

Home Hemodialysis: Bending the Utilization Curve With Novel Strategies

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Uptake of home hemodialysis (HHD) in North America lags behind that of other developed countries. While the incidence of peritoneal dialysis is climbing in the United States, the incidence of HHD remains stagnant,

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with HHD prevalence remaining <2% of the dialysis population.¹ Significant barriers to HHD can generally be divided into several categories: social, financial, regulatory, and educational (Box 1). Social barriers primarily relate to the patient; these include concerns of isolation, fear of a catastrophic event, “medicalization” of the home environment, and family or caregiver burden. Other barriers related to patients reflect the living situation, particularly if the patient lives in a space that is too small to accommodate the necessary equipment and supplies.

Financial barriers for patients include the costs of plumbing and electrical modifications to the home, ongoing utility costs (electricity and water use), and costs of transportation to the clinic for training. From the perspective of the dialysis provider, financial barriers are entwined to some degree with regulatory factors regarding reimbursement for training (of both patients and nurses) and continuous machine and supply costs. Regulations regarding training qualifications and oversight of home dialysis vary from state to state in the United States, further complicating the initiation and maintenance of HHD programs.

Perhaps the most significant impediment is the lack of education of nurses and especially physicians in the practice of HHD. Although exposure to HHD in fellowship programs has improved slightly during the past decade, there are still many nephrologists in this country uncomfortable prescribing HHD, particularly long nocturnal treatments. Because the attitude of professional caregivers has a profound influence on patients’ acceptance of home dialysis, it is imperative that we increase the level of awareness of and comfort with prescription of HHD in the United States. Recently enacted changes by Medicare Administrative Contractors have further complicated efforts to combine effective patient therapy and cost efficiencies.^{2,3}

Given the profound physiologic advantages with more intensive hemodialysis (HD), what can be done to improve uptake of nontraditional approaches to delivery of dialysis? The study by Walker et al⁴ in this issue of *Kidney Medicine* adds to the growing body of literature regarding alternative modes of delivery of more intensive HD. The authors have previously explored patient and caregiver

attitudes toward acceptance of HHD in New Zealand,⁵⁻⁷ the country with the highest proportion of HHD patients in the world. The concept of community dialysis houses arose after an analysis of potential disadvantages of HHD that excluded some patients from more intensive dialysis treatments. These houses represent an attempt to “capture” patients for whom dialysis at home is precluded by factors beyond their control, thereby allowing patients with insurmountable social barriers to HHD to still benefit from the improved quality of life associated with home dialysis.

The initial 2013 report from New Zealand of independent community house HD described 113 patients who participated in the community house dialysis experience over 10 years.⁸ The majority of patients were from urban centers and of lower socioeconomic status; they tended to be younger, of Maori or Pacific Island ethnic origin, less likely to have diabetes, and more likely to smoke than in-center patients. Outcomes were good, with similar adjusted mortality risk to a contemporary HHD cohort of more than 1,500 patients in New Zealand. Notably, 19 of the 113 patients in community house dialysis eventually transferred to HHD, suggesting that their initial experience increased their self confidence in dialyzing themselves at home, while only 12 of the 113 patients transferred to in-center HD.

In the present study, Walker et al⁴ interviewed 25 past and current community house HD patients to discuss their experiences. This was a thematic analysis, in which qualitative data were collected and examined for the purpose of pinpointing specific themes. An inductive approach was used; initial observations revealed patterns, leading to the development of hypotheses and eventual broad-based theories. The majority of patients were of Maori or Pacific ethnicity and worked either full- or part-time. Notably, and in contrast to earlier reports of this population, a significant proportion of patients dialyzed 20 or more hours per week, likely providing greater opportunity to derive physiologic benefits from more intensive dialysis. To what degree nocturnal treatments were used and whether treatments were remotely monitored is unclear from the present report. Although the original community houses were established in more remote areas, the paucity of patients made this a difficult model to sustain financially. The more successful community houses have been established in economically disadvantaged urban areas.

The themes generated from this approach fell into 4 general categories: (1) reduction in family or caregiver burden, (2) flexible scheduling of dialysis treatments (enabling employment or travel), (3) control of one’s health (ie, “self-efficacy”), and (4) community support,

Box 1. Barriers to Home Hemodialysis

Social	Financial	Regulatory/Facility Level	Educational
<ul style="list-style-type: none"> • Concerns of isolation • Fear of a catastrophic event • “Medicalization” of the home environment • Family or caregiver burden • Living situation factors 	<ul style="list-style-type: none"> • Plumbing and electricity modification costs • Utilities expenses • Transportation to the clinic for training • Inadequate storage space 	<ul style="list-style-type: none"> • Limited reimbursement for training • Expense of staff training • Cost of supplies • Uncertain reimbursement for more frequent sessions • Varying regulations for home dialysis by state 	<ul style="list-style-type: none"> • Nurse knowledge • Physician and physician extender knowledge • Patient and care partner knowledge

especially from peers—all concepts, not coincidentally, frequently used to inform patients of the benefits of HHD.⁹

Exploring these themes in depth, reduction in family burden sometimes referred to patients who preferred HHD but lived in a dwelling with inadequate infrastructure or space to accommodate equipment or supplies. These patients were reluctant to uproot their families to another location more suitable for HHD and viewed community houses as an acceptable compromise. For others, cultural traditions mandated removing signs of disease from the home environment, therefore maintaining a more normalized image for their children and neighbors. There were also patients who interpreted family burden as an economic one. Patients commented that the flexible scheduling of community houses enabled employment; this was an important theme in self-identity and the ability to financially support their families. An often underappreciated corollary to this is the societal benefit gained by patients maintaining employment and paying taxes.

Insofar as this is a self-selected population of patients, it is not surprising that many noted the importance of having control over their health outcomes and their strong need for independence. They appreciated the opportunity to perform extra treatments because of the flexible scheduling allowed by the community houses. In this way, they were able to avoid emergency department visits or repeated hospitalizations, conceivably resulting in cost savings to the health care system, although there is no comment in the report as to whether cost savings in this regard were realized. Some patients described the community houses as “a place of wellness” as opposed to their view of in-center dialysis clinics as “a place of sickness.” This further reinforced their wish to not be identified solely as “a renal patient.”

A number of patients commented on feeling a part of a community of peers in the dialysis houses. This is similar to the socialization seen in in-center dialysis units among patients on the same dialysis shift. The machines in the houses are generally shared by 2 patients, who collaboratively schedule their treatments around their respective needs. Some patients even convinced others to dialyze more hours weekly, noting their own improved sense of well-being when they did so. This is an important source of psychosocial support that is missing in HHD; some

community house patients who were eventually able to do HHD declined, citing the support and social network they were receiving as their main reason to not move their treatments to their own homes.

Interestingly, the interviewees reported no specific disadvantages of their experience in community dialysis houses. Perhaps cultural norms influenced patients’ reluctance to offer constructive criticism, particularly if they were still dialyzing in the community houses. This may also reflect the relative homogeneity of the community house patient population. It is conceivable that varying ethnic populations experience community house dialysis differently. Similarities could be made to groups with, on average, more socioeconomic disadvantage in the United States, including African American and Native American populations, who conceivably could greatly benefit from this model. Both populations have a relatively high incidence of kidney failure and relative underuse of home dialysis modalities. In our experience, the barriers are usually socioeconomic, including renting rather than owning a residence, inadequate income for home modifications and utilities, or inadequate space at home. Cultural factors will occasionally play a role, particularly involving perceived trustworthiness of professional caregivers. Critically, we have not found level of education, cause of end-stage kidney disease, or comorbid conditions to be reliable predictors of a patient’s ability to learn self-dialysis.

Community dialysis houses represent an opportunity to widen the circle of eligible patients receiving extended-hours dialysis with self-care. If successful, the community house model has the potential to significantly increase uptake of more frequent dialysis, particularly within minority and socioeconomically disadvantaged populations. Another interesting option would be to meld the concept of community house dialysis with the Canadian model of assisted HHD. This would allow stable dialysis patients with some barriers to HHD to achieve the health benefits of more intensive dialysis, with more flexible scheduling options.

Does this thematic analysis point the way to wider use of community houses? That answer remains unknown; as the authors point out, a major limitation of this study was the ethnic homogeneity of the patients, although this

probably enabled commonality of themes generated. It also would have been helpful to interview patients who left the community houses and converted to in-center HD, and their reasons for doing so. Although the themes explored mirrored many of those seen with HHD, it is not immediately apparent that this concept could be applied to a more heterogeneous patient population, or even a patient population of another ethnicity.

Would this model succeed in the United States? New Zealand has a mixed public-private health system, with dialysis services generally funded by government monies. The community houses are established and funded collaboratively between government and charitable institutions; the former being responsible for the provision of equipment and supplies and the latter assuming responsibility for the purchase and maintenance of the house.

Surprisingly, despite the absence of personnel costs, the community house dialysis is slightly more expensive per patient on an annual basis when compared with in-center HD. However, this figure does not take into account likely lower costs for emergency dialysis visits and recurrent hospitalizations, as well as the societal benefits of greater employment. Certainly, an initial foray into community house dialysis in the United States would need to occur in an urban setting, within a population that had expressed an interest in participating. Because this type of dialysis is neither truly in-center nor home, new payment structures would need to be authorized by the Centers for Medicare & Medicaid Services. Additionally, Medicare Administrative Contractor guidelines regarding dialysis frequency and payment would be applicable to this model and could have a significant adverse operational impact on these facilities. Financial support from the government would be critical to its success; from a public health standpoint, this is a potential step toward improving the standard of care for underserved minorities and increasing the uptake of more frequent dialysis among these populations. Critically, these objectives therefore reflect both the Center for Medicare and Medicaid Innovation's recognition of the need to improve the care of patients on dialysis, as well as President Trump's recent executive order intended to increase the number of patients choosing home-based modalities,¹⁰ with community house dialysis offering a compelling model to help achieve these goals.

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REFERENCES

1. Saran R, Robinson B, Abbott KC, et al. US Renal Data System 2018 Annual Data Report: epidemiology of kidney disease in the United States. *Am J Kidney Dis.* 2019;73(3):A7-A8.
2. Wilk AS, Hirth RA, Messana JM. Paying for frequent hemodialysis. *Am J Kidney Dis.* 2019;74(2):248-255.
3. Evans V. Frequent home dialysis: more is better. *Kidney Med.* 2019;1(2):41-42.
4. Walker RC, Tipene-Leach D, Graham A, Palmer SC. Patients' experiences of community house hemodialysis: a qualitative study. *Kidney Med.* 2019;1(6):338-346.
5. Walker RC, et al. Patient and caregiver perspectives on home hemodialysis: a systematic review. *Am J Kidney Dis.* 2015;65(3):451-463.
6. Walker RC, Hanson CS, Palmer SC, et al. Patient and caregiver values, beliefs and experiences when considering home dialysis as a treatment option: a semi-structured interview study. *Nephrol Dial Transplant.* 2016;31:133-141.
7. Walker RC, Howard K, Morton R, et al. Home hemodialysis: a comprehensive review of patient-centered and economic considerations. *Clinicoecon Outcomes Res.* 2017;9:149-161.
8. Marshall MR, van der Schrieck N, Liley D, et al. Independent community house hemodialysis as a novel dialysis setting: an observational cohort study. *Am J Kidney Dis.* 2013;61(4):598-607.
9. Cafazzo JA, Leonard K, Easty AC, et al. Patient-perceived barriers to the adoption of nocturnal home hemodialysis. *Clin J Am Soc Nephrol.* 2009;4:784-789.
10. Executive Order on Advancing American Kidney Health. <https://www.whitehouse.gov/presidential-actions/executive-order-advancing-american-kidney-health/>. Accessed July 20, 2019.