDL increased by about 9% and cholesterol increased by about 6% the high prevalence of coronary heart disease in menopausal women can be prevented by cardiac rehabilitation and lifestyle changes (Setianingrum, 2018).

Changes in diet that were previously high in carbohydrates, high in fiber and low in fat have changed to a new diet that is low in carbohydrates, high in fat, thus shifting the quality of food towards an unbalanced direction. Changes in diet in certain groups cause nutritional problems in the form of overweight and obesity. Frequent consumption of high-fat foods is the main cause of increased total cholesterol levels in the blood. Foods such as meat, offal, and eggs can increase cholesterol levels in the blood because foods such as meat, offal, and eggs contain quite high cholesterol (Yoeantafara and Martini, 2017). Young coconut water contains 12 types of important proteins including alanine, arginine, aspartic acid, glutamic acid, histidine, phenylalanine, tyrosine, and others. The types of vitamins found in young coconut water are the B vitamins which are coenzymes in the metabolism of energy sources such as carbohydrates, fats, and proteins, and cell formation. There are 7 types of vitamin B found in young coconut water, namely nicotinic acid, pantothenic acid, biotin, riboflavin (B2), folic acid, thiamine (B1), and pyridoxine (B6). (Tri Peni and Sulisdiana, 2015).

The vitamin C content in coconut water acts to maintain the activity of the cholesterol 7 alpha-hydroxylating system containing cyto-chrome P-450. The decrease in total cholesterol levels and the reduction in the accumulation of total cholesterol in the liver, blood plasma, and arteries occurs due to the activity of the cholesterol 7 alpha-hydroxylating system containing cyto-chrome P-450 increasing, so that the stimulation of cholesterol changes into bile acids increases (Ginter et al., 1982). The effect of the stimulation of bile acid sequestrants such as cholestyramine or pectin will also strengthen the effect of vitamin C, namely by reducing fat solubility and blocking cholesterol absorption. Bile acids which are usually 95% reabsorbed are also inhibited. Bile acid synthesis will also be stimulated which will compete with cholesterol synthesis in the liver (Ginter, 1982).

This is in line with research conducted by Zulaikha S, et al (2022) obtained the results of this study provide meaning that to reduce total cholesterol levels that increase due to quail egg induction, giving young coconut water can be used as a drug to lower total cholesterol levels even though giving simvastatin is still more successful in lowering total cholesterol levels because simvastatin is indeed the drug of choice in efforts to reduce total cholesterol levels (Zulaikha, et al 2016). The young coconut water used is water from coconuts that are 5-7 months old, because at this time coconut water has the sweetest and most delicious taste, the water and sugar content reaches a maximum at

that age and will decrease with increasing maturity of the coconut fruit. The ability of young coconut water to lower total cholesterol levels is due to the presence of polyphenols, Vitamin C, L-Arginine compounds. The role of polyphenols in lowering total cholesterol levels in two ways, namely by reducing fat absorption in the digestive system and increasing fat excretion into the feces, so that the amount of cholesterol absorbed and included in the circulation will be small. The vitamin C content in coconut water acts to maintain the activity of the cholesterol 7 alpha-hydroxylating system containing cyto-chrome P-450. The decrease in total cholesterol levels and the reduction in the accumulation of total cholesterol in the liver, blood plasma, and arteries occurs due to the activity of the cholesterol 7 alpha-hydroxylating system containing cyto-chrome P-450 increasing, so that the stimulation of cholesterol changes into bile acids increases. The effect of the stimulation of bile acid sequestrants such as cholestyramine or pectin will also strengthen the effect of vitamin C, namely by reducing fat solubility and blocking cholesterol absorption. Bile acids which are usually 95% reabsorbed are also inhibited. Bile acid synthesis will also be stimulated which will compete with cholesterol synthesis in the liver. The use of young coconut water as an alternative to prevent hypercholesterolemia has many benefits besides reducing total cholesterol levels and can help prevent various triggers of coronary heart disease, namely reducing the consumption of chemicals, reducing endothelial dysfunction, coconut water contains many antioxidants, and reducing oxidized LDL.

From the explanation above, researchers can assume that the use of young coconut water as an alternative to prevent hypercholesterolemia has many benefits besides reducing total cholesterol levels and can help prevent various triggers of coronary heart disease, namely reducing the consumption of chemicals, reducing endothelial dysfunction, coconut water contains many antioxidants, and reducing oxidized LDL. The results of this study still need to be studied with safety tests before being tested clinically on individuals with total cholesterol levels.

Conclusions

The average cholesterol value of menopausal women before being given young coconut water was ≥200 mg/dl, as many as 30 respondents (100%). The average cholesterol value of menopausal women after the intervention showed that normal cholesterol levels <200 mg/dL were 19 respondents (63.3%) and abnormal cholesterol levels ≥200 mg/dL were 11 respondents (36.7%) with a total of 30 respondents. Based on the Wilcoxon test for cholesterol levels at post-intervention 0.001 <0.05, it can be concluded that there is an effect of giving young coconut water on reducing cholesterol levels in menopausal women.

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