Published in final edited form as:
J Ren Nutr. 2007 July ; 17(4): 264–268.

THE PREVALENCE AND NUTRITIONAL IMPLICATIONS OF FAST FOOD CONSUMPTION AMONG HEMODIALYSIS PATIENTS

Saud Butt, MD[1,2], **Janeen B. Leon, MS, RD, LD**[1,6], **Carol L. David, MS, RD, LD**[4], **Henry Chang**[1], **Sanbir Sidhu**[1], and **Ashwini R. Sehgal, MD**[1,2,3,5,6,7]

1*Division of Nephrology, MetroHealth Medical Center, Cleveland, Ohio*

2*Department of Medicine, Case Western Reserve University, Cleveland, Ohio*

3*Department of Epidemiology and Biostatistics, Case Western Reserve University*

4*Department of Nutrition, Case Western Reserve University*

5*Department of Biomedical Ethics, Case Western Reserve University*

6*Center for Reducing Health Disparities, Case Western Reserve University*

7*Center for Health Care Research and Policy, Case Western Reserve University*

Abstract

Background—Fast food consumption has increased dramatically in the general population over the last 25 years. However, little is known about the prevalence and nutritional implications of fast food consumption among hemodialysis patients.

Methods—Using a cross-sectional study design, we obtained data on fast food consumption and nutrient intake (from four separate 24-hour dietary recalls) and nutritional parameters (from chart abstraction) for 194 randomly selected patients from 44 hemodialysis facilities in northeast Ohio.

Results—Eighty-one subjects (42%) reported consuming at least one fast food meal or snack in four days. Subjects who consumed more fast food had higher kilocalorie, carbohydrate, total fat, saturated fat, and sodium intakes. For example, kilocalorie per kilogram intake per day increased from 18.9 to 26.1 with higher frequencies of fast food consumption (p=.003). Subjects who consumed more fast food also had higher serum phosphorus levels and interdialytic weight gains.

Conclusion—Fast food is commonly consumed by hemodialysis patients and is associated with a higher intake of kilocalories, carbohydrates, fats, and sodium and adverse changes in phosphorus and fluid balance. Further work is needed to understand the long-term benefits and risks of fast food consumption among hemodialysis patients.

Keywords

Fast Food; End Stage Renal Disease; Hemodialysis; Nutrition

Address communications to: Ashwini Sehgal, MD, Division of Nephrology, MetroHealth Medical Center, 2500 MetroHealth Drive, Cleveland, OH 44109. Phone 216-778-7728, Fax 216-778-8401, E-mail axs81@cwru.edu

Potential conflicts of interest: None.

NIH-PA Author Manuscript
NIH-PA Author Manuscript

INTRODUCTION

Fast food consumption has increased dramatically in the general population over the last 25 years.[1] Americans currently consume an average of 0.27 fast food meals per day.[2] This is a likely contributor to the increased prevalence of obesity, with 30% of Americans now having a body mass index ≥30 kg/m².[2] Moreover, fast food consumption tends to be associated with an excess intake of undesirable nutrients (sugar, sodium, saturated and trans fats) and a reduced intake of desirable nutrients (e.g. vitamins and minerals from fruits and vegetables, calcium, fiber).[3]

Among hemodialysis patients, fast food consumption may influence three important conditions: obesity, cardiovascular disease, and malnutrition. About one-third of hemodialysis patients are obese and over one-half have cardiovascular disease.[4,5] Fast food consumption may contribute to obesity and cardiovascular disease among such patients. However, at least one-third of hemodialysis patients suffer from protein-calorie malnutrition.[6,7] While the etiology of malnutrition among dialysis patients is incompletely understood, inadequate nutritional intake appears to play an important role.[7] The convenience, affordability, palatability, and high caloric density of fast food may help to increase dietary intake among such patients.

Neither the patterns of fast food consumption nor their nutritional implications have been examined among hemodialysis patients. We therefore conducted a cross-sectional study to determine the frequency and implications of fast food consumption among hemodialysis patients. Because malnourished patients may potentially benefit from fast food consumption, we focused on patients with low albumin levels. We categorized an establishment as serving fast food if 2 of the following 4 criteria were present: a permanent menu board is provided from which to select and order food, customers pay for food before consuming it, a self-service condiment bar is provided, and most main course food items are prepackaged rather than made to order.[8]

METHODS

Subjects

We conducted the study from 2002–2004 at all 44 chronic hemodialysis facilities in northeast Ohio as part of a larger project to examine patients with low albumin levels.[9] At each facility, we identified patients who were age 18 or older, had been on dialysis at least 9 months, and had a serum albumin of <3.7 g/dL (37 g/L) with the bromcresol green method or <3.4 g/dL (34 g/L) with the bromcresol purple method. We excluded patients new to dialysis because the first several months are a time when patients are adapting to the renal diet. The institutional review board of MetroHealth Medical Center approved this study.

Data Elements

Each patient was asked to complete two separate 24-hour recalls at baseline (one dialysis day and one non-dialysis day) and two more 24-hour recalls four months later (one dialysis day and one non-dialysis day). Dietary recalls are structured interviews that elicit from subjects a detailed list of all the food items consumed by them over the previous 24 hours. Dialysis day dietary recalls were administered by telephone and non-dialysis day dietary recalls were administered in person by trained study coordinators. Subject responses are analyzed with the aid of nutrient database software to calculate macro- and micro-nutrient intake. Because intake varies from day to day, averaging the results of multiple recalls is necessary to accurately assess nutrient intake.[10] As part of the 24-hour recalls, we asked patients to specify whether each food item was obtained from a fast food restaurant.

From each patient's dialysis facility medical record, we obtained baseline demographic and medical characteristics as well as all measurements of serum albumin, serum potassium, serum phosphorus, and pre- and post-dialysis weights over a four month interval. Serum levels were generally measured monthly while weights were assessed before and after each dialysis treatment. A trained study coordinator also performed a subjective global assessment on all patients at baseline. Subjective global assessment involves integrating several subjective and objective aspects of a brief medical history and physical examination into a single global rating of nutritional status. Patients are classified as well nourished, moderately malnourished, and severely malnourished.[11,12]

A trained research dietitian analyzed 24-hour recalls using ESHA Food Processor SQL software (Version 9, Salem, OR). Macro- and micro-nutrients, as well as serum levels of nutritional parameters and subject weights were averaged over the four month interval. The number of fast food meals per day was calculated by summing the number of days of data collection that a patient ate fast food and dividing by the number of days of data collection. For example, if a patient had eaten two fast food meals on four different days, then they would be assigned 0.5 fast food meals per day. We used the chi square test, analysis of variance, and the Spearman correlation coefficient to examine the univariate relationship between fast food consumption and variables related to subject characteristics, nutrient intake, and nutritional parameters. We used multiple linear regression to perform multivariate analyses.

RESULTS

Subject Characteristics

Of 348 patients who met the eligibility criteria, 194 completed all study tasks, 140 declined to participate, and 14 dropped out, expired, or moved before completing study tasks. Demographic and medical characteristics of participating subjects are in Table 1. Their mean age was 61 years, and the most common cause of renal failure was diabetes.

Fast Food Consumption

Eighty-one subjects (42%) reported consuming at least one fast food meal or snack on one of the four days of dietary collection. On univariate analysis (Table 2), higher intakes of fast food consumption was associated with younger age and longer time on dialysis. For example, subjects age 18-44 years reported consuming 0.30 fast food meals per day while subjects age 65 years or older reported consuming 0.15 fast food meals per day (p=.003). On multivariate analysis, age and race were independently associated with fast food consumption. For every ten year increase in age, fast food consumption decreased by 0.06 meals per day (p<.001). In addition, white subjects consumed 0.08 more fast food meals per day than black subjects (p=.02).

Nutrient Intake

Subjects who consumed fast food more frequently were likely to have higher kilocalorie, carbohydrate, total fat, saturated fat, and sodium intake (Table 3). For example, subjects who did not eat fast food had a daily intake of 18.9 kilocalories per kilogram while subjects who ate an average of 0.75 or more fast food meals per day had an intake of 26.1 kilocalories per kilogram (p=.003). The increase in kilocalories was primarily from increases in carbohydrate and fat intake. Although there was a trend toward higher protein intake with higher frequencies of fast food consumption, this was not statistically significant. Sodium intake also increased from 2210 mg/day to 3040 mg/day with higher frequencies of fast food consumption (p=.001).

Nutritional Parameters

Subjects who consumed more fast food were more likely to have higher serum phosphorus levels and higher interdialytic weight gains (Table 4). For example, subjects who did not eat fast food had a serum phosphorus level of 5.2 mg/dL (1.68 mmol/L) while subjects who ate an average of 0.75 or more fast food meals per day had a serum phosphorus level of 6.6 mg/dL (2.13 mmol/L) (p=.001). Similarly, interdialytic weight gain increased from 3.4% of dry weight to 4.5% with higher frequencies of fast food consumption (p=.03). There was no statistically significant relationship between fast food consumption and serum albumin, serum potassium, body mass index, or subjective global assessment.

DISCUSSION

We found that fast food is commonly consumed by hemodialysis patients, especially by younger and white patients. Fast food consumption is associated with a higher calorie intake, primarily from carbohydrates and fat. Patients consuming fast food also have higher sodium intake and higher interdialytic weight gains. In addition, fast food consumption is associated with higher serum phosphorus levels.

Our patient sample was drawn from all 44 chronic hemodialysis facilities in northeast Ohio. While our subjects are more likely to be black than dialysis patients nationally, the large sample size ensured that white patients were well represented. Other demographic and medical characteristics are comparable to patients nationally. To further enhance the precision of our results, we obtained multiple dietary recalls and multiple measures of nutritional parameters for each patient.

Our results highlight the nutritional trade-offs inherent in fast food consumption among dialysis patients. Fast food may be a convenient, inexpensive, and palatable way to increase caloric intake.[13] This may be a benefit for malnourished patients with inadequate dietary intakes. However, the nutrient quality of fast food is suboptimal. While inadequate intakes of both calories and protein contribute to malnutrition, we found that consumption of fast food was associated with higher caloric intake but not with higher protein intake. Excess caloric intake may contribute to obesity while excess sodium intake may contribute to interdialytic weight gain. Both of these, along with the hyperphosphatemia and higher saturated fat intake that we observed, may in turn increase the risk of cardiovascular disease. Although only a small percentage of the general population has end stage renal disease, hyperphosphatemia may contribute to cardiovascular and bone disease among the 10 million Americans with moderate kidney disease.[14] In the general population, dietary intakes of phosphorus have been increasing while intakes of calcium have been decreasing.[15] There is evidence to suggest that these intake patterns interfere with the normal process of calcium regulation and affect peak bone mass and rate of bone loss even among individuals with normal renal function.[15,16]

Hemodialysis patients are instructed to restrict their phosphorus intake to 800–1000 mg/day. However, we found that patients who consumed 0.75 or more fast food meals per day had a phosphorus intake of 1100 mg/day. Although there was a trend toward a higher dietary phosphorus intake with higher frequencies of fast food consumption, this was not statistically significant (Table 3). Yet, there was a significant higher serum phosphorus level with higher frequencies of fast food consumption (Table 4). We speculate that this paradoxical finding may be due to the increasing presence of easily absorbed phosphorus-containing food additives in processed foods. If such additives are not adequately represented in nutrient composition databases, then nutrient analytic software (such as the ESHA Food Processor SQL software that we used) may underestimate actual dietary phosphorus intake.[17] Few fast food restaurant chains have publicly available phosphorus content data, therefore nutrient composition databases are unable to report the phosphorus content of brand-specific fast foods. As a result, neither patients nor dietitians may be able to accurately estimate the phosphorus content of fast foods. We recommend that fast food purveyors analyze menu items to make phosphorus content data available to the public.

Limitations of our study include a modest sample size, exclusion of patients with higher albumin levels, a focus on a single geographic area, and lack of long-term followup. The topics addressed by this study should be examined among other patients and geographical areas.

In conclusion, fast food is commonly consumed by hemodialysis patients and is associated with a higher intake of kilocalories, carbohydrates, fats, and sodium and adverse changes in phosphorus and fluid balance. We recommend that fast food purveyors analyze their menu offerings for phosphorus content, prominently display nutrient content at point of purchase, and provide food labels on fast food items to help patients comply with instructions to restrict dietary sodium and phosphorus intake. Further work is needed to understand the long-term benefits and risks of fast food consumption among hemodialysis patients.

Acknowledgements

Supported by grants DK51472 and GCRC M01 RR00080 from the National Institutes of Health, Bethesda, MD, and by the Leonard C. Rosenberg Renal Research Foundation, Cleveland, OH.

REFERENCES

1. National Restaurant Association. National Restaurant Association Says 2006 Sales Will Exceed Half-Trillion Dollar Mark for Nation's Largest Private-Sector Employer. [Accessed: May 31, 2006]. Available at: http://www.restaurant.org/pressroom/pressrelease.cfm?ID=1176
2. Pereira MA, Kartashov AI, Ebbeling CB, et al. Fast-food habits, weight gain, and insulin resistance (the CARDIA study): 15-year prospective analysis. Lancet 2005;365(9453):36–42. [PubMed: 15639678]
3. Paeratakul S, Ferdinand DP, Champagne CM, et al. Fast-food consumption among US adults and children: dietary and nutrient intake profile. J Am Diet Assoc 2003;103(10):1332–1338. [PubMed: 14520253]
4. Kramer HJ, Saranathan A, Luke A, et al. Increasing body mass index and obesity in the incident ESRD population. J Am Soc Nephrol 2006;(17):1453–1459. [PubMed: 16597682]
5. Longenecker JC, Coresh J, Klag M, et al. Validation of comorbid conditions on the end-stage renal disease medical evidence report. J Am Soc Nephrol 2000;(11):520–529. [PubMed: 10703676]
6. Lowrie EG, Lew NL. Death risk in hemodialysis patients: the predictive value of commonly measured variables and an evaluation of death rate differences between facilities. Am J Kidney Dis 1990;15(5): 458–482. [PubMed: 2333868]
7. Bossola M, Muscaritoli M, Tazza L, et al. Malnutrition in hemodialysis patients: what therapy? Am J Kidney Dis 2005;46(3):371–386. [PubMed: 16129199]
8. Chapter 65. Zoning Code--Land Use Definitions and Development Standards. Section 65.615. [Accessed: May 31, 2006]. Available at: http://www.stpaul.gov/code/lc065.html#sec65.615
9. Leon JB, Albert JM, Gilchrist G, et al. Improving albumin levels among hemodialysis patients: a community-based randomized controlled trial. Am J Kidney Dis. In press
10. Willett, W. Nutritional Epidemiology. ed 2. New York, NY: Oxford University Press; 1998.
11. Steiber AL, Kalantar-Zadeh K, Secker D, et al. Subjective global assessment in chronic kidney disease: a review. J Ren Nutr 2004;14(4):191–200. [PubMed: 15483778]
12. Detsky AS, McLaughlin JR, Baker JP, et al. What is subjective global assessment of nutritional status? J Parenter Enteral Nutr 1987;11:8–13.
13. Brantley PJ, Myers VH, Roy HJ. Environmental and lifestyle influences on obesity. J La State Med Soc 2005;157(1):S19–S27. [PubMed: 15751906]
14. Mehrotra R. Disordered mineral metabolism and vascular calcification in nondialyzed chronic kidney disease patients. J Ren Nutr 2006;16(2):100–118. [PubMed: 16567266]

NIH-PA Author Manuscript
NIH-PA Author Manuscript

15. Calvo MS, Park YK. Changing phosphorus content of the U.S. diet: potential for adverse effects on bone. J Nutr 1996;126(4 Suppl):1168S–1180S. [PubMed: 8642452]
16. Calvo MS, Kumar R, Heath H. Persistently elevated parathyroid hormone secretion and action in young women after four weeks of ingesting high phosphorus, low calcium diets. J Clin Endocrinol Metab 1990;70(5):1334–1340. [PubMed: 2335575]
17. Uribarri J, Calvo M. Hidden sources of phosphorus in the typical American diet: does it matter in nephrology? Semin Dial 2003;16(3):186–188. [PubMed: 12753675]

Table 1.

Subject characteristics (n=194).

<table>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Mean age, years|]]</td><td>[[61|]]</td><td>[[(31–85)|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Female, %|]]</td><td>[[58|]]</td><td>[[|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Race, %|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Black|]]</td><td>[[53|]]</td><td>[[|]]</td></tr>
<tr><td>[[White|]]</td><td>[[43|]]</td><td>[[|]]</td></tr>
<tr><td>[[Other|]]</td><td>[[4|]]</td><td>[[|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>Cause of renal failure, %</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Diabetes mellitus|]]</td><td>[[47|]]</td><td>[[|]]</td></tr>
<tr><td>[[Hypertension|]]</td><td>[[23|]]</td><td>[[|]]</td></tr>
<tr><td>[[Glomerulonephritis|]]</td><td>[[19|]]</td><td>[[|]]</td></tr>
<tr><td>[[Other|]]</td><td>[[11|]]</td><td>[[|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>Mean time on dialysis, years</td><td>[[2.9|]]</td><td>[[(0.5–18)|]]</td></tr>
</table>

Table 2.

Relationship between fast food consumption and subject characteristics.

[[|]]	[[n|]]	Number of Fast Food Meals per day	[[p value|]]
[[|]]	[[|]]	[[|]]	[[|]]
[[Age, years|]]	[[|]]	[[|]]	[[.003|]]
[[18–44|]]	[[29|]]	[[0.30|]]	[[|]]
[[45–54|]]	[[34|]]	[[0.23|]]	[[|]]
[[55–64|]]	[[45|]]	[[0.13|]]	[[|]]
[[65+|]]	[[86|]]	[[0.15|]]	[[|]]
[[|]]	[[|]]	[[|]]	[[|]]
[[|]]	[[|]]	[[|]]	[[|]]
[[Gender|]]	[[|]]	[[|]]	[[.88|]]
[[Female|]]	[[112|]]	[[0.18|]]	[[|]]
[[Male|]]	[[82|]]	[[0.19|]]	[[|]]
[[|]]	[[|]]	[[|]]	[[|]]
[[Race|]]	[[|]]	[[|]]	[[.14|]]
[[Black|]]	[[103|]]	[[0.16|]]	[[|]]
[[White|]]	[[84|]]	[[0.21|]]	[[|]]
[[Other|]]	[[7|]]	[[0.04|]]	[[|]]
[[|]]	[[|]]	[[|]]	[[|]]
Cause of renal failure	[[|]]	[[|]]	[[.65|]]
[[Diabetes mellitus|]]	[[91|]]	[[0.17|]]	[[|]]
[[Hypertension|]]	[[45|]]	[[0.15|]]	[[|]]
[[Glomerulonephritis|]]	[[36|]]	[[0.22|]]	[[|]]
[[Other|]]	[[22|]]	[[0.21|]]	[[|]]
[[|]]	[[|]]	[[|]]	[[|]]
Time on dialysis, years	[[|]]	[[|]]	[[.06|]]
[[0.5–0.9|]]	[[41|]]	[[0.10|]]	[[|]]
[[1.0–1.9|]]	[[50|]]	[[0.18|]]	[[|]]
[[2.0–3.9|]]	[[49|]]	[[0.20|]]	[[|]]
[[4.0+|]]	[[54|]]	[[0.23|]]	[[|]]

NIH-PA Author Manuscript
NIH-PA Author Manuscript

Table 3.

Relationship between fast food consumption and nutrient intake.

<table>
<tr><th>[[|]]</th><th colspan="4">Number of Fast Food Meals per Day</th><th>[[|]]</th></tr>
<tr><th>[[Nutrient Intake Parameters|]]</th><th>[[None (n=113)|]]</th><th>[[0.25–0.49 (n=47)|]]</th><th>[[0.50–0.74 (n=21)|]]</th><th>[[0.75+ (n=13)|]]</th><th>[[p value|]]</th></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Kilocalories/day/kg|]]</td><td>[[18.9|]]</td><td>[[22.1|]]</td><td>[[23.6|]]</td><td>[[26.1|]]</td><td>[[.003|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Protein, g/day/kg|]]</td><td>[[0.81|]]</td><td>[[0.85|]]</td><td>[[0.95|]]</td><td>[[1.01|]]</td><td>[[.08|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Carbohydrate, g/day/kg|]]</td><td>[[2.19|]]</td><td>[[2.71|]]</td><td>[[2.52|]]</td><td>[[3.06|]]</td><td>[[.01|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Fat, g/day/kg|]]</td><td>[[0.78|]]</td><td>[[0.89|]]</td><td>[[1.09|]]</td><td>[[1.12|]]</td><td>[[<.001|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Saturated Fat, g/day/kg|]]</td><td>[[0.25|]]</td><td>[[0.28|]]</td><td>[[0.37|]]</td><td>[[0.36|]]</td><td>[[<.001|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Sodium, mg/day|]]</td><td>[[2210|]]</td><td>[[2470|]]</td><td>[[2600|]]</td><td>[[3040|]]</td><td>[[.001|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Potassium, mg/day|]]</td><td>[[1570|]]</td><td>[[1580|]]</td><td>[[1660|]]</td><td>[[1890|]]</td><td>[[.24|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Phosphorus, mg/day|]]</td><td>[[860|]]</td><td>[[860|]]</td><td>[[930|]]</td><td>[[1100|]]</td><td>[[.22|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Fiber, g/day|]]</td><td>[[9.4|]]</td><td>[[9.2|]]</td><td>[[9.0|]]</td><td>[[10.8|]]</td><td>[[.99|]]</td></tr>
</table>

Table 4.

Relationship between fast food consumption and nutritional parameters.

<table>
<tr><th>[[|]]</th><th colspan="4">Number of Fast Food Meals per Day</th><th>[[|]]</th></tr>
<tr><th>[[Nutritional Parameters|]]</th><th>[[None (n=113)|]]</th><th>[[0.25–0.49 (n=47)|]]</th><th>[[0.50–0.74 (n=21)|]]</th><th>[[0.75+ (n=13)|]]</th><th>[[p value|]]</th></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Serum Albumin, g/dL|]] *</td><td>[[3.41|]]</td><td>[[3.45|]]</td><td>[[3.41|]]</td><td>[[3.44|]]</td><td>[[.22|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Serum Potassium mEq/L|]]</td><td>[[4.8|]]</td><td>[[4.9|]]</td><td>[[4.9|]]</td><td>[[5.1|]]</td><td>[[.17|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Serum Phosphorus mg/dL|]]</td><td>[[5.2|]]</td><td>[[6.0|]]</td><td>[[6.2|]]</td><td>[[6.6|]]</td><td>[[<.001|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>Interdialytic Weight Gain, % of dry weight</td><td>[[3.4|]]</td><td>[[3.8|]]</td><td>[[3.5|]]</td><td>[[4.5|]]</td><td>[[.03|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>Body Mass Index, kg/m²</td><td>[[29.4|]]</td><td>[[28.2|]]</td><td>[[27.5|]]</td><td>[[26.4|]]</td><td>[[.34|]]</td></tr>
<tr><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Subjective Global|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td></tr>
<tr><td>[[Assessment, %|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[|]]</td><td>[[.18|]]</td></tr>
<tr><td>[[Well nourished|]]</td><td>[[40|]]</td><td>[[45|]]</td><td>[[62|]]</td><td>[[42|]]</td><td>[[|]]</td></tr>
<tr><td>[[Moderately malnourished|]]</td><td>[[55|]]</td><td>[[51|]]</td><td>[[38|]]</td><td>[[58|]]</td><td>[[|]]</td></tr>
<tr><td>[[Severely malnourished|]]</td><td>[[5|]]</td><td>[[4|]]</td><td>[[0|]]</td><td>[[0|]]</td><td>[[|]]</td></tr>
</table>

* To convert albumin in g/dL to g/L, multiply by 10. To convert sodium or potassium in mEq/L to mmol/L, multiply by 1. To convert phosphorus in mg/dL to mmol/L, multiply by 0.323.