

The Effect Of Black Cumin Capsules On LDL Levels In Elderly Patients With Hypercholesterolemia At The Pegajahan Community Health Center

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Abstract

*Hypercholesterolemia is characterized by increased levels of LDL, total cholesterol, triglycerides, and decreased levels of HDL, caused by various variables, one of which is age. With age, a person's ability to bind to the LDL receptor decreases. This results in an increase in the amount of LDL present in the blood which in turn contributes to the blockage of blood vessels. Black cumin, also known as *Nigella sativa*, is a frequently used type of herbal medicine. By inhibiting the activity of HMG-CoA reductase enzyme and increasing the expression of LDL receptor mRNA, black cumin is an herbal medicine that has the potential to reduce LDL cholesterol levels. This study aims to determine the effect of black cumin (*Nigella sativa*) capsule administration on LDL levels in elderly individuals with hypercholesterolemia. This study was conducted using a quasi-experimental design with a non-equivalent control group, involving pre-test and post-test. The research subjects were 20 individuals, divided into two groups: the experimental group, consisting of 10 people, who were given 500 mg black cumin capsules (4 capsules per day for 30 days) and the control group, consisting of 10 people, who were given a placebo (4 capsules per day for 30 days). Data analysis was performed using the t-test. Data analysis using the t-test showed that the pre-test and post-test results of the black cumin capsule administration had a p-value of <0.001 . Black cumin capsules have an effect on lowering LDL levels in elderly individuals with hypercholesterolemia.*

Keywords: Black Cumin (*Nigella sativa*), LDL Levels, Hypercholesterolemia

INTRODUCTION

Hypercholesterolemia is a lipid metabolism disorder defined by elevated levels of total cholesterol and low-density lipoprotein (LDL). It remains a common condition today, with prevalence rates persisting at high levels. Globally, the prevalence is approximately 45%, with figures of around 30% in Southeast Asia and 35% in Indonesia. Hypercholesterolemia continues to be a major health issue, as elevated cholesterol levels contribute to 2.6 million deaths and 29.7 million cases of disability annually. Efforts to prevent, detect, and manage hypercholesterolemia are crucial to alleviating the associated burden of cardiovascular disease.

Lipoproteins are complexes of nonpolar lipids, amphipathic lipids, and proteins involved in the accumulation of fat in blood plasma. LDL is a primary type of plasma lipoprotein. It functions as a lipid transporter for cell membranes, where cholesterol is essential for membrane synthesis, fluidity modulation, and the regulation of intercellular communication. LDL cholesterol significantly impacts the development of cardiovascular diseases, including atherosclerosis. LDL is observed in the arterial tunica intima during the early stages of atherogenesis, and high levels increase the risk of atherosclerosis. While atherosclerosis can lead to various cardiovascular diseases, coronary heart disease and stroke are among the most common.

Elevated LDL levels can result from factors such as physical inactivity, obesity, high blood pressure, liver disorders, chronic kidney disease, hypothyroidism, stress, smoking, alcohol abuse, and advanced age. Older adults often experience reduced physical activity or mobility. A loss of muscle mass slows basal metabolism, causing the body to produce less energy and leading to fat accumulation. Lifestyle changes—specifically shifts away from healthy diets toward high fat intake and low consumption of fruits and vegetables—also

contribute to elevated LDL levels.

Various substances, such as black cumin, are known to address elevated LDL levels. Research by Muhammad (2020) demonstrated that the constituents of black cumin can lower LDL levels. This plant has been utilized in the treatment of numerous diseases and in traditional medicine.

Several studies have found that black cumin possesses various pharmacological effects, including analgesic, anti-inflammatory, antihistamine, anti-allergic, and anti-cholesterol properties. However, there has been no research regarding the effect of black cumin on LDL levels in elderly individuals with hypercholesterolemia. Consequently, the researchers aim to investigate the effect of administering black cumin (*Nigella sativa*) capsules on reducing LDL levels in elderly patients with hypercholesterolemia.

RESEARCH METHODS

This quantitative study employed a quasi-experimental methodology using a non-equivalent control group design. The study involved 22 elderly patients with hypercholesterolemia receiving treatment at the Pegajahan Community Health Center (Puskesmas) in Serdang Bedagai Regency, North Sumatra; however, only 20 patients met the criteria for inclusion in the study sample. Ten elderly patients with hypercholesterolemia received an intervention consisting of capsules containing black cumin, while the other ten received a placebo consisting of rice flour encapsulated in the same manner. Prior to the intervention, LDL levels were measured to establish baseline (pre-test) data. Participants in the intervention group received 120 black cumin capsules (500 mg each), taken at a dosage of four capsules daily—split into two doses—over a period of 30 days. Meanwhile, participants in the control group received 120 rice flour capsules (500 mg each), also taken at a dosage of four capsules daily—split into two doses—over a period of 30 days.

RESULTS AND DISCUSSION

Table 1. Demographic Data on Sample Age at Pegajahan Community Health Center:

Age	N	%
Control Group		
60-69	8	80
70-79	2	20
Total	10	100
Experimental Group		
60-69	8	80
70-79	2	20
Total	10	100

Table 2. Demographic Data on Sample Gender at Pegajahan Community Health Center:

Gender	N	%
Control Group		
Male	2	20
Female	8	80
Total	10	100
Kelompok Eksperimen		
Male	1	10
Female	9	90
Total	10	100

Table 4.3 Normality Test

Group	P Value
Control Group Pre-test	0.651
Control Group Post-test	0,086
Experimental Group Pre-test	0,566
Experimental Group Post-test	0,165

Table 4.3 above shows the results of the normality test, with a p-value greater than 0.05, indicating that the data in this study are normally distributed. Therefore, a t-test can be performed.

Table 4.4 T-test

Group	P Value
Control Group Pre-test Post-test Control Group	0,361
Experimental Group <i>Pre-test</i> Experimental Group <i>Post-test</i>	< 0,001
Control Group <i>Post-test</i> Experimental Group <i>Post-test</i>	< 0,001

Table 4.4 above presents the data analysis results. A p-value of 0.361 ($p > 0.05$) was obtained from the analysis of pre-test and post-test data for the control group, indicating no significant change in LDL levels within that group. Analysis of the difference in mean LDL levels between the experimental group's pre-test and post-test results yielded a p-value of <0.001 ($p < 0.05$), demonstrating a significant relationship. Analysis of the difference in post-test LDL levels between the control and experimental groups resulted in a p-value of <0.001 ($p < 0.05$), indicating a significant difference between the two groups.

Discussion

Data from the study sample indicate an increase in LDL levels associated with age in both the control and experimental groups, specifically within the 60–69 age bracket (representing 80% of the sample). These findings regarding age align with research by Saputri (2021), which demonstrated a correlation between cholesterol levels and age among the population of Bandar Lampung City, regardless of whether the individuals were adults, adolescents, or elderly. The rise in LDL levels among elderly women is attributed to a decline in estrogen hormones following the cessation of the menstrual cycle. Menopausal women face a higher risk because estrogen plays a key role in maintaining the balance of LDL levels. Women constituted the majority of participants in this study (85%). This is attributed to the fact that Indonesian women generally engage in lower levels of physical activity compared to men and tend to have a higher body fat composition. Consequently,

elderly women are at higher risk than men; women are more susceptible to obesity due to higher lipid content, a factor linked to an increased risk of hypercholesterolemia. These findings regarding gender are consistent with Saputri's (2021) study, which investigated the correlation between cholesterol levels and gender-related consumption patterns in Bandar Lampung City; that study revealed a stronger correlation in women than in men. By the age of 45, women typically lose 30–50% of their total muscle mass. This study demonstrates that the administration of black cumin extract significantly reduces LDL levels in patients with hypercholesterolemia, and data analysis reveals a significant difference in hypercholesterolemia status before and after treatment with black cumin capsules. In the group receiving black cumin capsules, a p-value of 0.001 was observed for LDL levels, indicating a significant difference in the mean LDL levels; conversely, for the placebo group, the p-value for LDL levels exceeded 0.05, indicating no significant difference in LDL levels before and after placebo administration. These results align with the study by Muhammad et al. (2020), which found that administering 500 mg black cumin oil capsules for two months significantly reduced LDL levels compared to patients who did not consume black cumin. The findings are also consistent with research by Fauzi (2023) on female *Ulu* free-range chickens, where treatment dosages of 36 mg/dL, 72 mg/dL, and 144 mg/dL of black cumin reduced total cholesterol and LDL levels while increasing HDL levels. This study is further supported by research conducted by Bamosa et al. (2021), in which patients administered 2 g/day of black cumin showed substantial reductions in triglycerides and LDL, as well as a substantial increase in HDL.

CONCLUSION

The mean LDL level for the control group was 141.3 mg/dL before placebo administration and 143.3 mg/dL after placebo administration.

The mean LDL level for the experimental group was 144.6 mg/dL before the administration of black cumin capsules and 100.8 mg/dL after the administration of black cumin capsules.

In this study, the mean LDL levels following the administration of black cumin capsules and the placebo differed significantly, with a P-value of 0.001.

REFERENCES

- Alifiyah AH, Lita SC. Pengaruh Pemberian Jus Nanas Terhadap Penurunan Kadar Kolesterol Di Desa Pasar Merah Timur Kota Medan. Published online March 24, 2024.
- Alodiae Y, Santi M. Pengaruh Pola Makan Terhadap Kadar Kolesterol Total. *Jurnal Media Kesehatan Masyarakat Indonesia*. 2021;13.doi.org/10.30597/mkmi.v13i4.2132.
- Anam MM, Usdiana Rosyida D, Sintowati R, Sutrisna E. Efek Anti-Inflamasi Ekstrak Etanol 96% Biji Jintan Hitam (*Nigella Sativa* L.) Anti-Inflammatory Effect Of Ethanolic Extract 96% Of Black Cumin Seeds (*Nigella Sativa* L.).
- Bela NAS, Nindita CAS. Pengaruh Pemberian Kapsul Jintan Hitam Terhadap Kadar Kolesterol Ibu Rumah Tangga. Published online June 1, 2023.
- Carson JAS, Lichtenstein AH, Anderson CAM, et al. Dietary Cholesterol and Cardiovascular Risk: A Science Advisory from the American Heart Association. *Circulation*. 2020;141(3):E39-E53. doi:10.1161/CIR.0000000000000743
- Cholesterol N, Program E. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Published online 2001.
- Eda Ünal, Aysel Özdemir. Old Age and Aging. Published online November 2019.

- Fauzi TA, Santosa PE, Sutrisna R, Riyanti R. Total Kolesterol, LDL Dan HDL Darah Ayam kampung Ulu Betina Yang Diberi Jintan Hitam (*Nigella sativa*) Dalam Rarum. *Journal Of Research And Innovation Of Animals*. 2023;7(3):402-410. doi:10.23960/jrip.2023.7.3.402-410
- Ikhsan Jurusan Ilmu Al-Qur M, dan Tafsir an, Ushuluddin UIN Sunan Gunung Djati Bandung F. *Habbatussauda Dalam Peningkatan Imun Di Masa Covid-19*. Vol 1.; 2021. <https://journal.uinsgd.ac.id/index.php/jra>
- Kaatabi H, Bamosa A, Lebda F, Al Elq A, Al-Sultan A. Favorable impact of (*Nigella sativa*) seeds on lipid profile in type 2 diabetic patients. *J Family Community Med*. 2021;19(3):155. doi:10.4103/2230-8229.102311
- Karina P. Tatalaksana Dislipidemia Terkait Penyakit Kardiovaskular Aterosklerosis (ASCVD): Fokus pada Penurunan LDL-c. *Continuing Medical Education*. CDK Edisi CME-4/Vol.48 no.10, th.2021
- Khairunnisa L, Ngestiningsih D, Setyawati AN. Pengaruh Pemberian Ekstrak Jintan Hitam (*Nigella Sativa*) Terhadap Kadar Kolesterol Ldl Serum Tikus Sprague Dawley Setelah Pemberian Paparan Asap Rokok. *JKD*. 2019;5(4):1171-1181.
- Khalisa AI. The Effect Of Black Cumin (*Nigella Sativa*) Ethanol Extract On The Number Of Rat Brain Striatum Neurons Post Of Bilateral Common Carotid Artery Occlusion. Yogyakarta, 2021.
- Kumalasari NC, Wardani KA, Diva M, Azizah A, Sefrina S, Martha RD. Edukasi Kesehatan untuk Mencegah Hiperkolesterolemia pada Masyarakat Umum Desa Jabalsari. *Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM)*. 2023;6(8):3099-3107. doi:10.33024/jkpm.v6i8.10231
- Kemenkes RI. Menurunkan Kolesterol. *artikel*. Published online 2022.
- Kementrian Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Tentang Rencana Aksi Nasional Kesehatan Lanjut Usia Tahun 2016-2019. 2016;14-15. diakses pada tanggal 10 November 2024.
- Muhammad NN, Ade IF. Pengaruh Pemberian Jintan Hitam (*N. Sativa*) Terhadap Kadar Ldl Pada Pasien Diabetes Mellitus Tipe 2 Di Rumah Sakit Umum Daerah Deli Serdang. Published online 2020.
- Mukaromah AH, Putri GSA, Qomariyah N, Wijanarko W. Pemeriksaan Glukosa, Kolesterol dan Asam Urat pada Masyarakat Peserta Car Free Day di Balai Pelatihan Kesehatan (Bapelkes) Kota Semarang. *Jurnal Surya Masyarakat*. 2020;2(2):133. doi:10.26714/jsm.2.2.2020.133-138
- Nikos P, Ayoola O. A, Anis R. *Dyslipidemia*.; 2024.
- Rahmawati Y, Ramadanty DD, Rahmawati F, Perwitasari E. Hiperkolesterolemia Pada Pasien Lanjut Usia : Studi Kasus Puskesmas Seyegan. 2022;3(1).
- Rizki Dwi Agustin H. Pengaruh Pemberian Jus Apel Varietas Manalagi dan Fuji Terhadap Kadar Kolesterol Total dan Trigliserida pada Lanjut Usia hiperkolesterolemia. 2022; <http://nfsr.sbm.ac.ir/article-1-514-en.html>.
- Perkeni. Pedoman Pengelolaan Dislipidemia Di Indonesia 2019. PB Perkeni; 2019.
- Rizki W, Hanif AM. Peran Proprotein Convertase Subtilisin / Kexin Type 9 (Pcsk9) Sebagai Kontrol Dislipidemia Pada Cardiovascular Disease. *Jurnal Human Care*. Volume 6; No.2 (June, 2021): 376-385.
- Rahim MA, Shoukat A, Khalid W, et al. A Narrative Review on Various Oil Extraction Methods, Encapsulation Processes, Fatty Acid Profiles, Oxidative Stability, and Medicinal Properties of Black Seed (*Nigella sativa*). *Foods*. 2022;11(18):2826. doi:10.3390/foods11182826
- Raisah ZHS. Uji Efektivitas Antibiotik Ekstrak Daun Belimbing Wuluh (*Averrhoa Bilimbi* L.) Dan Ekstrak Habbatussauda (*Nigella Sativa* L.) Terhadap Penyembuhan Luka Sayat

- Mencit Jantan (Mus Musculus L.) Yang Terinfeksi Staphylococcus Aureus Secara In Vivo. Vol 5.; 2021.
- Retno SK, Choesnan E, Asami RK. Pengaruh Pemberian Ekstrak Biji Jintan Hitam terhadap Kadar Kolesterol HDL dan LDL Rattus Norvegicus jantan Galur Wistar yang Diberi Diet Tinggi Lemak. Hang Tuah Medical Journal. 2021;18.
- Santoso P. Efektivitas Kapsul Biji Jintan Hitam (Nigella Sativa) Sebagai Terapi Komplementer Pada Pasien Hypercholesterolemia. *Farmasi Stikes Karya Putra Bangsa Tulungagung*. Juli 2023.
- Sastriani Y, Rinawati LP, Agung G, et al. Gambaran Kadar Kolesterol Total Pada Perokok Aktif Di Banjar Bekul Denpasar Selatan.; 2023. <https://ejournal.poltekkes-denpasar.ac.id/index.php/JSIH>
- Saputri DA, Novitasari A. Hubungan Usia Dengan Kadar Kolesterol Masyarakat Di Kota Bandar Lampung. *Jurnal Pendidikan Biologi*. 2021;12(2):238. doi:10.24127/bioedukasi.v12i2.4453
- Tim RisKesDas 2018. *Laporan Nasional Riskesdas 2018*. Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan (LPB); 2019.
- Ujjiani S. Hubungan Antara Usia Dan Jenis Kelamin Dengan Kadar Kolesterol Penderita Obesitas Rsud Abdul Moeloek Provinsi Lampung. *Jurnal Kesehatan*. Volume VI, Nomor 1, April 2019, hlm 43-48
- Wahyudi W, Srg DA, Alfiansyah NM. Literature Study: Indonesian Herbs with Cholesterol Level Lowering Activity Studi Literatur: Herbal Indonesia yang Berkhasiat sebagai Penurun Kadar Kolesterol. *Journal Of Pharmacy and Science*). 2022;5(2):36-45.
- World Health Organization(WHO). Raised Cholesterol. <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3236>.
- Yoeantafara A, Martini S. Pengaruh Pola Makan Terhadap Kadar Kolesterol Total.