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Does medication use affect blood pressure and lipid-lowering in tree nut and peanut interventions? A meta-analysis of randomised control trials

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Including nuts in the diet has been associated with improvements in cardiovascular disease (CVD) risk factors including high blood pressure (BP) and hyperlipidaemia [1–2]. However, few studies have investigated if the same benefits exist for medicated and unmedicated populations. This systematic review and meta-analysis investigated the effects of nut intake on BP and lipids, with a sub-analysis evaluating response differences according to BP and lipid-lowering medication usage. MEDLINE, EMBASE, Scopus and Web of Sciences databases were searched for randomised controlled trials (RCTs) of longer than 3 weeks duration that assessed the effects of whole tree nuts or peanuts on BP and lipid responses. The American Diabetes Association Quality Criteria checklist was used to assess the risk of bias, and studies with a negative rating were removed from the meta-analysis. A random-effects meta-analysis was conducted, with subgroup analyses performed based on medication use (medicated, unmedicated, unreported, and mixed-use). Inter-study heterogeneity was estimated using the I^2 test statistic. Data from 107 articles describing 98 studies (61 parallel, and 37 cross-over designs) were included in the meta-analysis. Overall, significant benefits of nut consumption were observed for triglycerides (TG) (mean difference [MD]: −0.11 mmol/L, 95% confidence intervals [CI]: −0.16, −0.06, $p < 0.01$, I^2: 32.95%), total cholesterol (TC) (MD: −0.15 mmol/L, 95% CI: −0.22, −0.08, $p < 0.01$, I^2: 61.84%), and low-density lipoprotein cholesterol (LDL-C) (MD: −0.12 mmol/L, 95% CI: −0.19, −0.06, $p < 0.01$, I^2: 52.7%), but not high-density lipoprotein cholesterol, systolic BP, or diastolic BP. Among unmedicated populations, nut intake resulted in a significant decrease in TG (MD: −0.16 mmol/L, 95% CI: −0.30, −0.03, I^2: 75.93%), and TC (MD: −0.21 mmol/L, 95% CI: −0.39, −0.03, I^2: 86.59%), while in those with unreported medication use, there were significant decreases in TG (MD: −0.08 mmol/L, 95% CI: −0.15, −0.01, I^2: 0%), TC (MD: −0.15 mmol/L, 95% CI: −0.22, −0.07, I^2: 0%) and LDL-C (MD: −0.12 mmol/L, 95% CI: −0.19, −0.06, I^2: 0.44%). No significant effects were observed for BP and lipids in the mixed medication group. While there were significant improvements in lipid profiles overall with tree nuts and peanuts consumption, we observed no benefits for BP. Furthermore, significant beneficial effects on lipids were only observed in those with unreported and no medication use. Few studies investigated effects in medicated participants only (n = 1 study for lipids), and the precise proportion of medication use within the mixed medicated group remains unclear. Consequently, it remains uncertain whether the lipid-lowering properties of consuming nuts remain when hyperlipidaemia is managed with medications. Further studies are needed to explore the influence of medication in combination with dietary approaches on responses to additional CVD risk factors.

Keywords: cardiovascular diseases; blood pressure; cholesterol; nuts

Ethics Declaration

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