PRACTICALITY OF THE USAGE OF MEDICAL FOODS TO ASSURE COMPLIANCE & MEET NUTRITIONAL REQUIREMENTS: HEALTHCARE PROVIDERS PERSPECTIVES ON THREE DISEASE STATES...ESRD

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OBESITY RATES 2017

Source: Behavioral Risk Factor Surveillance System
*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%
Prevalence of Hypertension, 2017
U.S. Adults Ages 20 and Older

Age-Adjusted Prevalence (%)
- 24.3 - 27.2
- 27.3 - 28.2
- 28.3 - 30.0
- 30.1 - 31.9
- 32.0 - 38.6

Data Source:
BRFSS - Behavioral Risk Factor Surveillance System, CDC.

Self-report: "Have you ever been told by a doctor, nurse, or other health care professional that you have high blood pressure?" Excludes women who reported being told only during pregnancy and respondents who reported they had been told that their blood pressure was borderline high or pre-hypertensive.
Global Prevalence of Chronic Kidney Disease Among Adults Aged 65+

- 1 in 5 men (Ages 65–74)
- 1 in 4 women
- Ages 75+

Source: http://www.usnews.com/health/articles/chronic-renal-failure-treatment-costs-
99-18-100805-03-76 | © Siemens Healthcare Diagnostics Inc., 2018
MAP OF THE STANDARDIZED PREVALENCE OF ESRD IN THE U.S. POPULATION, 2012-2016*

Data Source: Special analyses, USRDS ESRD Database. Standardized to the age-sex-race distribution of the 2011 US population. Special analyses exclude unknown age, sex, HSA and unknown/other race. *Four Health Service Areas were suppressed because the ratio of crude rate to standardized rate or standardized rate to crude rate was greater than 3. Values for cells with 10 or fewer patients are suppressed. Abbreviation: ESRD, end-stage renal disease.
TRENDS IN THE STANDARDIZED PREVALENCE OF ESRD, BY RACE, IN THE U.S. POPULATION, 2000-2016

Data Source: Special analyses, USRDS ESRD Database. Point prevalence on December 31 of each year. Standardized to the age-sex distribution of the 2011 US population. Special analyses exclude unknown age, sex, and unknown/other race. Abbreviations NH/PI: Native Hawaiian/Pacific Islander; AI/AN: Americans Indian/Alaska Natives; ESRD, end-stage renal disease.
IS THERE EVIDENCE THAT THE QUALITY OF DIETS OF PATIENTS WITH CKD IS POOR?
Figure 1. Dialysis patients are deficient in vitamin K. Distribution of PIVKA-II in hemodialysis patients. According to the upper limit of the normal range (dotted line, 2 ng/ml\textsuperscript{30}), \textbf{64\% of dialysis patients display vitamin K deficiency (as indicated by increased PIVKA-II levels)}. 

Schlieper et al, JASN, 2011
EVIDENCE FOR DEFICIENCY IN HD: INTERVENTION STUDY WITH VITAMIN K(2)

Table 2. Circulating dephosphorylated-uncarboxylated-MGP (pmol/L)

<table>
<thead>
<tr>
<th>Treatment group (MK-7) (N=165)</th>
<th>360 µg (n = 59)</th>
<th>720 µg (n = 53)</th>
<th>1080 µg (n=53)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>2872 (123–7539)</td>
<td>2897 (500–7567)</td>
<td>3206 (857–7337)</td>
</tr>
<tr>
<td>After treatment</td>
<td>2306 (105–6618)</td>
<td>1935 (130–6132)</td>
<td>1719 (116–6047)</td>
</tr>
<tr>
<td>% Change</td>
<td>17&lt;sup&gt;*&lt;/sup&gt;</td>
<td>33&lt;sup&gt;a&lt;/sup&gt;</td>
<td>46&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Circulating dephosphorylated-uncarboxylated MGP values are presented as mean (range).  
<sup>*P < 0.001</sup>.

Caluwe et al NDT 2014

Linear dose response of dp-uncarboxylated MGP to Vitamin K
Intake of Vitamins and Minerals in Stable Hemodialysis Patients as Determined by 9-Day Food Records

Michael V. Rocca, MD, MS,* Diane Poole, RD,† Patsy Poindexter, LPN,‡ Jean Jordan, LPN.§ and John M. Burkart, MD,*

Figure 1. Percentage of RDA consumed by chronic hemodialysis patients for selected vitamins and minerals.

Figure 2. Percent of patients consuming less than two thirds of the RDA for selected vitamins and minerals.
### Table 2. Daily Intake of Macronutrients and Proportion of Individuals Within Recommended Targets

<table>
<thead>
<tr>
<th>Macronutrients</th>
<th>Daily Intake</th>
<th>N (%) Within Target Values</th>
<th>Daily Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calorie density, kcal/kg$^{+}$</td>
<td>24.8 ± 7.5</td>
<td>10 (11)$^\dagger$</td>
<td>30-35 kcal/kg$^{+}$</td>
</tr>
<tr>
<td>Protein density, g/kg$^{+}$</td>
<td>1.1 ± 0.4</td>
<td>14 (15)$^\dagger$</td>
<td>30-40 kcal/kg$^{+}$</td>
</tr>
<tr>
<td>Total fat, g</td>
<td>68.8 ± 29.3</td>
<td>43 (47)</td>
<td>≥1.2 g/kg$^*$</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>22.6 ± 10.9</td>
<td>7 (8)</td>
<td>≤25%–35% energy</td>
</tr>
<tr>
<td>MUFA</td>
<td>28.9 ± 12.3</td>
<td>14 (15)</td>
<td>&gt;7% energy</td>
</tr>
<tr>
<td>PUFA</td>
<td>12 ± 8.2</td>
<td>10 (11)</td>
<td>&gt;20% energy</td>
</tr>
<tr>
<td>Cholesterol mg</td>
<td>257 ± 127</td>
<td>39 (43)</td>
<td>&gt;10% energy</td>
</tr>
<tr>
<td>Carbohydrates g</td>
<td>189 ± 70</td>
<td>76 (84.5)</td>
<td>≤200 mg</td>
</tr>
<tr>
<td>Fiber g</td>
<td>16.6 ± 6.2</td>
<td>21 (22)</td>
<td>≥130 g</td>
</tr>
</tbody>
</table>

Only parameter with >50% meeting = carbohydrates

### Table 3. Daily Intake of Micronutrients and Proportion of Individuals Within Recommended Targets

<table>
<thead>
<tr>
<th>Micronutrients</th>
<th>Daily Intake, mg</th>
<th>N (%) Within Target Values</th>
<th>Daily Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minerals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus</td>
<td>1104 ± 316</td>
<td>18 (20)</td>
<td>800-1000 mg</td>
</tr>
<tr>
<td>Calcium</td>
<td>710 ± 268</td>
<td>31 (34)</td>
<td>500-800 mg</td>
</tr>
<tr>
<td>Sodium</td>
<td>2208 ± 910</td>
<td>15 (15)</td>
<td>2000-2300 mg</td>
</tr>
<tr>
<td>Potassium</td>
<td>2609 ± 716</td>
<td>43 (47)</td>
<td>19-250 mg</td>
</tr>
<tr>
<td>Iron</td>
<td>9.1 ± 3.1</td>
<td>90 (99)</td>
<td>&lt;8 mg/d/15 mg</td>
</tr>
<tr>
<td>Magnesium</td>
<td>230 ± 66</td>
<td>2 (2)</td>
<td>≥15 mg/d/15 mg</td>
</tr>
</tbody>
</table>

Nutrients that >50% are meeting = iron, zinc and B12

Luis D et al, JREN 2016
DIET/NUTRIENT ADEQUACY KEY POINTS

- **Deficiency has been identified and replenishment is needed**
  - ✓ Evidence exists that certain nutrients have been documented to be either suboptimal or frankly deficient in patients with CKD

- **Diet is sub-optimal to support adequacy of key nutrients**
  - ✓ Evidence exists that a substantial percentage of patients with CKD consume a diet that is low in multiple nutrients (macro and micro)

- **Clinical condition causes an increased need in single or multiple nutrients**
  - ✓ Evidence exists that the medical condition of chronic kidney disease alters the metabolism of at least one nutrient leading to increased needs
INTERVENTIONS WITH ONS...CONSIDERATION AND EFFECTIVENESS
MOSr CURRENT STUDIES, USED ALBUMIN STATUS AS THE CRITERIA FOR MALNUTRITION
Protein Intake as an outcome with ONS Interventions

Statistically significant
PNA/PCR Outcome with Oral Nutrition Supplement (ONS) Interventions

Not statistically significant
Energy Intake by Population and ONS

Not statistically significant
The Effects of oral nutrition supplements in patients with maintenance dialysis therapy: A Systematic Review and Meta-analysis of Randomized Clinical Trials
**Fig 2**

Forest plots depicting the effect of ONS on serum albumin level.
Conclusion: “Evidence of very-low quality suggests that short-term oral nutritional supplements with energy or protein/AA were found to be associated with increased ALBUMIN level, esp. in those who receive HD.

More high-quality & large RCTs, particularly those involving the observation of mortality and/or quality of life, are needed to validated our findings in a long-term way.

Liu P, Ma F, Wang Q and He S, PLoS One, 2018