nutrition-model-development-in-hypercolesterolemia-patients-601ac731805c4.pdf

by Iche Liberty

Submission date: 16-Feb-2021 11:16AM (UTC+0700)
Submission ID: 1510495876
File name: nutrition-model-development-in-hypercolesterolemia-patients-601ac731805c4.pdf (300.86K)
Word count: 5028
Character count: 26833

Sapporo Medical Journal
Volume 55, Issue 01, January, 2021

Nutrition Model Development in Hypercolesterolemia Patients

Suryadi Tjekyan[1],Pariyana[1], Iche Andriyani Liberty[1]
Department of Public Health and Community Medicine, Faculty of Medicine, Sriwijaya University, Palembang, Indonesia.[1]

Abstract— **Background:** Hypercholesterolemia is one of the major risk factors for coronary heart disease (CHD) that takes the most lives in the world today. This study aims to develop a nutritional model that is effective for hypercholesterolemia patients in maintaining a normocholesterolemic condition after receiving a short-term anti-hypercholesterolemia drug therapy. **Methods**: This research was a descriptive study with cross sectional design. A descriptive survey was carried out in the community regarding the menu of hypercholesterolemia patients as a risk factor for hypercholesterolemia in Palembang along with literature review to build a Theoretical Model, then continued with Nominal Focus Group Discussions and then carried out the construction of an Operational Model, namely nutritional pattern management involving nutritionists. The samples in this study were 374 residents in Palembang City. The sampling technique was purposive sampling. Data analysis in this study was carried out descriptively and analytically using the Chi-square test.**Results**: There was a significant difference between the cholesterol level category and the diet in the form of menu categories, food processing methods and daily total calories (p value = 0.000) p <α.**Conclusion**:There is a significant association between cholesterol levels and dietary patterns, food processing methods and total calories per (p value = 0.000) p<α.

Keyword: Nutritional Model, Hypercholesterolemia

1. Introduction

Hypercholesterolemia is a condition when the concentration of cholesterol in the blood exceeds normal limits. Hypercholesterolemia is one of the major risk factors for coronary heart disease (CHD)that takes the most lives in the world today. [1] The main cause of this disease is coronary atherosclerosis. Atherosclerosis arises slowly due to endothelial dysfunction, vascular inflammation, and accumulation of cholesterol on the walls of blood vessels.The 2015 WHO report shows that 17.5 million people died from cardiovascular disease, accounting 31% of deaths in the world. WHO predicts that in 2030, about 23.6 million people will die from cardiovascular disease. In Indonesia, this disease constitutes 30% of the causes of death, and constitutes the largest proportion of the existing causes of death.[2]

Treatments for hypercholesterolemia consist of non-pharmacological therapy and pharmacotherapy with cholesterol-lowering drugs. The first-choice lipid-lowering drugs recommended by NCEP-ATP III are the HMG-CoA reductase inhibitor class. [3,4] Atorvastatin is one of the cholesterol-lowering drugs in the statin class, which pharmacologically works to reduce plasma cholesterol levels and reduce lipoprotein levels by inhibiting HMG-CoA reductase and inhibiting cholesterol synthesis in the liver, and increasing LDL receptors on the surface of liver cells, resulting in an increase in LDL cholesterol uptake and catabolism.

Pharmacological therapy is given to maintain the lipid profile of patients with hypercholesterolemia, and generally requires a long time and is very difficult to do. Various literature indicates that long-term pharmacological therapy carries a risk of drug side effects that cannot be ignored, including myopathy, tremors, vertigo, paresthesia, central nervous disorders, anxiety, abdominal pain, constipation and bloating.

The low cure rate of anticholesterolemic drug therapy, the various side effects that arise from the long-term consumption of anti- hypercholesterolemic drugs, the patient's non-compliance in taking the drug, and the difficulty of maintaining normocholesterolemic conditions for patients are some of the problems in

controlling hypercholesterolemia clinicians and health practitioners face today. Development of a nutritional model for post anti hypercholesterolemia therapy are very much needed, so the normocholesterolemic conditions after anti-hypercholesterolemia drug therapy can be maintained so that the drug can be given in a short period of time and the side effects can also be minimized. This study aims to develop a nutritional model that is effective for hypercholesterolemia patients in maintaining a normocholesterolemic condition after receiving a short-term anti-hypercholesterolemia drug therapy and to compare the effectiveness of the interventions given to the positive nutrition model group with the negative nutrition model group.

2. Method

This research was a descriptive study with cross sectional design. In this study, a descriptive survey was carried out in the community regarding the menu of hypercholesterolemia patients as a risk factor for hypercholesterolemia in Palembang along with literature review on menu patterns as a risk factor for hypercholesterolemia. The results of the descriptive survey and literature review are then summarized as materials for building a theoretical model and then continued with a nominal focus group discussion, namely a meeting of experts who are expected to develop a hypothetical / theoretical nutritional model in hypercholesterolemic patients. The development of an Operational Model was then conducted, by management of nutritional patterns that involve nutritionists.

The research process was carried out in Palembang City. This phase I research lasted for 6 months in the first year of the study. The research population at this stage were the entire Palembang community. The sample in this study was the people of Palembang city with the number of samples calculated based on the reference of the population aged more than 45 years in Palembang, which was 329,960 (Profil Dinas Kesehatan Kota Palembang, 2014). With the study prevalence estimate of 36%, the maximum error is 2%, so the number of samples is 2198 people. The sample used in this study were patients who had met the inclusion criteria, namely patients who were willing to be research respondents, lived in Palembang, were over 45 years old and had cholesterol levels>200 mg / dl.

The data processing and analysis plan in this study used STATA version 15 software. The data collected was then performed cleaning, editing and coding, followed by data processing. This type of research analysis is descriptive and inferential analysis. Descriptive analysis in this study is by describing the distribution and frequency such as mean, median, mode, and standard deviation of numeric data (ratio / interval), while categorical data will be displayed in the form of proportions or percentages. Meanwhile, inferential analysis in this study used the chi-square statistical test to determine the association between co. variable risk factors with independent variables and logistic regression to analyze multivariate data. The results of the research were presented in tabular form which is explained by narrative.

3. Results

3.1 Distribution of Respondents Characteristics

Out of the 374 respondents studied, 211 were female (56.4%). Most of respondents were Muslim (92%). The occupations of respondents were categorized into nine, namely unemployed, school/university students, housewives, laborers, general employees, entrepreneurs, civil servants, retirees, and farmers.The respondents' age was categorized into four categories with most of the respondents were adults (44,1%). Of 374 respondents, 268 were married (71.6%).

Majority of respondents had normal blood pressure (92.5%). The blood type was majorly B (37.7%). The blood sugar levels of respondents in this study were categorized into diabetes and non-diabetes. Most of the respondents had diabetic (81.9%). The body mass index category was mainly normoweight (74.6%).

The abdominal circumference was divided into two, for men andfor women. The division of categories was the same, namely normal and excessive. Out of 163 male respondents, 123 (75.5%) had normal abdominal circumference and out of211 female respondents, 116 (55%) had normal abdominal circumference. The total cholesterol of respondents in this study was categorized into two, namely normal cholesterol and hypercholesterolemia.Out of 374 respondents studied, 233 respondents had normal cholesterol (62.3%).

Table 1. Distribution of Respondents Characteristics

Characteristics	Category	n	%
Gender	Male	163	43.6
	Women	211	56.4
Religion	Islam	344	92.0
	Christian	21	5.6
	Catholic	4	1.1
	Buddha	2	0.5
	Hindu	3	0.8
Occupation	Unemployed	2	0.5
	School / University Students	83	22.2
	Housewives	75	20.1
	Laborers	46	12.3
	General employees	52	13.9
	Entrepreneurs	56	15.0
	Civil servants	48	12.8
	Retired	6	1.6
	Farmers	6	1.6
Age	Youth	95	25.4
	Adult	165	44.1
	Elderly	103	27.5
	Seniors	11	2.9
Marital status	Married	268	71.6
	Unmarried	99	26.5
	Divorced	7	1.9
Blood Pressure	Normotension	346	92.5
	Prehypertension	15	4
	Hypertension	13	3.5
Blood Type	A	104	27.8
	B	141	37.7
	AB	29	7.8
	O	100	26.7
Blood Sugar Level	Diabetes	306	81.9
	Non-Diabetes	68	18.1
Body Mass Index	Underweight	14	3.7
	Normoweight	279	74.6
	Overweight	35	9.4
	Obese	46	12.3
Abdominal Circumference	Normal	239	63.9
	Excess	135	36.1
Total Cholesterol	Normal Cholesterol	233	62.3
	Hypercholesterol	141	37.7

3.2 Distribution of Respondents by Menu Pattern

The breakfast, lunch, and dinner menu variable are divided into three categories, namely low, acceptable and high. Of the 374 respondents, 70.1% respondents had breakfast menu with high saturated fat, also for the lunch and dinner respectively 79,7% and 69%.

The breakfast, lunch, and dinner cooking methods are categorized into fried, boiled, roasted, steamed, and grilled. Of the 374 respondents, 302 people eat fried food for breakfast. For lunch and dinner, most of the respondents also ate fried food.

The total calories variable is divided into three categories. Of the 211 male respondents, 155 were categorized into low calorie respondents (73.5%). Meanwhile out of 163 female respondents, 143 were categorized into low calorie respondents (87.7%). The description of the distribution of the respondents based on menu pattern can be seen in table 2.

Table 2. Distribution of Respondents' Menu Patterns

Menu Pattern	Category	n	%
Breakfast	No breakfast	9	2.4
	Low	12	3.2
	Acceptable	91	24.3
	High	262	70.1
Lunch	No lunch	11	2.9
	Acceptable	65	17.4
	High	298	79.7
Dinner	No Dinner	34	9.1
	Acceptable	82	21.9
	High	258	69.0
How to Prepare the Breakfast Menu	No breakfast	9	2.4
	Fried	302	80.7
	Boiled	44	11.8
	Baked	18	4.8
	Steamed	1	0.3
How to Prepare the Lunch Menu	No lunch	11	2.9
	Fried	220	58.8
	Boiled	28	7.5
	Baked	25	6.7
	Steamed	83	22.2
	Grilled	7	1.9
How to Prepare the Dinner Menu	No Dinner	29	7.8
	Fried	278	74.3
	Boiled	43	11.5
	Baked	10	2.7
	Steamed	3	0.8
	Grilled	11	2.9
Total Daily Calories for Men	High Calorie	6	2.8
	Recommended Intake	50	23.7
	Low Calorie	155	73.5
Total Daily Calories for Women	High Calorie	0	0
	Recommended Intake	20	12.3
	Low Calorie	143	87.7

3.3 Association between Cholesterol Levels and Respondents' Characteristic

The research on the association between cholesterol levels and the characteristics of respondents using Chi-square statistical test found a significant association between the levels of cholesterol and occupation, age, marital status, blood sugar levels, blood pressure, BMI and abdominal circumference ($p < \alpha$), but there is no significant association between gender, religion and blood type ($p > \alpha$) (Table 3).

Table 3. Association between Cholesterol Levels and Respondents' Characteristics

Characteristics Category		Cholesterol Level Category		*p value*
		Hypercholesterolemia	Normal	
Gender	Male	53	110	0,069
	Women	123	88	
Religion	Islam	130	214	0,805
	Christian	7	14	
	Catholic	1	3	
	Buddha	1	1	
	Hindu	2	1	
Occupation	Unemployed	1	1	0,000
	School / University Students	5	78	
	Housewives	52	23	
	Laborers	27	19	
	General employees	8	44	
	Entrepreneurs	25	31	
	Civil servants	16	32	
	Retired	5	1	
	Farmers	2	4	
Age	Youth	5	90	0,000
	Adult	60	105	
	Elderly	67	36	
	Seniors	9	2	
Marital status	Married	131	137	0,000
	Unmarried	4	95	
	Divorced	6	1	
Blood pressure	Normotension	126	228	0,000
	Hypertension	15	5	
Blood Type	A	38	66	0,682
	B	52	89	
	AB	14	15	
	O	37	63	
Blood Sugar Level	Diabetes	69	233	0,000
	Non-Diabetes	72	0	
Body Mass Index	Underweight	2	12	0,000
	Normoweight	89	190	
	Overweight	19	16	
	Obese	31	15	
Male Abdominal Circumference	Normal	85	181	0,000
	Excess	56	52	
Female Abdominal	Normal	58	124	0,023

Circumference	Excess	83	109

3.4. Association between Cholesterol Levels and Meal Menu

The research on the association between cholesterol levels and meal menu using statistical Chi-square test found a significant association between the levels of cholesterol and meal menu (p value = 0.000) p<α. (**Table 4**).

Table 4. The Association between Cholesterol Levels and Diet

Menu Category		Cholesterol Levels Category (n)		*p value*
		Hypercholesterolemia	Normal	
Breakfast	High	135	127	0,000
	Acceptable	2	89	
	Low	4	8	
	No breakfast	0	9	
Lunch	High	140	158	0,000
	Acceptable	0	65	
	No lunch	1	10	
Dinner	High	122	136	0,000
	Acceptable	11	71	
	No Dinner	8	26	

Chi-square test

3.5. Association between Cholesterol Levels and Menu Cooking Method

The research on the association between cholesterol levels and menu cooking method using statistical Chi-square test found a significant association between the levels of cholesterol and menu cooking method p<α. (**Table 5**).

Table 5. The Association between Cholesterol Levels and Menu Cooking Method

Category Menu Cooking Method		Cholesterol Levels Category (n)		*p value*
		Hypercholesterolemia	Normal	
Breakfast	Fried	113	189	0.028
	Boiled	2 0	24	
	Roasted	8	10	
	Steamed	0	1	
	No breakfast	0	9	
Lunch	Fried	92	128	0,000
	Boiled	3	25	
	Roasted	9	16	
	Steamed	36	47	
	Grilled	0	7	
	No lunch	1	10	
Dinner	Fried	1 29	149	0,000
	Boiled	4	39	
	Roasted	4	6	
	Steamed	0	3	

	Grilled	1	10
	No dinner	3	26

Chi-square test

3.6. Association between Cholesterol Levels and Total Calories per Day

The research on association of cholesterol levels and total calories consumed in a day with the statistical test Chi-square test found a significant association between the levels of cholesterol and total calories per day ($p < \alpha$). (**Table 6).**

Table 6. Association between Cholesterol Levels and Total Calories per Day

Gender	Total Calories	Cholesterol Levels Category (n)		*p value*
		Hypercholesterolemia	Normal	
Male	High calorie	5	1	0.009
	Recommended intake	27	23	
	Low calorie	56	99	
Women	High calorie	0	0	0,000
	Recommended intake	14	6	
	Low calorie	39	104	

Chi-square test

4. Discussion

4.1. Distribution of Respondents Based on Ender

There was a total of 374 respondents with 163 male respondents and 211 female respondents. From this number it is known that the difference in the number of male and female respondents is not much different. This is in line with the ratio of the population between women and men in the world, where according to the World Data Bank, the ratio of men and women is directly proportional, namely 1: 1. [1]

4.2. Distribution of Respondents Based on Religion

From 5 categories of religion, it was found that respondents with the Islamic religion had the largest number of 344 people with a percentage of 92%. This cannot be denied, because the majority of the Indonesian population is Muslim, and Indonesia is also one of the countries with the largest Muslim population in the world.

4.3. Distribution of Respondents Based on Occupation

Hypercholesterolemia generally occurs in the elderly, but it is possible to occur in adolescence. According to Wulur and Pieter's research.[3] Poor nutrition intake patterns will have an impact on growth and development, making them not optimal, and are more susceptible to chronic diseases such as cardiovascular disease, cancer and osteoporosis in adulthood (Yang, 2013) .[4] According to survey results conducted by (Nilsen, 2008), 69% of urban people in Indonesia consume fast food, with the following details: 33% stated

that it was for lunch, 25% had dinner, 9% stated that it was a snack and 2% chose to eat as a breakfast. The research conducted by (Heryana, 2015) found that the highest level of consumption of fast food was the student or adolescent group, which was 83.3%. [5]

4.4. Distribution of Respondents Based on Age

Disease in the elderly is closely related to hypercholesterolemia conditions. A research conducted by Gabriel et al. (2004), stated that 68% of Spanish elderly experienced hypercholesterolemia. Other research conducted by Panagiotakos et al., states that subjects with an age > 50 years old experience hypercholesterolemia as much as 48% in women and 57% in men.[6] According to the World Health Organization (WHO), in 2003 there were 16,6 million people died from cardiovascular disease and in 2001 there were 7.2 million deaths due to coronary heart disease (CHD). CHD has irreversible risk factors such as age. Getting older (over 60 years) increase the risk of CHD. Based on the WHO report in 2002, there were 4.4 million deaths due to hypercholesterolemia.

4.5. Distribution of Respondents Based on Marriage Status

Most of the respondents are married. Husband and wife are not genetically related, and therefore the similarity in risk factors for cardiovascular disease is most likely due to an individual's tendency to choose a partner with a similar lifestyle or due to cohabitation effects (Knuiman et al., 1966).[7] Several studies have investigated the correlation between partner in cardiovascular risk factors. Majority have found a positive correlation, although the findings for cholesterol are still vague (Garrison et al., 1979).[8]

4.6. Distribution of Respondents Based on Blood Pressure

Based on the results of this study, most of the respondents had normal or normotensive blood pressure. Research by Tjekyan about the risk factors for hypertension in the city of Palembang in 2013, risk factors that has most influence was gender, age, BMI and comorbidities.[9] Research on risk factors for hypertension was also conducted by Sartik et al. with the result that the most dominant factors in influencing the incidence of hypertension are age and family history / heredity.[10]

4.7. Distribution of Respondents Based on Blood Type

In this study, it was conducted that the most common blood type is blood type B group and the least common blood type is AB blood group. The results of the research conducted by Widiyanti et al, showed that the least common blood type is AB blood type group and the most common blood type is O blood type group.[11] This occurred because of the differences in time, place and sample in this study. Research conducted by Garini et al, showed that from 317 respondents, the least common blood group percentage is AB blood group and different results were obtained for the most common blood group, which is blood type A group.[12]Type AB is a blood type that is rarely found in the world, because blood type AB contains two antigens, which are A and B. Antigen A tends to be more dominant than antigen B. The percentage difference in ABO blood group can occur because each population or race has variations in genetic characters and allele distribution. The type of ABO blood group is determined by multiple allele series, namely the IA allele, the IB allele and the IO allele, almost all population in the world has these three alleles, even though the alleles spread differently.

4.8. Distribution of Respondents Based on Blood Sugar Levels

Hyperglycemia is a medical condition where there is an increase in normal glucose levels, which become the characteristic of several diseases, especially diabetes mellitus. Diabetes mellitus (DM) is currently a global health threat. WHO predicts an increase in the number of people with type 2 DM in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030.[13]Predictions from the International Diabetes

Federation (IDF) also explai hat in 2013-2017 there was an increase in people with DM from 10.3 million to 16.7 million in 2045.[14] According to data f m the Indonesian Central Statistics Agency, based on the population growth pattern it is estimated hat in 2030 there will be 194 million over the age of 20, assuming the prevalence of DM in urban areas (14.7%) and rural (7.2%), it is estimated that there are 28 million people with diabetes in urban areas and 13.9 million in rural areas. The report on the results of Basic Health Research (RISKESDAS) in 2018 by the Ministry of Health, there is an increase in the prevalence of DM to 8.5%. This increase is in line with the prevalence of obesity which is a risk factor for diabetes, which increased from 14.8% in the 2013 RISKESDAS data to 21.8% in 2018. his is also in line with the increase in the prevalence of overweight, from 11.5% to 13.6% and for central obesity (waist circumference> = 90 cm in men and 80> = cm in women) increased from 26.6% to 31%. The data above shows that the number of people with diabetes mellitus in Indonesia is very large and it is a heavy burden to be handled by specialists / subspecialists or even all health workers.[15,16]

4.9. Distribution of Respondents Based on Body Mass Index

Data grouping for Body Mass Index (BMI) is divided into 4, which are underweight, normoweight, overweight and obese. The results of this data were dominated by respondents with a normoweight BMI (74.6%) followed by respondents with obese BMI (12.3%). From several studies, normoweight BMI is mostly dominated by adolescents to young adults (Dewi et al, 2019) [17] while overweight and obese BMI (BMI> 25 kg / m2) are mostly found in patients aged 40 years and over (Ramadhani, 2017). This data obtained is also supported by other research conducted on adolescents showing that adolescent respondents are dominated by BMI normoweight / normal, which is 83.33% from the total 36 respondents. This may be related to physical activity and food intake. The elderly has less physical activity due to limited movement has higher intake of high fat food, and their metabolism has begun to decrease (Ramadhani, 2017).[18]Whereas in adolescents, the body's metabolism tends to be higher, they do more physical activity, and the intake food is likely not much different (Suyasmi, 2018).[19]

4.10. Distribution of Respondents According to Abdominal Circumference

The majority of respondents (63.9%.) had a normal abdominal circumference in both men (75.5%) and women (55%). This is also in line with research conducted by Hamam, et al. in Saudi Arabia concerning the impact of diet on overweight / obesity prevalence, where most of the respondents had a normal abdominal circumference, which are 84.2% in men and 95.7% in women. [20] Similar results were also found in the cross-sectional study by MM and Jackson where 75% of respondents have normal abdominal circumference.[21]Research by Perwitasari, et al. also stated that, 87.5% of the sample had a normal abdominal circumference. Abdominal circumference was stated to be positively correlated with fasting blood glucose levels in its study. [22]

4.11. Distribution of Respondents Based on Total Cholesterol

Based on the results of this study, there were 141 respondents (37.7%) experiencing hypercholesterolemia. This research is in line with research conducted by Ni Komang W, et al. in 2018 regarding hypercholesterolemia in Bali, where 34.2% of respondents experienced hypercholesterolemia.[23]Another study conducted by Polychronopoulos et al. obtained higher results, where about 65% of respondents experienced hypercholesterolemia.[24]Hypercholesterolemia is the result of increased intake of both saturated fat and cholesterol and central obesity. Intake of saturated fat and sources of cholesterol from foods that are consumed excessively can affect lipid profiles levels such as increased levels of triglycerides and cholesterol, even though the body's production of cholesterol is only 25 percent derived from dietary cholesterol.

4.12. Distribution of Respondents by Breakfast, Lunch, and Dinner Menu

The results of the study showed a significant association between cholesterol levels and daily diet which categorized based on saturated fat, (p value = 0.000, p <α). This is in line with research by Emy Yulianti, et al. in 2015, the correlation between the two variable is significant with a probability value of 0.001 (p <α). The results showed that the higher saturated fat on the diet, the higher cholesterol levels in the blood. Total fat, saturated fat and total energy are ingredients in the diet which became risk factors in increasing blood cholesterol levels. The main sources of saturated fat in dietary menu are meat, dairy products, egg yolks and vegetable oils. Increased consumption of saturated fat will stimulate the liver to produce cholesterol so that it increases its levels in the blood. As a result, the blood clots faster and is deposited on the walls of the blood vessels in the form of atheroma.[25]

4.13. Distribution of Respondents Based on Method of Food Processing

The results showed a significant association between cholesterol levels and the way food is processed (p <α). It is known that frying method category has the highest number from other categories. This is in line with research by Suryaningsih Elisabeth NL, et al in 2019, that showed a significant association between the two variables (p value = 0.000) p <α. Foods that are processed by frying contain more fat so that they are a risk factor for hypercholesterolemia. Saturated fat can be converted into cholesterol and can increase blood cholesterol levels, especially LDL by slowing down the catabolic process.[26]

4.14. Distribution of Respondents According to Daily Calorie Intake

Calories are substances contained in food and drink, produced by fat, carbohydrates and protein. Metabolism of carbohydrates, in the process of glycogenesis in cells, glucose will be transformed into glucose 6 phosphorylation which is reversible into energy or glycogen. Glucose can be broken down into acetyl Co-A which then becomes fat. The results of study showed that there is a significant association between cholesterol levels and total calories (p value = 0.009) p <α. This result is in line with research conducted by Emy Yulianti, et al. in 2015, that showed significant correlation between the two variables..[25]

5. Conclusion

Based on the results of this study about development of nutritional models in hypercholesterolemia patients, it can be concluded that there is a significant association between cholesterol levels and dietary patterns, food processing methods and total calories per day (p value = 0.000) p <α.

6. References

[1]. Smith DG. 2007. Epidemiology of dyslipidemia and economic burden on the healthcare system. Am J Manag Care. 2007;13(Suppl):568-71.

[2]. Perhimpunan Dokter Spesialis Kardiovaskular Indonesia. 2013. Pedoman Tatalaksana Dyslipidemia Edisi I. Jakarta: CentraCommunications.

[3]. Grundy SM. 2006. Nutrition in the management of disorders of serum lipids and lipoproteins. In: Modern Nutrition in Health and Disease. 1st ed. Philadelphia: Lipincott William & Wilkins; 2006. p.1076-92

[4]. John MF. 2006. Dislipidemia. In: Aru W Sudoyo, Bambang Setiyohadi, Idrus Alwi, Marcellus Simadibrata K, Siti Setiati, Editor. Buku Ajar Penyakit Dalam., Vol. 3. 1st Ed. Jakarta: Pusat Penerbitan Departemen Ilmu Penyakit Dalam FKUI; 2006.p.1948-54.

[5]. Suyatna, 2008, Obat Kardiovaskular, Farmakologi dan Terapi, Edisi 5, Departemen Farmakologi dan Terapetik, Fakultas Kedokteran UI, Jakarta,388.

[6]. HermansMP,CastroCabezasM,StrandbergT,FerrieresJ,FeelyJ,ElisafM,etal.2010. Centralized Pan-European survey on the under-treatment of hypercholesterolaemia (CEPHEUS): overall findings

from eight countries. Curr Med Res Opin2010;26:445e54.
[7]. Institute NHL and B. Diseases and Conditions Index. Coronary Heart Disease. [Internet]. 2011 [cited 2019 Dec 29]. Availablefrom: http://www.nhlbi.nih.gov/health/dci/Diseases/Cad/CAD_WhatIs.html.
[8]. Prevention C for DC and. Heart Disease [Internet]. 2011 [cited 2019 Dec 29]. Available from:http://www.cdc.gov/heartdisease/coronary_ad.htm
[9]. Sanchis-Gomar F, Perez-Quilis C, Leischik R, Lucia A. Epidemiology of coronary heart disease and acute coronary syndrome. Ann Transl Med.2016;4(13).
[10]. Pranavchand R, Reddy BM. Current status of understanding of the genetic etiology of coronary heart disease. J Postgrad Med.2013;59(1):30.
[11]. Ambrose JA, Singh M. Pathophysiology of coronary artery disease leading to acute coronary syndromes. F1000Prime Rep.2015;7.
[12]. Khayyam-NekoueiZ,NeshatdoostH,YousefyA,SadeghiM,ManshaeeG.Psychological factors and coronary heart disease. ARYA Atheroscler.2013;9(1):102.
[13]. Rubin JB, Borden WB. Coronary heart disease in young adults. Curr Atheroscler Rep. 2012;14(2):140–9.
[14]. Stapleton PA, Goodwill AG, James ME, Brock RW, Frisbee JC. Hypercholesterolemia and microvascular dysfunction: interventional strategies. J Inflamm.2010;7(1):54.
[15]. Gupta R, Rao RS, Misra A, Sharma SK. Recent trends in epidemiology of dyslipidemias in India. Indian Heart J.2017;69(3):382–92.
[16]. Ibrahim MA, Jialal I. Hypercholesterolemia. In: StatPearls [Internet]. StatPearls Publishing;2019.
[17]. Karr S. Epidemiology and management of hyperlipidemia. Am J Manag Care. 2017;23(9 Suppl):S139–48.
[18]. MozaffarianD,BenjaminEJ,GoAS,ArnettDK,BlahaMJ,CushmanM,etal.Executive summary: heart disease and stroke statistics—2016 update: a report from the American Heart Association. Circulation.2016;133(4):447–54.
[19]. Onwe PE, Folawiyo MA, Anyigor-Ogah CS, Umahi G, Okorocha AE, Afoke AO. Hyperlipidemia: etiology and possible control. J Dent Med Sci 2015; 14 93.2015;100.
[20]. Grundy SM, Stone NJ, Bailey AL, Beam C, Birtcher KK, Blumenthal RS, et al. 2018AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/AmericanHeartAssociationTaskForceonClinicalPracticeGuidelines.JAm Coll Cardiol.2019;73(24):e285–350.
[21]. SMG,NJS,ALB.CholesterolManagementGuideforHealthcarePractitioners.AmHear Assoc. 2018;
[22]. School HM. High Cholesterol (Hypercholesterolemia) [Internet]. Harvard Health Publishing. 2019 [cited 2019 Dec 29]. Available from: https://www.health.harvard.edu/a_to_z/high-cholesterol-hypercholesterolemia-a-to-z
[23]. [Ni Komang W, et al. Fat Intake, Central Obesity and Hypercholesterolemia in The Civil Apparatus of The Regional Government of Bali Province. 2018. Journal of The Indonesian Nutrition Association p-ISSN: 0436-0265 e-ISSN: 2528-5874 http://ejournal.persagi.org/index.php/Gizi_Indon
[24]. Polychronopoulos E, et al. Diet, lifestyle factors and hypercholesterolemia in elderly men and women from Cyprus. 2005. doi:10.1186/1476-511X-4-17
[25]. Yuliantini E, et al. Intake of Energy, Fat and Fiber Content with the Ratio of Total Cholesterol-HDL). 2015:38(2):139-147.
[26]. Elisabeth S, et al. The Correlation between Physical Activity and the Consumption of Fried and Hypercholesterolemia. 2019.

nutrition-model-development-in-hypercolesterolemia-patients-601ac731805c4.pdf

ORIGINALITY REPORT

7%	2%	6%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	"1st Annual Conference of Midwifery", Walter de Gruyter GmbH, 2020 Publication	3%
2	Titiek Idayanti, Siti Fithrotul Umami. "THE EFFECT OF PREGNANCY EXERCISE ON THE SMOOTH DELIVERY OF THE SECOND STAGE OF CHILDBIRTH PROCESS IN EKA MEDIKA PRATAMA CLINIC, PUNGGING VILLAGE, MOJOSARI SUB-DISTRICT, MOJOKERTO DISTRICT", Nurse and Health: Jurnal Keperawatan, 2018 Publication	1%
3	Submitted to iGroup Student Paper	1%
4	ejournal.unsri.ac.id Internet Source	1%
5	repositori.usu.ac.id Internet Source	1%

worldwidescience.org

6	Internet Source	1%

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		