

Eliminating Missed Opportunities for CKD Care

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Although excessive thirst, frequent urination, hunger, and fatigue may be bothersome symptoms for patients developing diabetes, having symptoms has potential benefits for both patients and providers. Symptoms lead peo-

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ple to realize that they have a problem and drive them to seek diagnosis and treatment from health care providers. Providers use these symptoms to develop a differential diagnosis and laboratory testing plan, facilitating clinical diagnosis and implementation of a treatment plan.

Most chronic diseases have symptoms: arthritis has joint pain, chronic obstructive pulmonary disease has shortness of breath, and coronary artery disease has chest pain. Although symptoms may vary widely among patients for any given disease, the presence of symptoms alerts patients and providers that something is wrong. This is not the case for all chronic diseases, including chronic kidney disease (CKD), in which people are frequently asymptomatic until the disease has substantially progressed. While some people with CKD will have symptoms such as leg swelling and foamy or tea colored urine, most people with CKD lack symptoms until the latest stages of kidney disease, when interventions to slow progression may be too little too late. This asymptomatic CKD state may be perceived by both patient and provider as a reflection of usual health when CKD carries a high risk for cardiovascular disease, mortality, and kidney failure. This lack of symptoms impedes treatment-seeking behavior (patients may neither want nor feel the need to go to their health care provider) and prevents providers from diagnosing and treating the CKD.

Treatments to reduce the high risk for cardiovascular disease and kidney failure include angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs),¹⁻³ statin medications,⁴ possibly sodium-glucose cotransporter-2 (SGLT2) inhibitors,⁵ and medical nutrition therapy.^{6,7} In part due to lack of diagnosis, ACE-inhibitor/ARB medications are prescribed to only 60% of adults with CKD and cardiovascular disease⁸ or diabetes,^{9,10} and only 10% of patients with non-dialysis-dependent CKD ever meet with a dietitian for medical nutrition therapy.⁶ This lack of treatment is compounded by poor patient self-management due to a lack of CKD awareness and education.¹¹

Until it is very advanced, CKD predominantly is a laboratory-based diagnosis, and most older adults have serum creatinine measured at least annually, with automatic reporting of estimated glomerular filtration rate (eGFR).^{12,13} CKD presence may be identified by 2 or more

eGFRs < 60 mL/min/1.73 m² at least 3 months apart in the electronic health record or by the presence of kidney damage, most often identified by increased urine albumin-creatinine ratio.

Since 2006, most clinical laboratories have reported both eGFR and serum creatinine level,¹⁴ but automated eGFR reporting has not substantially increased CKD diagnosis and awareness. CKD awareness remains at 10% overall, and approximately half the patients with advanced CKD are unaware of their disease.¹⁴ Thus, although patients are being seen by providers when information for CKD is available in the electronic health record, these patients remain completely unaware of their disease status after a clinic visit.

This scenario of “lost opportunity” was identified as a common problem in US health care more than a decade past when in July 2006, the Institute of Medicine convened a workgroup to discuss the growing demand for evidence to improve health care.¹⁵ The workgroup aimed for “90% of all clinical decisions to be supported by accurate, timely and up-to-date clinical information” by 2020.¹⁵ 2020 is upon us, yet opportunities to diagnose and treat CKD continue to be missed.

In this issue of *Kidney Medicine*, Tuot et al¹⁶ describe the results of a 2×2 randomized clinical trial that examined the effects of a CKD registry implemented within safety-net primary care clinics and/or a patient self-management program on outcomes including blood pressure (BP) control and urine albumin excretion among patients with mild to moderate CKD. Although the overall result of the trial was null, the study provides important lessons for future research on ways to improve CKD care.

The trial by Tuot et al had 2 interventions that could be compared with usual care either by themselves or combined. These interventions included a CKD registry with point-of-care notifications and quarterly feedback to providers and a patient program with automated telephone self-management (CKD-ATSM). Because of the 2×2 factorial design, patients could be in 1 of 4 groups: CKD registry alone, CKD-ATSM alone, CKD registry plus CKD-ATSM, or usual care. The trial was designed to randomly assign 6 primary care provider teams, treating a total of 137 patients aged 18 to 75 years with mild to moderate CKD, with 3 teams randomly assigned to the CKD registry.

The CKD registry identified individuals with CKD based on eGFR and/or albuminuria within the electronic health record. A printed patient profile informed providers of patients' recent BP readings, use of ACE-inhibitor/ARB or statin medications, and other relevant information such as cancer screenings and vaccinations. All 137 patients within these 6 provider teams were also randomly assigned to

either the CKD-ATSM intervention or usual care. The CKD-ATSM provided the patients with printed educational materials about CKD, ATSM messages, and live telephone-based health coaching. The CKD-ATSM included 27 different educational modules that covered topics in kidney health, and modules were provided by telephone. The primary care clinics were within a safety-net hospital system; 93% of patients were racial/ethnic minorities and 41% did not speak English. Diabetes was present in 59%, and 49% had stages 3 to 4 CKD; 73% had moderate to severely increased urine albumin excretion. Follow-up for all groups was 12 months, and 90% of participants completed the trial.

The majority of the providers randomly assigned to the CKD registry arm reported that quarterly feedback influenced (88%) or enhanced (74%) their CKD management. No significant differences in BP control or change in urine albumin excretion were noted by allocation to the CKD registry at the end of the trial. No significant changes in systolic BP were noted with the usual-care group or the group with the CKD registry plus CKD-ATSM. Patients allocated to the CKD-ATSM showed high use of the telephone education system, with 95% of participants calling their health coach; 40% of these patients had an average call completion rate > 80%. Despite this success, the CKD-ATSM arm showed no significant difference in percentage of patients achieving a systolic BP < 140 mm Hg, medication adherence, or CKD awareness compared to the usual-care arm regardless of whether their providers were allocated to the CKD registry or usual care.

Allocation to the CKD registry with or without the CKD-ATSM intervention also showed no significant difference in percentage of patients achieving controlled BP or CKD awareness. Unfortunately, no sample size calculation to ensure adequate power was performed before the trial was initiated. The investigators report some signals of improved BP readings among patients with baseline systolic BPs > 140 mm Hg randomly assigned to the intervention groups versus those randomly assigned to usual care but without a prespecified sample size calculation, such signals are difficult to interpret.

Although this trial was overall null, there are some great lessons that can be learned from the hard work of the investigators. First, electronic health record data can be used to develop CKD interventions. While the CKD registry was not successful in improving patient outcomes as assessed by BP control and urine albumin reduction, the primary care providers reported that the CKD registry with accompanying information was useful.¹⁷ Similar to other studies, CKD registries have not been shown to improve clinical outcomes, at least over a short period,^{18,19} but their use may improve processes of care such as use of ACE inhibitors/ARBs and appropriate CKD laboratory testing.¹⁸⁻²⁰ Future trials of CKD registries may want to focus on process-of-care measures such as appropriate laboratory testing, use of ACE-inhibitor/ARB medications, and CKD diagnosis by the primary care

providers, especially if the trial is of short duration (≤ 12 months). Longer follow-up is likely needed to see process-of-care improvements translated into better patient outcomes.

Second, approximately half the patients with CKD identified using laboratory data in the electronic health record did not have physician-confirmed CKD after chart review. Similar errors by omission in CKD diagnosis using electronic health record data have been reported by others.²¹ The majority of this error is likely attributed to the inclusion of increased urine albumin excretion as a marker for CKD status. CKD may be defined as persistently increased urine albumin excretion, but increased urine albumin excretion at one time point does not define CKD. Urine albumin excretion shows wide intraperson variability and approximately half with moderately increased urine albumin excretion will have urine albumin excretion within the normal range on repeat testing.²² Even use of 2 eGFR values 90 or more days apart can sometimes be misleading due to the presence of acute kidney injury, but most error in CKD diagnosis will be with urine albumin data. Thus, CKD registries may want to use caution with the use of urine albumin data and advise providers to confirm CKD presence with repeat laboratory testing if historical data are not available.

The CKD-ATSM intervention in the trial by Tuot et al provided printed educational materials and a telephone self-management education program designed to teach patients about CKD. The patients randomly assigned to the CKD-ATSM intervention showed high use and almost all participated in calls with their health coach. In a separate publication,¹⁷ the investigators reported that patients who participated in the CKD-ATSM intervention really enjoyed talking with their health coach by telephone because the health coaches provided solutions that providers did not, such as connecting them with various community resources.¹⁷ Health coaches are increasingly being used in health care systems to manage chronic diseases, and more research is needed to determine the benefits of health coaches to improve patient self-management of CKD.

Overall, the trial by Tuot et al demonstrates that improving the care of patients with CKD remains extremely challenging. Due to the hard work of the investigators, we are now a bit closer to eliminating missed opportunities. Data from this trial may be used to build smarter and more efficient interventions that use accurate, timely and up-to-date patient information to improve the diagnosis and care of CKD.¹⁵

ARTICLE INFORMATION

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