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Dietary fibre intake and cardiovascular disease: A systematic review and meta-analysis of prospective studies

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Cardiovascular disease (CVD) incidence rates are slowing in developed countries[(1)] but remain a significant issue, with CVD-related deaths totalling almost half (48%) of all deaths in Europe[(2)]. Studies have explored the associations between fibre and CVD or risk factors for CVD such as hypertension, central obesity, insulin sensitivity and elevated plasma cholesterol[(3,4)] but findings differ between studies. A systematic review and meta-analysis was undertaken to synthesize findings from prospective studies published between January 1990 and May 2012. Pooled relative risks (RRs) were generated using a dose response, random-effects model.

The pooled RR for nine studies reporting total fibre and CVD was 0.91 (95% Confidence Interval (CI) 0.88 to 0.94) for each 7 g/day increase in fibre (Fig. 1) and 0.90 (95%CI 0.87 to 0.94) for the eleven studies reporting CHD events (Fig. 2). There was moderate evidence of heterogeneity between studies for the CVD [I^2 = 51% (95%CI 0 to 77%)] and CHD estimates [I^2 = 38% (95%CI 0 to 70%)]. Insoluble fibre appeared to be protectively associated with CHD risk but heterogeneity between studies was reasonably high, making the estimate somewhat unreliable. Water-soluble fibre did not appear protectively associated with CHD risk when five studies were pooled, RR per 4g/day increase was 0.88 (95%CI 0.75 to 1.04) [I^2 = 57% (95%CI 0 to 84)]. Fibre from cereal and vegetable sources were both protectively associated with CHD risk when estimates from eight publications were pooled but greater intake of fibre from fruit was not associated with CHD risk reduction.

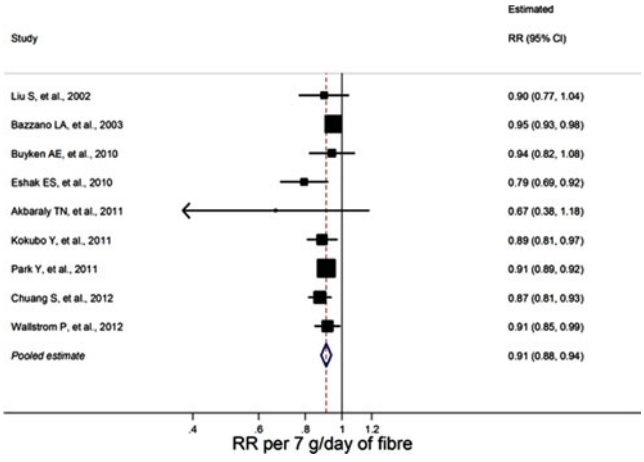

Fig. 1. total CVD risk per 7 g/d increase in fibre.

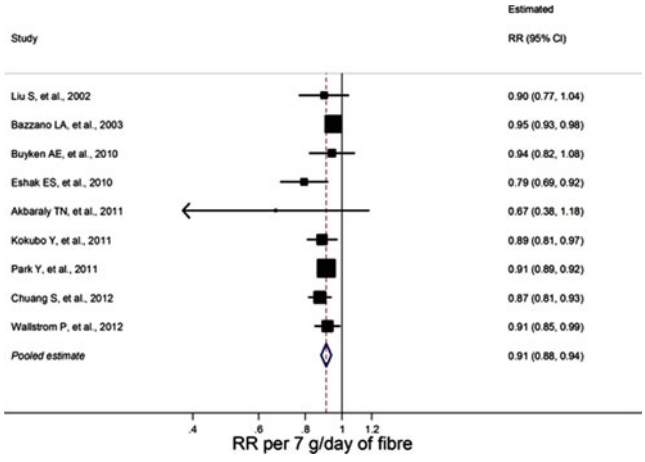

Fig. 2. CHD risk per 7 g/d increase in fibre.

With 9% and 10% reduction in CVD and CHD risk for each 7 g/day increment in fibre consumed (equivalent to one standard deviation in UK intake), findings support national recommendations to increase dietary fibre intake. Better understanding of the different mechanisms through which soluble and insoluble types of fibre influence CVD risk factors is needed through clinical trials.

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