

Cholesterol Levels Coming Down, But Dietary Changes Still Needed

Author : Dr. Mark Messina

Date : May 5, 2020

Cardiovascular disease (CVD) kills more Americans than any other disease. Coronary heart disease (CHD) accounts for the largest share of the diseases that fall under the umbrella of CVD as it is responsible for 13% of all U.S. deaths (~365,000/year).¹ Elevated cholesterol is an important CHD risk factor – so a recent report from the Centers for Disease Control (CDC) is good news for the health of the American public.²

According to the CDC,* in recent years the number of American adults with elevated total cholesterol and low levels of high density lipoprotein cholesterol (HDL-C) has markedly declined.² Soy protein and soybean oil, both of which have FDA approved heart health claims, are two dietary factors that clinical studies show can lower total and LDL-cholesterol (LDL-C).^{3,4} Soy protein may also raise HDL-C. While these effects on cholesterol are important, blood cholesterol is just one among many CHD risk factors. In fact, a large cohort of U.S. patients hospitalized with CHD found that almost half had LDL-C below the recommended upper limit of 5 mmol/L. Although the effects of soy on cholesterol has taken center stage, there is evidence that soy protein or other soybean components favorably affect more than one CHD risk factor.

In 1999-2000, the age adjusted prevalence of high total cholesterol (≥ 240 mg/dl) was 18.3% whereas in 2017-2018 it was 10.5%.² The prevalence of low HDL-C (< 40 mg/dl)

The CDC did not discuss the reasons for these declines. The evidence that statins played a role in reducing total cholesterol is impressive considering that statin use among U.S. adults 40 years of age and older in the general population increased 79.8% from 21.8 million individuals (17.9%) in 2002-2003 (134 million prescriptions) to 39.2 million individuals (27.8%) in 2012-2013 (221 million prescriptions).⁶

Despite the widespread use of statins and other cholesterol-lowering drugs,⁷ diet therapy remains the first line of approach for reducing elevated cholesterol and risk of CHD. Clinical studies show both soy protein⁸⁻¹⁰ and soybean oil^{11,12} lower total and LDL-C. In addition, some evidence indicates soy protein raises HDL-C and lowers blood triglyceride levels, the latter being another CHD risk factor.¹⁰ However, to markedly lower elevated cholesterol levels via diet requires adopting a comprehensive approach, the efficacy of which has demonstrated clinically by David Jenkins and colleagues from the University of Toronto through the use of the portfolio diet.^{13,14} Soyfoods and soy protein play a prominent role in this diet.^{13,14}

The portfolio diet has also been shown to lower blood pressure¹⁵ and some evidence indicates that soy protein may do likewise.^{16,17} These findings are important because reducing elevated blood pressure has been proven to reduce risk of death and CVD,¹⁸ thus confirming there is a lot more to CHD than elevated cholesterol.

In addition to elevated blood pressure and cholesterol, obesity and diabetes are also independent CHD risk factors. While achieving long-term weight loss has been proven difficult, there is some evidence that higher-protein diets may be helpful in this regard.¹⁹ Soybeans are higher in protein than other legumes and come without the amounts of saturated fat typically found in commonly consumed sources of protein in the U.S. diet.²⁰ There is also evidence that soy helps regulate glucose levels, which over time, might help to reduce risk of developing diabetes.²¹

The reduction in blood cholesterol levels among Americans that has occurred over the past two decades is certainly a notable and welcomed achievement. Ideally, a reduction in cholesterol occurs as a result of making appropriate dietary changes because the changes that lower cholesterol are often the same as those that lower blood pressure and risk of other chronic diseases. Eating soyfoods is a step in the right direction.

*Data from the National Health and Nutrition Examination Survey (NHANES) from 1999–2000 through 2017–2018 were used for these analyses. Data from NHANES 2015–2018 were used to test differences between subgroups. Ten 2-year cycles (1999–2018) were used in testing for trends in the prevalence of high total cholesterol, and six 2-year cycles (2007–2018) were used for prevalence of low HDL-C.

References

1. Ferguson JF, Fornage M, Khan SS, Kissela BM, Knutson KL, Kwan TW, Lackland DT, Lewis TT, Lichtman JH, Longenecker CT, Loop MS, Lutsey PL, Martin SS, Matsushita K, Moran AE, Mussolino ME, Perak AM, Rosamond WD, Roth GA, Sampson UKA, Satou GM, Schroeder EB, Shah SH, Shay CM, Spartano NL, Stokes A, Tirschwell DL, Vanwagner LB, Tsao CW; on behalf of the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics-2020 update: a report from the American Heart Association. *Circulation*. 2020;141:e1-e458. doi: 10.1161/CIR.0000000000000757.
2. Carroll MD, Fryar CD. Total and high-density lipoprotein cholesterol in adults: United States, 2015–2018. NCHS Data Brief, no 363. Hyattsville, MD: National Center for Health Statistics. 2020.
3. Food labeling: health claims; soy protein and coronary heart disease. Food and Drug Administration, HHS. Final rule. *Fed Regist*. 1999;64(206):57700-33.
4. Qualified Health Claim Petition – Soybean Oil and Reduced Risk of Coronary Heart Disease (Docket No. FDA-2016-Q-0995).
<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwjFsf>

[HlsojpAhVTCs0KHU6xBxgQFjAAegQIAxAB&url=https%3A%2F%2Fwww.fda.gov%2Fmedi
a%2F106649%2Fdownload&usg=AOvVaw1OacdW5qPEJwAz- 0yxdGz.](https://www.fda.gov/medwatch/2019/06/10/soy-protein-lowering-cholesterol-and-blood-pressure-0012458)

5. Sachdeva A, Cannon CP, Deedwania PC, et al. Lipid levels in patients hospitalized with coronary artery disease: an analysis of 136,905 hospitalizations in Get With The Guidelines. *Am Heart J*. 2009;157(1):111-7 e2.
6. Salami JA, Warraich H, Valero-Elizondo J, et al. National trends in statin use and expenditures in the US adult population from 2002 to 2013: Insights from the medical expenditure panel survey. *JAMA Cardiol*. 2017;2(1):56-65.
7. Salami JA, Warraich HJ, Valero-Elizondo J, et al. National trends in nonstatin use and expenditures among the US adult population from 2002 to 2013: Insights from medical expenditure panel survey. *Journal of the American Heart Association*. 2018;7(2).
8. Blanco Mejia S, Messina M, Li SS, et al. A meta-analysis of 46 studies identified by the FDA demonstrates that soy protein decreases circulating LDL and total cholesterol concentrations in adults. *J Nutr*. 2019;149(6):968-81.
9. Jenkins DJA, Blanco Mejia S, Chiavaroli L, et al. Cumulative meta-analysis of the soy effect over time. *Journal of the American Heart Association*. 2019;8(13):e012458.
10. Anderson JW, Bush HM. Soy protein effects on serum lipoproteins: A quality assessment and meta-analysis of randomized, controlled studies. *J Am Coll Nutr*. 2011;30(2):79-91.
11. Lichtenstein AH, Matthan NR, Jalbert SM, et al. Novel soybean oils with different fatty acid profiles alter cardiovascular disease risk factors in moderately hyperlipidemic subjects. *Am J Clin Nutr*. 2006;84(3):497-504.
12. Kris-Etherton PM, Derr J, Mitchell DC, et al. The role of fatty acid saturation on plasma lipids, lipoproteins, and apolipoproteins: I. Effects of whole food diets high in cocoa butter, olive oil, soybean oil, dairy butter, and milk chocolate on the plasma lipids of young men. *Metabolism*. 1993;42(1):121-9.
13. Jenkins DJ, Kendall CW, Faulkner D, et al. A dietary portfolio approach to cholesterol reduction: combined effects of plant sterols, vegetable proteins, and viscous fibers in hypercholesterolemia. *Metabolism*. 2002;51(12):1596-604.
14. Jenkins DJ, Kendall CW, Marchie A, et al. Direct comparison of a dietary portfolio of cholesterol-lowering foods with a statin in hypercholesterolemic participants. *Am J Clin Nutr*. 2005;81(2):380-7.
15. Jenkins DJ, Jones PJ, Frohlich J, et al. The effect of a dietary portfolio compared to a DASH-type diet on blood pressure. *Nutrition, metabolism, and cardiovascular diseases : NMCD*. 2015;25(12):1132-9.
16. Dong JY, Tong X, Wu ZW, et al. Effect of soya protein on blood pressure: a meta-analysis of randomised controlled trials. *Br J Nutr*. 2011;106(3):317-26.
17. Kou T, Wang Q, Cai J, et al. Effect of soybean protein on blood pressure in postmenopausal women: a meta-analysis of randomized controlled trials. *Food & function*. 2017;8(8):2663-71.
18. Brunstrom M, Carlberg B. Association of blood pressure lowering with mortality and cardiovascular disease across blood pressure levels: A systematic review and meta-analysis. *JAMA internal medicine*. 2018;178(1):28-36.

19. Drummen M, Tischmann L, Gatta-Cherifi B, et al. Dietary protein and energy balance in relation to obesity and co-morbidities. *Front Endocrinol (Lausanne)*. 2018;9443.
20. Messina MJ. Legumes and soybeans: overview of their nutritional profiles and health effects. *Am J Clin Nutr*. 1999;70(3 Suppl):439S-50S.
21. Zhang XM, Zhang YB, Chi MH. Soy protein supplementation reduces clinical indices in type 2 diabetes and metabolic syndrome. *Yonsei Med J*. 2016;57(3):681-9.