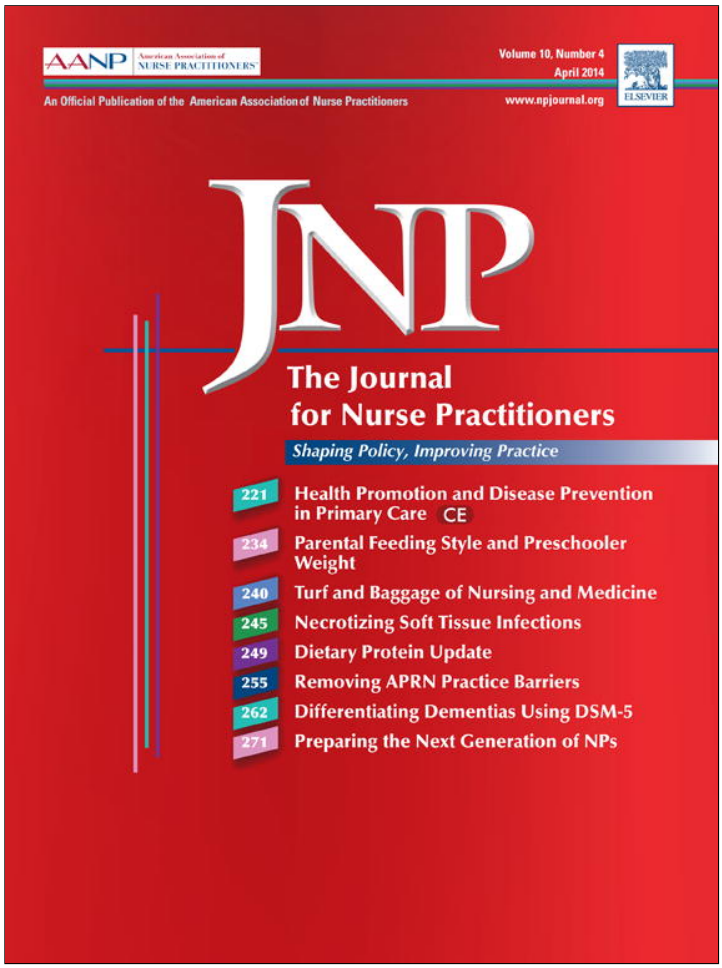

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Nutrition Update: Dietary Protein

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ABSTRACT

Dietary protein is a trendy topic in the news. Providers need to encourage individuals to consume healthy sources of dietary protein. Including protein at breakfast and at snack time is a way to help promote satiety and curb the intake of less nutrient-rich foods. Extra dietary protein is needed during periods of growth (childhood/adolescence), pregnancy/lactation, intense physical training, disease states, and frailty associated with aging. The middle-aged and elderly adult can help prevent sarcopenia and osteoporosis by including protein at every meal, remaining physically active, and incorporating sources of calcium and vitamin D.

Keywords: appetite regulation, dietary protein, osteoporosis, protein needs, sarcopenia, timing of protein intake

Nurse practitioners (NP) are on the front lines when it comes to educating patients regarding healthful dietary choices. Diet-related diseases are at an all-time high. Overweight and obesity are at epidemic rates. Like never before, NPs need to work with registered dietitians to help patients achieve a healthful diet. An NP's education may not have included extensive dietary training, but an NP is often required to provide dietary expertise to patients.

Dietary protein has become a trendy topic in the news. Providers need to be knowledgeable regarding dietary protein. The goal of this article is to provide the busy practitioner with information related to dietary protein. Printable patient handouts and dietary recommendations for patients across the life span are also provided. Feel free to make copies of the handouts for your patients.

AMERICANS HAVE QUESTIONS REGARDING PROTEIN INTAKE

Americans have many questions regarding dietary protein. The International Food Information Council Foundation (2013) surveyed 1,000 Americans, ages 18-82 years, about what they consider when they purchase packaged food or beverages, and 63% responded that they are looking for protein.[1] In fact, 57% of respondents identified that they are trying to get a certain amount or as much protein as possible. The quest for protein ranked in the top 3 for diet desirability after fiber and whole grains. This interest in protein correlates with the surge in media attention to protein powders, shakes, and supplements that are widely promoted and often consumed in large quantities. The consumption of protein in large quantities may create an excessive burden on the poorly functioning liver and kidneys to metabolize and excrete the excess waste products (ie, ammonia and urea).[2] Individuals often rely on health care providers to clarify dietary protein information that they have read or seen through media advertisements. Therefore, NPs are in a perfect position to correct misperceptions and relate the importance of including dietary protein in a healthful diet.

WHAT IS THE RECOMMENDED DIETARY ALLOWANCES FOR PROTEIN?

Providers are often asked questions about dietary recommendations such as, "How much protein should I eat?" Before that question is answered, it is important to know that the recommended dietary allowances (RDAs) are set by Institute of Medicine's Food and Nutrition Board and are based on preventing deficiency in healthy adults, which can be different from promoting optimal health. The RDA of 0.8 g/kg/d is defined as the amount of protein that

would satisfy the needs of almost all (98%) of the population.[3] This does not take into account the source of the protein; its quality, which reflects its amino acid content; the individual's level of activity; or their distribution of protein intake over the day.

WHAT PERCENTAGE OF PROTEIN NEEDS TO BE INCLUDED IN OUR DAILY DIET?

In addition to the RDA, the Food and Nutrition Board also sets an acceptable macronutrient distribution range, which is the range of intake for a particular energy source that is associated with reducing the risk of chronic disease while providing intakes of essential nutrients. For protein, the range of intake is generally between 10% to 35% of total calorie intake for adults.[4] This percentage of daily protein is thought to confer benefits beyond the level of preventing deficiency. Protein needs vary according to age and activity level (Table 1).

WHEN IS EXTRA PROTEIN NEEDED?

Overall, in the general US population, protein intake may exceed the RDA requirement.[4] However, there are conditions that may require extra dietary protein such as periods of growth (childhood/adolescence), pregnancy/lactation, intense physical training, disease states, and frailty associated with aging.[2] It is not recommended to encourage a diet high in protein and low in other nutrients. Protein intake above the required amount that is not used efficiently by the body will be stored as body fat in adipose tissue. The risk of adverse effects from excess protein intake from foods is very low; therefore, no upper level of intake for protein or for any of the amino acids has been established by the Institute of Medicine. However, high levels of amino acid intake from dietary supplements may pose an excess burden on the liver and kidneys required to metabolize and excrete the excess waste products (ie, ammonia and urea).[2]

TIMING OF PROTEIN INTAKE IS IMPORTANT

The International Food Information Council Foundation (2013) survey found that consumers are not particularly concerned about what time of day they consume protein.[1] The survey revealed that 47% indicated that it did not matter what time of day they took in the protein just as long as it was enough. However, 44% identified that the time of day they consumed protein did matter. These individuals were younger and college educated. This may reflect their awareness of research identifying protein's function in promoting muscle synthesis when consumed within 30 minutes of a meal. However, evidence has identified dietary protein needs to be present, adequate, and evenly distributed at every meal.[5,6] This is especially true with older adults who are unable to maintain a high efficiency of protein use for nitrogen retention from 1 large protein meal per day. Because the quality and quantity of protein consumed at each meal is important for older adults to maintain muscle mass, it is critical to encourage them to have adequate protein at every meal.[5,6]

QUALITY OF PROTEIN IS IMPORTANT

Providers need to encourage healthy sources of protein. Low-fat protein sources that are baked, grilled, or stewed are considered healthier because they provide fewer excess calories. An example of healthy protein sources include the following:

Table 1. Protein Needs Based on Calorie Needs by Sex, Age, and Activity Level

	Adult Males' Calorie Needs, g			Adult Females' Calorie Needs, g		
Age	Sedentary	Moderately Active	Active	Sedentary	Moderately Active	Active
21-30 y	60-210	68-236	75-263	48-149	53-184	60-210
31-50 y	60-210	65-228	65-228	45-158	50-175	55-193
50-70 y	55-193	60-210	60-210	40-140	45-158	53-184
> 70 y	50-175	55-193	55-193	40-140	45-158	50-175

Note: Calculations based on RDAs and the *2010 Dietary Guidelines for Americans*.[22]

fish; seafood; poultry; low-fat dairy, including milk, cheese, and yogurt; lean beef; egg; soy; and beans. For a complete listing of healthy protein sources (including vegetarian sources), please see http://www.choosemyplate.gov/food-groups/protein-foods.html.

APPETITE CONTROL AND OBESITY PREVENTION

Obesity is a major health problem in the United States; 62.2% of adults over 20 years old are overweight or obese.[7] Successful strategies to help individuals control their weight long-term are desperately needed. The best strategy for weight loss is reducing daily calorie intake, increasing physical activity, and modifying behavior for lifelong healthy eating. Rather than cutting calorie intake alone, individuals should be encouraged to learn to eat smarter by meeting nutrient needs without excess calorie intake. Several studies have proposed that dietary protein may serve as a helpful regulator of satiety/appetite, may provide greater satiety than fats and carbohydrates, and may play a role in reducing calorie consumption.[7-9] One study found that an increase in dietary protein consumption from 15% to 30% of energy while maintaining carbohydrate intake resulted in decreasing appetite and, consequently, less consumption of calories.[10]

It is important to encourage individuals to select healthy snacks. Fresh fruit and vegetables are healthy snack foods that provide many vitamins and minerals as well as fiber. It may also be helpful to encourage individuals to select snacks that contain a higher ratio of protein to carbohydrate content. In the short term carbohydrates can be very satiating, but protein appears to have a more prolonged satiating effect.[9,10] Healthful snacks that contain protein can often curb the intake of less nutrient-rich foods (Table 2). A possible reason to explain the effect of protein on satiety may be because of a reduction in the peak postprandial insulin response, which is especially important for prediabetic individuals.

One study compared a high-protein breakfast with a carbohydrate breakfast with individuals on a weight loss program. The findings indicated that those who ate the protein-rich breakfast had greater weight loss and reported feeling full for a longer period of time.[11,12] Eating an adequate amount of protein at every meal, especially after exercise, is highly recommended to maintain muscle strength. Including protein at breakfast is a great way to help increase satiety. To prevent or decrease obesity, selecting protein sources to supply about one third of daily caloric intake along with fruits, vegetables, and some whole grains is recommended. A complete list of protein contents in food can be found at https://www.ars.usda.gov/SP2UserFiles/Place/12354500/Data/SR25/nutrlist/sr25a203.pdf.

THE BENEFICIAL IMPACT OF PROTEIN FOR PEOPLE OVER AGE 55

The International Food Information Council Foundation (2013) survey found that less than half of the respondents felt that protein was beneficial for people over 55 years old.[1] This low percentage may

Table 2. Quick and Easy Ways to Add Protein to Your Day

If You Usually Eat This	Try Eating This
Granola bar with orange juice	English muffin with 2 tablespoons of peanut butter or 1 cup low-fat cottage cheese and fruit
Turkey sandwich with pretzels	3 ounces of reduced-sodium turkey luncheon meat or tuna on 2 slices of whole wheat bread with 1 ounce low-fat cheese and 1/4 cup almonds
Strawberry milkshake	6 ounces of low-fat Greek yogurt with 3/4 cup frozen strawberries and 1 cup low-fat milk
Tortilla chips and guacamole	2 hardboiled eggs and 1 cheese stick
Spaghetti with marinara sauce and green side salad	1 cup of whole-wheat spaghetti with chunky marinara sauce and 3 ounces of chicken sausage. Pair with side salad that includes edamame, walnuts, and raisins
Fruit cup	1 sliced apple with 1 ounce of low-fat cheese

indicate that consumers are not aware that, unlike caloric needs, protein needs do not decline with age. This could lead to older adults or their caretakers overlooking the importance of an adequate protein intake. As noted previously, older adults are unable to maintain a high efficiency of protein use for nitrogen retention from 1 large protein meal per day, so the quality and quantity of protein at each meal are important.[5,13,14] Encouraging older adults to have sufficient protein at each meal is vital to their health, especially during recovery from injury or illness.

All age groups benefit from optimal dietary protein intake; middle-aged and elderly populations are particularly vulnerable. The baby boomer population now includes the 65 and older age bracket. It is predicted that in 2 decades, 1 in every 5 Americans will be considered "elderly."[15] Every effort must be made to prevent chronic and debilitating conditions that often accompany this age group. Two common conditions that plague this population are addressed in the next section.

PREVENTING SARCOPENIA IN MIDDLE-AGED AND ELDERLY ADULTS

One common problem that occurs with natural aging is sarcopenia. Sarcopenia is characterized by a progressive decline in muscle mass and strength. It is characterized by a 3%-8% decrease in lean muscle mass every decade after 30 years of age.[5] This rate is higher in sedentary individuals and is much higher in men than women.[16]

Sarcopenia is often a result of lower levels of physical activity, lowered hormone levels, insulin resistance, and decreased dietary protein consumption. As people age, they have decreased energy requirements; however, they should not decrease their intake of protein.[17] Unfortunately, elderly individuals often consume much less dietary protein than recommended because of fear of dietary fat intake or dental challenges. Advanced sarcopenia is associated with frailty, high risk for falls and fractures, and loss of independent living.[16-18]

The current recommended dietary intake for protein is 0.8 g/kg body weight for adults 19 and older; however, this amount may not protect the elderly from sarcopenic muscle loss.[5,14] Research has identified that adults receive the greatest benefits from protein when 30 g protein is present at each meal.[5,14] It has been found that when individuals consume a minimal amount of protein at breakfast and lunch and a large portion at dinner, it does not provide a sufficient amount of protein for muscle mass maintenance.[5,14] Researchers recommend 25-30 g high-quality protein at each meal; this amount stimulates skeletal muscle protein synthesis.[5,14] Providers must communicate the importance of physical activity and optimal protein intake with this age group. Registered dietitians can help suggest foods that meet individual's protein and nutrient needs.

PREVENTING OSTEOPOROSIS IN OLDER ADULTS

Osteoporosis is another major health concern for older individuals. Calcium and vitamin D intake has been advocated for years to prevent osteoporosis. The research regarding dietary protein and its possible role in helping to prevent osteoporosis have been controversial. Although excessively high dietary protein intake has been associated with a negative calcium balance, a low dietary protein intake has been correlated with an increased risk for fractures with the elderly.[19-21] Several studies have found that individuals with adequate protein intake had the least bone loss when the individuals also had adequate calcium and vitamin D supplementation. According to Tucker,[19] "however the convergence of information suggests that rather than avoiding protein-rich foods for the purpose of improving bone states, many older persons may benefit from higher protein intakes." A closer look at the unique needs of specific age groups will be addressed.

UNIQUE PROTEIN NEEDS ACROSS THE LIFE SPAN

Protein is a considerable component of the diets of growing children.[4] Foods high in protein provide essential vitamins and minerals needed to build healthy bones, strengthen the immune system, and provide energy. It is advantageous to encourage parents to provide healthful snacks that contain protein in addition to meals with adequate amounts of protein throughout the day. Healthful snacks that

are rich in protein will help children feel full longer and could lead to less unhealthful snacking. Excellent fact sheets that address the protein needs of all ages can be found at http://www.foodinsight.org/Resources/Detail.aspx?topic=Protein_Fact_Sheets.

Encouraging young children to incorporate a variety of healthy protein foods will promote healthful eating that can be carried into their adolescent stage. Children and adolescents who are often very physically active would greatly benefit from frequent healthful protein snacks throughout the day. It is important that health care providers address protein needs at all ages with an emphasis on the prevention of sarcopenia and osteoporosis, especially for the middle-aged and elderly populations.

CONCLUSION/CLINICAL APPLICATION

NPs have the opportunity to provide a wealth of dietary information to patients and their families that could make an enormous impact on their health and well-being. Obesity is at an all-time high, and strategies to help with weight control are desperately needed. To prevent and lower obesity levels in families, healthy dietary habits need to be encouraged. Encouraging families to include protein at breakfast and with snacks is 1 way to help promote satiety and weight control. Providers need to encourage healthy sources of protein. Low-fat protein sources that are baked, grilled, or stewed are considered healthier because they provide less excess calories.

All age groups will benefit by ensuring that they have an essential amount of protein in their diet. As noted in the fact sheets, it is important that each age group has a diet that contains an ideal amount of protein. It is essential that middle-aged and elderly adults do everything they can to prevent sarcopenia and osteoporosis by including optimal intakes of protein at every meal, remaining physically active, and incorporating sources of calcium and vitamin D.

As busy health providers, it is important to work with health team members. Registered dietitians have resources available to use as tools that provide nutritional guidance. Resources in the area of dietary recommendations are an excellent way to provide patients with the information they need to make lifestyle changes that could promote and enhance their lives. JNP

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