Disparities in Kidney Transplant Outcomes: A Review

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Summary: Sociocultural and socioeconomic disparities in graft survival, graft function, and patient survival in adult kidney transplant recipients are reviewed. Studies consistently document worse outcomes for black patients, patients with low income, and patients with less education, whereas better outcomes are reported in Hispanic and Asian kidney transplant recipients. However, the distinct roles of racial/ethnic versus socioeconomic factors remain unclear. Attention to potential pathways contributing to disparities has been limited to immunologic and nonimmunologic factors, for which the mechanisms have yet to be fully illuminated. Interventions to reduce disparities have focused on modifying immunosuppressant regimens. Modifying access to care and health care funding policies for immunosuppressive medication coverage also are discussed. The implementation of culturally sensitive approaches to the care of transplant candidates and recipients is promising. Future research is needed to examine the mechanisms contributing to disparities in graft survival and ultimately to intervene effectively.

Keywords: *Kidney transplantation, socioeconomic status, race/ethnicity, disparities, graft survival, patient survival, outcomes*

Kidney graft loss in the first 10 years after transplantation is a significant problem despite scientific advances in treating acute and chronic rejection. Although short-term acute rejection has reached encouraging levels with 1-year survival rates surpassing 91%, long-term graft survival remains much lower.[1] Kidney transplantation is the treatment of choice for transplant-eligible patients with end-stage renal disease (ESRD) because it improves life expectancy, reduces morbidity, offers better quality of life,[2,3] and is more cost effective than dialysis.[4]

The presence of sociocultural and socioeconomic (SES) disparities in transplant outcomes compounds the problem of inadequate long-term graft survival and constitutes a public health problem.[5] Health disparities can be defined as "potentially avoidable differences in health (or in health risks that policy can influence) between groups of people who are more or less advantaged socially; these differences systematically place socially disadvantaged groups at further disadvantage on health."[6] The elimination of health disparities is a national health care priority.[7,8] Disparities in transplant outcomes can threaten public trust in transplantation, and thereby can reduce the public's willingness to donate organs, which leads to a reduced number of available organs for transplantation.[9] The organ shortage exacerbates disparities in access to transplantation and outcomes.[10] Therefore, understanding and mitigating dispari-

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ties and their contributing factors is essential to improve transplant outcomes.

This article reviews the literature on disparities and factors contributing to sociocultural and socioeconomic disparities in kidney transplant outcomes. We focus on graft survival and patient survival as the key outcome measures in kidney transplantation. We assess available interventions designed to reduce disparities, and propose future research and policy mechanisms aimed to reduce disparities. We conclude by providing clinical practice recommendations.

Our review included empiric studies and review articles written in English examining socioeconomic disparities in adult kidney transplant outcomes published between 1993 and 2008. We searched PubMed and Highwire (http://highwire.stanford.edu/) bibliographic databases and used Google Scholar, using the following search terms: kidney transplantation, renal transplantation, ESRD, graft survival, patient survival, graft function, outcomes, disparity(ies), health disparity, socioeconomic, inequity, inequality, racial, ethnic, sex, age, education, income, insurance, finance, cost, international, cross-cultural, geographic. We searched the reference lists of included articles for additional sources. We focused our review on studies conducted in the United States because of unique historical, cultural, economic, and policy contexts occurring in the United States.

DISPARITIES IN TRANSPLANT OUTCOMES

The kidney transplant literature documents extensive sociocultural (racial/ethnic, sex, age, educational); socioeconomic (income, insurance); and geographic disparities in transplant outcomes (see Table 1). Most research concentrates on disparities by ethnic/racial groups, and focuses heavily on comparing non-Hispanic whites with blacks rather than comparing them with Hispanics and Asians or others. A pervasive assumption in the kidney transplant literature on disparities is the putative biological basis of race, which has no genetic basis.[11] Despite this limitation, our review uses the terms *black* and *white*, recognizing that race is largely a social construct, and that each group overlaps with diverse ethnic backgrounds.

Repeatedly, studies have shown worse graft function and shorter graft survival in black kidney transplant recipients[12-15] (Table 2). For example, the half-lives of the transplanted kidney for deceased donor kidneys in black and white recipients are 8 years and 14 years, respectively.[16,17] Blacks also are found to have higher rates of chronic allograft nephropathy compared with whites and other ethnic/racial groups. For instance, the mean time to chronic allograft nephropathy was shorter in black recipients than in white patients (18 versus 37 mo), although the incidence of chronic allograft nephropathy was comparable.[18]

Older studies reveal higher rates of graft survival among Hispanics and Asians than among whites, albeit with some inconsistency.[19-21] Although one older study concluded that blacks and Hispanics were independent predictors of graft failure compared with whites,[22] other studies have reported equivalent renal graft survival and mortality rates between Hispanics and whites,[19,23,24] and more recent studies have shown better patient and graft survival among Hispanics[16,25,26] and Asians than whites.[19] Nonblack patients experience better patient survival than blacks[3,5,27,28] (Table 2).

Table 1. Risk Factors for Worse Graft Function by Type of Disparities

Sociocultural	Socioeconomic	Geographic
African American	Lower income	Living in poor areas
Male	Less insurance coverage	Living farther from transplant center
Older age	Medicare or Medicaid	
Unmarried	Low SES	
Less education		
Unemployed		