



Association of Self-Rated Health With Functional Limitations in Patients With CKD

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Rationale & Objective: In patients with chronic kidney disease (CKD), self-rated health ("In general, how do you rate your health?") is associated with mortality. The association of self-rated health with functional status is unknown. We evaluated the association of limitations in activities of daily living (ADLs) with self-rated health and clinical correlates in a cohort of patients with CKD stages 1-5.

Study Design: Prospective cohort study.

Setting & Participants: Patients with CKD at a nephrology outpatient clinic in western Pennsylvania.

Outcome: Patients participated in a survey assessing their self-rated health (5-point Likert scale) and physical (ambulation, dressing, shopping) and cognitive (executive and memory) ADLs. Adjusted analysis was performed using logistic regression models.

Analytical Approach: Logistic regression was conducted to examine the adjusted association of 3 dependent variables (sum of total, physical, and cognitive ADL limitations) with self-rated health (independent variable of interest).

Results: The survey was completed by 1,268 participants (mean age, 60 years; 49% females,

and 74% CKD stages 3-5), of which 41% reported poor-to-fair health. Overall, 35.9% had at least 1 physical ADL limitation, 22.1% had at least 1 cognitive ADL limitation, and 12.5% had at least 3 ADL limitations. Ambulation was the most frequently reported limitation and was more common in patients reporting poor-to-fair self-rated health compared with those with good-to-excellent self-rated health (58.1% vs 17.4%, $P < 0.001$). In our fully adjusted model, poor-to-fair self-rated health was strongly associated with limitations in at least 3 ADLs (total ADL) [OR 8.29 (95% CI, 5.23-13.12)]. There was no significant association of eGFR with ADL limitations.

Limitations: Selection bias due to optional survey completion, residual confounding, and use of abbreviated (as opposed to full) ADL questionnaires.

Conclusions: Poor-to-fair self-rated health is strongly associated with physical ADL limitations in patients with CKD. Future studies should evaluate whether self-rated health questions may be useful for identifying patients who can benefit from additional evaluation and treatment of functional limitations to improve patient-centered outcomes.

Visual Abstract included

Complete author and article information provided before references.

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Chronic kidney disease (CKD) affects approximately 13% of the population in the United States.¹ Comorbidity and symptom burden is high within this population and may lead to a negative self-perception of health.² In fact, prior studies have shown that 47% to 53% of adults with CKD stages 3-5 perceive their health as poor to fair.^{3,4} However, the prevalence of poor self-rated health in earlier stages of CKD and its clinical correlates are not known.³

In patients with CKD, poor self-rated health has been shown to be associated with mortality, kidney disease progression, and worsened patient-centered outcomes such as anxiety, depression, coping, autonomy, and self-esteem.^{3,5} Consequently, poor self-rated health may directly or indirectly affect patients' ability to perform activities of daily living (ADLs) and impair their functional independence, which is a priority for most patients with CKD.⁶ Limitations in ADLs can in turn worsen patients' self-rated health. We previously showed that poor self-rated health was associated with frailty and disability among older patients with advanced CKD.⁴ However, the relationship between self-rated health and functional

status among patients across the spectrum of CKD stages and age groups has not been assessed. Understanding these associations may enhance our ability to identify patients who could benefit from additional health care resources to evaluate functional status further and to receive targeted interventions to improve clinical outcomes.

Our study evaluated the prevalence of poor self-rated health, its clinical correlates, and its association with limitations in ADLs in patients with CKD stages 1-5.

METHODS

Study Population

We enrolled patients prospectively from a nephrology clinic affiliated with University of Pittsburgh Medical Center (UPMC) between September 2015 to December 2016. All patients seen at the clinic were invited to participate, and there were no eligibility restrictions. For patients who filled out the survey on multiple occasions, only the first survey was used in this study. We excluded patients with incomplete questionnaires and those lacking

PLAIN-LANGUAGE SUMMARY

This study looks at self-rated health and how it associates with limitations in daily activities such as walking in patients with chronic kidney disease. We asked patients at a nephrology clinic to fill out a survey of how they feel about their health and what activities (eg, walking, dressing, shopping, taking care of their home, and remembering to pay bills) they have trouble completing. We found that patients with lower self-rated health had higher limitations in these activities, with walking as the most common reported limitation. Future studies may determine if self-rated health may be a screening tool used to identify patients who may need additional resources targeted toward these limitations to improve their health outcomes.

a recent creatinine value within 1 year of survey administration.

A total of 1,731 surveys were collected from 1,343 unique individuals, out of which 70 patients were excluded for incomplete survey responses and 5 were excluded for lack of recent creatinine measurement. The total cohort for analysis was the remaining 1,268 patients (Fig S1). This survey was collected as part of a quality improvement project approved by the University of Pittsburgh Quality Improvement Committee with a waiver of patients' informed consent, and the medical chart abstraction was approved by the University of Pittsburgh institutional review board (no. PRO18030227).

Assessment of Self-Rated Health and ADLs

The patients were asked to complete a 6-item questionnaire on paper before their office visit with a nephrology provider. Self-rated health was assessed using a single question: "In general, compared to other people your age, would you say that your health is?" The responses are scored on a Likert scale: 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, and 5 = Excellent.³ The patients were categorized into 2 groups: those with poor-to-fair self-rated health versus those with good-to-excellent self-rated health.

Patients were also asked to report on limitations or inability to perform ADLs. Items for ADL assessments were chosen to realize 3 goals: maximize the feasibility of ADL assessments during routine clinical care, minimize the patient burden, and assess patient abilities across a spectrum of activities. Hence, 5 ADL questions were chosen from standard questionnaires (Lawton and Brody's Instrumental ADL Scale, Katz Index of Independence in ADL, and the Kidney Disease and Quality of Life Survey), including physical and cognitive ADLs.⁷⁻⁹ The items

assessing cognitive ADLs were (1) "During the past 12 months, have you had problems with your memory or thinking that interfere with your ability to do things that you regularly do such as taking care of your home, managing your checkbook, or keeping up with TV programs?" (executive function) and (2) "During the past 12 months, have you noticed a decline in your memory such that you have trouble remembering where you put things, remembering to take your medications, or remembering to pay bills?" (memory). The items assessing physical ADLs were (3) "Do you have trouble walking across a room or climbing stairs because of your health or physical condition?" (walking), (4) "Do you have trouble dressing, bathing, or showering because of your health or physical condition?" (dressing), and (5) "Do you have trouble shopping for personal items (like toilet items, medicine, or groceries) because of your health or a physical condition?" (shopping). Responses to all these questions were recorded as yes or no.

Clinical Data and Assessment

Data for clinical correlates was obtained from the electronic health record and supplemented with manual chart abstraction if needed (eg, to look for scanned records). The clinical data included demographic factors (age, gender, race, ethnicity, marital status), health behaviors (smoking), comorbidities (diabetes, hypertension, cardiovascular disease, and dementia), clinical measures (body mass index, systolic and diastolic blood pressure), medication classes (antidepressants, benzodiazepine and non-benzodiazepine sedatives, and opioids), and laboratory values (serum creatinine, serum albumin, and hemoglobin).^{5,10-12}

Smoking was classified as never versus ever smoker. Comorbidities were defined by including both ICD-9 and ICD-10 codes from the problem list and from 2 outpatient billing encounters. Additionally, the Charlson Comorbidity Index (CCI) was calculated to assess comorbidity burden using a model based on ICD codes from Quan et al.^{13,14} Medication classes were chosen based on the classes' effects on cognitive and physical function.¹⁵ Medications were limited to those active on the medication list within 1 year of the survey's administration date. Physical and laboratory measures were generated using the mean from data within 1 year of the survey's administration date. We followed a validated approach to average serum creatinine values over the baseline period for estimated baseline kidney function.¹⁶ CKD stage was calculated based on estimated glomerular filtration rate (eGFR) data using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation.

Statistical Analysis

Descriptive statistics were examined by self-rated health groups (poor-to-fair vs good-to-excellent self-rated health) and presented as number and percentage for

Table 1. Baseline Characteristics of Cohort by Self-Rated Health Categories

Variable	Good to Excellent	Poor to Fair	P Value
Participants (n)	753	515	
Age	60.9 ±17.4	57.6 ±16.2	
<65	381 (50.5%)	299 (57.7%)	0.01
≥65	372 (49.3%)	216 (41.7%)	
Race			
White	594 (78.9%)	389 (75.5%)	0.14
Ethnicity			
Not Hispanic	696 (92.4%)	485 (94.2%)	0.18
Female	346 (46.0%)	275 (53.4%)	0.02
Marital status			
Married	440 (58.4%)	235 (45.6%)	<0.001
Smoking status			
Never smoker	372 (49.4%)	244 (47.4%)	0.43
BMI (kg/m ²)	27.9 ± 5.6	31.1 ± 7.7	0.02
Blood pressure			
Systolic (mm Hg)	130.8 ± 13.2	132.0 ± 14.0	0.52
Diastolic (mm Hg)	77.1 ± 8.1	76.3 ± 8.0	0.14
Comorbidities			
Diabetes	222 (29.5%)	203 (39.4%)	<0.001
Hypertension	171 (22.7%)	207 (40.2%)	<0.001
Cardiovascular disease	406 (53.9%)	317 (61.6%)	0.01
Dementia	7 (0.9%)	8 (1.6%)	0.46
CCI	3.4 ± 2.4	5.0 ± 2.4	<0.001
CKD stage based on eGFR ^a			<0.001
Stage 1 and 2	217 (28.7%)	108 (20.9%)	
Stage 3	329 (43.6%)	216 (41.7%)	
Stage 4 and 5	207 (27.4%)	191 (36.9%)	
Medications			
Antidepressant	223 (29.5%)	257 (49.6%)	<0.001
Sedative	157 (20.8%)	155 (29.9%)	0.56
Opioid	282 (37.4%)	303 (58.5%)	0.001
Laboratory values			
Albumin (g/dL)	4.0 ± 0.5	3.7 ± 0.5	<0.001
Hemoglobin (g/dL)	12.7 ± 1.9	11.5 ± 2.0	<0.001
eGFR (per 10 mL/min/1.73 m ²)	4.96 ±2.69	4.37 ± 2.80	0.01
Creatinine (mg/dL)	1.8 ± 1.1	2.3 ± 2.3	0.004

Note: Continuous variables expressed as mean ± SD; categorical variables expressed as number (percentage).

Abbreviations: BMI, body mass index; CCI, Charlson Comorbidity Index; CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate.

^aDetermined using eGFR only.

categorical variables and as mean ± SD for continuous variables. We used χ^2 tests and odds ratios (OR) to assess bivariate associations of clinical correlates with self-rated health. The distribution of ADL limitations by age and CKD stage were examined.

Univariate association of self-rated health groups and ADL limitations was evaluated using odds ratio. Next, we examined the multivariable association of self-rated health with limitations to 3 or more total ADLs, 1 or more physical ADL limitations, or 1 or more cognitive ADL limitations.

We used logistic regression to examine the adjusted association of 3 dependent variables (sum of total, physical, and cognitive ADL limitations) with self-rated health (independent variable of interest). We included covariates

in the first step based on clinical significance and plausibility of an association with limitations to ADLs. Model 1 adjusted for age, sex, race, eGFR, body mass index, and marital status. Models 2 and 3 included variables from model 1 plus covariates that were found to be statistically significant in unadjusted analyses. Model 2 adjusted for variables from model 1 and albumin, hemoglobin, and CCI score. Model 3 included all variables included in model 2 and additionally antidepressant and opioid use. The multivariable analysis with the outcomes of total, sum of physical, and sum of cognitive ADL limitations each used the above approach.

Finally, in the models fitting the outcomes sum of physical limitations and sum of cognitive ADL limitations, we fit an additional model that adjusted for cognitive

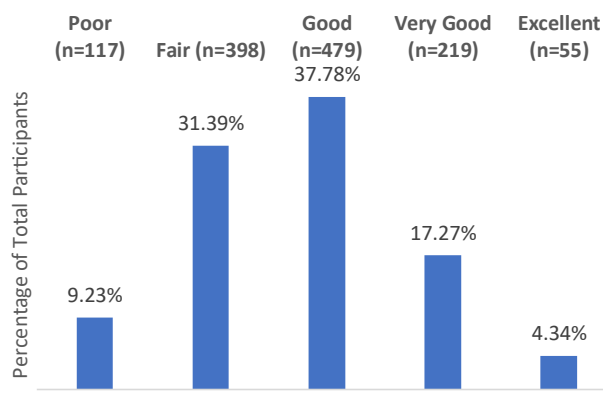


Figure 1. Reported self-rated health within total survey participants.

limitations (in physical limitations outcome model) and physical limitations (in the cognitive limitations model) to examine the effect of adjusting for one limitation on the association between the self-rated health and physical or cognitive ADL limitations. The Akaike information criterion (AIC) was used to estimate prediction error and relative quality of the models. We assessed the linearity of continuous covariates using restricted cubic splines.

For the logistic regression analysis, missing data was handled using multiple imputation by chained equations (MICE) with five imputed datasets, and the results were pooled using the mice R package.¹⁷ Outcomes were reported as adjusted odds ratios. $P < 0.05$ was used to determine statistical significance for analyses. Analyses were performed using R version 3.6.0 (R Foundation for Statistical Computing).¹⁸

RESULTS

Baseline Characteristics by Self-Rated Health Categories

Of the 1,268 survey participants, 41% reported poor-to-fair self-rated health, and 59% reported good-to-excellent self-rated health (Table 1). The patients reported their self-rated health as 9% poor, 31% fair, 38% good, 17% very good, and 4% excellent (Fig 1). The mean age of the total cohort was 60.3 ± 16.9 years. The patients were predominantly White (77.5%) and male (51.0%). Approximately 57% had cardiovascular disease, 43% had stage 3 CKD, and 31% ($n = 398$) had stage 4 or 5 CKD. Missing values include 1.9% ($n = 24$) race, 6.2% ($n = 79$) ethnicity, 0.6% ($n = 7$) marital status, 10.3% ($n = 131$) smoking history, 9.0% ($n = 114$) albumin, and 4.5% ($n = 57$) hemoglobin.

Clinical Correlates of Self-Rated Health

The univariate analyses showed that poor-to-fair self-rated health was associated with younger age, female sex, and unmarried marital status. Notably, older patients (age ≥ 65 years) were less likely to report poor-to-

fair health as compared with younger patients: OR, 0.74 (95% CI, 0.59-0.93) ($P = 0.01$) (Table 1). Patients with poor-to-fair self-rated health had a higher body mass index and a higher comorbidity burden, as expected. There was a greater percentage of patients reporting poor-to-fair self-rated health with more advanced CKD stages. Poor-to-fair self-rated health was reported in 33.2% of patients with stages 1-2 CKD, 39.6% patients with stage 3 CKD, and 48.0% patients with stages 4-5 CKD: OR, 1.85 (95% CI, 1.37-2.51) ($P < 0.001$) (Table 1). Additionally, poor-to-fair self-rated health was associated with lower albumin, lower hemoglobin, and lower eGFR values. Antidepressant and opioid use were both more likely in patients who also reported poor-to-fair self-rated health.

Patient-Reported Limitations in ADLs

In the total cohort, patients reported ADL limitations in executive function (15%; $n = 195$), memory (19%; $n = 238$), walking (34%; $n = 430$), dressing (10%; $n = 132$), and shopping (10%; $n = 132$). Aggregating the limitations, about 36% had at least 1 physical ADL limitation, 22% had at least 1 cognitive ADL limitation, and 13% reported limitations in at least 3 (of the 5 total) ADL limitations that were assessed. When stratified by age, older adults (≥ 65) were more likely to report ≥ 1 physical limitation (Fig 2A; Table S1). When stratified by CKD stage, presence of at least 1 physical limitation was reported significantly more as CKD stage worsened (Fig 2B; Table S1). There were no significant differences in total ADL limitations or cognitive limitations between patients of different CKD stages.

Association of Self-Rated Health With ADL Limitations

Patients with poor-to-fair self-rated health reported significantly more limitations in each ADL individually as well as in the composite ADL score. (Fig 2C and D). The most frequently reported ADL limitation was difficulty with ambulation, and it was significantly more common in patients with poor-to-fair self-rated health compared with those with good-to-excellent self-rated health (58.1% vs 17.4%, $P < 0.001$) (Fig 2C).

In the fully adjusted multivariable analyses, we found that poor-to-fair self-rated health was significantly associated with the composite of total ADL limitations: OR, 8.29 (95% CI, 5.23-13.12) (Table 2). Poor-to-fair self-rated health also had significant associations with physical and cognitive ADL limitations, but the strength of association was weaker for cognitive limitations: OR, 5.84 (95% CI, 4.32-7.91) and OR, 2.37 (95% CI, 1.71-3.28), respectively. The AIC values (Table S3) showed that the model 3 including all clinical covariates had the best fit for the outcome of total ADL limitations, and model 4 had the best fit for physical ADLs only or cognitive ADLs only as the outcome.

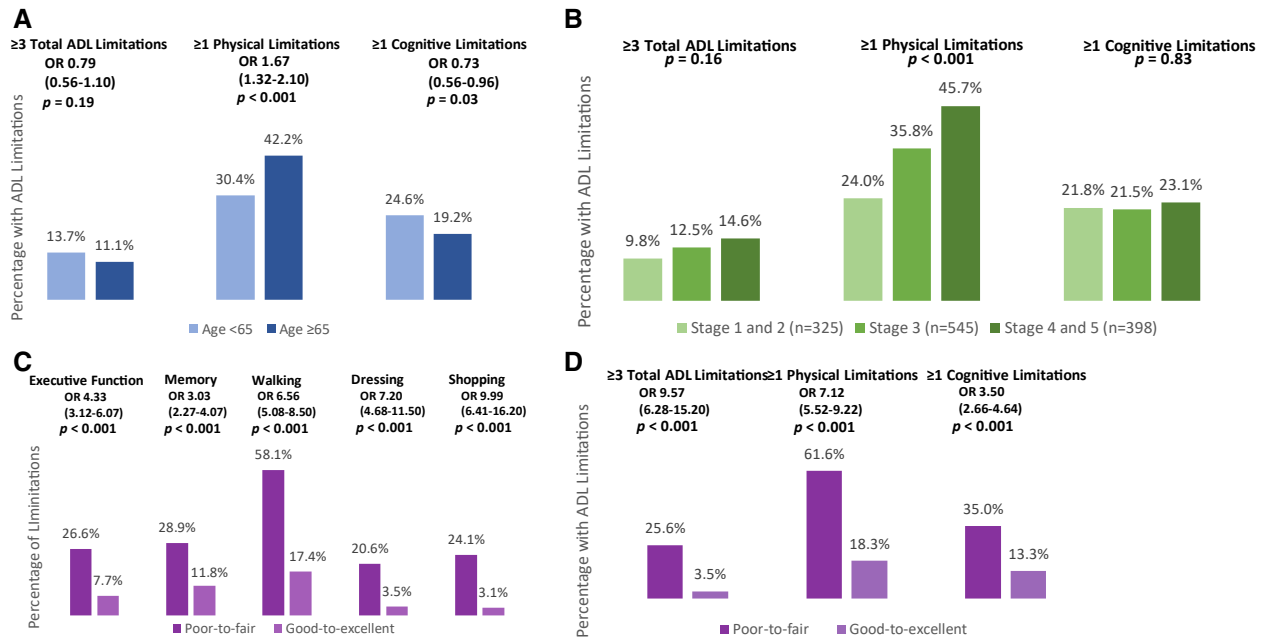


Figure 2. Poor-to-fair self-rated health associated with significantly higher percentages of individual limitations in ADLs and sum of ADLs. (A) Reported total number of limitations, physical limitations, and cognitive limitations by age groups. (B) Reported total number of limitations, physical limitations, and cognitive limitations by CKD stage. (C) Comparison of “good-to-excellent” versus “poor-to-fair” self-rated health to ADL limitations. OR values are expressed as OR (95% CI). (D) Association of total number of limitations, physical limitations, and cognitive limitations between self-rated health groups. Abbreviations: ADL, activity of daily living; CKD, chronic kidney disease; OR, odds ratio.

Other covariates that had a significant association with the outcome of total ADL limitations included White race, albumin, and antidepressant use. For the sum of physical ADL limitations, the additional covariates significantly associated with worse outcome included older age, being married, lower hemoglobin, opioid use, and presence of at least 1 cognitive ADL limitation. For cognitive ADL limitations as the outcome, higher CCI score, antidepressant use, and presence of at least 1 physical limitation were also associated with greater limitations (Table S2).

DISCUSSION

In this broad cross-sectional analysis of patients with CKD stages 1-5, we found that almost 40% perceived their health to be poor-to-fair. About one-third of the

participants reported limitations in physical ADLs, with ambulatory difficulties being the most commonly reported. In our fully adjusted model, we found that poor-to-fair self-rated health was significantly associated with total, physical, and cognitive ADL limitations. This suggests that future work should focus on whether self-rated health may be a useful screen to help identify patients with limitations in ADLs, who may benefit from further evaluation and treatment (eg, physical rehabilitation, cognitive behavioral therapy).

The reported prevalence of poor-to-fair self-rated health among patients with CKD stages 3-5 is 47% to 53%.^{3,4} The findings from our study confirm that even in a cohort that included earlier stages of CKD (stages 1 and 2 CKD) and younger patients, the overall prevalence of poor-to-fair self-rated health is high at 41%. We found that about 26% of patients with CKD stages 1 and 2 in our cohort

Table 2. Multivariable Associations of Self-Rated Health With ADL Limitations

Model	ADL Limitations		
	Total	Physical	Cognitive
1	9.51 (6.08-14.88)	8.34 (6.27-11.09)	3.49 (2.63-4.64)
2	8.95 (5.69-14.08)	7.62 (5.71-10.17)	3.67 (2.74-4.92)
3	8.29 (5.23-13.12)	6.90 (5.12-9.28)	3.46 (2.57-4.67)
4	—	5.84 (4.32-7.91)	2.37 (1.71-3.28)

Abbreviation: ADL, activities of daily living.

reported poor-to-fair self-rated health. As patients are likely to have minimal symptoms from CKD at this early stage, other factors such as comorbidities or medication use may be important contributors of self-rated health in these patients.

Notably, we found that older patients were more likely to report good-to-excellent self-rated health compared with younger patients in both our unadjusted and adjusted models. This was despite a higher prevalence of physical limitations in the older individuals, as expected. This finding is similar to reported quality of life in patients with kidney disease. For example, in a cross-sectional study among 151 patients undergoing dialysis or with stages 4 and 5 CKD, younger patients reported significantly lower quality of life scores when stratified by the median age of 53 years-old ($P < 0.001$).¹⁹

Older CKD patients likely have expectations of poorer health and may normalize their experience of poorer health. This is similar to what has been observed in the general population. In a study among older adults, those aged 83 or higher had better self-rated health than people aged 65-82 years, and this was attributed to factors such as lack of functional dependence.²⁰ Additionally, one study that assessed self-rated health against multiple chronic diseases across 3 age groups have found that older adults reported higher self-rated health compared with younger adults. These differences were attributed adaptation and adjusted health expectations over a greater number of years of living with chronic diseases.²¹ Conversely, younger adults likely have higher expectations of good health and in comparison with their peers may perceive their health status more negatively.

Limitations in ADLs were common, even among younger patients and those with less advanced CKD. We did not find a significant association between kidney function and limitations of ADLs. This suggests that the effect of kidney function on ADLs may be substantially mediated by clinical factors that were included in our adjusted models. Other covariates with significant associations with ADL limitations such as low albumin and hemoglobin values, and opioid and antidepressant use may provide potentially modifiable targets to improve limitations of ADL. The association of antidepressant and opioid use with ADL limitations in our study may reflect the underlying depression and pain, which are highly prevalent and often undertreated in this population; or these medications may affect ADLs through their adverse effects.²²

The strong association between self-rated health and total ADL limitations indicates that future work should examine whether self-rated health can serve as a screening marker for ADL limitations. Further studies should also examine whether targeting modifiable factors associated with self-rated health (eg, pain disorder, depression, anxiety, and/or substance use disorder) can improve self-rated health. If useful, self-rated health could be incorporated as part of clinical care to quickly identify patients

who could benefit from resource and time-intensive ADL evaluations and treatments. Interventions such as physical therapy, exercise, cognitive behavioral therapy, cognitive stimulation, self-management support programs, or home aide services to target these ADL limitations have demonstrated positive outcomes on independence and quality of life in other populations.²³⁻²⁸ Because older adults with advanced CKD value independence as a top priority, addressing physical limitations can be a targeted focus for interventions in the CKD population to improve independence.⁶ By focusing resources and developing interventions that address physical and cognitive limitations for patients with kidney disease, providers may be able to give patients a more patient-centered approach to CKD management and may improve patients' self-perception of health.

Physical ADL limitations were commonly reported in our study and had a stronger association with poor-to-fair self-rated health than cognitive ADLs. This may be because physical ADL limitations have a greater perceived impact on a person's participation in family and social life as well as independence in accomplishing day-to-day tasks. In addition, patients may have poorer insight into cognitive decline, especially at earlier stages, and cognitive decline may be perceived as part of the normal aging process by some patients and have less of an impact on perception of health than physical limitations. Alternatively, misclassification with less accurate recall from patients may have mitigated the association. We found a lower frequency of cognitive limitations in older adults, which may be attributed to the adapted expectations in older patients compared with their younger peers. Notably, we categorized shopping as a physical limitation; however, the ability to accomplish this ADL requires multifactorial coordination of transporting oneself to a location for shopping, understanding which items need to be purchased, mobilizing the desired items, and completing the financial transaction.

Our study provides novel information on the association of self-rated health and ADL limitations, and clinical correlates of self-rated health in a large, diverse sample across the spectrum of CKD stages with robust phenotypic data on multiple covariates obtained from electronic health records. Our cohort represents a referred population of patients who received the same standard of care at the clinic. However, our findings have a few limitations.

First, patients voluntarily completed the questionnaire during the office visit intake process, and completion was optional. Although over 1,200 patients completed the instrument, patients who were unwilling to fill out the question, did not understand English, or were physically unable to complete the questionnaire would have been excluded. Second, as with any observational study, residual confounding may be present.

Third, we did not include the presence of abnormal albuminuria or proteinuria in our dataset as part of our requirement to define stages 1-2 of CKD. However, few

patients are managed at this clinic for hypertension or electrolyte abnormalities in absence of pathological or radiological signs of kidney damage. Fourth, our survey abstracted individual questions from validated instruments to minimize the burden of administration; however, the individual items may no longer have the psychometric properties of the full validated instrument.

In conclusion, poor self-rated health is highly prevalent and is strongly associated with functional limitations in patients with CKD. Future research should evaluate whether self-rated health can serve as a simple screening tool to identify patients who could benefit from additional health care resources for evaluation and treatment of functional limitations to improve person-centered outcomes.

SUPPLEMENTARY MATERIAL

Supplementary File (PDF)

Figure S1: Study population included 1,268 in the final cohort.

Table S1: Summary of associations between self-rated health, age, CKD stage, and aggregate ADL limitations.

Table S2: Summary of adjusted associations between all covariates and ADL limitations.

Table S3: AIC values for multivariable models.

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Is self-rated health associated with function limitations in chronic kidney disease?



Methods & Cohort	Outcomes	Results
Prospective Cohort Western Pennsylvania Nephrology Outpatient Clinic CKD stage 1-5 N=1268	Survey of Self rated health Physical based ADLs* Ambulation Dressing Shopping Cognitive based ADLs* Executive & memory <small>*ADL - Activities of daily living</small>	Mean age = 60 yrs 49% Female 74% CKD stage 3-5 41% Poor to fair health ↓ Ambulation based on self rated health: • poor to fair (58.1%) • good to excellent (17.4%). [P <0.001] Poor-to-fair self-rated health was strongly associated with limitations in at least 3 ADLs [OR 8.29 (95% CI 5.23-13.12)]

Conclusion: Poor-to-fair self-rated health is strongly associated with physical ADL limitations in patients with CKD. Future studies should evaluate whether self-rated health questions may be useful for identifying patients who can benefit from additional evaluation and treatment of functional limitations to improve patient-centered outcomes.

Reference: Lee K, Abdel-Kader K, Yabes JG, et al. Association of self-rated health with functional limitations in patients with CKD. *Kidney Medicine*, 2021.
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