



## The scope, efficacy and effectiveness of Mediterranean diet interventions outside Mediterranean countries: A systematic review and meta-analysis of intervention studies

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Epidemiological, and more recently some interventional studies such as the high-profile PREDIMED Study<sup>(1)</sup> in Spain and the Lyon Diet Heart Study<sup>(2)</sup> in France, have demonstrated the numerous health benefits of the Mediterranean diet (MD), including a substantial decrease in risk for cardiovascular diseases. Such evidence places the MD in a prominent position when choosing a model of healthy eating, however, the acceptability as well as the effectiveness and efficacy of MD interventions outside Mediterranean countries have not been previously examined, therefore this study aims to evaluate the acceptability, effectiveness and efficacy of the Mediterranean diet in non-Mediterranean countries.

A systematic review of MD dietary interventions on adults in countries outside the Mediterranean was undertaken. Scopus, Embase and PubMed were searched from inception using specific search terms to find both randomised and non-randomised trials. Meta-analysis was carried out using RevMan software and statistical heterogeneity was evaluated using the Chi squared and  $I^2$  statistic with the 95% CI for  $I^2$  values, with funnel plots of effect size against standard error used to assess for evidence of publication bias. The protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO CRD42014015560).

The searches yielded 1713 publications after removal of duplicates, and after screening 48 papers were included in the qualitative synthesis and 26 of these in the meta-analysis. Nine studies were conducted in Europe, eleven in North America, one in South America, one in Asia and four in Oceania.

Meta-analysis showed non-significant decreases in total cholesterol levels ( $p = 0.08$ ), triglyceride levels ( $p = 0.17$ ), LDL levels ( $p = 0.74$ ), systolic blood pressure ( $p = 0.09$ ), diastolic blood pressure ( $p = 0.91$ ), BMI ( $p = 0.61$ ), waist circumference ( $p = 0.12$ ) and fasting plasma insulin levels ( $p = 0.22$ ), alongside non-significant increases in body weight change ( $p = 0.89$ ) and waist:hip ratio ( $p = 0.91$ ), and no significant changes to fasting plasma glucose levels ( $p = 0.95$ ) and HDL levels ( $p = 0.83$ ).

This systematic review identified a number of MD clinical trials outside Mediterranean countries, reflecting growing interest in the potential use of the MD among non-Mediterranean populations. Results are modest but are in line with previous epidemiological and interventional trials, alongside systematic reviews and meta-analyses showing that the MD has beneficial effects on health outcomes, in particular blood lipids.

1. Estruch R, Ros E, Salas-Salvado J *et al.* (2013) Primary Prevention of Cardiovascular Disease with a Mediterranean Diet. *N Engl J Med* **368**, 1279–90.
2. de Lorgeril M, Salen P, Martin JL *et al.* (1999) Mediterranean diet, traditional risk factors, and the rate of cardiovascular complications after myocardial infarction - Final report of the Lyon Diet Heart Study. *Circulation* **99**, 779–85.