

Renal replacement therapy: can we separate the effects of social deprivation and ethnicity?

Fergus J. Caskey^{1,2}

¹Richard Bright Renal Unit, Southmead Hospital, Westbury on Trym, Bristol, UK and ²Clinical Sciences at North Bristol, University of Bristol, Bristol, UK

Britain's current ethnic mix is largely a consequence of legislation introduced following the Second World War to allow people from the British Empire and Commonwealth unhindered access to enter Britain to help revive the economy. British minority ethnic populations tend to live in more socially deprived areas, making differentiation between the effects of social deprivation and ethnicity difficult to distinguish. Free-at-the-point-of-use health care should minimize finance-related difficulty accessing treatment, and issues of geographical access to treatment will certainly differ from those of larger, more sparsely populated countries. To examine this, the UK Renal Registry has adopted an approach of studying social deprivation separately in the white-only population before studying the effect of ethnicity and social deprivation in the general population. Using this approach, rates of renal replacement therapy have been shown to be higher in individuals from socially deprived areas and, to varying extents, in those from ethnic minority groups. Attainment of standards on RRT, however, tended not to differ. Survival on RRT is lower for individuals from socially deprived areas but higher for South Asian and black patients. Inequalities have been identified in access to transplantation, with reduced access to the transplant waiting list for socially deprived patients and reduced access to transplantation, once on the waiting list, for ethnic minority patients. The reasons for these inequalities, including any contribution from underlying inequities, are the subject of ongoing research.

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Correspondence: Fergus J. Caskey, Richard Bright Renal Unit, Southmead Hospital, Southmead Road, Westbury on Trym, Bristol, Avon BS10 5NB, UK. E-mail: fjaskey@doctors.org.uk

INTRODUCTION

The UK was populated by migration from what is now mainland Europe during the Stone Age, and despite many invasions over the years its population has remained a mix of predominantly white Europeans. Although references to African musicians living in Scotland and England appear in the early sixteenth century,¹ the number of Africans living in Britain increased greatly from the 1560s when international trade in slaves began.¹ In a census carried out just before the abolition of the slave trade in 1807, 14,000 Africans were living in the UK at that time.¹

Britain's current ethnic mix is, however, more a result of events in the nineteenth and twentieth centuries. Following the Second World War, legislation was introduced to allow people from the Empire and Commonwealth unhindered access to enter Britain to help with the economy, a policy that remained in place until 1972.¹ It is the descendants of these workers and their families from the Indian subcontinent and Africa/the Caribbean that represent 4% and 2% of the UK general population, respectively.² Reflecting the reasons for their migration, these migrant populations have always tended to be younger than their indigenous counterparts,³ though the percentage of the Caribbean population now over 65 is approaching that of the general population.² The implications of these aging ethnic minority populations for the public health of the nation are increasingly being recognized.

Ethnicity and social deprivation are closely linked, with, for example, higher rates of unemployment in all non-white groups, especially females.⁴ The effect of social deprivation can also differ according to which ethnic group is being considered; in other words, there is a statistical interaction. For this reason the UK Renal Registry (UKRR) tends to study social deprivation separately, in whites first, before studying the effect of ethnicity in all groups, adjusting for social deprivation. This is the approach adopted in all analyses reported below.

METHODS

The UKRR collects individual patient-level data for all patients receiving renal replacement therapy in the UK. This is done directly, with automatic electronic data capture, for patients in England, Wales, and Northern Ireland and via the Scottish Renal Registry for patients in Scotland. The UKRR has been granted approval to collect

data without prior patient consent by the National Information Governance Board. Individual-level socio-economic data are not routinely collected, so social deprivation is captured at an area level using the patient's postcode of residence, which can be used to calculate a Townsend score.⁵ Data on ethnicity are extracted from renal IT systems or, where data are missing, using UK Transplant registration data, using name recognition software (SANGRA),⁶ or by assuming a patient is white if they live in an area in which more than 95% of the inhabitants are white.

RESULTS

ESRD treatment rates

The incidence of treated end-stage renal disease, that is RRT, increases with increasing social deprivation in all regions of the UK,⁷ and rates of treated ESRD tend to be higher for most primary renal diseases for those in ethnic minority groups.⁸ Before accounting for case mix, patients from the most deprived areas are approximately 50% more likely to receive RRT than those from the most affluent quintile, an effect that is only slightly attenuated by adjusting for age and gender.⁹ Once the ethnic mix of areas has been taken into account, this increased risk is no longer observed.⁹

Survival on RRT

In an analysis of 10,392 white patients commencing RRT in England and Wales between 1997–2004, the UKRR demonstrated poorer survival in those from socially deprived areas, but only in the 65+ group.¹⁰ Further, the poorer survival appeared to be explained by baseline differences in comorbidity.¹⁰ When all patients commencing RRT in England and Wales between 1997–2006 were considered ($n = 30,561$), South Asians and blacks had a 30% and 45% lower adjusted mortality on dialysis than whites, respectively.¹¹

Attainment of standards on RRT

The UKRR has also looked at indicators of quality of care, as evidenced by attainment of UK Renal Association national clinical standards for hemoglobin, urea reduction ratio, phosphate, calcium, and parathyroid hormone. In a sample of 14,117 patients commencing RRT in England and Wales between 1997–2004 and alive on dialysis at 1 year, no consistently higher or lower rates of attainment of standards were observed across the social deprivation gradient.¹² Nor was a consistent pattern seen according to ethnicity; though some differences in attainment of standards were noted, most of these could be explained by previously described biological differences between ethnic groups.¹²

Access to kidney transplantation

Overall, even after adjusting for age, cause of renal disease, duration of dialysis, and center effect, white individuals living in the most socially deprived areas were 44% less likely to receive a kidney transplant than those living in the most affluent areas (hazard ratio 0.56, 95% confidence interval 0.47–0.65).¹³ On examining the steps in the pathway towards getting a transplant, whites from socially deprived areas were less likely to reach the transplant waiting list (0.59,

0.53–0.66),¹⁴ but once on the list were no less likely to receive a transplant.¹³ South Asians and blacks, on the other hand, were equally likely to reach the transplant waiting list,¹⁴ but significantly less likely to receive a transplant once on the list (0.74, 0.65–0.85 and 0.66, 0.49–0.87, respectively).¹³ White individuals from socially deprived areas and South Asians and blacks were all less likely to receive a pre-emptive renal transplant than their affluent (odds ratio 0.35, 95% CI 0.27–0.47) and white (0.43, 0.30–0.61 and 0.35, 0.15–0.80) counterparts, respectively.¹³ Living kidney donor transplantation was less likely for those living in most deprived areas (0.40, 0.33–0.49) and those classified as South Asian or black (0.66, 0.45–0.96 and 0.40, 0.21–0.73, respectively).¹³ These results are summarized in Table 1.

DISCUSSION

Inequalities in health exist where there are differences in the health status or distribution of health determinants between populations; where an inequality in health is observed, this may or may not be due to an inequity—a difference that is avoidable, unnecessary, and deemed to be unfair or stemming from some form of injustice.^{15,16} Broadly these health inequities can be considered to occur at three levels: health status, access to health care, and delivery of health care, with a much larger number of underpinning theoretical explanations, such as genetic, cultural-behavioral, psycho-social, and life course.¹⁷ When approaching an observed health inequality, it is always helpful to adopt a structured approach to understanding it.

Health inequality studies must also be considered in the context of the health-care system to which they relate, in this case the UK National Health Service (NHS). Founded back in 1948 on three core principles—to meet the needs of everyone, to be free at the point of delivery, and to be based on need, not ability to pay—the NHS should be perfectly designed to minimize inequities in health. The NHS is far from perfect, however. When the number of general practitioners increased markedly in the early 2000s, it was the areas with lowest need that appeared to benefit most.¹⁸ Further, and despite an overall increase in life expectancy, the biggest gains in life expectancy are in the wealthy, so that the 'gap' in life expectancy between rich and poor is actually widening.¹⁹

Evidence of health inequalities in the UK already exists for other, non-renal medical conditions. Considering social deprivation, diabetes, obesity, cardiovascular mortality, and all-cause mortality are all higher in individuals from socially deprived backgrounds. However, things are more complex when ethnicity is considered. South Asians have higher rates of diabetes and cardiovascular disease, and blacks have higher rates of cerebrovascular disease and prostate cancer. South Asians and blacks appear to have (appropriately) higher rates of primary care use (i.e. care in the community), but lower rates of secondary care use (i.e. hospital-based, specialist care), and lower rates of breast cancer screening and use of coronary revascularization.²⁰

Table 1 | A summary of the evidence relating to access to kidney transplantation in the UK

Access to:	Increasing social deprivation	Ethnicity		
		South Asians	Blacks	Whites
Transplant (any type)	↓	↓	↓	Ref
Deceased-donor waiting list	↓	↔	↔	Ref
Deceased-donor transplant, once listed	↔	↓	↓	Ref
Pre-emptive transplant	↓	↓	↓	Ref

Arrows indicate equivalent (↔), or reduced (↓) access compared with the reference category.

Considering the survival differences reported, lower mortality in blacks, especially cardiovascular mortality, has also been reported in registries in North America,^{21,22} with some evidence that selection bias (in terms of reduced access to dialysis for higher-risk blacks) may be an underlying explanation.²³ However, blacks in the United States have been shown to adapt better to life on dialysis, reporting better quality of life,²⁴ and this may be an alternative explanation for their apparently better survival. Lower mortality on dialysis has also been observed for South Asians in Canada,²¹ though the reasons for this have been less well studied.

There are various steps in the pathway to receiving a kidney transplant. To receive a kidney from the national allocation program, a patient first needs to be assessed as medically fit and placed on the waiting list; once on the list the national allocation scheme should be what determines when they receive a kidney. A patient may alternatively receive a kidney from a living donor, perhaps before ever receiving dialysis, and never appear on the national waiting list. To explore the association between social deprivation and ethnicity and access to kidney transplantation in the UK, a series of analyses were undertaken to look at each of these options.

The analyses reported above were undertaken on data from the period prior to a major overhaul in organ allocation in the UK. This revision in the organ allocation system reduced the emphasis on HLA matching and increased the emphasis on waiting time. The recognized reduced chance of a non-white individual receiving a kidney transplant once on the national waiting list was a key driver behind this revision,²⁵ with early evidence suggesting reductions in waiting times for individuals from minority groups.²⁶

Social deprivation and ethnicity are closely but not always consistently linked. Processes need to be in place at a national level to identify and monitor inequalities in the general population, both at the chronic kidney disease level and at the RRT level. Ongoing research—a UKRR doctoral fellowship on rates of RRT and home dialysis and the NIHR-funded Access to Transplant and Transplant Outcomes (ATTOM) Study—is looking at how (potentially modifiable) renal unit-level practices and organizational factors are associated with these identified inequalities with a view to informing service redesign.

DISCLOSURE

The author declared no competing interests.

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