

Environmentally friendly diets: the impact of replacing animal protein with legumes on the risk of non-alcoholic fatty liver disease

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Abstract

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Non-alcoholic fatty liver disease (NAFLD) is associated with long-time exposure to obesity, physical inactivity, smoking, and Western diets high in saturated fats, refined sugar, and low in fibres.⁽¹⁾ It is one of the most common chronic liver disease globally with a prevalence of 32% in 2022,⁽¹⁾ and is associated with greater risk of cardiovascular diseases as well as non-alcoholic steatohepatitis (NASH).⁽¹⁾ Currently, there is no medical treatment against NAFLD, but high consumption of plant-based protein sourced foods appear beneficial.

Legumes are considered an environmentally friendly and healthy protein source, low in saturated fat and energy density, and rich in dietary fibre⁽²⁾. However, the scientific evidence on the association between legume intake and NAFLD in humans is sparse.⁽²⁾ This study evaluated substituting red and processed meat, poultry, or fish with legumes on the risk of developing NAFLD.

We analyzed data from 124,194 UK Biobank participants who completed two or more dietary assessments using a 24-hour dietary assessment tool, the Oxford WebQ, developed and validated within the cohort,⁽³⁾ and provided comprehensive information on covariates. Participants were invited to complete up to five Oxford WebQs from 2009 to 2012.⁽³⁾ Incident NAFLD cases were identified through linkage to National Health Service registries.

Multivariable adjusted Cox proportional hazards regression models were used to conduct equal mass food substitution analyses, estimating hazard ratios (HR) and 95% confidence intervals (CI) for NAFLD when replacing one 80g serving/week of i) red and processed meat, ii) poultry, iii) or fish with legumes.

Age was the underlying time scale in the analyses. Person-years at risk were calculated from the date of the last completed Oxford WebQ to the date of death, loss to follow-up, diagnosis of NAFLD or NASH, or right censoring, whichever occurred first.

All participants gave written informed consent to participate in the study. The UK Biobank was approved by the National Information Governance Board for Health and Social Care and the National Health Service North West Multicentre Research Ethics Committee (ref 21/NW/0157).

Over a median follow-up period of 10.49 years (IQR: 10.4-10.9 years), 1,201 NAFLD cases were documented. Replacing 80 g/week of red and processed meat or poultry with legumes resulted in 4% and 3% lower rates of NAFLD, respectively (Meat HR: 0.96, 95% CI: 0.94–0.98; Poultry HR: 0.97, 95% CI: 0.95; 0.99). However, replacing fish with legumes was not significantly associated with NAFLD risk (HR: 0.98, 95% CI: 0.96–1.01). These findings remained consistent after adjusting for BMI.

Replacing red and processed meat or poultry with legumes could modestly reduce the risk of NAFLD. No significant association was observed for replacing fish with legumes.

References

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