Geography and ESRD Care: What Contributes Most to Hemodialysis Patient-Provider Visit Variation?

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In 2004, the Centers for Medicare and Medicaid Services (CMS) made a landmark change in the way nephrologists were reimbursed for outpatient dialysis visits for the first time in over 30 years. The Final Rule, as it was called, changed reimbursement for dialysis outpatient assessment from a capitated monthly visit to a graded reimbursement based on the number of times per month a patient was seen in the outpatient setting. These ESRD-related visits, defined by the new “G codes,” allow for reimbursement for 1 visit, 2–3 visits, or ≥4 visits per month. Visits must be provided face to face by a nephrologist or other provider and can occur in the dialysis unit or other outpatient settings (1). Before the Final Rule, much discussion occurred among dialysis providers, nephrologists, and nephrology practices because of concerns that acceptance of this rule would have adverse effects on ESRD patient care due to increased requirements for dialysis unit rounding.

Before the ruling, little was known regarding the association of frequency of dialysis rounding and outcomes. Several observational studies reported that increased frequency of dialysis patient visits by nephrologists was associated with several positive outcomes, including achievement of some clinical performance targets (albumin and dialysis adequacy [Kt/V], and total number of improved performance measures) (2), satisfaction with the nephrologist, and patient adherence (3). However, increased frequency was not associated with improved short-term outcomes such as fewer hospitalizations, better quality of life, or overall satisfaction with care (3). Conversely, increased frequency of “sit-down” team rounds with nursing staff, social workers, and nutritionists in the dialysis unit was associated with better clinical performance measures (albumin level), fewer hospitalizations (incidence rate ratio, 0.68; 95% confidence interval [95% CI], 0.51 to 0.91), decreased number of hospital days, and improved survival (hazard ratio, 0.71; 95% CI, 0.53 to 0.95) compared with units with fewer reported sit-down team rounds (4).

Since the Final Rule went into effect, recent studies have evaluated the association of dialysis patient visits and outcomes. Mentari and colleagues evaluated changes in quality of care and health-related quality of life before and after the rule went into effect and found that patient visits increased from 1.5 to 3.14 (P<0.001) and the percentage of patients not seen during the month decreased from 16.6% to 5.1% (P<0.001); however, there were no differences in Kt/V, albumin, hemoglobin, phosphorus, calcium, catheter use, hospitalizations, compliance with dialysis treatment prescription, or patient satisfaction (5).

Using a larger national sample of data from the US Renal Data System (USRDS), Slinin and colleagues evaluated provider-patient visit frequency and hemodialysis outcomes, and found no difference in all-cause mortality; however, patients who had four provider visits per month had a 4% lower risk of first hospitalization, or hospitalizations for congestive heart failure, cardiovascular disease, infection, or vascular access compared with those with less frequent visits (6). The authors also performed an instrumental variable analysis, which allows approximation of a randomized controlled trial based on a variable that is highly correlated with the exposure variable of interest, but not associated with the outcome of interest (7,8), and found no association with the probability of mortality comparing ≥4 visits to <4 visits (6). Thus, increased physician-patient visit frequency has been shown to be associated with decreased number of hospitalizations but not mortality in observational data.

To further evaluate this issue, Erickson and colleagues in this issue of C JASN investigated the question of whether variation in provider-patient visits on dialysis occurs since introduction of the G codes and what factors contribute to the variation (9). The authors used the USRDS database to evaluate provider practice patterns, which they hypothesized were stronger determinants of frequency of provider visits than patient characteristics, including indicators of health status. The authors developed a cohort of primary Medicare beneficiaries from the 2006 USRDS database, and assessed comorbid conditions by the presence or absence of Medicare claims 6 months before the initiation of the study using a modified Charlson comorbidity index (10). USRDS data were linked to population density and facility and nephrology care data from the rural urban commuting area codes obtained from the Dartmouth Atlas of Health (11). The primary unit of examination was every month a provider had ≥4 visits. Patient-months were excluded if patients were hospitalized for 2 more days, died, started dialysis, or ended dialysis. The authors used a statistical method termed
variation decomposition analysis to determine the relative importance of dialysis facility, geographic region, or patient characteristics to explain frequency of provider visit (12). The primary outcome was a dichotomized physician-patient frequency variable of ≥4 visits versus <4 visits per month. The authors found that only 0.9% of the variation of frequency visits was attributable to patient characteristics, whereas hemodialysis facilities accounted for approximately 24.9% of the variance and geographic region explained only 9.3% of the variance. Using logistic regression analyses, the authors found that age (50–75 and ≥75 years), black race, high comorbidity (≥5), facility size, advanced practitioners, and additional nephrologists were all associated with ≥4 visits per month. Facilities in small towns or rural areas were associated with 18% less odds of ≥4 visits per month (odds ratio, 0.82; 95% CI, 0.79 to 0.85), as were white and Native American race and recent hospitalizations. The authors conclude that hemodialysis provider visit frequency is influenced more by geography and facility characteristics rather than patient health status and “provider visit frequency practices do not reflect optimal management of patient on dialysis.”

Some concerns regarding the conclusions are warranted. The authors did not use all available information on dialysis patients available through the USRDS (13), such as baseline cause of ESRD, whether patients received predialysis care from a nephrologist, whether patients started with a catheter or arterial venous fistula, or the level of kidney function at dialysis initiation, all of which have been shown to be associated with dialysis outcomes. A further limitation is that the authors did not evaluate physician-visit frequency and other outcomes such as clinical performance measures (albumin, hemoglobin, or Kt/V), variables that may not be available in the USRDS database utilized for their analyses but that have also been associated with hospitalizations and mortality (14). However, because the authors used USRDS 2006 data, mortality could have been assessed over time. The authors used logistic regression to examine associations with frequency of dialysis visits per month; however, use of logistic regression models only allows one to ascertain associations but does not take into account the time to the event.

Variation decomposition analysis is a statistical method used for multilevel analysis that was initially intended for evaluation of variation in provider decision making, particularly as it relates to health services research and geographic variation in the use of medical procedures (12). The models are predicated on the presumption that multiple levels of decision making occur, which include input from patients, providers, and clinics, and allow profiling of health care providers. In this regard, the analysis by Erickson and colleagues takes into account patient- and facility-level characteristics, but does account for provider characteristics other than those associated with geographic region and closest hospital facility.

Geographic or regional variation has been shown to be associated with increased costs (15,16), intensity of health care treatment practices among older adults with ESRD (17), access to deceased donor kidney transplantation (18), and death and transplantation (19). Compared with urban patients, rural patients have less access to dialysis units and home dialysis therapies as well (20). Erickson and colleagues confirmed that geographic location was associated with less frequent patient visits by dialysis providers, which may be due to many reasons, such as fewer nephrologists in rural areas, difficulty with access to dialysis units, and distance to dialysis units. It would have been interesting to include distance from the nearest dialysis unit as a potential confounding variable in the analyses as well to determine whether this influences physician-patient visit frequency.

The authors state that although the optimal number of patient visits by physicians is not known, more frequent physician visits may lead to improvements in patient-related outcomes such as decreased catheter use, lower transplant waiting times, and higher patient satisfaction, some of which has been substantiated by prior work. One would assume that the higher number of physician visits is associated with improved outcomes, but the literature thus far only substantiates associations with decreased hospitalizations (4%) but not mortality. It would be interesting to conduct a sensitivity analysis to determine whether 2–3 or ≥4 visits versus 1 visit per month are associated with the best outcomes or if there is a plateauing of benefit. Regarding lowering transplant waiting time, their data show that African Americans were found to have more frequent visits but are known to have less access to transplantation than whites and are transplanted less frequently. Further research into these areas using available data would help to answer these questions.

In summary, Erickson and colleagues evaluated the association of frequency of nephrology provider patients visits across dialysis facilities nationwide and found that variation was most influenced by geography and less by patient characteristics and surrogates of patient health. Physicians in urban areas with more patients per dialysis units saw patients on average more frequently than providers in rural and smaller units. The results may reflect more on geographic difficulties with seeing patients 4 times per month and increased ease and potential competition of urban dialysis providers to see patients ≥4 times per month rather than optimal management of patients on dialysis. Validation of ≥4 visits as the gold standard for outpatient ESRD patient visits and further investigation of the association of visit frequency with clinical outcomes longitudinally are needed to confirm that more dialysis visits are associated with better short-term and long-term outcomes.

Acknowledgments

B.Y. is supported by resources from the Veterans Affairs Puget Sound Health Care System, Seattle, Washington. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Veterans Affairs Puget Sound.

Disclosures

None.

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Published online ahead of print. Publication date available at www.cjasn.org.

See related article, “Variation in nephrologist visits to patients on hemodialysis across dialysis facilities and geographic locations,” on pages 987-994.