SHORT REPORT

Socioeconomic deprivation, travel distance, and renal replacement therapy in the Trent Region, United Kingdom 2000: an ecological study

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The incidence of chronic renal failure rises with age and is higher in men and in people of Asian and Afro-Caribbean origin. A study using data from 1991–3 found that renal replacement therapy rates were related to age, ethnicity, socioeconomic deprivation, and travel distance to renal units.[1] In the Trent Region, UK, which served a population of 5.1 million, a review of renal services was undertaken in 2000. We examined utilisation rates in relation to socioeconomic deprivation and travel distance to renal units as part of the needs assessment and planning process.

METHODS AND RESULTS

Patients in Trent Region who were receiving renal replacement therapy (haemodialysis, peritoneal dialysis, renal transplantation) in August/September 2000—that is, point prevalent cases—were categorised by enumeration district (ED), age band (15–24 to 80–84 years), and gender. (Data on acceptance of new patients were incomplete.) Data were obtained from renal units, including units outside Trent Region, which served patients resident in the Region. Corresponding 1991 census denominators, corrected for under-enumeration and scaled to 1998 Office for National Statistics mid-year estimates for the 11 health authorities in Trent, were obtained from an existing population dataset. The 1991 census based ED level Townsend score was categorised by quintile (with equal population in each category) and used as an indicator of socioeconomic deprivation.[2] Travel distances were calculated from ED population centroids to the nearest renal unit, including satellite units, using 1:200 000 resolution road network data and categorised by five mile bands. The percentage of population of black and Asian origin at the ED level was obtained from the 1991 census and categorised (<1%, 1–5%, >5%). Data were analysed using Poisson regression with adjustment for overdispersion.

Trent Region is largely served by six main and eight satellite renal units. There were 998 patients on haemodialysis, 550 on peritoneal dialysis, and 1075 with renal transplants in the Region in 2000, giving a crude point prevalence of 645 per million population aged 15–84 years. After adjustment for age, sex, ethnicity, and travel distance, renal replacement therapy prevalence increased progressively with increasing deprivation. Prevalence in the most deprived category was 1.28 (95% confidence intervals (CI) 1.12 to 1.46) times that in the least deprived category. The progressive rise was most pronounced for haemodialysis, with a relative prevalence of 1.49 (95%CI 1.21 to 1.83) in the most deprived areas. Peritoneal dialysis also increased but the trend was inconsistent. There was much less of an increase in transplantation rates, with a relative prevalence of 1.10 (95%CI 0.90 to 1.35) in the most deprived areas (table 1).

The prevalence of renal replacement therapy after adjustment for age, socioeconomic deprivation, ethnicity, and gender tended to decrease slightly with increasing distance from a renal unit. This was most clearly seen for haemodialysis, with a less consistent pattern for transplantation, and no evidence of a decrease for peritoneal dialysis.

Exclusion of data for one health authority with potentially incomplete data made little difference to the overall patterns observed.

COMMENT

We have observed a clear increase in the prevalence of renal replacement therapy with increasing socioeconomic deprivation, which is likely to reflect the underlying prevalence of

Table 1 Relative prevalence of renal replacement therapy modalities (95% confidence intervals) by socioeconomic deprivation and road travel distance to the nearest renal unit, Trent Region, UK 2000

	Haemodialysis	Peritoneal dialysis	Transplantation	All renal replacement therapy
Socioeconomic deprivation category by quintile				
1 (least deprived)	1.00	1.00	1.00	1.00
2	0.98 (0.79 to 1.22)	1.42 (1.08 to 1.87)	1.07 (0.88 to 1.29)	1.10 (0.97 to 1.26)
3	1.17 (0.94 to 1.44)	1.21 (0.90 to 1.61)	1.15 (0.95 to 1.40)	1.17 (1.02 to 1.33)
4	1.32 (1.07 to 1.62)	1.50 (1.14 to 1.97)	1.14 (0.95 to 1.39)	1.27 (1.12 to 1.45)
5 (most deprived)	1.49 (1.21 to 1.83)	1.28 (0.95 to 1.71)	1.10 (0.90 to 1.35)	1.28 (1.12 to 1.46)
Distance to nearest renal unit (miles)				
<5	1.00	1.00	1.00	1.00
5–<10	0.99 (0.84 to 1.17)	1.03 (0.82 to 1.31)	0.88 (0.74 to 1.03)	0.95 (0.85 to 1.06)
10–<15	0.92 (0.74 to 1.15)	1.22 (0.92 to 1.61)	0.83 (0.67 to 1.02)	0.93 (0.82 to 1.07)
15–<20	0.66 (0.51 to 0.85)	1.06 (0.78 to 1.43)	0.94 (0.76 to 1.17)	0.86 (0.74 to 0.99)
⩾20	0.78 (0.62 to 0.99)	1.07 (0.79 to 1.43)	0.86 (0.69 to 1.06)	0.87 (0.75 to 1.00)

Socioeconomic deprivation category was based on the ED level Townsend score. Prevalence of renal replacement therapy modalities is relative to the corresponding reference (baseline) category. Poisson regression models included age, gender, percentage black and Asian population, deprivation category, and road travel distance.

chronic renal failure. However, we found that while the prevalence of haemodialysis and peritoneal dialysis was higher in more socioeconomically deprived areas, there was less of an increase for renal transplantation. This may be because acceptance on to transplant lists is influenced by comorbidity (for example, heart disease), which tends to be more common in patients from deprived areas. The higher incidence of end stage renal disease in deprived areas is likely to be driven by underlying causes that are socioeconomically distributed (for example, diabetes, renovascular disease, hypertensive renal disease) and patients with these conditions are more likely to have contraindications to receiving a transplant. Survival after transplantation may be lower in deprived areas. However, for this to be a plausible explanation, it would have to be assumed that survival by socioeconomic status was differentially poorer in transplant than in dialysis patients, which seems unlikely. There tends to be a higher proportion of minority ethnic groups living in deprived areas and allocation of kidneys to people from ethnic minority groups in the UK is low because of the lack of matching donor kidneys. Although we adjusted for ethnicity, the possibility of residual confounding by ethnicity cannot be ruled out. It is possible that live donation is more common in higher socioeconomic groups but as we did not have information on type of donation, we were unable to examine the contribution of live donation to the prevalence of transplantation. Another potential explanation is that people living in affluent areas are more likely to receive renal transplants, the preferred option for most people with end stage renal failure. Studies in the USA, where the healthcare system is quite different from those in Europe, have found that socioeconomically deprived people are less likely to receive renal transplantation,[3 4] which may be attributable to barriers at various stages in the transplantation process.[5]

With regard to travel distance, we found that the prevalence of haemodialysis clearly decreased with increasing distance from a renal unit while there was no evidence of a decrease for peritoneal dialysis. This presumably reflects clinical practice as geographical access would be taken into consideration when deciding on the type of dialysis.

Further studies are needed to examine the reasons behind socioeconomic differences in access to renal transplantation.

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Contributors

NP and DM helped to plan the renal review process and obtained the data. RM and PRF analysed the data. RPB provided background clinical information and interpretation of data. RM wrote the paper with contributions from all co-authors. RM, NP and DM are guarantors for the study.

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