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[Intervention Review]

Dietary interventions for adults with chronic kidney disease

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ABSTRACT

Background

Dietary changes are routinely recommended in people with chronic kidney disease (CKD) on the basis of randomised evidence in the general population and non-randomised studies in CKD that suggest certain healthy eating patterns may prevent cardiovascular events and lower mortality. People who have kidney disease have prioritised dietary modifications as an important treatment uncertainty.

Objectives

This review evaluated the benefits and harms of dietary interventions among adults with CKD including people with end-stage kidney disease (ESKD) treated with dialysis or kidney transplantation.

Search methods

We searched the Cochrane Kidney and Transplant Specialised Register (up to 31 January 2017) through contact with the Information Specialist using search terms relevant to this review. Studies contained in the Specialised Register are identified through search strategies specifically designed for CENTRAL, MEDLINE, and EMBASE; handsearching conference proceedings; and searching the International Clinical Trials Register (ICTRP) Search Portal and ClinicalTrials.gov.

Selection criteria

Randomised controlled trials (RCTs) or quasi-randomised RCTs of dietary interventions versus other dietary interventions, lifestyle advice, or standard care assessing mortality, cardiovascular events, health-related quality of life, and biochemical, anthropomorphic, and nutritional outcomes among people with CKD.

Data collection and analysis

Two authors independently screened studies for inclusion and extracted data. Results were summarised as risk ratios (RR) for dichotomous outcomes or mean differences (MD) or standardised MD (SMD) for continuous outcomes, with 95% confidence intervals (CI) or in descriptive format when meta-analysis was not possible. Confidence in the evidence was assessed using GRADE.

Main results

We included 17 studies involving 1639 people with CKD. Three studies enrolled 341 people treated with dialysis, four studies enrolled 168 kidney transplant recipients, and 10 studies enrolled 1130 people with CKD stages 1 to 5. Eleven studies (900 people) evaluated dietary counselling with or without lifestyle advice and six evaluated dietary patterns (739 people), including one study (191 people) of a carbohydrate-restricted low-iron, polyphenol enriched diet, two studies (181 people) of increased fruit and vegetable intake, two studies (355 people) of a Mediterranean diet and one study (12 people) of a high protein/low carbohydrate diet. Risks of bias in the included studies were generally high or unclear, lowering confidence in the results. Participants were followed up for a median of 12 months (range 1 to 46.8 months).

Studies were not designed to examine all-cause mortality or cardiovascular events. In very-low quality evidence, dietary interventions had uncertain effects on all-cause mortality or ESKD. In absolute terms, dietary interventions may prevent one person in every 3000 treated for one year avoiding ESKD, although the certainty in this effect was very low. Across all 17 studies, outcome data for cardiovascular events were sparse. Dietary interventions in low quality evidence were associated with a higher health-related quality of life (2 studies, 119 people: MD in SF-36 score 11.46, 95% CI 7.73 to 15.18; $I^2 = 0\%$). Adverse events were generally not reported.

Dietary interventions lowered systolic blood pressure (3 studies, 167 people: MD -9.26 mm Hg, 95% CI -13.48 to -5.04; $I^2 = 80\%$) and diastolic blood pressure (2 studies, 95 people: MD -8.95, 95% CI -10.69 to -7.21; $I^2 = 0\%$) compared to a control diet. Dietary interventions were associated with a higher estimated glomerular filtration rate (eGFR) (5 studies, 219 people: SMD 1.08; 95% CI 0.26 to 1.97; $I^2 = 88\%$) and serum albumin levels (6 studies, 541 people: MD 0.16 g/dL, 95% CI 0.07 to 0.24; $I^2 = 26\%$). A Mediterranean diet lowered serum LDL cholesterol levels (1 study, 40 people: MD -1.00 mmol/L, 95% CI -1.56 to -0.44).

Authors' conclusions

Dietary interventions have uncertain effects on mortality, cardiovascular events and ESKD among people with CKD as these outcomes were rarely measured or reported. Dietary interventions may increase health-related quality of life, eGFR, and serum albumin, and lower blood pressure and serum cholesterol levels.

Based on stakeholder prioritisation of dietary research in the setting of CKD and preliminary evidence of beneficial effects on risks factors for clinical outcomes, large-scale pragmatic RCTs to test the effects of dietary interventions on patient outcomes are required.

PLAIN LANGUAGE SUMMARY

Dietary patterns for adults with chronic kidney disease

What is the issue?

People who have kidney disease can experience a lower life expectancy, complications including heart disease, and may need treatment for severe kidney failure, such as dialysis. Patients and doctors wish to identify treatments that protect people against kidney failure or heart disease. For both doctors and people who have kidney disease, lifestyle changes such as diet are very important as possible ways to improve health and well-being, and provide people with a chance to 'self-manage' their care for kidney disease.

What did we do?

We combined all studies looking at dietary changes for people who kidney disease including people treated with dialysis or who have a kidney transplant.

What did we find?

We found 17 studies involving 1639 people who had chronic kidney disease that looked into whether diet changes or advice improved their health. Studies included men and women with mainly moderate or severe kidney disease. Diets involved increasing fruit and vegetable intake, increasing poultry and fish, higher nut and olive oil use, and some increases in cereals and legumes (e.g. beans), and less red meat, sugar, and salt. We looked particularly at three key outcomes: the risk of death, the risk of advanced kidney disease requiring dialysis, and quality of life. There were four studies involving people who have had a kidney transplant and three studies involving people treated with dialysis.

After combining the available studies, it was uncertain whether making healthy diet changes prevented heart complications as most studies did not measure these. Diet changes may improve life quality. We did see that some risk factors for future disease, such as blood pressure and cholesterol, were lower following diet counselling or healthier eating.

The quality of the included studies was often very low meaning we could not be sure that future studies would find similar results.

Conclusions

We are very uncertain whether dietary changes improve well-being for people with kidney disease because the available research studies were not designed to learn about these. Diet changes may lower blood pressure and cholesterol, but the longer term impact of these effects on well-being is not proven. This means we still need large and good-quality research studies to help understand the impact of diet on the health of people with kidney disease.