Leicester Kidney Exercise Team

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ETHNIC DIFFERENCES IN ACTIVITY STATUS, FUNCTIONAL CAPACITY AND CARDIOVASCULAR RISK FACTORS IN RENAL TRANSPLANT PATIENTS

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Introduction

A renal transplant improves health and quality of life for patients with end-stage renal failure, but cardiovascular (CV) disease remains the largest cause of mortality. Regular exercise can help reduce CV risk, but few UK centres formally offer exercise prescription. South Asians (SAs) are known to have additional CV disease burden, and evidence suggests reduced activity levels in ethnic minorities.

Aims

This study aimed to explore ethnic differences in physical activity (PA), functional capacity, body composition and systemic inflammation in RTRs using a survey and objective methods.

Methods

271 RTRs (mean age 52 years, 54% male, 70% White British (WB), 14% SA) completed a survey including 3 validated questionnaires:

- GP Physical Activity Questionnaire (**GPPAQ**) to categorise PA status
- Duke Activity Status Index (**DASI**) to measure functional capacity
- Stage of Change Questionnaire (**SOCQ**) to describe readiness to change exercise behaviour.

Next, 35 RTRs (mean age 52 years (range 29-70), 66% male, 65.8% WB, 34.2% SA) underwent further objective investigation, outlined in Table1.

Table 1: Objective measures (n=35)

Physical activity	Triaxial accelerometry (Senswear)measured over 7 days
Physical Function	Endurance Shuttle Walk Test (**ESWT**) : *Assesses endurance exercise capacity* and Incremental Shuttle Walk Test (**ISWT**) : *Assesses exercise capacity*
Cardiovascular function	Non-Invasive Cardiac Output Monitoring (NICOM): *Measures Cardiac Output **(CO)**, Stroke Volume **(SV)** and Total Peripheral Resistance **(TPR)***
Body composition	Dual-Energy X-ray Absorptiometry (DXA): *Measures % **body fat** and **fat free mass***
Systemic inflammation	Enzyme-Linked Immunosorbent Assay (ELISA): ***Plasma IL-6***

Results

Table 2 summarises self-reported physical activity status between 271 white and SA RTRs.

Table 2. Questionnaire Survey (n = 271)

	White (n=25)	SA (n=10)	P value
GPPAQ	36% active	29% active	0.37
DASI (METS)	40.8 ± 1.25	31.6 ± 2.88	**0.03**
SOCQ	40% readiness to change PA behaviour	53% readiness to change PA behaviour	0.32

Thirty-five RTRs underwent more detailed objective testing. Table 3 summarises the demographics of this group.

Table 3: Demographics (n=35)

	White (n=25)	SA (n=10)	P value
Age (years)	49.4	57.2	0.088
Males (%)	60	80	

Table 4 demonstrates SA had a significantly lower endurance shuttle walk time and higher body fat (kg) and sedentary time.

Table 4: Objective methods (n=35)

Parameter	White (n=25)	SA (n=10)	P value
Sedentary time (min)	4236 ± 126.14	4831 ± 158.53	**0.011**
ESWT (min)	13.9 ± 1.31	5.7 ± 1.75	**0.002**
ISWT (m)	556.8 ± 34.9	433.0 ± 40.9	0.051
Cardiac output	7.5 ± 0.29	7.2 ± 0.65	0.611
Body fat (kg)	30.9 ± 1.93	38.6 ± 1.36	**0.021**
Fat free mass (kg)	53.3 ± 2.3	48.7 ± 4.1	0.309
IL-6 (pg/ml)	1.74 ± 0.42	2.6 ± 0.8	0.315

In both ethnic groups, DASI functional capacity scores were significantly correlated with percentage body fat (r=-0.44, p=0.008) and plasma IL-6 (r=-0.37, p=0.029)(Figures 1 and 2). In addition, fat-free mass positively correlated with cardiac output (r=0.75) and stroke volume (r=0.78, both p<0.001) in both ethnic groups.

Figure 1. Correlation between DASI and %body fat

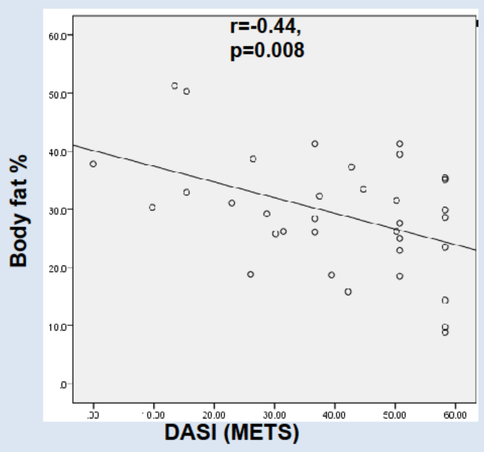
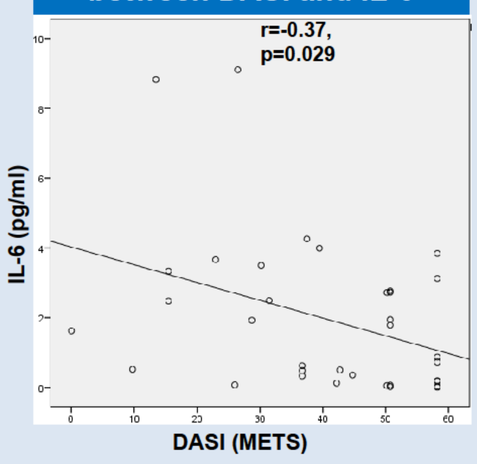


Figure 2. Correlation between DASI and IL-6



Conclusion

South Asian RTRs have significantly lower physical function compared to White British RTRs. This was associated with higher adiposity and systemic inflammation in SAs. Although self-reported PA did not differ in the two groups, objective accelerometry revealed that SAs are more sedentary. Appropriate strategies should be employed to engage South Asian RTRs in exercise to improve physical function and reduce cardiovascular risk in this particularly vulnerable population. These results may indicate that a lower body fat and greater muscle mass may be associated with improved cardiovascular risk in renal transplant recipients.

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