Renal replacement therapy provision in renal satellite units in England and Wales

An evaluation of the costs, effectiveness and quality of renal replacement therapy provision in renal satellite units in England and Wales

P Roderick,[1*] T Nicholson,[1] A Armitage,[2] R Mehta,[1] M Mullee,[1] K Gerard,[1] N Drey,[1] T Feest,[2] R Greenwood,[3] D Lamping[4] and J Townsend[5]

[1] Health Care Research Unit, University of Southampton, UK
[2] Richard Bright Renal Unit, Southmead Hospital, Westbury-on-Trym, Bristol, UK
[3] Department of Renal Medicine, Lister Hospital, Stevenage, UK
[4] Health Services Research Unit, Department of Public Health and Policy, London School of Hygiene and Tropical Medicine, London, UK
[5] Public and Environmental Health Research Unit (PEHRU), London School of Hygiene and Tropical Medicine, London, UK

* Corresponding author

Executive summary

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Executive summary

Background

The prevalence and annual acceptance rates for renal replacement therapy (RRT) have increased significantly over the past decades and continue to rise. Over 30,000 patients were being treated with RRT in England by 2000, at a cost of about £600 million. The patients now being treated are older with more co-morbidity. Given the continued shortage of kidneys for transplantation, the expansion of RRT in the last decade has largely been in dialysis. Peritoneal dialysis, although popular in the 1980s, has not grown in recent years; most expansion has been in hospital haemodialysis (HD), increasingly delivered in renal satellite units (RSUs). In general these are nurse-run renal units which provide only chronic HD. They are linked to main renal units (MRUs) at which nephrologists, inpatient services and interventional facilities are based. They are more geographically accessible for patients. Previous national surveys have shown them to be of variable size, location (e.g. some are on non-hospital sites) and organisational arrangements (e.g. some are private). However, there are few data on the effectiveness and costs of RSUs or of patients' experience. This report presents data first from an updated survey of the structure, processes and organisation of RSUs in England and Wales (Phase 1), and then a detailed comparison of the effectiveness, acceptability, accessibility and economic impact of chronic haemodialysis performed in RSUs compared with MRUs (Phase 2).

Methods

Phase 1

Questionnaire survey to all renal units in England and Wales in 1999. The content was similar to previous surveys, including the structure, processes and organisation of care in the RSUs. Semi-structured interviews were held in a representative sample of 24 RSUs with the senior clinician, senior nurse and manager.

Phase 2

Effectiveness, acceptability and accessibility

Cross-sectional comparison of patients from a representative sample (based on geography, site, private-public ownership, medical input) of 12 RSUs from throughout England and Wales and MRU HD patients deemed by senior staff to be suitable for satellite care, and where possible matched by groups on age and sex. Clinical information was obtained from medical notes and unit computer systems. This included processes of care such as vascular access, medication, biochemical and other indices of the impact of HD and healthcare contacts. Generic and disease-specific health-related quality of life (HRQoL) measures – Short Form with 36 items (SF-36), Kidney Disease Quality of Life (KDQOL^{TM}) and the EuroQol 5D Instrument (EQ-5D) and also a specially constructed patient satisfaction questionnaire were used.

Co-morbidity was assessed by the Wright/Khan Index, the Lister/Chandna Score, the Modified Charlson Index and the Karnofsky Performance Score. Adverse events on dialysis were recorded for 6 weeks in RSU patients only.

Statistical analyses compared RSU with MRU patients and took account of the paired and clustered nature of the data.

Accessibility was assessed for RSU and MRU patients using unit and patient postcodes and the Autoroute program to generate road time and distance to the RSU and MRU for RSU patients.

Costs

Identification of resources for costing was based on the key health and personal cost items expected to differ, or where it was unclear whether differences would be expected. Unit level resources were measured using information extracted from Trust personnel during site visits, telephone interviews or completion of specially constructed forms. Patient level resources were collected from a patient questionnaire and medical notes review. Unit cost data were from national cost and salary sources and manufacturer's list prices and costed in 2000 prices.

Results

Phase 1

Responses were received from 74/80 (93%) of RSUs; 2600 patients were being treated in these RSUs, of whom 42% were over 65 and 12% ▶

diabetic. Although most RSUs were on acute hospital sites, one-third were on other hospital sites and one in eight were not on a hospital site. Unit size varied substantially with a median of eight HD stations (range 3–31). One-quarter were privately owned; these were larger and more often on non-hospital sites. Most RSUs had no daily medical input but they accepted patients with temporary necklines once they were stabilised. One-quarter did accept some patients starting HD for the first time.

The interviews were generally positive about the impact of RSUs in terms of improved accessibility and a better environment for chronic HD patients, and in expanding RRT capacity. There was some concern about the level of medical cover, siting on non-acute hospital sites and the potential isolation of nurses in RSUs from the main renal unit.

Phase 2

Some 82% of those eligible units took part, 394 patients in the 12 RSUs and 342 in the parent MRUs. The response rate was similar in both groups, with participants being younger than non-participants in both. The mean age of the RSU group was 63 years; 18% of RSU patients were diabetic, 33% scored 'high risk' on the Wright/Khan Index and 34% were dependent or required assistance (assessed by Karnofsky Performance Score). The MRU group had similar co-morbidity scores and dependency but a lower mean age (57 years) and a higher proportion from ethnic minorities.

There were no significant differences in clinical processes of care (e.g. haemodialysis methods such as fluid used, medication). Most clinical outcomes were similar, especially after pooled analysis, although a few parameters were statistically significantly different – notably the proportion achieving Renal Association Standards for adequacy of dialysis as measured by the urea reduction ratio (URR) was higher in the RSU patients. The proportion of patients previously hospitalised was less in the RSU patients although the number of hospitalisations per patient, total length of stay and patient's mean length of stay were comparable between the groups.

Patient-specific quality of life (KDQOL^{TM}, SF-36, EQ-5D) did not differ except on the patient satisfaction questions from the KDQOL^{TM}, which were scored higher by the RSU sample. The specially constructed patient satisfaction instrument also showed higher satisfaction in RSUs on the themes of communication with staff and the environment and atmosphere of the unit. Strength of preference for health status on and off dialysis was very similar between the groups, as were EQ-5D utilities.

Major adverse events were not common in the RSU patients, although there were many hypotensive episodes on HD, a proportion of which affected the duration of the HD session. No comparative data were available from MRUs.

Patients travelling to RSUs saved a potential mean of 17 km or 19 minutes of travel three times a week, although this saving could be partially offset if there were multiple patients to collect using NHS transport.

Of the costs measured, the only difference that was statistically significant was for District Nurse visits. Of particular note was that despite the MRU group having a higher proportion of patients hospitalised, this did not translate into a statistically significant budgetary impact in terms of the total cost per patient of hospitalisations or mean cost per patient per hospitalisation. Limitations of the study, however, meant that costing was incomplete and the full cost consequences of RSU/MRU care remain uncertain. Patients in RSUs experienced statistically significant less amounts of time associated with dialysis; out-of-pocket expenses were marginal in both groups.

Conclusion

This study has shown that RSUs are an effective alternative to MRU HD for a wide spectrum of patients. They improve geographic access for more dispersed areas and reduce patients' travel time, and are generally more acceptable to patients on several criteria. There does not seem to be an adverse impact of care in the RSUs although comparative long-term prospective data are lacking.

The cost-effectiveness of RSUs compared with MRUs remains uncertain. Effectiveness may be better in RSUs and there is greater satisfaction and in many areas improved accessibility. Drawing conclusions about the relative cost advantage of RSUs, however, is difficult. No reliable data were obtained in many key economic components such as capital/overheads, medical staff, transport and non-scheduled visits to the MRU, nor was the most straightforward of expenditure information easy to access. The findings and experience have shed important light on how to design a ▶

long-term study of cost-effectiveness that could not have been appreciated without having first conducted this study.

From a clinical point of view, the evidence suggests that satellite development could be successfully expanded; not all MRUs have any satellites and many have only a few. Models of future demand for RRT predict a continued increase in the prevalence of RRT, rising to nearly 50,000 in England by 2010, with the growth being differentially higher in older patients and those on HD, particularly if kidney transplant supply does not increase. No single RSU model can be recommended but key factors would include local geography, the likely catchment population and the type of patients to be treated. In planning the development of RSUs, allowance needed to be made in opening a new RSU for future growth in staff and HD stations in order to treat more patients and the knock-on impact of RSU patients on medical workload in the MRU. It is important that there are appropriate policies in place in the RSUs to deal with emergencies and for transfer of patients, protocols for management on common clinical problems and good communication links with the MRU. Staff rotation would help overcome the professional and social isolation felt by some staff in RSUs.

Finally, although this study's findings of comparable outcomes in RSUs and MRUs are reassuring, the appropriateness of further expansion of dialysis provision by RSUs at the expense of the MRU base, which remains uniquely small compared with other countries, is an open question.

Publication

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The HTA Programme was set up in 1993. Its role is to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined to include all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care, rather than settings of care.

The HTA Programme commissions research only on topics where it has identified key gaps in the evidence needed by the NHS. Suggestions for topics are actively sought from people working in the NHS, the public, service-users groups and professional bodies such as Royal Colleges and NHS Trusts.

Research suggestions are carefully considered by panels of independent experts (including service users) whose advice results in a ranked list of recommended research priorities. The HTA Programme then commissions the research team best suited to undertake the work, in the manner most appropriate to find the relevant answers. Some projects may take only months, others need several years to answer the research questions adequately. They may involve synthesising existing evidence or conducting a trial to produce new evidence where none currently exists.

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The research reported in this monograph was commissioned by the HTA Programme as project number 95/31/05. The contractual start date was in October 1998. The draft report began editorial review in October 2002 and was accepted for publication in January 2004. As the funder, by devising a commissioning brief, the HTA Programme specified the research question and study design. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the referees for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

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