# The Perceived Medical Condition Self-Management Scale can be applied to patients with chronic kidney disease

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**Chronic Kidney Disease (CKD) is a major burden on patients and the health care system. Treatment of CKD requires dedicated involvement from both caretakers and patients. Self-efficacy, also known as perceived competence, contributes to successful maintenance of patient's CKD self-management behaviors such as medication adherence and dietary regulations. Despite a clear association between self-efficacy and improved CKD outcomes, there remains a lack of validated self-report measures of CKD self-efficacy. To address this gap, the Perceived Kidney/Dialysis Self-Management Scale (PKDSMS) was adapted from the previously validated Perceived Medical Condition Self-Management Scale. We then sought to validate this using data from two separate cohorts: a cross-sectional investigation of 146 patients with end-stage renal disease receiving maintenance hemodialysis and a longitudinal study of 237 patients with CKD not receiving dialysis. The PKDSMS was found to be positively and significantly correlated with self-management behaviors and medication adherence in both patient cohorts. The PKDSMS had acceptable reliability, was internally consistent, and exhibited predictive validity between baseline PKDSMS scores and self-management behaviors across multiple time points. Thus, the PKDSMS is a valid and reliable measure of CKD patient self-efficacy and supports the development of interventions enhancing perceived competence to improve CKD self-management.**

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Chronic kidney disease (CKD) affects more than 13% of individuals in the United States.[1] Favorable outcomes are attainable, but are impossible without sufficient ability of patients to manage their care when away from the treatment facility.[2] Chronic disease self-management can be defined as a set of skilled behaviors performed to manage one's own illness.[3] CKD patients must be able to perform activities to manage CKD-related symptoms such as excessive thirst, sleep problems, muscle cramps, and edema.[2] They must also be able to take prescription medications;[4] care for vascular accesses if receiving dialysis;[5] and maintain diet, exercise, fluid intake, and vaccination recommendations.[6] Unfortunately, participation in these self-management behaviors by patients with kidney disease is low,[5,7,8] often due to impaired understanding of the tasks and their importance for sustained good health. Nonadherence to self-care behaviors has been associated with increased mortality risk.[9–11]

A number of psychological factors contributing to enhanced adherence and better treatment outcomes in CKD patients have been identified.[12] Self-efficacy,[13] the self-belief that one can successfully carry out a specific behavior in a specific situation, has been shown to be predictive of improved health behaviors and outcomes broadly[14–16] and in CKD specifically.[4,8] In the few studies of self-efficacy in CKD,[17–25] a broad range of scales have been used, ranging from generalized self-efficacy[19,26] to self-efficacy in restricting dietary sodium.[20] Overall, the literature supports that self-efficacy in CKD is positively associated with medication adherence, quality of life, treatment adherence, education, and self-care behaviors, and negatively associated with depression, with gender and age having been shown to be modifying factors.[21–25]

Perceived competence[15,27] is a term used to describe a more general concept of self-efficacy that similarly contributes to the belief that one can perform goal-directed behaviors across situations to ultimately achieve desired outcomes. Because Bandura's definition of self-efficacy relates to specific behaviors, measures of perceived competence can be more readily applied to chronic diseases, which require a coordination of many behaviors during the course of treatment. Guided by early measures of perceived competence,[11,28,29] the Perceived Medical-Condition Self-Management Scale

(PMCSMS) was designed as a generic template to measure perceived competence that could be modified for use with a variety of diseases.[30] Since then, condition-specific versions using the PMCSMS template have been found to be reliable and valid among persons with diabetes, HIV/AIDS, and various rheumatologic conditions.[30–32]

Despite the associations between health-related self-efficacy and positive health outcomes, there remains a lack of a brief, validated measure of *perceived health competence* as it relates to CKD. One measure, the 25-item chronic kidney disease self-efficacy (CKD-SE) instrument was validated in a population of Taiwanese patients with CKD.[19] It has been used in pilot studies and displays good psychometric qualities. However, the length of the CKD-SE measure limits its utility in clinical settings. Thus, a brief, efficient measure of CKD-specific perceived health competence is still necessary.

The objective of this study is to describe the psychometric properties of an 8-item CKD-specific version of the PMCSMS. The scale examined is not a new instrument, but rather an adaptation of a previously validated template designed to be tailored to specific medical conditions. Based upon previous findings using the PMCSMS, the Perceived Kidney/Dialysis Self-Management Scale (PKDSMS) is expected to be internally consistent and stable over time. To establish the construct validity of the PKDSMS in patients with kidney disease, we compared the results of this self-management self-efficacy scale with an index of self-management behaviors and with health outcomes. Specifically, we hypothesized that higher perceived competence would be related to higher health literacy, better overall health status, more kidney disease self-care behaviors, and lower blood pressure and serum phosphorus levels.

## RESULTS

Data from 2 separately collected participant samples (Table 1) were used to validate the PKDSMS. The first sample is from a cross-sectional evaluation of the PKDSMS and other psychosocial measures in patients receiving hemodialysis (HD). The second sample is from a short-term, longitudinal clinical trial that investigated the efficacy of an educational intervention on medication adherence in nondialysis CKD clinic patients. The study populations differed in severity of kidney disease and demographic composition, though both studies recruited from the same geographic region.

### Participant characteristics

The HD sample consisted of 51% men, with 72% self-reporting their race as non-White, with the majority reporting as Black or African American. On average, the 146 participants were 52 years old (SD: 14), received HD therapy for 4 years, completed 12.8 (SD: 3.1) years of school, and had a serum phosphorus level of 6.0 mg/dl. Approximately 26% of the sample reported a yearly income less than $10,000, while a similar percentage reported an income of more than $40,000 per year. Nearly two-thirds of the participants self-rated their health as "good to excellent" while the remaining rated it as "fair" or "poor."

**Table 1 | Participant characteristics**

| Characteristic | Dialysis sample Median (IQR) | CKD sample Median (IQR) |
|---|---|---|
| Age (yr) | 51 (42, 63) | 59 (50, 67) |
| Education (yr) | 12 (12, 14) | 14 (12, 16) |
| Hemodialysis duration (yr) | 3 (1, 6) | N/A |
| Body mass index | 28.5 (23.6, 33.7) | 29.5 (25.1, 35.0) |
| Health literacy | 12 (10, 14) | 14 (11, 15) |
| | **Percent (*N*)** | **Percent (*N*)** |
| Gender | | |
| Male | 51.4% (75) | 44.7% (106) |
| Female | 48.6% (71) | 55.3% (131) |
| Race | | |
| Non-White | 72.0% (105) | 19.8% (47) |
| White | 25.3% (37) | 83.1% (197) |
| Income | | |
| < $20K per year | 42.0% (61) | 20.0% (48) |
| $20K–$39.9K | 31.5% (45) | 23.3% (56) |
| >$40K per year | 25.9% (37) | 56.6% (136) |
| Previous attendance at kidney disease education class | | |
| Yes | 34.6% (44) | 28.6% (65) |
| No | 65.4% (83) | 71.4% (162) |
| Diabetes diagnosis | | |
| Yes | 31.5% (46) | 43.0% (105) |
| No | 67.1% (98) | 57.0% (139) |
| Self-rated health | | |
| Poor or fair | 35.6% (52) | 32.1% (76) |
| Good | 42.5% (62) | 46.4% (110) |
| Very good | 8.2% (12) | 16.5% (39) |
| Excellent | 12.3% (18) | 1.7% (4) |
| CKD stage | | |
| 3 (eGFR = 30–60ml/min/1.73 $m^2$) | N/A | 46.0% (109) |
| 4–5 (eGFR< 30ml/min/1.73 $m^2$) | | 54.0% (128) |

CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; IQR, interquartile range.

The CKD sample consisted of 55% women, 83% of whom self-identified their race as White, while 16% identified themselves as Black or African American. On average, the 237 participants were 57 years old (SD: 12), had an estimated glomerular filtration rate (eGFR) of 32.7 ml/min/1.73 $m^2$ (SD: 14.0), a systolic blood pressure of 137 mm Hg at baseline, and had completed 14.0 years of school (SD: 3.0). Approximately 6% of participants reported an annual income of less than $10,000 per year, while 38% reported an annual income of $60,000 or more. Approximately two-thirds of participants endorsed their health in general as "good" to "excellent" (Table 1).

### Performance on the PKDSMS

For the 146 participants in the HD sample, the mean item scores for the PKDSMS ranged from 2 to 5 (on a scale of 1 to 5), with a grand item mean of 3.84. For the 237 participants in the CKD sample, the average item scores on the PKDSMS ranged from 1.71 to 5, with a grand item mean of 3.85 (Table 2). Therefore, on average, participants in both studies somewhat agreed that they could self-manage their kidney