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Medication Regimen Complexity in Kidney and Liver Transplant Recipients

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Dear Editor

Organ transplantation is the optimal and most cost-effective treatment for patients with end-stage renal and liver disease. To maintain long-term graft function, patients must take lifelong immunosuppression (IS) in addition to multi-drug regimens to manage comorbid conditions. Previous studies show that the prevalence of non-adherence in solid organ transplant recipients is about 23 cases per 100 patients per year across organ types [1]. IS non-adherence is associated with post-transplant complications including graft rejection, graft loss, and increased medical costs [2]. Medication regimen complexity is one of the major determinants of medication non-adherence in the general chronic disease population [3]. Although data in transplantation are limited, regimen complexity is likely to be high due to multi-drug regimens and frequent medication and dosing changes.

The Medication Regimen Complexity Index (MRCI) is a validated tool to quantify medication complexity beyond the number of drugs a patient is taking [4]. The MRCI accounts for the number of medications, number of daily doses, dosing form (e.g. tablet vs. injection), frequency, and specific instructions such as “take with food” [5]. The MRCI can be a useful clinical tool in transplantation to identify patients at risk for over-complicating regimens, medication errors, and non-adherence, which increase the risk of negative health outcomes. Previous research has quantified disease-specific MRCI for geriatric depression (M=3.0 [SD 1.1], diabetes (M=6.3 [SD=3.1]), HIV (M=4.9 [SD=2.1]), and hypertension

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($M=3.5$ [$SD=1.5$]) (see Figure 1) [4]. The MRCI has not been previously quantified in a transplant population.

Using data from a cross-sectional study at two large transplant centers in Chicago, IL and Atlanta, GA, we report MRCI scores for a sample of kidney and liver transplant recipients. A total of 204 (kidney $n=99$; liver $n=105$) patients were recruited. Each medication was initially identified as ‘transplant-related’ or ‘other’ (e.g. for a comorbidity). The average transplant-related MRCI score for our sample was 18.0 ($SD=8.5$), with patients taking on average 8.5 ($SD=3.7$) transplant-specific medications. Transplant-related MRCI scores did not vary by organ type (kidney: $M=17.9$ [$SD=8.1$]; liver: $M=18.1$ [$SD=8.8$], ($p=0.84$) or time since transplant (≤ 12 months: $M=19.1$ [$SD=8.0$]; >12 months: $M=17.4$ [$SD=8.6$], ($p=0.18$).

These data are the first to quantify medication regimen complexity in kidney and liver transplant patients. Our data support the generally accepted notion that medication regimen complexity is high in transplantation due to the presence of multiple transplant-specific medications and others needed to manage chronic disease. The MRCI may be a useful tool to quantify complexity beyond just the number of medications a transplant recipient may be taking, as it accounts for other factors such as frequency and route of administration. Further studies should validate the MRCI among a larger cohort of transplant recipients and investigate the association between MRCI, medication adherence, and transplant-specific outcomes. Strategies aimed at reducing treatment complexity by consolidating regimens, synchronizing medication refills, and providing patients with reminders may be effective at improving post-transplant adherence and clinical outcomes.

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Figure 1.