

EFFECT OF HIGH-FIBRE DIET ON LIPID PROFILE AMONG ADULTS: A COMPREHENSIVE REVIEW

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ABSTRACT

Cardiovascular diseases (CVDs) remain major contributors to global morbidity and mortality, with dyslipidaemia serving as a key modifiable risk factor. High-fibre diets—especially those rich in soluble fibre—have demonstrated beneficial effects on lipid metabolism in adults. This review summarises scientific evidence regarding the impact of dietary fibre on lipid profiles, explaining mechanisms and clinical findings. The findings show that increased fibre intake significantly reduces serum LDL-cholesterol and total cholesterol, thereby improving cardiovascular health. High-fibre diets remain an effective, safe, and accessible non-pharmacological strategy for lipid management.

INTRODUCTION

Dyslipidemia is characterized by elevated LDL-C, high triglycerides (TG), and low HDL-C—factors strongly associated with atherosclerosis and cardiovascular diseases. Dietary intervention remains a first-line approach to managing lipid disorders. Among dietary components, fibre has sustained scientific interest due to its role in cholesterol absorption, bile acid metabolism, insulin sensitivity, and gut microbiota regulation. This paper evaluates contemporary evidence on the influence of high-fibre diets on lipid profiles in adults.

DIETARY FIBRE: CONCEPT AND CLASSIFICATION

Dietary fiber refers to non-digestible carbohydrates and lignin that resist enzymatic hydrolysis in the gastrointestinal tract.

Soluble Fibre

- Found in oats, barley, legumes, citrus fruits, and psyllium
- Forms viscous gels, slows digestion
- Fermented by colonic bacteria
- Strongly associated with LDL-cholesterol reduction

Insoluble Fibre

- Found in vegetables, whole grains, wheat bran
- Increases stool bulk and intestinal motility
- Indirect metabolic benefits

MECHANISMS LINKING HIGH-FIBRE DIET TO LIPID PROFILE IMPROVEMENT

- Reduced Cholesterol Absorption: Soluble fibre reduces micelle formation, lowering cholesterol uptake.

- Enhanced Bile Acid Excretion: Fibre binds bile acids, increasing excretion and forcing hepatic cholesterol utilization.
- Short-Chain Fatty Acid (SCFA) Production: Fermentation produces SCFAs—especially propionate—which may inhibit hepatic cholesterol synthesis.
- Improved Insulin Sensitivity: Stabilization of postprandial glucose reduces hepatic TG synthesis.
- Gut Microbiome Modulation: Fibre promotes microbial diversity linked to improved lipid metabolism.

EVIDENCE FROM CLINICAL STUDIES

Randomized controlled trials (RCTs) demonstrate reductions in LDL-C and total cholesterol with soluble-fibre intake ranging from 5–15 g/day.

- Meta-analyses show LDL-C reductions of 5–10% with increased soluble fibre intake.
- Psyllium-based interventions report significant decreases in LDL-C within 8–12 weeks.
- HDL-C effects remain neutral, though whole-grain diets may yield modest improvements.
- Triglyceride improvements are more pronounced in individuals with metabolic syndrome or insulin resistance.

Long-term prospective cohort studies continue to show that higher fibre intake is associated with reduced incidence of cardiovascular disease.

DISCUSSION

Review of literature reinforces the lipid-modifying benefits of high-fibre diets. Soluble fibres exert more potent effects due to their viscosity-based mechanisms. While study designs and fibre sources vary, the overall direction of evidence is consistent.

High-fibre diets are low-cost, sustainable, and synergistic with other lifestyle interventions. More research is needed on fibre–microbiome interactions and long-term adherence in diverse populations.

CONCLUSION

High-fibre diets provide a validated, non-pharmacological method for improving lipid profiles in adults. They significantly reduce LDL-cholesterol, lower total cholesterol, and enhance overall cardiometabolic health. Increased consumption of soluble-fibre-rich foods such as oats, legumes, fruits, and psyllium should be encouraged in clinical and public-health contexts.

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