

## **Chapter 19: The influence of socio-economic deprivation on survival of prevalent dialysis patients.**

### ***Summary***

These data show that, using the Townsend index, no significant influence of socio-economic deprivation on survival of the cohort of prevalent dialysis patients on the Registry in 1998 could be demonstrated. This was true for the unadjusted analysis and the analysis adjusted for age, gender, diabetes, and length of time on renal replacement therapy. Some potential confounders of this analysis are discussed.

### ***Aim***

To analyse the relationship between socio-economic deprivation (as measured by the Townsend Score) and one-year survival of prevalent patients on dialysis.

### ***Background***

There are socio-economic differences in both incidence and mortality in a range of chronic conditions. Survival from common cancers has also been shown to be poorer in patients from more deprived areas<sup>1</sup>. Possible reasons include delayed referral/presentation, host factors (e.g. comorbidity, compliance, diet) and quality of care.

There is some evidence of socio-economic differences in the incidence of CRF. Mortality from CRF is higher in lower social classes<sup>2</sup>. Modelling of geographic variation in acceptance from the 1991-2 Renal Review for England showed acceptance rates onto renal replacement therapy programmes were higher in deprived areas, after adjustment for access and ethnicity<sup>3</sup>. A population based cross sectional study in the South West of England showed higher levels of chronic renal failure, as judged by serum creatinine, in deprived areas<sup>4</sup>. In contrast, a prospective study of patients starting renal replacement therapy in Scotland during 1998 did not show a difference in the acceptance rate with social deprivation, although the numbers were small and this may have been a type 2 error<sup>5</sup>. However there are no data on the outcome of renal replacement therapy and socio-economic status in the UK.

### ***Methods***

#### ***Inclusion***

Patients on dialysis at the start of the 1/1/1998 who had been receiving renal replacement therapy for over one year were included.

#### ***Exclusion criteria***

If the duration of renal replacement therapy could not be determined  
Patients who had a transplant between the 1/7/1997 and the 31/12/1997

Transplant patients who transferred in during this period, with an unknown date of transplant.

Patients receiving treatment at Centre G as there were a large number of patients with no Townsend Score at this Centre (27%).

The sample was 3,300 patients. In the analysis adjusting for diabetes, patients at Centre H were also excluded, since most patients who died at this centre had no diagnosis data. This reduced the sample to 3,107 patients.

### ***Deprivation measure***

The patient's Townsend index was derived from the postcode. This is a composite measure of deprivation based on total unemployment rate, no car households, overcrowded households and not owner occupier households based on the electoral ward as at the 1991 Census (6). A comparison of the current methods of scoring deprivation in the UK is listed at the end of this chapter.

Note that the Registry only stores the patient's most recent postcode on the database, so that the postcode may occasionally differ from the patient's postcode at the start of the analysis. This will only affect a small number of patients, some of whom will in any case have probably moved to similar social areas.

There was a Townsend score for 96% (3,209) of the 3,330 patients. The score was categorised into quintiles defined from this sample of  $\leq -3.01$ ,  $-3.00$  to  $-1.29$ ,  $-1.28$  to  $0.64$ ,  $0.65$  to  $3.07$  and  $\geq 3.08$ . Lower Townsend Scores (negative scores) correspond to relatively more affluent areas, and higher Townsend Scores (positive scores) indicate greater need, corresponding to relatively more deprived areas.

### ***Censoring***

Patients were censored if they transferred out to a non Renal Registry site or if they were transplanted in 1998. Patients were classified as having diabetes from their primary renal diagnosis: this excluded those diabetic patients with another cause of end stage renal failure. Patient's age on 1/1/1998 was used.

A Cox Proportional Hazard Model was used to analyse the relationship between Townsend Score and risk of death over the one-year follow up period and was stratified by treatment centre. The analysis was repeated adjusting for age, gender, diabetes and length of time on renal replacement therapy. The logarithm of the length of time on renal replacement therapy was used in the analysis as this normalised the skewed distribution.

## ***Results***

### ***1. Unadjusted Analysis: n = 3,209.***

There was no significant association between deprivation score and risk of death ( $p = 0.4002$ ). There was also no significant linear trend between deprivation score and risk of death ( $p = 0.7620$ ).

Deprivation Score	Hazard Ratio [95% CI]
≤ -3.01	REF
-3.00 to -1.29	1.18 [0.89 – 1.58]
-1.28 to 0.64	1.30 [0.98 – 1.72]
0.65 to 3.07	1.16 [0.87 – 1.54]
≥ 3.08	1.06 [0.79 – 1.43]
P-value	0.4002

**Table 19.1 Unadjusted analysis**

**2. Unadjusted Analysis (centre H also excluded): n = 2,999.**

The analysis was repeated also excluding centre H. This was performed as it is necessary to exclude Centre H from any analysis adjusting for diabetes. Repeating the analysis excluding Centre H will ensure that any differences in results between the unadjusted and adjusted analyses are not due to differences in the centres included.

Deprivation Score	Hazard Ratio [95% CI]
≤ -3.01	REF
-3.00 to -1.29	1.18 [0.88 – 1.59]
-1.28 to 0.64	1.34 [1.00 – 1.79]
0.65 to 3.07	1.13 [0.84 – 1.53]
≥ 3.08	1.07 [0.79 – 1.45]
P-value	0.3566

**Table 19.2 Unadjusted analysis excluding H**

There was no significant association between deprivation score and risk of death ( $p = 0.3566$ ). There was also no significant linear trend between deprivation score and risk of death ( $p = 0.7841$ ).

**3. Adjusted Analysis (for sample excluding Centres G & H): n = 2,874.**

Deprivation Score	Hazard Ratio [95% CI]
≤ -3.01	REF
-3.00 to -1.29	1.16 [0.85 – 1.57]
-1.28 to 0.64	1.40 [1.04 – 1.88]
0.65 to 3.07	1.18 [0.86 – 1.60]
≥ 3.08	1.21 [0.88 – 1.66]
P-value	0.2814

**Table 19.3 Adjusted deprivation analysis**

In the adjusted analysis there was no significant association between deprivation score and risk of death ( $p = 0.2814$ ). There was also no significant linear trend between deprivation score and risk of death ( $p = 0.2464$ ).

## **Discussion**

These data did not demonstrate any significant socio-economic influence on survival of prevalent dialysis patients on the Registry in 1998. The hypothesis that patients from lower social groups had poorer survival because of factors such as comorbidity, other host factors such as diet, and quality of care, was not supported. It seems unlikely that quality of care will vary for different socio-economic groups when once they are receiving regular dialysis.

There are several potential confounders in this analysis:-

The analysis of a prevalent cohort assumes that a large number of patients in one subgroup had not died early on in the renal replacement therapy programme leaving a biased subset of survivors in different deprivation groups.

The analysis assumes equity of access to a renal replacement programme for all social groups. Although the analysis of the 1992 Review data shows a higher incidence of patients in deprived areas starting renal replacement therapy (after adjusting for ethnicity), this was not adjusted for co-morbidity. Furthermore there is no data on the incidence, as opposed to the treatment rate, of end stage renal failure in different socio-economic groups in the UK. If patients from lower socio-economic groups with higher co-morbidity scores were less likely to gain access to a renal replacement therapy programme (or had died prior to starting renal replacement therapy) the analysis would be invalid.

The assignment of socio-economic status by area of residence can lead to misclassification and a reduced chance of findings relationships (i.e. not all people living in deprived areas are deprived and vice versa).

All postcodes in the Renal Registry database are verified and corrected using the patient's address and a postcode software package. The package is updated quarterly for new postcodes issued by the post office. Allocation of a Townsend Index was via the Manchester University database (MIMAS), which is not updated with the recent postcode changes. The 4% of postcodes without a Townsend Index allocated are all related to the recent boundary changes and this may have caused a slight bias.

When sufficient time has elapsed to allow for adequate follow-up, this analysis will be repeated with the much larger 1999 cohort of 6260 prevalent dialysis patients, and with the combined 1998 and 1999 incident cohort of 2990 patients.

## **Conclusion**

With the number of patients available for this analysis it was not possible to demonstrate any effect on socio-economic deprivation on the survival of prevalent dialysis patients in the UK. Further analyses will be carried out when larger numbers of patients are available and will also be repeated using the Carstairs Index

## Comparison of UK Deprivation Scores

Indicator	DoE (1983)	Townsend	Jarman	Carstairs	LWT	DoE, ILC (1994)
Census data						
Total unemployment rate	*	*	*		*	All levels
Male unemployment rate				*		
Overcrowded households	*	*	*	*		All levels
Households lacking amenities	*					All levels
Not owner occupier households		*			*	
No car households		*		*	*	All levels
Low social class (4&5 or SEG 11)			*	*	*	
Lone parent households	*		*		*	
Lone pensioner households	*		*			
Under 5s			*			
Children in unsuitable accom.						All levels
Children in low earning h/h						All levels
Moving with previous year			*			
Limiting long term illness					*	
Born New Commonwealth	*		*			
17 yr olds not in full time ed.						ward/district
Non-census data						
Standard mortality ratio						district
Long term unemployment						district
Income support recipients						district
House contents insurance						district
Low GCSE attainment						district
Derelict land						district

**Table 19.4** Comparative UK deprivation scores

## References

1. Coleman MP, Babb PO, Damiacki P et al. Cancer survival trends in England and Wales. 1971-1995. Deprivation and NHS Region. London: The Stationary Office, 1999.
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