Social deprivation, ethnicity and access to kidney transplantation in England and Wales

Udaya Udayaraj
Introduction (1)

NUMBER OF DECEASED DONORS AND TRANSPLANTS IN THE UK, 1999 - 2008
AND PATIENTS ON THE ACTIVE AND SUSPENDED TRANSPLANT LISTS AT 31 DECEMBER
Pathway to kidney transplantation

- Established renal failure
- Dialysis therapy
- Deceased donor renal transplant waiting list
  - Deceased donor transplant
  - Live donor transplant
  - Pre-emptive transplant
  - ECD kidney
  - Standard criteria kidney
Background

• **North America**
  – Socially deprived and ethnic minority have reduced access to kidney transplant

• **In the UK**
  – Socially deprived in Scotland
    • Decreased access to waiting list, but equal access to transplant once waitlisted (Oniscu et al BMJ 2003)
  – Ethnic minority in UK
    • Wait longer once waitlisted (Rudge et al Transplantation 2007)
Aims

Role of social deprivation, ethnicity and access to

• Deceased kidney donor transplant

• Living kidney donor transplant
Access to deceased donor transplant

Where is the disparity?
Access to transplant waiting list
Probability of transplantation once waitlisted
Methods

• Study population
  – Patients aged < 70 years starting RRT 1997 – 2004
  – excluded patients with malignancy

• Area level deprivation score
  – Townsend score (census based)
  – Patient postcode linked to census area
  – Quintile 1 (least deprived), Quintile 5 (most deprived)

• Ethnicity
  – Blacks, South Asians, Whites
Methods

• Social deprivation and Ethnicity – a complex association
  – Social deprivation (in White patients only)
  – Ethnicity (all patients)
• Multivariable Cox regression analysis
• Follow up period
  – RRT start → 31st Dec 2007 for access to waiting list
  – Waiting list → 31st March 2006 (New allocation scheme) for access to transplant once waitlisted
  – Suspension periods on waiting list excluded
## Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>South Asian</th>
<th>Black</th>
<th>All patients</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients(%)</td>
<td>9602 (84.9)</td>
<td>1178 (10.5)</td>
<td>519 (4.6)</td>
<td>11299</td>
<td></td>
</tr>
<tr>
<td>Median age</td>
<td>56.1</td>
<td>55.0</td>
<td>48.1</td>
<td>55.8</td>
<td>0.0001</td>
</tr>
<tr>
<td>Males (%)</td>
<td>61.3</td>
<td>58.3</td>
<td>52.2</td>
<td>60.6</td>
<td>0.001</td>
</tr>
<tr>
<td>Cause of renal failure (%)</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>21.3</td>
<td>36.6</td>
<td>28.4</td>
<td>24.3</td>
<td></td>
</tr>
</tbody>
</table>
Ethnic minority live in deprived areas

[Bar chart showing the distribution of patients by ethnicity and deprivation quintile.]

- **Ethnicity**: White, South Asian, Black
- **Deprivation Quintiles**: Quintile 1 (least deprived), Quintile 2, Quintile 3, Quintile 4, Quintile 5 (most deprived)

The chart illustrates that the Black population is disproportionately represented in the most deprived quintile, while the White population is more evenly distributed across quintiles.
Socially deprived had reduced access to waiting list

<table>
<thead>
<tr>
<th>Quintile</th>
<th>Hazard Ratio</th>
<th>Unadjusted</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (least deprived)</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.89</td>
<td>0.92</td>
<td>0.92</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.83</td>
<td>0.82</td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.73</td>
<td>0.70</td>
<td>0.69</td>
<td></td>
</tr>
<tr>
<td>5 (most deprived)</td>
<td>0.64</td>
<td>0.59</td>
<td>0.59</td>
<td></td>
</tr>
</tbody>
</table>

* includes age, sex, diabetes, year of RRT start

p value: <0.0001
Ethnic minority had equal access to waiting list

<table>
<thead>
<tr>
<th></th>
<th>Step 1 unadjusted</th>
<th>Step 2 + patient factors*</th>
<th>Step 3 + social deprivation</th>
<th>Step 4 + Dialysis centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>South Asian</td>
<td>0.91</td>
<td>1.00</td>
<td>1.10</td>
<td>1.10</td>
</tr>
<tr>
<td>Black</td>
<td>0.89</td>
<td>0.80</td>
<td>0.92</td>
<td>0.95</td>
</tr>
</tbody>
</table>

*p value*  

* includes age, sex, diabetes, year of RRT start
Socially deprived had equal chance of transplant once waitlisted

<table>
<thead>
<tr>
<th>Quintile</th>
<th>Step 1 unadjusted</th>
<th>Step 2 + patient factors*</th>
<th>Step 3 + blood group, matchability score, PRA</th>
<th>Step 4 + centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quintile 1 (least deprived)</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>0.99</td>
<td>0.98</td>
<td>1.00</td>
<td>0.99</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>1.06</td>
<td>1.03</td>
<td>1.00</td>
<td>1.01</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>0.95</td>
<td>0.9</td>
<td>0.91</td>
<td>0.91</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.99</td>
<td>0.92</td>
<td>0.94</td>
<td>0.92</td>
</tr>
</tbody>
</table>

* includes age, sex, diabetes, year of RRT start

P value: NS, NS, NS, NS
Ethnic minority had reduced chance of transplant once waitlisted

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Step 1 unadjusted</th>
<th>Step 2 + patient factors*</th>
<th>Step 3 + blood group matchability score, PRA</th>
<th>Step 4 + social deprivation</th>
<th>Step 5 + centre</th>
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<tbody>
<tr>
<td>White</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>South Asian</td>
<td>0.56</td>
<td>0.55</td>
<td>0.67</td>
<td>0.68</td>
<td>0.74</td>
</tr>
<tr>
<td>Black</td>
<td>0.53</td>
<td>0.53</td>
<td>0.72</td>
<td>0.73</td>
<td>0.66</td>
</tr>
<tr>
<td>p value</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

* includes age, sex, diabetes, year of RRT start
Conclusions

• Patients from socially deprived areas
  – Have reduced access to transplant waiting list
  – But equal chance of transplantation once waitlisted

• Ethnic minority patients
  – Have equal access to transplant waiting list
  – But reduced chance of transplantation once waitlisted
Socially deprived had reduced access to waiting list

• **Patient related barriers**
  – Co-morbidity?
    • Analyses including only those who survived > 3 years
  – Awareness and attitudes?

• **Health care related barriers**
  – Presented late to renal unit
    • Referral time (time between first seen and RRT start)
    • 586 days (quintile 1)
    • 399 days (quintile 5) (p< 0.0001)
  – Organisation of care?
    • Location of transplant assessment and cardiology, physician-patient communication
Ethnic minority wait longer for a transplant

- Rare blood group and HLA type
- New Organ Allocation scheme (April 2006)
  - More points for those waiting longer
  - Blood group O kidneys \(\rightarrow\) B recipients
  - Rare HLA types defaulted to common HLA types
- Efforts to increase deceased donation rates amongst ethnic minority
Access to living donor transplantation

• **Study population**
  – Patients aged < 70 years starting RRT 1997 – 2004
  – excluded patients with malignancy

• **Multivariable Logistic regression**
  – Receipt of living donor transplant at 3 years from start of RRT
  – Separate analysis for ethnicity and SES
Socially deprived had reduced access to living donor transplant

<table>
<thead>
<tr>
<th></th>
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</thead>
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<tr>
<td></td>
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<td>dialysis centre</td>
</tr>
<tr>
<td>Quintile 1 (least deprived)</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>0.75</td>
<td>0.75</td>
<td>0.79</td>
</tr>
<tr>
<td>Quintile 3 (least deprived)</td>
<td>0.75</td>
<td>0.67</td>
<td>0.72</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>0.46</td>
<td>0.38</td>
<td>0.41</td>
</tr>
<tr>
<td>Quintile 5 (most deprived)</td>
<td>0.43</td>
<td>0.35</td>
<td>0.40</td>
</tr>
<tr>
<td>p value</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

* i.e deprived, age, sex, diabetes, year of RRT start
Ethnic minority had reduced access to living donor transplant

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<thead>
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<th>Step 4</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hazard ratio</strong></td>
<td>1.00, 0.59, 0.57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>p value</strong></td>
<td>&lt;0.0001, &lt;0.0001, 0.006, 0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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* includes age, sex, diabetes, year of RRT start
Socially deprived and ethnic minority have lower rates of living donor transplant

- Patient related barriers
  - ? Co-morbidity
    - sensitivity analyses do not suggest this
  - Lack of suitable living donors
  - Concerns regarding donor health
  - Patients not willing to receive/ actively seek LRD
  - Religious beliefs/ trust/language barriers
Social deprivation and access to kidney transplant

Established renal failure

Dialysis therapy

Deceased donor renal transplant waiting list

- (Reduced)
- (Equal)
- (Increased)

Deceased donor transplant

Live donor transplant

- (Reduced)

ECD kidney

Standard criteria kidney

Pre-emptive transplant
Ethnicity and access to kidney transplant

Established renal failure

Dialysis therapy

Deceased donor renal transplant waiting list

(Reduced)

Pre-emptive transplant

(Equal)

Deceased donor transplant

(Reduced)

Live donor transplant

(Equal)

ECD kidney

Standard criteria kidney
Conclusions

• Socially deprived and ethnic minority have reduced access to kidney transplantation in E&W

• Disparities occur at several steps in the pathway towards receiving a kidney transplant

• These could be due to patient and/or health care related barriers

• Systematic approach to these barriers may reduce such disparities
LUCKILY WE'VE GOT PLENTY OF FAT TO LIVE OFF
Acknowledgements

- Fergus Caskey
- Yoav Ben-Shlomo
- Paul Roderick
- Chris Dudley
- Charlie Tomson
- David Ansell
- Rachel Johnson
- Dave Collett
- UKRR statisticians
SES and Ethnicity – a complex relationship

- **Confounder**

  ![Diagram showing SES affecting transplant and ethnicity]

- **Interaction**

  ![Diagram showing SES affecting mortality with a cross symbol indicating interaction]

  (White)  (non white)

  Eg: Low income associated with poor survival on dialysis only amongst Blacks in USA