Early nutritional intervention is thought to play a major role in the preservation of renal function and the overall wellbeing in the renal patient. In preparation for renal replacement therapy (RRT), a consultation with the renal nutritionist to establish a diet consistent with the existing diagnosis may increase the likelihood of reducing cardiovascular risk factors, preventing malnutrition and anemia, and slowing the progression of renal disease, all of which can contribute to positive patient outcomes. In a 1999 United States Renal Data System survey of 3,468 new dialysis patients, 46% indicated that they had not consulted with a dietitian before the initiation of dialysis. To help with establishing education programs, determine staffing guidelines, and planning future endeavors, the National Kidney Foundation Council on Renal Nutrition conducted a survey of their 1,748 members. The survey was designed to assess the current demographic profile and clinical practice elements of practicing renal dietitians. Surveys were distributed as a section of the 1999-2000 winter issue of the CRN Quarterly Newsletter, with 353 of the members responding. Information collected pertained to patient care settings, number of facilities covered, patient age, patient treatment modalities, dietitian contact hours required to effectively educate pre–end-stage renal disease patients on a low-protein diet and to ensure optimal nutrition status for the chronic kidney disease patients. The dietitians of this cohort had practiced dietetics for 14.5 ± 8.6 years and renal nutrition for 9.15 ± 6.9 years. The survey data showed a discrepancy between what the clinical practices were in 1999 and what the current recommendations are, based on the Kidney Disease Outcomes Quality Initiatives (K/DOQI) Clinical Practice Guidelines.

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Both the prevalence and incidence of end-stage renal disease (ESRD) seem to be growing geometrically, approximately doubling from 1990 to 1999. In 1999, there were 350,000 patients on renal replacement therapy (RRT) in the United States, with combined Medicare and non-Medicare expenditures of approximately 17.9 billion dollars. The rate of new cases of chronic kidney failure (CKF) increased from 190 per million population in 1990 to 317 per million population in 1999. This represents an increase in the number of new cases reported from 48,350 to 89,252 respectively, a 46% increase. This continued increase seems to be primarily caused by the epidemic growth of type II diabetes, which has increased by 150% in the past 10 years in the US population. Based on this steady growth, one can assume that without improvements in prevention and care, the rate of new CKF cases will continue to increase.

Several studies have shown that many patients...
with CKF were not seen by renal health care professionals until just before the initiation of RRT, including adequate nutrition education by a qualified renal dietitian. In fact, a 1997 United States Renal Data System (USRDS) survey showed that of the 3,468 new dialysis patients, 50% of the hemodialysis and 43% of the peritoneal dialysis populations had not seen a dietitian before RRT initiation. It has been shown that appropriate medical care of chronic kidney disease (CKD) patients within the 12 months before the initiation of RRT reduces the comorbidity, disability, and mortality rates that are associated with CKF.

Some of these recommended therapies for the pre-ESRD patient include the reduction of cardiovascular disease risk factors, treatment of anemia, optimum medication therapy to preserve residual renal function, and nutrition consultation. It is well accepted that with proper medical and diet therapies, in many patients, the rate of progression to ESRD and RRT can be significantly slowed, especially in diabetic patients. Any improvements made in the care of the CKD and CKF populations might not only decrease the morbidity and mortality in the population, but also reduce the cost to society. It would be reasonable to assume that providing adequate numbers of qualified renal dietitians who can formulate nutritional assessments and provide counseling sessions would have a significant positive impact on the health care of CKF patients.

To help with establishing educational programs, determining staffing guidelines, and planning future endeavors to address these problems, the National Kidney Foundation’s (NKF) Council on Renal Nutrition (CRN) completed in a survey in 1999 of its membership. The survey was distributed to the 1,748 members through the 1999-2000 winter issue of the CRN Quarterly Newsletter. Of the 1,748 sent, 353 responded, providing a 20% rate of return. Of the 1,748 CRN members, approximately 200 are international, but the return rate of this small cohort was unknown, although there was a small percentage of respondents. Of the study cohort, 70% worked full time and 29% worked part time. Furthermore, 84% stated that 100% of their time was allocated to renal nutrition, and 15% stated that they allocated less than 100% of their time to renal nutrition. There was a 1% no-response rate. Demographic information such as number of years practicing dietetics, number of years as a renal dietitian, number of facilities in which patients are seen, patient age groupings, and time spent carrying out administrative duties is summarized in Table 1.

### Table 1. Demographic Information for Study Cohort and Their Patient Populations

<table>
<thead>
<tr>
<th>Number of Facilities Covered</th>
<th>Percentage of Time Spent on Administrative Duties</th>
<th>Percentage of Patients Seen &lt; 15 Years Old</th>
<th>Percentage of Patients Seen &gt; 15 Years Old</th>
<th>Number of Years Worked as Clinical Dietitian</th>
<th>Number of Years Worked as Renal Dietitian</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 350)</td>
<td>(n = 345)</td>
<td>(n = 350)</td>
<td>(n = 350)</td>
<td>(n = 351)</td>
<td>(n = 350)</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>1.70 ± 0.88</td>
<td>35.1 ± 44.4</td>
<td>1.02 ± 7.79</td>
<td>14.5 ± 8.6</td>
<td>9.15 ± 6.9</td>
</tr>
<tr>
<td>Range</td>
<td>1-6</td>
<td>0-100</td>
<td>0-95</td>
<td>1-39</td>
<td>0.5-31</td>
</tr>
</tbody>
</table>

NOTE. n = number of renal dietitians responding.

Data collected pertained to patient care setting, number of facilities covered, patient age, patient modality, contact hours required to ensure maintenance of good nutritional status, and contact hours required to effectively teach pre-ESRD patients a low-protein diet. The survey was distributed to the 1,748 members through the 1999-2000 winter issue of the CRN Quarterly Newsletter. Of the 1,748 sent, 353 responded, providing a 20% rate of return. Of the 1,748 CRN members, approximately 200 are international, but the return rate of this small cohort was unknown, although there was a small percentage of respondents. Of the study cohort, 70% worked full time and 29% worked part time. Furthermore, 84% stated that 100% of their time was allocated to renal nutrition, and 15% stated that they allocated less than 100% of their time to renal nutrition. There was a 1% no-response rate. Demographic information such as number of years practicing dietetics, number of years as a renal dietitian, number of facilities in which patients are seen, patient age groupings, and time spent carrying out administrative duties is summarized in Table 1.

### Data Analysis

Some of the data are presented as mean ± standard deviation, with the reported n representing the number of responses to that particular query. If the data reported as percentages do not

### Methods

#### Population

The NKF-CRN developed a survey to assess the current demographic profile and clinical practice elements of practicing renal dietitians. The survey was directed to the 1,748 members through the 1999-2000 winter issue of the CRN Quarterly Newsletter. Of the 1,748 sent, 353 responded, providing a 20% rate of return. Of the 1,748 CRN members, approximately 200 are international, but the return rate of this small cohort was unknown, although there was a small percentage of respondents. Of the study cohort, 70% worked full time and 29% worked part time. Furthermore, 84% stated that 100% of their time was allocated to renal nutrition, and 15% stated that they allocated less than 100% of their time to renal nutrition. There was a 1% no-response rate. Demographic information such as number of years practicing dietetics, number of years as a renal dietitian, number of facilities in which patients are seen, patient age groupings, and time spent carrying out administrative duties is summarized in Table 1.
equal 100%, the missing percentage is caused by no response to that particular question by some of the respondents.

Results

The survey showed the following: of the 1,748 CRN members who received the newsletter containing the survey, 353 returned surveys, for a 20% return rate. The average number of years worked as a clinical dietitian was 14.5 ± 8.6 years. The members of this group worked an average of 9.2 ± 6.9 years as renal dietitians. Seventy percent worked full time, and 29.5% worked part time. The average number of facilities in which patients were seen was 1.7 ± 0.88, with a range of 1 to 6 facilities. Twenty-six percent of the dietitians spent time on inpatient care, 7% with posttransplantation care, 10% with acute renal failure, and 13% spent the majority of their time with pre-ESRD patients. Of the total number of patients seen, 99% ± 7.8% were over the age of 15. The other 1% were patients aged 15 years or younger.

Dietitians of this study cohort spent an average of 35.1% of their time carrying out administrative duties. The average number of patients that dietitians (n) are responsible for during 1 month in the inpatient and outpatient setting is listed in Tables 2 and 3, respectively. The number of chronic dialysis patients followed up was significantly higher than the other types of CKD patients, in both the inpatient (24.2) and the outpatient (105) setting. It was shown that an average of 1.0 to 3.4 new pre-ESRD patients were seen in a typical month as inpatients and an average of 2.2 to 3.0 were seen as outpatients (n = 239), as can be seen in Table 4.

After the initial nutrition consultation, 48.7% (n = 166) of the pre-ESRD patients seen received no follow-up, 13.1% (n = 124) of patients received only 1 follow up, 9.49% (n = 116) of patients received more than 1 follow up, and 17.1% ± 3.4% (n = 116) of patients had unlimited follow-up visits with a dietitian. Of the 339 respondents, 88 used actual body weight (BW) in kilograms when assessing nutrients per kilograms of BW; 19 used usual BW; 171 used ideal BW (Metropolitan Life Tables); 52 used a combination of actual, usual, and ideal; and 9 used a method other that the three listed.

The daily protein intake for pre-ESRD patients after the initial consultation was as follows: 20.2% of the patients were placed on the 0.6 g/kg BW diet, 58.6% of the patients were placed on the 0.8 g/kg BW diet, and 18.7% of the patients were placed on the 1.0 g/kg BW. For patients under the age of 15, the recommendation was 1.4 ± 0.4 g/kg BW with a median of 1.4g/kg BW and a range of 1 to 2.25 g/kg BW (n = 11). The respondents also prescribed a mean of 1.2 ± 0.1 g/kg BW and a range of 1 to 1.5 g/kg BW protein for hemodialysis patients (n = 332) and a mean of 1.4 ± 0.1 g/kg BW with a median of 1.35 g/kg BW with a range of 1 to 2 g/kg BW protein for patients on continuous ambulatory peritoneal dialysis (CAPD) (n = 278).

The average daily caloric intake prescribed for the pre-ESRD patients was 31.2 kcal/kg BW with a range of 20 to 36 kcal/kg BW. For the hemodialysis patients, 31.5 kcal/kg BW with a range of 20 to 35 kcal/kg BW was prescribed, and for the CAPD patients, 28.7 kcal/kg BW with a range of 20 to 35 kcal/kg BW was used. It was also shown that for patients under 60 years of age, 60% of the dietitians responding made no adjustments in caloric intake and 33% did alter their kilocalorie prescription. Of the renal dietitians who adjusted their calorie prescriptions, 39% adjusted kilocalories based on activity levels, 11% increased the caloric intake, 3% decreased caloric intake, 23% used various other formulas to determine intake, and 4% did not respond to the question.

The average amount of time (hours per

Table 2. Average Number of Inpatients Seen by the Renal Dietitian Per Month

<table>
<thead>
<tr>
<th>Patient Type</th>
<th>Number of Patients Seen Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute renal failure (n = 183)</td>
<td>2.6</td>
</tr>
<tr>
<td>Pre-ESRD (n = 181)</td>
<td>1.8</td>
</tr>
<tr>
<td>Chronic dialysis (n = 211)</td>
<td>24.2</td>
</tr>
<tr>
<td>Posttransplantation (n = 183)</td>
<td>1.9</td>
</tr>
</tbody>
</table>

NOTE. n = number of renal dietitians responding.

Table 3. Average Number of Outpatients Seen by the Renal Dietitian Per Month

<table>
<thead>
<tr>
<th>Patient Type</th>
<th>Number of Patients Seen Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-ESRD (n = 216)</td>
<td>4.6</td>
</tr>
<tr>
<td>Chronic dialysis (n = 330)</td>
<td>105</td>
</tr>
<tr>
<td>Posttransplantation (n = 4.2)</td>
<td>4.2</td>
</tr>
</tbody>
</table>

NOTE. n = number of renal dietitians responding.
month) required to educate the pre-ESRD and pediatric patients on the prescribed protein amount, and the follow-up time requirements for ensuring optimal nutritional status can be found in Figure 1.

Based on current staffing levels, 21% of respondents thought that the 0.6 g/kg BW diet could be adequately taught with successful adherence, 59% thought that it could not, 19% did not respond, and 1% answered not applicable. Forty-six percent thought that the 0.8 g/kg BW could be adequately taught with successful adherence, 37% thought that it could not, 16% did not respond, and 1% answered not applicable. Fifty-six percent thought that the 1.0 g/kg BW could be adequately taught with successful adherence, 28% thought that it could not, 15% did not respond, and 1% answered not applicable. These results can be seen in Figure 2.

Of the respondents, 67% stated that there was no reimbursement for pre-ESRD nutritional counseling, 11% were being reimbursed, and 22% did not respond. For the pre-ESRD patients approaching dialysis, 56% of the respondents thought that it was not acceptable to use the 0.6 g/kg BW diet to alleviate symptoms when creatinine clearance reached 5 to 10 mL/min, 12% thought it was appropriate, and 31% did not respond. When using 0.8 g/kg BW to determine protein needs as creatinine clearance approached 14 mL/min, 82% were in favor of using .8 g/kg/BW to determine protein needs based on the presence of uremic symptoms. Three percent were not in favor of this method, and 15% did not respond.

### Clinical Practice Discussion

Demographic information regarding this study cohort and the patient populations is given in Tables 1, 2, and 3. It is significant to note that the average number of years working as a general clinical RD was 14.5, and as a renal dietitian the average was 9.2 years. It would seem that these dietitians were experienced individuals in all aspects of clinical nutrition and in the specialty field of renal dietetics.

The data in Tables 2 and 3 show that the average renal dietitian sees approximately 24 chronic dialysis patients per month as inpatients and 105 chronic dialysis patients per month as outpatients.
outpatients. Another 15 patients were seen as either inpatients or outpatients in the areas of acute renal failure, posttransplantation, and pre-ESRD, for a total of 144 patients per month. Based on these numbers and assuming a standard 160-hour month, this allowed approximately 67 minutes per patient per month (17 min/wk). Subtract from this the 35% administrative time, and it is now cut to 43 minutes per patient per month (11 min/wk). A study by Kelly et al\textsuperscript{13} took 613 hemodialysis patients and divided them into 3 groups based on the average time spent with the patient in minutes per week. This study showed that a significantly smaller percentage, 15.6%, of the group that had 30 or more minutes per week with an RD were hospitalized when compared with the other two groups of 20 to 30 and <0 minutes. It seems that the average dietitian does not have this quantity of time, based on the survey’s reported caseloads.

The current K/DOQI Clinical Practice Guidelines for Nutrition in Chronic Renal Failure states that based on “a general sense among practicing dietitians,” an individual dietitian should be in charge of 100 patients but no more than 150 patients to be able to provide adequate nutritional care.\textsuperscript{14} If one were to compute the number of patients that could be adequately cared for based on the study by Kelly et al (30 minutes per week), the maximum number of patients should be in the neighborhood of 80. If we subtract the time required for administrative responsibilities, the maximum number of patients would be somewhere between 56 and 72. Based on the 1 hour per patient per month (15 min/wk) and the mean administrative time, the maximum number of patients that could be seen would be 112. These rough computations also do not take into account any of the other duties, such as care plans and patient education, including the development of education materials.

Data obtained from 19,494 dietitian time logs of the Modification of Diet in Renal Disease Study, which encompassed a period of 36 months, showed that time spent with patients gradually declined from 183 ± 70 minutes per visit in months 1 through 4 to 116 ± 41 minutes per visit during year 3. The first 4 months of the MDRD study were the most involved regarding counseling and education. During months 5 to 24, more emphasis was placed on providing feedback on progress and on improving patient knowledge and skills.

The last few months focused on maintaining adherence and preventing relapse. The total time of 183 ± 70 minutes included preparation, follow-up, and charting, as well as counseling. The actual counseling time per month in the first 4 months was 59 ± 25 minutes for patients on the 1.3 g/kg protein diet and 68 ± 29 minutes for the .58 g/kg protein diet. In year 3, counseling time decreased to 34 ± 14 minutes and 36 ± 15 minutes, respectively.\textsuperscript{15}

Our survey respondents reported less counseling time available per patient once administrative time was deducted (43 min/patient/mo). When compared with the optimal numbers reported by Kelly and the MDRD study, it quickly becomes apparent that a caseload of 100 to 150 patients could have negative consequences on the ability of the CKD patient to maintain good nutritional status and to comply with the renal diet restrictions.

### Pre-ESRD

It has been shown that surgical, dialysis, nursing home, radiation and chemotherapy, respiratory therapy, and drug and alcohol treatment patients may all be at high risk for protein energy malnutrition (PEM).\textsuperscript{16,17} The nutritional well-being of the chronic renal failure patient often begins to deteriorate when glomerular filtration rate (GFR) levels are still in the range of 28 to 35 mL/min/1.73 m\textsuperscript{2}.\textsuperscript{18} Other studies have shown that PEM is present in approximately 18% to 70% of the patients on maintenance dialysis, and its presence is one of the strongest predictors of morbidity and mortality in the adult ESRD patient.\textsuperscript{19} It is apparent that nutrition intervention by a qualified dietitian for the pre-ESRD and maintenance dialysis (MD) patient should become an integral function of the renal health care team. Not only is this in the best interest of the patient, eg, fewer hospitalizations and medical complications, but it also has the potential to save millions of dollars for the renal health care system.

As of January 2002, the MNT Legislation Act went into effect and is available to compensate therapeutic and counseling services provided by a registered dietitian in the areas of predialysis and posttransplantation.\textsuperscript{20} This is an important mile-
stone for identifying the significant role of MNT in slowing the progression of CKD.

This new benefit enables Medicare beneficiaries to receive MNT for the management of kidney disease and diabetes. The Medicare providers who provide these services, as defined by this legislation, are registered dietitians or qualified nutrition professionals. This law also provides for a specified number of follow-up MNT visits. In our study, almost 49% of new pre-ESRD patients received no follow-up nutrition education, so diet adherence was unknown. MNT has been proven to be cost effective, and the bottom line is that it works.21 The MDRD study showed that follow-up consultations with patients by an RD was very important in helping the patient adhere to the low-protein diet prescription.22 The current MNT provision and reimbursement coverage for the new pre-ESRD patient is a positive step in the treatment of CKD.

Low-Protein Diet

As can be seen in Figure 1, the time required to teach the different diets is inversely related to the quantity of protein in the diet. It is interesting to note that the respondents indicate that more than 2 hours are required to adequately teach the diet to new ESRD and pre-ESRD patients. This matches the results from the MDRD study, in which dietitian teaching time was increased as the protein prescription became more restrictive.15 As can be seen in Figure 3, at the time of this survey, only one quarter of the pre-ESRD patients had been on a low-protein diet before starting MD. Of this group, a registered renal dietitian had instructed only 50%. Figure 2 shows that 74% of the renal dietitians thought that the 0.6-g diet could not be safely taught, and 67% thought that the <1.0-g diet could. This is probably caused by lack of time to monitor and follow up. The MDRD study results suggested that the frequency of follow-up as well as the dietitian-to-patient ratio was important in determining long-term patient adherence.22

A study by Ikizler et al23 indicated that the dietary protein intake (DPI) in the CRF patient spontaneously decreases as the creatinine clearance (Ccr) decreases to 25 mL/min. Below a Ccr of 10 mL/min, the DPI is below that of the normal healthy population. The MDRD study showed, in general, that the lower the GFR, the lower the values for nutrition parameters. The number of patients with low albumin, transferrin, and total cholesterol increased as the GFR decreased. Also, total caloric intake decreased with a lower protein prescription. These changes were observed in the healthier population of CKD patients (no catabolic disease, IDDM).24 Because large populations of CKD patients have a comorbid condition that already negatively impacts nutrition status, the role of the dietitian becomes paramount in these patients.

Future Planning Recommendations

The magnitude of the patient population with chronic renal insufficiency is just beginning to be appreciated. Per the K/DOQI Clinical Practice Guidelines for nutrition in CKF, it is recommended that a low-protein diet be considered for CKD nutrition management for patients having a GFR of <25 mL/min.25 Healthy People 2010 recommends an increase for nutrition counseling in proportion with the treated CKF patients before the initiation of RRT. To summarize the results from this survey in developing future strategic planning26:

Nutritional intervention must start at least 12 months before the initiation of maintenance dialysis.

The patient–dietitian ratio should be adjusted for adequate time availability for the patient to be counseled by a qualified renal dietitian.

Strive together as the renal health care team to educate regarding the importance and impact of this issue and to bring third-party payers into the loop.
Work to mobilize renal dietitians, patient advocacy organizations, and other health care organizations involved in patient care to emphasize the need for additional MNT legislative coverage.

Foster research into the areas that show the positive effects that nutrition counseling and education have with the pre-ESRD patient for prioritizing quality-of-life issues.

Development of education materials to assist the RD in improving MNT counseling skills required for the nutritional care of the PEM-ESRD patient is of utmost importance.

Stress the importance of making the CRF patient’s medical conditions a reason to initiate MD early on. Evidence from studies has indicated that once the DPI is below 0.7 g/kg, preservation of residual kidney function becomes less advantageous, leading to PEM.19,27

This survey did show the need to increase the number of employed, registered renal dietitians to decrease the patient caseload to an effective counseling level with pre-ESRD patients. Ideally, this time element would be recommended at a 12-month time frame before RRT initiation.

From these study results, very small numbers of pre-ESRD patients had been seen compared with the larger number of patients seen with outpatient dialysis. Dietitian counseling services have been reimbursed under the composite rate for chronic dialysis treatments. Limited numbers of renal dietitians have worked primarily in areas where the service generates dollars to pay for the RD coverage.

The MNT Act that went into effect January 2002 will have an enormous impact in saving taxpayer dollars and will improve the quality of life for the pre-ESRD patient. This legislation, in itself, has opened the door for future possibilities with Centers for Medicare/Medicaid Services and expanded MNT services, for which the RD provides.

The data from this survey show the increasing need for adequate coverage by qualified renal dietitians for MNT counseling of the CKD patient. Evidence in the literature indicates that not only would this increase the quality of life for the patient, but also fewer hospitalizations and fewer comorbid complications might occur, which in turn would save the renal health care system a considerable amount of financial burden.

References


