Chapter 3: A national survey of renal satellite units in England and Wales

Summary

In order to meet the increasing demand for haemodialysis in the UK and to improve access to these services, renal satellite units have developed. These are largely nurse run chronic haemodialysis centres linked to main renal units.

There were 82 satellite units in England & Wales on 31st March 1999 (73 in 1998), with 67% of main renal units possessing a satellite.

A renal satellite unit is defined as a haemodialysis facility which is linked to a main renal unit and not autonomous for medical decisions, and which provides chronic out patient maintenance haemodialysis, but without in-patient nephrology beds on-site.

Satellite units varied in their location and size with 43% not on an acute hospital site, a median of 8 HD stations, (range 3-31), and 19 units (26%) were commercially run. Only 9 units (12%) had regular daytime onsite medical supervision. Of the 2599 patients being treated in the renal satellite units, 42% were aged 65 or over, compared with 45% of haemodialysed aged 65 or over in the UK as a whole. 12% of patients dialysing in satellite units were diabetic and 28% of satellite units also accepted patients dialysing for their first time. Commercially run renal satellite units were more likely to be based on sites that were not within hospital grounds and were significantly larger than NHS renal satellite units (median number of HD stations 12 vs 8 $p<.001$). They were also less likely to accept patients who were hepatitis B positive.

There was a diverse range of models of service provision for renal satellite units in England and Wales. They are heterogeneous in size, location, funding and staffing and despite relatively low levels of medical input are treating elderly patients with considerable comorbidity. It is important that their effectiveness, quality of care, acceptability to patients and carers and costs are evaluated.

Introduction

During the 1960s and 1970s renal replacement therapy programmes in the UK were provided by a small number of renal units based in teaching hospitals covering large catchment populations. Until CAPD was introduced in the late 1970's treatment was restricted to younger patients without significant comorbidity, the majority of whom were trained to undergo Home Haemodialysis. Facilities for unit haemodialysis in the UK were very limited by contrast with the situation elsewhere in Europe.

In the 1980's renal services expanded in the UK. This expansion was partly due to investment prompted by a national target set in 1984[1] and also by the widespread use of CAPD, which allowed the treatment of an increased number of patients without the need for additional haemodialysis facilities. However, despite this, as the prevalence of patients requiring treatment for end-stage renal failure has continued to rise the majority of main renal units

have experienced progressive congestion of their haemodialysis facilities. This is contributed to by the increasing population of elderly patients with other co-morbid illnesses who are unable to manage CAPD, a decrease in the use of home haemodialysis programmes and the limited life-span of CAPD as a treatment.

In 1992 the Department of Health in England commissioned a survey of all renal units. The results of this survey showed that the acceptance rate of new patients starting renal replacement therapy in 1991/2 was 67 per million population (pmp), which was well below the minimum estimated need of 80 pmp for the population under the age of 80[2-4]. Moreover, there was considerable geographic variation between areas in both the supply of services and in acceptance rates. Whilst this was in part due to different population age and ethnic minority profiles, distance from renal units was inversely related to the acceptance rate, particularly in non-metropolitan areas, suggesting that access to services was a barrier to referral[5].

In the early 1980's a few satellite renal units had been established in different parts of the country and then in 1994 National Renal Purchasing Guidelines, which were distributed to health authorities as a guide to commissioning effective renal care, recommended that the development of renal satellite units be expanded to improve geographical accessibility.[6] These units would be attached to main renal units (MRU) and provide a chronic maintenance haemodialysis service, run by nurses, and mainly for the benefit of patients living at some distance from the main unit.

These Guidelines hastened the development of renal satellite units and the decentralisation of renal services. Over the past decade the annual acceptance rates for renal replacement therapy in England has increased from 67 pmp in 1991/1992[6] to 82pmp in 1995[7] and 92 pmp in 1998[8.] As shown in figure 3.1 the greatest growth has been in satellite haemodialysis.

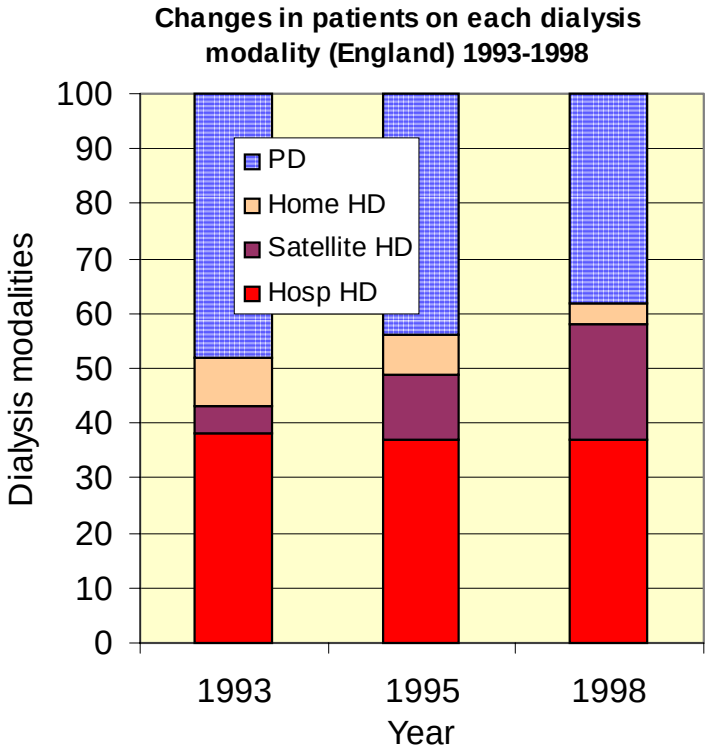

Figure 3.1: Changes in Dialysis Modality in England 1993-1998

Table 3.1 shows that whilst the number of haemodialysis stations within main units increased by 37% over this period, there was a 300% increase in the number of haemodialysis stations within renal satellite units[8,9] .

	1993	1995	1998	% increase
Main Renal Units	52	51	52	0%
Main unit HD stations	743	832	1021	37%
Satellite Units	36	60	73	103%
Satellite unit HD stations	189	472	761	303%

- source- National Renal Surveys

Table 3.1: Changes in Renal Units in England 1993-1998

This is a survey of renal satellite units in England and Wales, focusing on their service delivery and organisational structure.

Methods

The directors of all renal units in England and Wales with a satellite unit attached, were contacted to confirm the number and name of each satellite units linked with their main unit.

A renal satellite unit is defined as a haemodialysis facility which is linked to a main renal unit and not autonomous for medical decisions, and which provides chronic out patient maintenance haemodialysis, but without in-patient nephrology beds on-site.

A questionnaire was sent seeking information on the structure, organisation and processes of care. Information was requested on policies for accepting patients categorised as high-risk, with temporary vascular access and for first dialysis. Details were sought about the arrangements for elective and emergency medical input. Demographic data were collected on the proportions of patients who were over 65 years of age and of those with diabetes. The questionnaire was piloted in two renal satellite units. Questionnaires were sent out at the beginning of 1999 requesting data relating to the 31st of March of that year.

Data were entered directly into SPSS using "automated forms scanning". Standard summary statistics were used to describe the baseline data. Comparisons between different categories of renal satellite units were made by using either the Pearson's Chi-squared test, the Mann-Whitney-U test or the two-sample t-test where appropriate.

Results

Of the 57 main renal units identified, 38 (67%) had a total of 82 renal satellite units. Questionnaires were returned from 74 (90%) of these units. Two main renal units didn't respond (with six renal satellite units).

Figure 3.2 demonstrates that while 5 main renal units had 4 or more satellite units; 19 (33%) did not have a satellite unit. In several cases a single satellite unit served more than one main renal unit.

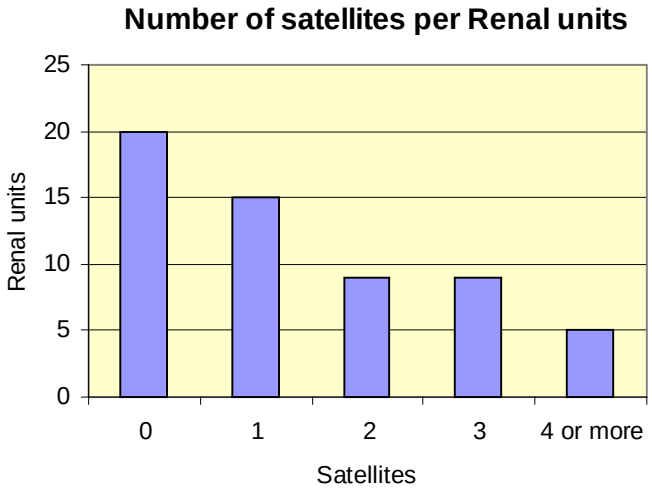

Figure 3.2: Numbers of Renal Satellite Units linked to Main Renal Units

Of the 2599 patients treated in the satellite units that responded to the survey, 1518 (58%) were male, 1101 (42%) were over 65 years (unit median 50%, IQR 35-58%, range 0-88%), and 311 (12%) were diabetic (unit median 14%, IQR 10-18%, range 0-42%).

Location	**Numbers**
Acute hospital	42/74 (57%)
Other hospital	23/74 (31%)
Non hospital	9/74 (12%)
Unit management	NHS 55 (74%), Private 19 (26%)
Median number of HD stations (range)	8 (3-31)
Median number of patients (range)	34 (8-120)
Support services	
CAPD support	6/69 (9%)
Home HD support	6/69 (9%)
APD support	4/69 (6%)
Integral out-patient clinic	18/66 (27%)
Permanent medical cover	9/74 (12%)
Consultant	*5/9 (56%)*
Associate specialist	*1/9 (11%)*
Staff grade	*3/9 (33%)*
SPR	*3/9 (33%)*
Non-permanent medical cover	*65/74 (88%)*
Methods of receiving medical care	
Phone call to MRU	*57/65 (88%)*
GP Visits	*4/65 (6%)*
Ambulance 999 call	*25/65 (38%)*
Onsite emergency cover from local hospital	*29/65 (45%)* *(81% for those on acute hospital site)*
Call out of MRU staff	7/65 (11%)
Other	16/65 (25%)
Patient : Nurse Ratio	5.6
Patient : All Staff Ratio**	4.0

*denominator varies due to missing data ** includes healthcare assistants

Table 3.2: Organisational characteristics of renal satellite units in England and Wales

Satellite units were sited mainly in acute hospitals (57%), with 31% on other hospital sites and 12% on non-hospital sites. Ownership was predominantly by the National Health Service (NHS), although a significant proportion 19 (26%) were commercially run, mainly by two companies. The size of the satellite units varied considerably, with a median of 8 haemodialysis stations (range 3-31) and 34 patients (range 8-120) per unit. Six satellite units (9%) also provided support for patients on other forms of renal replacement therapy. However, 27% did offer an integral out-patient clinic, thereby avoiding the need for the satellite patients to travel to the main renal unit for regular follow-up.

Only 9 (12%) satellite units had permanent daytime medical cover (defined as a doctor regularly on site during the daytime most days of the week). This was mainly at consultant level (5/9), with other grades of doctor providing cover in the other hospitals. In the 65 (88%) satellite units which did not have on-site daytime medical cover, medical care was sought by a variety of means, principally by telephone advice from the main renal unit. A few satellite units (6%) also relied on cover from a local primary care physician. For more serious situations, 45% reported that they relied on support from the local acute hospital (rising to 81% for those units on an acute hospital site), 38% relied on emergency ambulance calls, and 11% would call out a doctor from the main renal unit.

The average number of patients to whole time equivalent (WTE) staff ratio was 5.6 for nursing staff and 4.0 when healthcare assistants (HCAs) were included.

Policy	Number of units (Percentage)
Accept for first dialysis	18/65* (28%)
Temporary neckline	63/74 (86%)
Hep B +ve patent	36/74 (49%)
Hep C +ve patent	54/74 (73%)
HIV +ve patent	45/74 (61%)

* missing data

Table 3.3: Treatment Acceptance Policies of Renal Satellite Units

Eighteen (28%) renal satellite units accepted patients for their first dialysis without stabilising them first in the main renal unit, and 63 (85%) accepted patients with a temporary neckline: Seventy three of the 74 renal satellite unit would accept patients with a permanent tunnelled neckline. Only 36 (49%) renal satellite units would accept patients who were Hepatitis B positive, 54 (73%) accepted Hepatitis C positive patients, and 45 (61%) accepted HIV positive patients.

Forty one (55%) renal satellite units dialysed some patients for less than 3 times per week (median 3% of patients per renal satellite unit). The most common factors influencing this decision were residual renal function in 28 units and patient choice in 20 units. Only 4 (10%) renal satellite units reported lack of staff or haemodialysis station time as a reason for dialysing patients less than thrice weekly. Only 4 (5%) renal satellite units reported re-use of dialysers.

The majority of patients travelled for dialysis by hospital car (median 70% of patients per unit), 20% drove themselves and 5% relied upon ambulance transport

Table 3.4 compares NHS and commercially run renal satellite units. NHS renal satellite units were more likely to be on an acute (60% vs 47%) or other hospital (36% vs 16%) site. There was also a significant difference in unit size; commercialy run renal satellite units had a greater number of haemodialysis stations and patients, but did not differ in the patient: staff ratio or in the proportions of patients over 65 or diabetic.

Renal satellite unit characteristics	**NHS (55)**	**Private (19)**	**P value**
Location			
Acute hospital	33 (60%)	9 (47%)	.001
Other hospital	20 (36%)	3 (16%)	.001
Non hospital	2 (4%)	7 (37%)	.001
Median number of HD stations (range)	8 (3-16%)	12 (6-31)	<.001
Median number of patients (range)	28 (8-96)	44 (22-120)	.014
Patient:Staffing Ratios			
Patient : Nurse	5.5	5.8	NS
Patient : All Staff	3.7	5.5	NS
Unit treatment acceptance policies			
Accept for first dialysis	10/47 (21%)	8/18 (44%)	NS
Temporary neckline	50/55 (91%)	13/18 (72%)	0.045
Hep B +ve patent	34/55 (62%)	4/19 (21%)	0.002
Hep C +ve patent	17/55 (31%)	3/19 (16%)	NS
HIV +ve patent	25/55 (45%)	4/19 (21%)	NS

Table 3.4: Comparison of NHS and Private Renal Satellite Units

Treatment acceptance policies did not generally differ significantly, except that private renal satellite units were less likely to accept patients with temporary necklines or hepatitis B infection.

The location of a renal satellite unit, (acute hospital site, non-hospital site or non-acute hospital site) appeared to have little impact on the organisation or processes of care. There was a non significant trend for renal satellite units on acute hospital sites to have slightly more nurses but fewer overall staff per patient than those on a non-acute site (Patient: Nurse Ratio Acute 5.4, non-Acute 5.9; Patient: All Staff Ratio Acute 4.1 non-Acute 3.8). Integral outpatient clinics were more common in renal satellite units based on acute hospital sites than in other locations.

The satellite units with permanent medical staffing, they were more likely to accept patients for their first dialysis (62% vs 23% in non-medically staffed units, p=.019), and to provide an integrated out-patient clinic (86% vs 20% in non-medically staffed units, p=<.001).

Discussion

During the 1990s there was a significant increase in both the number of renal satellite units in England and Wales and the number of patients dialysing within them[7,8]. This development allowed expansion of patient numbers on haemodialysis and a reduction in patient travelling times to and from dialysis sessions. Renal satellite units have been opened in smaller towns in both rural areas and on the periphery of large conurbations, as well as in urban areas. This survey shows that renal satellite units are heterogeneous in size, location, finance, and the services they provide.

A key feature is that most are nurse run with no onsite medical cover. Despite this many are not based on acute hospital sites, some being sited on business parks or shopping centres that are some distance from the acute hospital services. Whilst there is some selection used when referring patients for satellite care, the proportions of patients on haemodialysis aged over 65 (42%) and with comorbidity such as diabetes (12%) are similar to those found by the UK Renal Registry for all HD patients at participating renal units in 1999 (45% over 65 years old and 14% diabetic respectively[9]). Moreover some of the satellite units also provide a haemodialysis service for patients who have not been previously stabilised on haemodialysis in the main renal unit. Senior nursing staff in these satellite renal units therefore carry a significant clinical and managerial responsibility.

The link between the private sector and provision of renal services is well established and the choice to utilise a private company to provide a renal satellite unit is becoming increasingly common. The 1996 Renal Review[7] found that 19% of renal satellite units in England and Wales had private sector involvement, rising to 26% by 1999. This study has shown many similarities in the services provided by private and NHS units. This is not surprising, as whilst the ownership of the units differs, the medical management remains the responsibility of an NHS consultant nephrologist. However there are differences, with private renal satellite units being significantly larger and also less likely to accept Hepatitis B+ve patients who would require an isolation cubicle with a dedicated machine[10].

In response to the increasing demand for renal replacement therapy, the growth in satellite haemodialysis care is a trend that is likely to continue. Key factors contributing to this increase are the current unmet need for renal replacement therapy, which is compounded by demographic change in ethnic minority groups with higher rates of renal failure such as Indo-Asians and African Caribbeans[11]. Modelling shows that a steady state of the prevalent pool will not be reached for several decades [12]. Given the shortage of kidneys for transplantation, there will be an increasing need for haemodialysis. Satellite care seems a suitable option to providing an accessible haemodialysis service for an increasing elderly population on renal replacement therapy.

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The increase in demand for renal replacement therapy and resultant expansion in haemodialysis services is occurring in all other developed countries[13,14]. However most of these countries have a higher proportion and absolute number of patients on hospital haemodialysis than in the UK. They also have more renal centres and doctors per million population. Renal satellite care is described in the international literature although there is no universal definition for a renal satellite unit. In some countries, minimal care facilities (whereby the patients carry out their own dialysis in a centre with no medical supervision and often without a trained nurse on site), are included in the number of patients on satellite

dialysis. This makes comparison across countries problematic. Nevertheless data from national registries suggests there has been a major growth in renal satellite units in other countries[14,15].

Several questions are raised by the findings of this survey. :-

1. The optimal size for a renal satellite unit is unclear. Currently there is a large variation in size which in part reflects the geographical distribution of the catchment population of the main renal unit.
2. As a significant proportion of patients dialysing in these units are elderly and or diabetic, with co-existing co-morbidity, the safety of renal satellite units sited far from an acute medical facility needs to be investigated as most renal satellite units do not have permanent medical cover.
3. It is also important to evaluate patients' views of dialysis away from the main unit, and the impact of care in a renal satellite unit on the patients' quality of life.
4. As renal satellite units are becoming a significant part of the provision of renal replacement therapy in the UK, their cost effectiveness and how this varies by type of renal satellite unit needs to be evaluated.
5. As demand for renal replacement therapy continues to grow, more satellite renal units are likely to open, which might enable main renal units to concentrate on the treatment of the more complex and unstable haemodialysis patients. However it is possible that some renal satellite units, particularly those on an acute hospital site with a large local catchment population, will evolve into medically staffed autonomous renal units. These would then provide not only a chronic haemodialysis service for all haemodialysis patients in their catchment area, but also a full nephrology service. This would be closer to the model of services in other developed countries.

Further Work

This study has shown a diverse range of models of service provision for the renal satellite units in England and Wales. There is an ongoing second phase of this study, funded by the Health Technology Assessment Programme at the Department of Health, with the aims of :-

1. Comparing the effectiveness, safety and acceptability of care for renal satellite units patients with a similar group of dialysis patients dialysing in the main renal unit.

2. Identifying and contrasting the resource use of both sets of patients and the resulting cost differences between the satellite and parent main units.

3. Determining the improvement in geographical accessibility from dialysing in an renal satellite unit.

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