

Association between self-care and chronic kidney disease in patients with type 2 diabetes mellitus

Dear Editor,

Chronic kidney disease (CKD) is one of the key complications occurring in 25–40% of patients with type 2 diabetes mellitus (T2DM).¹ Our earlier study also showed that CKD was present in 53% of patients with T2DM recruited from a secondary care diabetes centre and primary care polyclinic in Singapore.² T2DM management comprises not only medical care, but also “self-care”, which is crucial in preventing end-organ complications.³

The Summary of Diabetes Self-Care Activities (SDSCA) questionnaire⁴ is a reliable and valid measure of diabetes mellitus (DM) self-care adherence in observational and interventional studies. These studies have addressed issues related to psychological well-being and quality of life, but not diabetic nephropathy.⁵ Current scant literature⁶ suggests that self-care potentially reduces the risks of developing diabetic nephropathy. We examine the association between self-care and CKD in T2DM patients, and aim to establish if glycaemic control mediates the possible association between self-care and CKD.

This was a cross-sectional study of 631 patients with T2DM (age 57.0±11.5 years, 54.7% male, 45.2% Chinese, 33.3% Malay and 20.0% Indian) recruited from November 2017 to December 2020 from the Diabetic Kidney Disease – Onset and Progression Risk Factors (DORIS) cohort in Singapore.⁷ Patients self-administered SDSCA to quantify the following self-care activities performed over 7 days: general diet, specific diet, exercise, self-monitoring of blood glucose (SMBG), and foot care. CKD, with a prevalence of 62.3% in the cohort, was defined as estimated glomerular filtration rate (eGFR) <60mL/min/1.73m² and/or urinary albumin-to-creatinine ratio (uACR) ≥30mg/g from blood and urine samples collected according to Kidney Disease: Improving Global Outcomes (KDIGO) Clinical Practice Guidelines for the Evaluation and Management of Chronic Kidney Disease guidelines.⁸ Group differences between non-CKD and CKD were examined by Student’s t-test, Wilcoxon rank sum test for continuous variables, and chi-square test for categorical variables. Logistic

regression models examined the association between self-care measures and CKD in T2DM patients. Mediation analysis based on Baron and Kenny’s framework⁹ was performed to examine the role of haemoglobin A1c (HbA1c) as a possible mediator for the association between SDSCA score for SMBG and the presence of CKD. Results with $P<0.05$ were considered statistically significant.

The distribution of ethnicity of patients in this study was: Chinese 45.2%, Malay 33.3% and Indian 20.0%. Patients with CKD were older in age and belonged to a lower educational background ($P<0.001$). They had a longer DM duration, alongside a more deleterious metabolic profile: higher body mass index, higher systolic blood pressure, higher Hb1Ac, higher triglycerides, lower eGFR and higher uACR ($P<0.001$). They were on more medications, whether oral and insulin, insulin only, or a renin-angiotensin system antagonist ($P<0.001$).

Mean scores (±standard deviation) (higher scores more favourable) for self-care were: general diet 3.9±2.1; specific diet 4.8±1.5; exercise 2.8±2.0; SMBG 2.0±2.1; and foot care 3.7±2.8. SMBG had the lowest score. This trend was similar for both non-CKD and CKD patients, with no significant difference in scores for SMBG between both groups of patients. Higher SMBG scores, suggestive of better self-care, were inversely associated with reduced odds of CKD (odds ratio [OR] after adjusting for demographics 0.91, 95% confidence interval [CI] 0.84–0.99; $P=0.024$) and also after adjusting for demographics, metabolic profile and medications (OR 0.90, 95% CI 0.82–0.99; $P=0.035$). The other self-care measures were not significantly associated with CKD (Table 1).

SDSCA scores for SMBG were positively correlated with age and eGFR, and negatively correlated with triglycerides ($P<0.05$). In terms of DM medications, SDSCA scores for SMBG were higher in patients on insulin only (3.4±1.8) compared to those on oral medication(s) only (1.8±2.1), and combined oral medication(s) and insulin (2.3±2.1) ($P=0.002$). There was no association between SDSCA scores for SMBG and ethnicity ($P=0.064$), education level ($P=0.179$) and housing type ($P=0.821$).