Examining Demographic Factors Influencing the Choice of Dialysis Modalities in Patients with End-Stage Renal Disease

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Introduction

Dialysis serves to remove waste and excess fluid from the body in patients with end-stage renal disease (ESRD). Patients with ESRD have two primary options for dialysis: in-center or home dialysis, which can include both home hemodialysis and peritoneal dialysis. There is an increasing number of studies that show advantages of home dialysis.

Many studies have documented significant quality-of-life benefits in patients who dialyze at home.[1-3] Patients undergoing in-center dialysis are in a clinic 3 days a week for 3-4 hours. As a result, they have less freedom and flexibility as compared to home dialysis patients who can dialyze overnight in the comfort of their own home.

In addition, there are numerous findings of home dialysis having lower costs than in-center.[3-5]

Despite clear advantages to dialyzing at home, multiple researchers have found disparities among dialysis modalities, particularly in the African American community.[6-8]
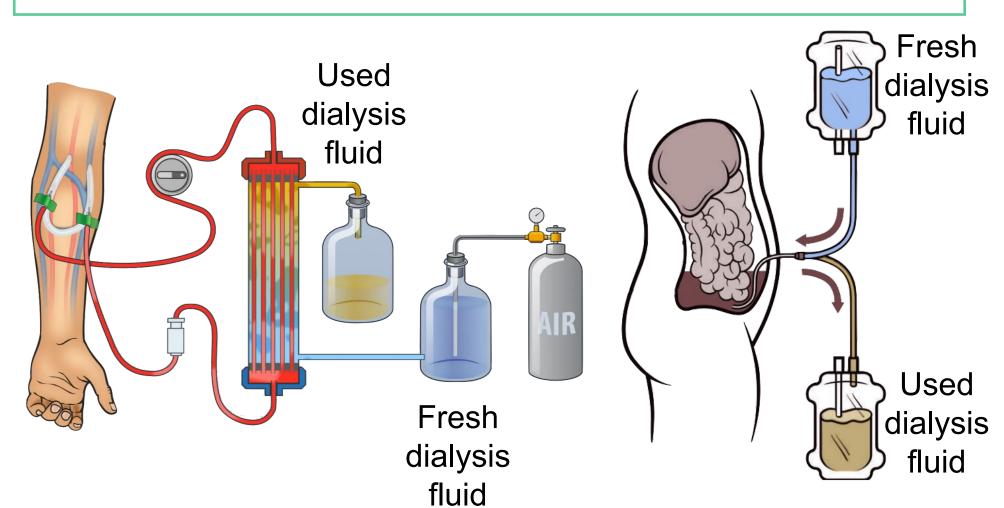
Figure 1. Hemodialysis model.   **Figure 2. Peritoneal dialysis model.**

Used dialysis fluid
Fresh dialysis fluid
AIR
Fresh dialysis fluid
Used dialysis fluid

Objective

Our study aims to investigate the influence of demographic factors on choice of dialysis.

Methods

The study was approved by the LSUHSC-NO IRB. The study population was a convenience sample that consisted of LSU Nephrology patients at selected DaVita dialysis units across the New Orleans metro area. Patients were presented with a standardized survey with no identifiers other than zip code. The variables of interest included age, sex, race, education level, employment status before beginning dialysis, and health insurance. Upon completion, surveys were reviewed and uploaded into a REDCap database for analysis. Patients were grouped into those who performed dialysis at home and in-center as their first dialysis modality of choice. Between group comparisons for age were made by t-test. Between group comparisons for the other variables were made by Pearson Chi-Squares. Binomial logistic regression was used to do multivariate analysis. SPSS ver was used to conduct all analysis.
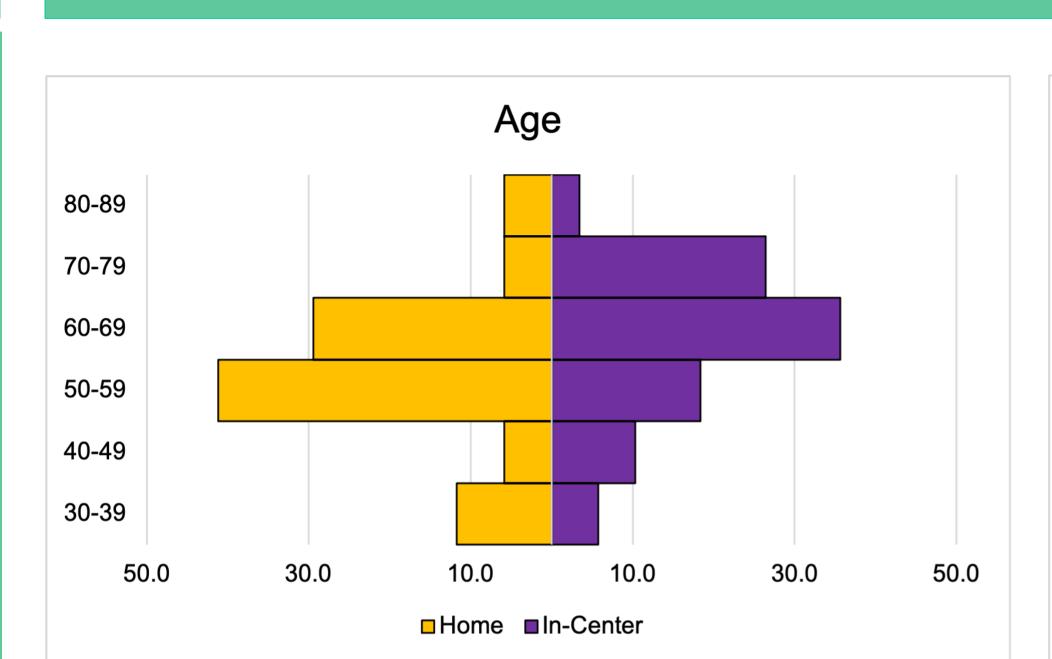
Results

Age

Figure 3. Distribution of age between in-center patients and home patients. Values are percentages. In-center dialysis patients tended to be older than home dialysis patients. Average age of in-center patients (62.07 ± 11.68) is greater than average age of home patients (58.82 ± 12.74).

Sex

Figure 4. Distribution of sex between in-center patients and home patients. Values are percentages. There are slight differences in sex between the two groups. In the study group, more males were on in-center dialysis (43.33% in-center vs. 41.18% home), and more females were on home dialysis (56.67% in-center vs. 58.82% home). No significant observations are made.
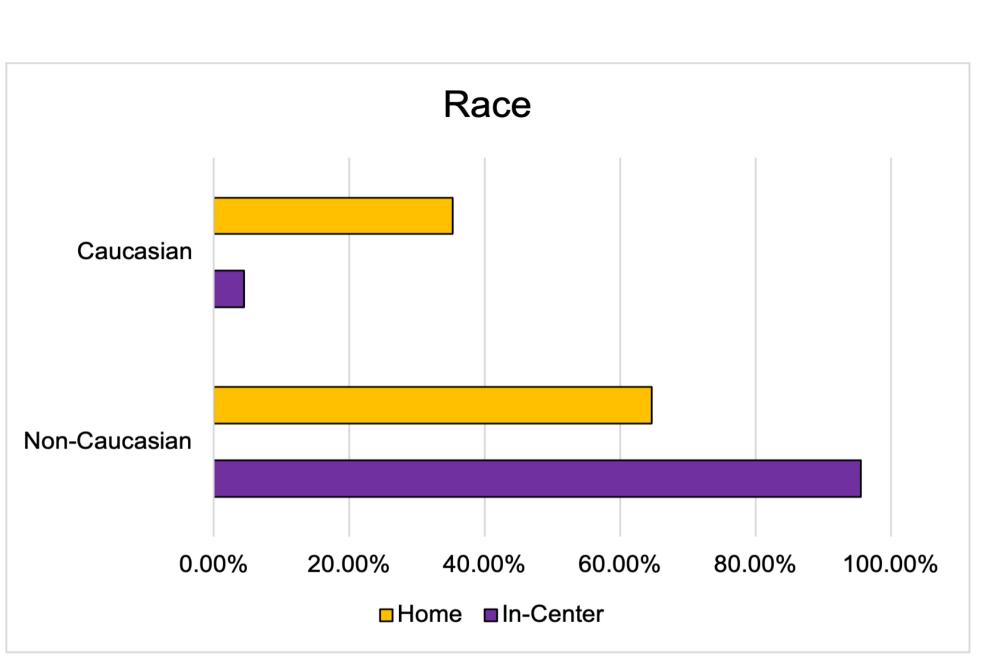
Race

Figure 5. Distribution of race between in-center patients and home patients. Values are percentages. In both groups, patients were more likely to be Non-Caucasian. The in-center dialysis patient group had a greater proportion of Non-Caucasian patients in comparison to the home dialysis patient group (95.56% in-center vs. 64.71% home).
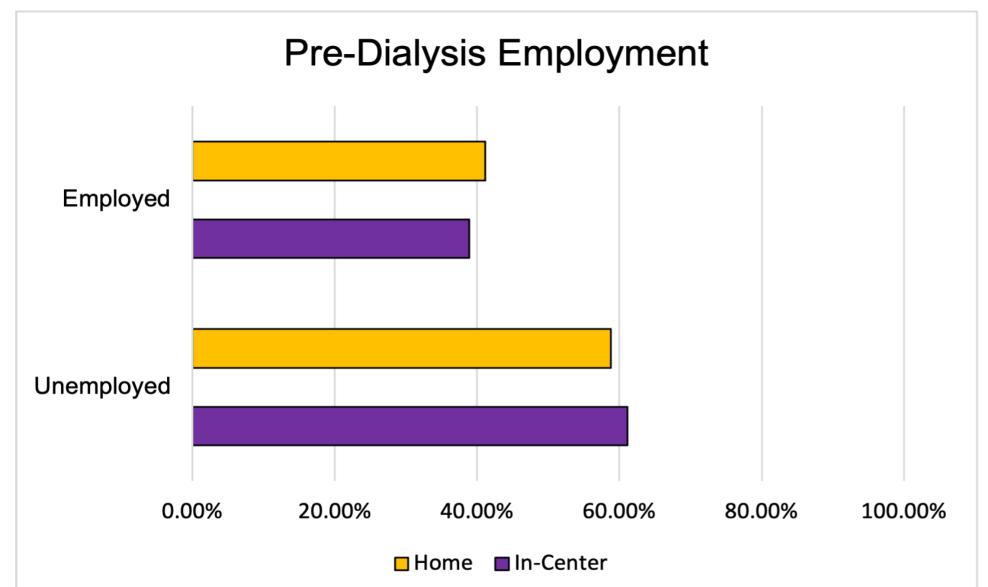
Education

Figure 6. Distribution of education between in-center patients and home patients. Values are percentages. Compared to in-center, patients who dialyzed at home had higher levels of education (undergraduate or more: 4.44% in-center vs. 41.18% home). A large majority of in-center patients had little to no college education (95.56%).

Pre-Dialysis Employment

Figure 7. Distribution of pre-dialysis employment status between in-center patients and home patients. Values are percentages. Compared to in-center patients, home dialysis patients were slightly more likely to be employed before beginning dialysis (38.89% in-center vs. 41.18% home). In-center patients were more likely to be unemployed than employed.
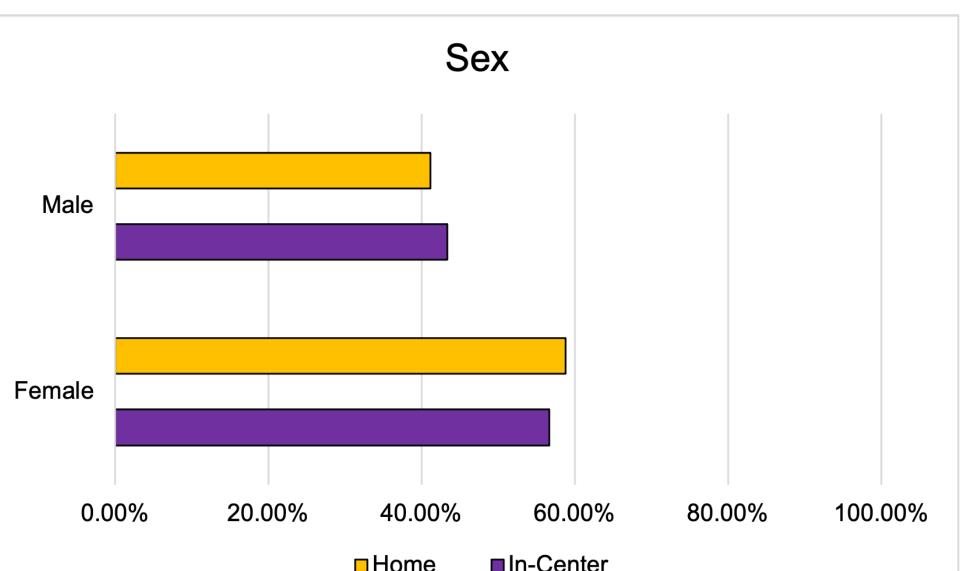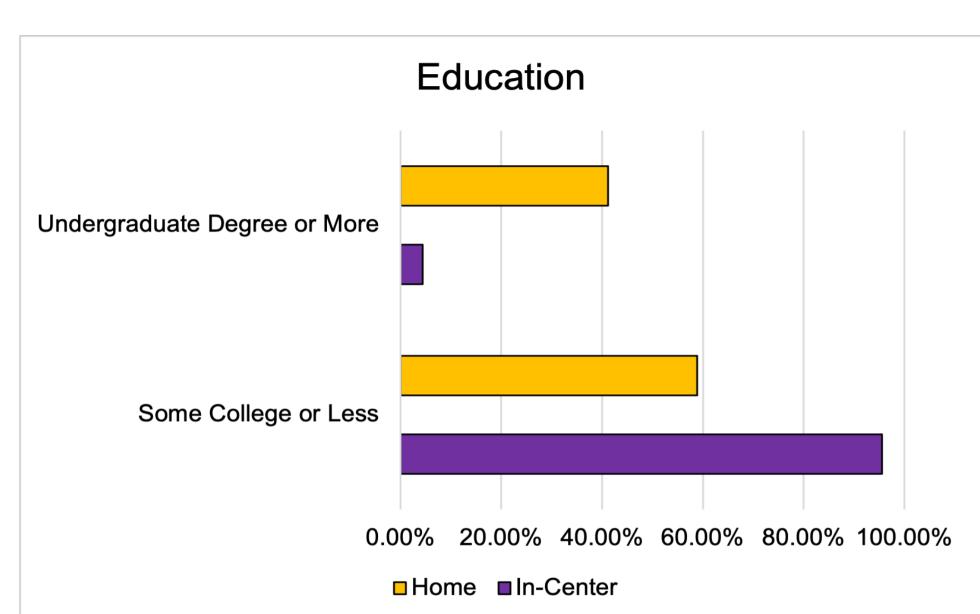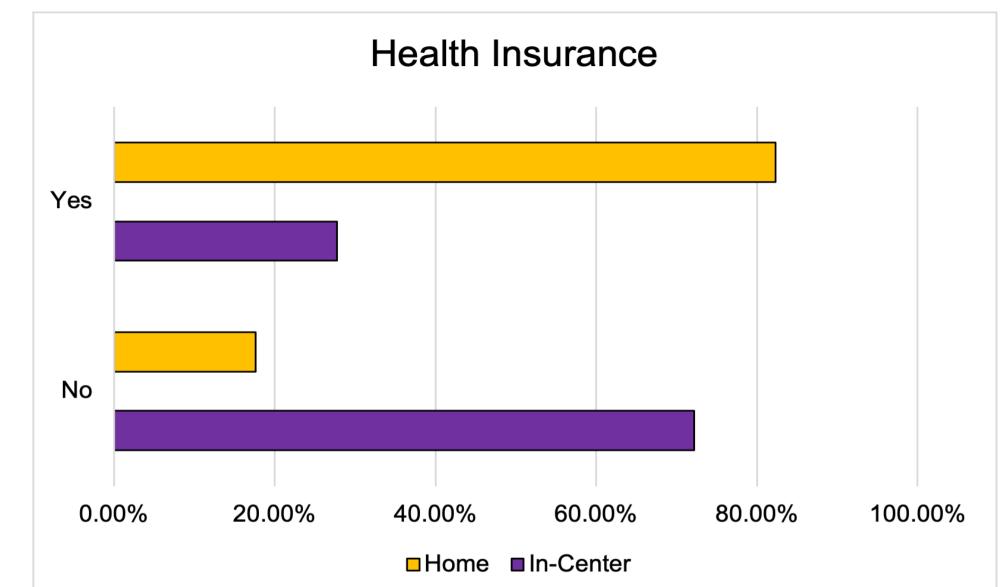
Health Insurance

Figure 8. Distribution of health insurance between in-center patients and home patients. Values are percentages. Data shows greatly opposing responses with a vast number of in-center patients not having health insurance (72.22%) and a large portion of home patients having health insurance (82.35%).

Variable	In-Center	Home	P-Value
Age	62.07 ± 11.68	58.82 ± 12.74	0.34
Sex			0.87
Male	43.33%	41.18%	
Female	56.67%	58.82%	
Race			<0.001
Caucasian	4.44%	35.29%	
Non-Caucasian	95.56%	64.71%	
Education			<0.001
Undergraduate Degree or More	4.44%	41.18%	
Some College or Less	95.56%	58.82%	
Pre-Dialysis Employment			0.96
Employed	38.89%	41.18%	
Unemployed	61.11%	58.82%	
Health Insurance			<0.001
Yes	27.78%	82.35%	
No	72.22%	17.65%	

Table 1. T-test for age values and Pearson Chi-Square test between in-center patients and home patients. The age differences between groups was not significant with P= 0.34. Between in-center and home patients, the differences in race, education, and health insurance were significant (P<0.001 for each). The differences in sex (P= 0.87) and in pre-dialysis employment (P=96) were not significant.

Variable	Sig.
Age	0.840
Sex	0.094
Race	0.025
Education	0.005
Pre-Dialysis Employment	0.191
Health Insurance	0.004

Table 2. Binomial logistic regression test between in-center patients and home patients. A multivariate logistic regression test shows the differences in race, education, and health insurance to be significant between in-center and home dialysis patients.

Conclusion

Our findings demonstrate that race, education, and health insurance were strong predictors of home dialysis. Our survey needs to be repeated in a larger sample size and an unselected patient population for validation. Qualitative studies such as focus groups should be completed to further find what factors influence these decisions on dialysis modalities.

References

1: Noshad H, et al. Comparison of outcome and quality of life: haemodialysis versus peritoneal dialysis patients, *Singapore Med J*. 2009; 50(2): 185-192.
2: Jung H, et al. Better Quality of Life of Peritoneal Dialysis compared to Hemodialysis over a Two-year Period after Dialysis Initiation, *Scientific Reports*. 2019; 9:10266.
3: François, K & Bargman, JM. Evaluating the benefits of home-based peritoneal dialysis, *International Journal of Nephrology and Renovascular Disease*. 2014; 4: 447-455.
4: Karopadi, et al. Cost of peritoneal dialysis and haemodialysis across the world, *Nephrology Dialysis Transplantation*. 2013; 28(10): 2553-2569.
5: Klomjit N, et al. The Cost-effectiveness of Peritoneal Dialysis Is Superior to Hemodialysis: Updated Evidence From a More Precise Model, *Kidney Med*. 2021; 3(1): 15-17.
6: King A, et al. Renal Replacement Knowledge and Preferences for African Americans with Chronic Kidney Disease, *J Ren Care*. 2020; 46(3): 151-160.
7: Saran R, 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 Suppl 1): A7-A8.
8: Wallace, EL, et al. Home Dialysis Utilization Among Racial and Ethnic Minorities in the United States at the National, Regional, and State Level, *Perit Dial Int*. 2017; 37(1): 21-29.