Clinical effectiveness and quality of life of conventional haemodialysis versus short daily haemodialysis: a systematic review
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CRD summary
The review found that short daily haemodialysis might be associated with improvements in blood pressure control and medication requirements and improved quality of life over conventional haemodialysis in end stage renal disease patients. The cautious conclusions reflected the evidence, but shortcomings in review processes and included studies and variation in treatment dosages mean the conclusions should be treated with caution.

Authors' objectives
To compare the clinical effectiveness, quality of life and safety of short daily haemodialysis versus conventional haemodialysis in end-stage renal disease.

Searching
PubMed, EMBASE, DARE, NHS EED, The Cochrane Library, Web of Knowledge and un-named national databases were searched for relevant studies published in English, Spanish, French, Italian or Portuguese between January 1995 and January 2005; search terms were reported. Searches for ongoing clinical trials and research projects were performed on ClinicalTrials.gov, CenterWatch and Health Services Research Projects in Progress. Reference lists of relevant papers were searched.

Study selection
Eligible studies were systematic reviews, meta-analyses, clinical trials, cohort studies and case control studies with a minimum of 10 patients in each treatment arm for a minimum of one month in patients with end-stage renal disease. Studies were considered only if at least half of the patients were dialyzed on daily haemodialysis in dialysis centres, hospitals or self-care units. Patients (all or part) were to be treated since January 1995 with daily haemodialysis (five to seven times a week, 1.5 to 3 hours per session) or conventional haemodialysis (three times per week, three to five hours per session).

Eligible outcomes included blood pressure control, medication requirements, vascular accesses complications, hospitalisations, therapy efficiency, morbidity and quality of life. Studies were excluded if patients were treated with daily haemofiltration or they covered dialysers or dialysis membranes without including patients.

Mean age of participants in the included studies ranged from 35 to 60 years. Most participants had comorbidities such as diabetes, hypertension and heart disease. All participants had previously experienced haemodialysis.

Two reviewers independently selected trials for inclusion, but it was not reported how disagreements were resolved.

Assessment of study quality
Study quality was assessed using a specific scale developed for patients on haemodialysis. Criteria included study design, sample size, randomisation, blinding, follow-up, intention-to-treat analysis, comparable groups at baseline and concurrent controls. A single quality score (percentage) was awarded to each study.

Two reviewers independently assessed studies for quality. Discrepancies were resolved by consensus. Concordance in scores between reviewers was measured using the intraclass correlation coefficient.

Data extraction
Data were extracted as reported in the original studies and classified according to type of outcome variable: vascular access problems, cardiovascular outcomes (hypertension control and left ventricular hypertrophy), anaemia and erythropoietin dosage, nutritional status, therapy efficiency, morbidity and quality of life. Data were recorded in
evidence tables.

The authors did not state how data extraction was undertaken.

**Methods of synthesis**

Results from the individual studies were displayed in tables and the studies were synthesized in narrative format.

**Results of the review**

Seventeen studies (528 participants) were included in the review. No RCTs were identified. Most studies were of pre-post design. There were two prospective cohort studies, two crossover trials and one non-randomised study. The median quality score was less than 50%. The most important shortcomings of the studies were small sample size, short follow-up periods and restrictive inclusion/exclusion criteria.

Two of seven studies reported that patients who received short daily haemodialysis had lower incidence of vascular occlusions and higher vascular access survival compared to patients on conventional haemodialysis.

Seven of 11 studies found reductions in systolic or both systolic and diastolic blood pressure in patients on short daily haemodialysis compared with patients on conventional haemodialysis.

Seven of 13 studies found that when patients were transferred from conventional haemodialysis to short daily haemodialysis they could discontinue or reduce their doses of antihypertensive drugs or required a lower association of different antihypertensive drugs.

Five of seven studies reported a reduction in cardiac hypertrophy parameters when patients were changed from conventional haemodialysis to short daily haemodialysis.

Six of eight studies reported that erythropoietin doses could be reduced during the short daily haemodialysis period.

Seven studies reported that significant improvements were observed in most nutritional parameters studied when patients were transferred from conventional haemodialysis to short daily haemodialysis.

Five out of seven studies found that serum phosphate levels were reduced during short daily haemodialysis compared to conventional haemodialysis.

Almost all the studies observed that the overall assessment of quality of life improved when patients were on short daily haemodialysis therapy. There was no evidence of a difference in hospitalisation rates, length of stay or body weight between treatments.

**Authors' conclusions**

Short daily haemodialysis might result in better clinical effectiveness, particularly through better control of blood pressure, lower consumption of antihypertensive drugs and better quality of life than conventional haemodialysis.

**CRD commentary**

The review addressed a clear research question. Inclusion criteria were appropriate and detailed. A wide variety of electronic databases were searched and attempts made to find further studies by searching reference lists and unpublished studies by searching registers of ongoing trials. Language restrictions meant that language bias could not be ruled out. Appropriate methods were used for study selection and quality assessment. Methods for data extraction were not reported, so reviewer error and bias during this aspect of the review process could not be excluded. Study quality was assessed using appropriate criteria, although only a summary score was reported.

Studies were mostly small with short follow-up periods and low to moderate quality. The authors acknowledged that there were variations in the dialysis doses that were likely to reduce confidence in the overall results. Since studies were synthesized by reporting the proportion of studies that found significant differences between groups and results were based on the individual analyses in each trial, it was difficult to determine the extent of potential differences.
The authors’ cautious conclusions reflected the evidence base, but potential shortcomings in the review process, methodological flaws in the included studies and variation in treatment dosages mean that the conclusions should be treated with caution.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice. However, they acknowledged that other outcomes not assessed in the review, such as transportation costs and consumption of consumables, might impact on practical decision making on types of haemodialysis.

**Research:** The authors stated that better quality studies were needed to assess the effectiveness of short daily haemodialysis.

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