

Ouachita Baptist University

Scholarly Commons @ Ouachita

Scholars Day Conference

Virtual Scholars Day 2020

May 1st, 12:00 AM

Role of Nutrition Focused Physical Exam in the Identification of Malnutrition in the Elderly

Madeline Wallace

Ouachita Baptist University

Markie Campbell

Ouachita Baptist University

Detri Brech

Ouachita Baptist University

Follow this and additional works at: https://scholarlycommons.obu.edu/scholars_day_conference



Part of the [Dietetics and Clinical Nutrition Commons](#), and the [Nutrition Commons](#)

Wallace, Madeline; Campbell, Markie; and Brech, Detri, "Role of Nutrition Focused Physical Exam in the Identification of Malnutrition in the Elderly" (2020). *Scholars Day Conference*. 10.

https://scholarlycommons.obu.edu/scholars_day_conference/2020/natural_sciences/10

This Poster is brought to you for free and open access by the Carl Goodson Honors Program at Scholarly Commons @ Ouachita. It has been accepted for inclusion in Scholars Day Conference by an authorized administrator of Scholarly Commons @ Ouachita. For more information, please contact mortensona@obu.edu.



Role of Nutrition Focused Physical Exam in the Identification of Malnutrition in the Elderly

Madeline Wallace, Markie Campbell, Detri Brech, PhD
Ouachita Baptist University

Abstract

Sixteen percent of the U.S. population is over 65 years of age and up to one out of two have malnutrition. The nutrition-focused physical exam (NFPE) is an integral part of the nutrition care process and model consisting of consecutive steps: nutrition assessment, diagnosis, intervention, and monitoring/evaluation. The NFPE is a component of nutrition assessment providing registered dietitian nutritionists (RDs) with information to determine nutrition status and degree of malnutrition. Six clinical characteristics used to identify malnutrition are energy intake, weight loss, subcutaneous fat loss, muscle loss, fluid accumulation, and reduced function status. Each has a threshold for identification of well-nourished, mild/moderate malnutrition and severe-malnutrition. The objective of the study was to determine if there is a correlation between the number of positive NFPE findings and the degree of severity of malnutrition and to identify the components of NFPE that have the most frequent positive results in this sample population. The study also assessed the role of nutrient intake and body mass index in relation to overall nutritional status. A cohort study of senior adults participated in a NFPE, body mass index (BMI) calculations and nutrition analysis. Thirty-four, free-living adults attending the Senior Center in Arkadelphia, AR, participated in this study. Descriptive statistics were calculated using Nutritionist Pro[®], Excel[®], and SPSS[®]. A bivariate (Pearson) correlation compared age with nutrient intake and a one-sample t test compared nutrient intake with Dietary Reference Intake (DRI). Thirty-three of the 34 subjects met the criteria for mild/moderate and severe malnutrition. There was no positive statistical correlation with the number of positive NFPE findings and the degree of severity of malnutrition. Specific sites identified with malnutrition were numerous for many subjects. Fifty-nine percent had muscle loss in the dorsal hand region, 53% in the temple, 44% in the clavicle, and 32% in the acromion/scapular region. Seventy-nine percent had subcutaneous fat loss in the orbital region, 44% in the upper arm, 41% in the patellar/anterior thigh region and 0% in the thoracic/lumbar region. Thirty-five percent had edema. Data analysis revealed a positive correlation between age and monounsaturated fat intake ($r = -.38, p < 0.03$), polyunsaturated fat intake ($r = -.36, p < 0.04$), and body mass index ($r = -.37, p < 0.03$). Mean calcium intake 618.4 ± 273.8 ($p < 0.00$) was significantly below the DRI. Mean carbohydrate intake 158.3 ± 73.8 ($p < 0.03$) was significantly above the DRI. All other mean nutrient intakes were not significantly different from the DRI. All but one subject met the clinical criteria of having mild/moderate malnutrition; six subjects had severe malnutrition in at least one site. Calcium intake was significantly low while carbohydrate, monounsaturated fat, and polyunsaturated fat intake were significantly high.

Objective

The research's goal was to determine if there is a correlation between the number of positive (abnormal) NFPE findings and the degree of severity of malnutrition and to identify the components of NFPE that have the most frequent positive results in the sample population. The role of nutrient intake and body mass index in relation to overall nutritional status was assessed.

Introduction

The nutrition-focused physical exam, established in 2003 by the Academy of Nutrition and Dietetics (AND), is an essential part of the nutrition care process used by registered dietitian nutritionists to support a diagnosis of malnutrition in adults. Information collected in the NFPE is synthesized and integrated by the dietitian to determine the nutrition-related diagnosis.¹ When registered dietitian nutritionists use the NFPE techniques, they have a greater impact on care by being able to more readily identify nutritional issues that impair health and go unrecognized by general practitioners.²

Malnutrition, defined as any imbalance in nutrient levels that can result in changes to the body,³ is a major issue within the elderly population. It is estimated that 20-50% of elderly who are hospitalized are malnourished.⁴ Older adults living in long-term care facilities require a higher level of care, and are at a great risk of developing malnutrition.⁵ To be diagnosed as malnourished, a patient must fit into two of the following six criteria: insufficient energy intake, weight loss, loss of muscle mass, loss of subcutaneous fat, localized or generalized fluid accumulation, and diminished functional status.⁶ Studies show that community-dwelling older adults have diets that are insufficient in nutrition quality. Identifying those with malnutrition is the first step. Many elderly people who are malnourished can go undetected if the health care staff does not accurately test the patients for undernutrition levels. Once they are identified, it is critical for them to receive the right kind of care to prevent further decline of their nutrition status, and possibly reversing the negative effects of their previous poor nutrition.⁷ Nutrition intervention is vital and has tremendous benefits on malnutrition levels.⁸

Methods

Malnutrition is a major problem in the elderly population but is often undiagnosed. The research study used the nutrition-focused physical exam, BMI, and 24-hour recall to determine the nutritional status of an elderly population. Data was collected on two separate dates from seniors attending a local senior center that volunteered to participate. Approval from the Ouachita Baptist University Institutional Review Board and informed consent from the subjects was obtained prior to data collection. Each subject was weighed on a Health-o-Meter[®] scale to the nearest tenth of a pound, height was measured using a SECA[®] portable stadiometer in feet and inches, BMI calculated and BMI weight status category determined.

A nutrition-focused physical exam was conducted on each subject to determine if there was any muscle or fat loss in the following areas: orbital region surrounding the eye, upper arm region, thoracic and lumbar region, temple region, clavicle and acromion bone region, scapular bone region, the interosseus muscle of the dorsal hand, the patellar and anterior thigh region of the quadriceps muscle, the posterior calf region, and any noticeable edema. The NFPE was carried out by trained examiners who looked for abnormal physical findings and degree of malnutrition based upon the Academy of Nutrition and Dietetics and Association of Parenteral and Enteral Nutrition (ASPEN) consensus statement criteria. All NFPE measurements were categorized as well-nourished, mild/moderate malnutrition, or severe malnutrition. A registered dietitian nutritionist interviewed each subject to obtain a current 24-hour recall. A menu of the lunch served the day before at the center was provided for the subjects to use as a guide to remember the foods consumed at lunch.

Table 1. Parameters to Identify the Assessment of Nutritional Status

Area Examined	Normal Measurements	Mild/Moderate Malnutrition	Severe Malnutrition
Orbital Region	Healthy, full, symmetric, dark circles	Slightly sunken, symmetric	Markedly sunken, asymmetric
Upper Arm Region (Triceps)	Soft, supple, full	Slightly soft, slightly sunken	Markedly soft, sunken, flaccid
Thoracic/Lumbar Region	Soft, full, symmetric	Slightly soft, slightly sunken	Markedly soft, sunken, flaccid
Acromion/Scapular Region	Soft, full, symmetric	Slightly soft, slightly sunken	Markedly soft, sunken, flaccid
Dorsal Hand Region	Soft, full, symmetric	Slightly soft, slightly sunken	Markedly soft, sunken, flaccid
Patellar/Anterior Thigh Region	Soft, full, symmetric	Slightly soft, slightly sunken	Markedly soft, sunken, flaccid
Posterior Calf Region	Soft, full, symmetric	Slightly soft, slightly sunken	Markedly soft, sunken, flaccid
Clavicle/Intercostal Space Region	Soft, full, symmetric	Slightly soft, slightly sunken	Markedly soft, sunken, flaccid
Edema	No edema	Mild edema (ankles)	Severe edema (swollen)
Fluid Accumulation	No edema	Mild edema (ankles)	Severe edema (swollen)
Reduced Function	Active	Mildly decreased	Severely decreased
Weight Loss	Stable	Mild weight loss	Severe weight loss
Energy Intake	High	Moderate	Low
Subcutaneous Fat	Full	Slightly reduced	Markedly reduced
Calcium Intake	High	Moderate	Low
Carbohydrate Intake	High	Moderate	Low
Monounsaturated Fat Intake	High	Moderate	Low
Polyunsaturated Fat Intake	High	Moderate	Low
Body Mass Index	High	Moderate	Low

Analysis of Data
Each subject's 24-hour recall was analyzed using the Nutritionist Pro[®] software. Data was compiled into Excel[®] spreadsheets to calculate means and frequencies for the daily value nutrient intake levels. Each subject's nutritional analysis was compared to the Food and Nutrition Board of the Institute of Medicine National Academy of Sciences Dietary Reference Intake recommendations for adults and identified as below, met, or over the DRI.

Data was analyzed using the Statistical Package for the Social Sciences (SPSS[®]). A bivariate (Pearson) correlation compared age with nutrient intake, calorie intake and BMI. Descriptive statistics for calories, carbohydrates, protein, fat, cholesterol, saturated fat, monounsaturated fat, polyunsaturated fat, trans fat, sodium, potassium, calcium, iron, age and BMI were also compiled with SPSS[®]. A one-sample t test comparing nutrient intake with DRI was conducted.

Subject	Female (n=16)	Male (n=18)	Total (n=34)
Age	72.8	73.2	73.0
BMI	23.0	23.5	23.3
Weight (lb)	141.4	149.2	145.3
Height (in)	58.5	59.4	58.9
Energy Intake (kcal)	1500	1500	1500
Carbohydrate Intake (g)	140	140	140
Protein Intake (g)	40	40	40
Fat Intake (g)	40	40	40
Cholesterol Intake (mg)	100	100	100
Sodium Intake (mg)	1000	1000	1000
Potassium Intake (mg)	1000	1000	1000
Calcium Intake (mg)	100	100	100
Iron Intake (mg)	10	10	10
Trans Fat Intake (g)	10	10	10
Saturated Fat Intake (g)	10	10	10
Monounsaturated Fat Intake (g)	10	10	10
Polyunsaturated Fat Intake (g)	10	10	10

Results

Thirty-four seniors (18 females and 16 males) volunteered for the nutrition-focused physical exam. Twenty-three Caucasian and 11 African American, with ages ranging from 60-90 years, participated. None of the subjects were underweight, 11 had a normal weight, 14 were overweight, and 9 were obese. One subject was unable to be weighed because of physical limitations.

Thirty-three of the 34 subjects met the criteria for mild/moderate and severe malnutrition. There was no positive statistical correlation with the number of positive NFPE findings and the degree of severity of malnutrition. Specific sites identified with malnutrition were numerous for many subjects. Fifty-nine percent had muscle loss in the dorsal hand region, 53% in the temple, 44% in the clavicle, and 32% in the acromion/scapular region. Seventy-nine percent had subcutaneous fat loss in the orbital region, 44% in the upper arm, 41% in the patellar/anterior thigh region and 0% in the thoracic/lumbar region. Thirty-five percent had edema. Data analysis revealed a positive correlation between age and monounsaturated fat intake ($r = -.38, p < 0.03$), polyunsaturated fat intake ($r = -.36, p < 0.04$), and body mass index ($r = -.37, p < 0.03$). Mean calcium intake 618.4 ± 273.8 ($p < 0.00$) was significantly below the DRI. Mean carbohydrate intake 158.3 ± 73.8 ($p < 0.03$) was significantly above the DRI. All other mean nutrient intakes were not significantly different from the DRI.

Table 3. Frequency of Severe Malnutrition, Mild/Moderate Malnutrition, and Well Nourished by Exam Areas

Exam Area	Severe Malnutrition	Mild/Moderate Malnutrition	Well Nourished
Orbital Region	11 (32%)	11 (32%)	12 (36%)
Upper Arm Region (Triceps)	11 (32%)	11 (32%)	12 (36%)
Thoracic/Lumbar Region	11 (32%)	11 (32%)	12 (36%)
Acromion/Scapular Region	11 (32%)	11 (32%)	12 (36%)
Dorsal Hand Region	11 (32%)	11 (32%)	12 (36%)
Patellar/Anterior Thigh Region	11 (32%)	11 (32%)	12 (36%)
Posterior Calf Region	11 (32%)	11 (32%)	12 (36%)
Clavicle/Intercostal Space Region	11 (32%)	11 (32%)	12 (36%)
Edema	11 (32%)	11 (32%)	12 (36%)
Fluid Accumulation	11 (32%)	11 (32%)	12 (36%)
Reduced Function	11 (32%)	11 (32%)	12 (36%)
Weight Loss	11 (32%)	11 (32%)	12 (36%)
Energy Intake	11 (32%)	11 (32%)	12 (36%)
Subcutaneous Fat	11 (32%)	11 (32%)	12 (36%)
Calcium Intake	11 (32%)	11 (32%)	12 (36%)
Carbohydrate Intake	11 (32%)	11 (32%)	12 (36%)
Monounsaturated Fat Intake	11 (32%)	11 (32%)	12 (36%)
Polyunsaturated Fat Intake	11 (32%)	11 (32%)	12 (36%)
Body Mass Index	11 (32%)	11 (32%)	12 (36%)

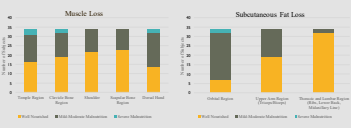


Figure 1. Muscle loss in the elderly subjects

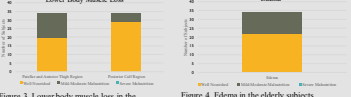


Figure 2. Subcutaneous fat loss in the elderly subjects

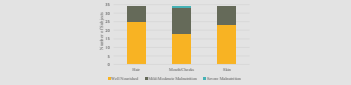


Figure 3. Lower body muscle loss in the elderly subjects



Figure 4. Edema in the elderly subjects



Figure 5. Signs of micronutrient deficiencies in the elderly subjects

Results

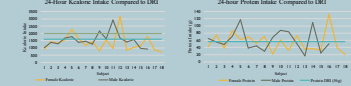


Figure 6. 24-hour kcalorie intake of elderly subjects compared to Dietary Reference Intake

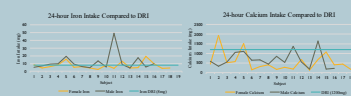


Figure 7. 24-hour protein intake of elderly subjects compared to Dietary Reference Intake



Figure 8. 24-hour iron intake compared to Dietary Reference Intake

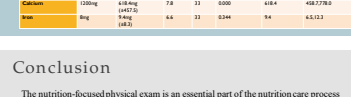


Figure 9. 24-hour calcium intake compared to Dietary Reference Intake

Table 4. Results of the One-Sample t-test Comparing Nutrient Intake with Dietary Reference Intake

Nutrient	Value	Mean (SD)	DF	t	Significance (2-tailed)	Mean Difference	95% CI
Kcalories	1600	1446.0 (419.6)	33	3.114	.0015	154.0	(125.0, 183.0)
Protein	60g	48.6 (17.4)	33	3.696	.0004	11.4	(6.6, 16.2)
Carbohydrate	300g	319.9 (116.3)	33	3.011	.0033	119.9	(81.0, 158.8)
Cholesterol	300mg	272.8 (119.2)	33	3.114	.0015	72.8	(45.0, 100.6)
Calcium	1200mg	618.4 (273.8)	33	3.889	.0003	581.6	(518.7, 644.5)
Sodium	2300mg	1611.2 (646.2)	33	3.244	.0024	688.8	(530.0, 847.6)

Conclusion

The nutrition-focused physical exam is an essential part of the nutrition care process used by registered dietitian nutritionists to assess the nutritional status in the elderly. Thirty-three of the cohort of 34 had mild/moderate malnutrition and 6 had severe malnutrition. Edema was also present in 35% of the subjects. Twenty-three (70%) were overweight or obese. Statistical significance was found in low calcium intake and high carbohydrate, monounsaturated fat, and polyunsaturated fat intakes. Use of the NFPE highlights the importance of the registered dietitian nutritionist in the multidisciplinary team. The information provided by the NFPE is essential in developing a holistic nutritional treatment plan for individuals.

References

- Esper D. Utilization of nutrition-focused physical assessment in identifying micronutrient deficiencies. *Nutr Clin Pract.* 2015;30(2):194-202.
- Litchford M. Putting the nutrition-focused physical assessment into practice in long-term care settings. *Ann Longterm Care.* 2013;21(11):38-41.
- Trippend K, Quattrin B, Parkhurst M, Malone A, Farnjang G, Ziegler T. Critical role of nutrition in improving quality of care: an interdisciplinary call to action to address adult hospital malnutrition. *J Acad Nutr Diet.* 2013;13(9):1219-1237.
- Laur C, Keller H. Making the case for nutrition screening in older adults in primary care. *Nutr J.* 2017;53(3):129-136.
- Isserieg E, Banks M, Ferguson M, Bauer J. Beyond malnutrition screening: appropriate methods to guide nutrition care for aged care residents. *J Acad Nutr Diet.* 2012;12(3):376-381.

Acknowledgements

• Dr. J. D. Patterson Summer Research Grant
• Ouachita Baptist University