


REVIEW

## Eating habits in older adults: an approach based on Neuman's Systems Model

### Hábitos alimentarios en el adulto mayor: un enfoque desde el Modelo de Sistemas de Neuman

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#### ABSTRACT

**Introduction:** nutrition in old age was recognized as a key determinant of well-being and autonomy. Deficiencies and excesses in nutrition coexisted in older adults, with effects on morbidity, functionality, and quality of life. From a systems perspective, Betty Neuman's model allowed for an understanding of the interaction between the individual and the environment, placing prevention and system stability as goals of care. Within this framework, the aim was to describe the quality of dietary practices and identify their main determinants.

**Development:** the study addressed eating habits as a result of interrelated factors: psychological (emotional state, stress), socioeconomic (income, family support, advertising), environmental (accessibility, portion size, eating in company), and physiological (hunger/satiety, senses, age). The quality of the practice was defined as adherence to specific recommendations and needs, incorporating diversity, balance, safety, and affordability. Critical requirements for older adults were reviewed—high biological value proteins, vitamins B12 and B6, calcium, magnesium, fiber, and water—and malnutrition (undernutrition, overweight/obesity, sarcopenia) was characterized. The nutritional assessment included dietary history and anthropometric and functional indicators. Based on Neuman's model, behavior modification and nutrition education strategies were described, along with community actions to improve access and affordability, and the inclusion of adapted physical activity as an adjunct.

**Conclusions:** it was concluded that intervening in the nutrition of older adults required an integrated, person-centered approach based on Neuman's Systems Model. Prioritizing systematic nutritional screening, protein-micronutrient prescription, continuing education with family support, and improvements in the food environment projected benefits on autonomy and quality of life. It was recommended that cost-effectiveness be evaluated and interventions be adapted to local heterogeneities.

**Keywords:** Elderly Person; Eating Habits; Betty Neuman Model; Malnutrition; Nutrition Education.

#### RESUMEN

**Introducción:** se reconoció que la alimentación en la vejez fue un determinante central del bienestar y la autonomía. En el adulto mayor coexistieron malnutrición por déficit y por exceso, con efectos sobre morbilidad, funcionalidad y calidad de vida. Desde una mirada de sistemas, el Modelo de Betty Neuman permitió comprender la interacción entre persona y entorno, situando la prevención y la estabilidad del sistema como metas del cuidado. En este marco, se planteó describir la calidad de las prácticas alimentarias e identificar sus principales determinantes.

**Desarrollo:** el estudio abordó los hábitos alimentarios como resultado de factores interrelacionados: psicológicos (estado emocional, estrés), socioeconómicos (ingresos, apoyo familiar, publicidad), ambientales (accesibilidad, tamaño de raciones, comer en compañía) y fisiológicos (hambre/saciedad, sentidos, edad).

Se definió la calidad de la práctica como la adecuación a recomendaciones y necesidades específicas, incorporando diversidad, balance, seguridad y asequibilidad. Se revisaron requerimientos críticos del adulto mayor —proteínas de alto valor biológico, vitaminas B12 y B6, calcio, magnesio, fibra y agua— y se caracterizó la malnutrición (desnutrición, sobrepeso/obesidad, sarcopenia). La valoración nutricional contempló historia dietética e indicadores antropométricos y funcionales. A partir del modelo de Neuman, se describieron estrategias de modificación de conducta y educación alimentaria, junto con acciones comunitarias para mejorar acceso y asequibilidad, y la inclusión de actividad física adaptada como coadyuvante.

**Conclusiones:** se concluyó que intervenir sobre la alimentación del adulto mayor requirió un enfoque integrado, centrado en la persona y basado en el Modelo de Sistemas de Neuman. La priorización de cribado nutricional sistemático, prescripción proteico-micronutricional, educación continua con apoyo familiar y mejoras del entorno alimentario proyectó beneficios sobre autonomía y calidad de vida. Se recomendó evaluar costo-efectividad y adaptar intervenciones a heterogeneidades locales.

**Palabras clave:** Adulto Mayor; Hábitos Alimentarios; Modelo de Betty Neuman; Malnutrición; Educación Alimentaria.

## INTRODUCTION

Nutrition in old age has been recognized as a key determinant of well-being and autonomy. Older adults are a particularly vulnerable group, in which both undernutrition and overnutrition coexist, with an impact on morbidity, disability, and quality of life. Evidence showed that a balanced, diverse, and safe diet contributed to preventing chronic diseases, maintaining muscle mass and function, and sustaining cognitive and functional performance. However, the physiological changes associated with aging, together with psychological, socioeconomic, and environmental factors, made it difficult to adhere to healthy dietary guidelines.

From a systems perspective, Betty Neuman's model provided an integrative framework for understanding and addressing the eating habits of older adults. By conceiving of the person as an open system interacting with environmental stressors, the model placed primary, secondary, and tertiary prevention and system stability as goals of care. Applied to nutrition, it allowed for the identification of physiological, psychological, sociocultural, and developmental stressors that altered intake, as well as lines of defense that could be strengthened through education, social support, and improved access to adequate food.

Eating habits depended on interrelated determinants: psychological factors (emotional state, stress management), socioeconomic factors (income, family support, advertising, social class), environmental factors (accessibility, climate, portion size, eating in company), and physiological factors (hunger and satiety, senses, genetics, age). In this context, the quality of dietary practices was understood as the degree of adequacy in relation to nutritional recommendations and the specific needs of older adults, including diversity, balance, safety, and affordability.

Nutritional needs at this stage required attention to proteins of high biological value and micronutrients such as vitamins B12 and B6, calcium, magnesium, fiber, and water. The assessment of nutritional status—dietary history, anthropometric and functional indicators—was essential for detecting malnutrition, overweight or obesity, and sarcopenia, and for planning behavior modification actions aimed at adherence and self-care.

Despite the relevance of the problem, gaps persisted in the local characterization of eating habits and in the evaluation of cost-effective strategies to improve them. In this context, the study aimed to describe the quality of dietary practices in older adults, identify associated physiological, psychological, sociocultural, and environmental determinants, estimate the presence of malnutrition due to deficiency and excess, and design intervention guidelines based on Neuman's Systems Model.<sup>(1,2,3)</sup>

## DEVELOPMENT

### Theoretical Framework

#### *Theoretical Positions*

Betty Neuman was a nursing theorist who developed a systems model that has had a major impact on nursing and has influenced the way eating habits are addressed in older adults. Betty Neuman's theory is based on general systems theory and considers individuals as open systems in constant interaction with their environment. Neuman's model focuses on disease prevention and maintaining the stability of the patient's system by identifying the management of conditions, the patient as a system composed of five variables that are physiological, psychological, sociocultural, development/growth, and maintaining their stability through management assistance. Neuman's model has had a significant impact on nursing and has been applied in various areas of nursing practice.<sup>(4,5,6)</sup>

Betty Neuman's systems theory in relation to the research topic of eating habits in older adults. This

theory considers the individual as a system interacting with their environment, which includes aspects such as nutrition and adaptation to change. Some of Neuman's theories, such as stress and prevention, are relevant to understanding and addressing eating habits in the older adult population, as they can influence their ability to adapt through nutrition and maintaining excellent health. In addition, Betty Neuman's theory is associated with disease prevention, which is relevant in the context of eating habits in older adults, as adequate nutrition can contribute to the prevention of age-related factors.

## Conceptual Framework

### *Quality*

According to the ISO (International Organization for Standardization), quality is the adequacy and conformity to the requirements established by both the standard itself and by customers. In other words, quality represents the degree of excellence of a process, service, or product provided by a company, in such a way that it satisfies the demands specified by the ISO and, of course, by customers. Quality refers to the level at which a product or service meets or exceeds customer expectations. It can also include aspects such as reliability, performance, durability, and other factors that are significant to the customer.<sup>(7)</sup> In the context of this research, it refers to the degree to which the eating habits of this population meet or exceed the nutritional recommendations established for their well-being. In addition, the quality of eating habits can encompass aspects such as diet diversity and balance, adequacy for the specific nutritional needs of older adults, food safety and accessibility, and other factors that are important for maintaining their health and quality of life.

### *Nutrition*

Nutrition is the process of consuming, absorbing, and utilizing the nutrients necessary for the growth and development of the body and for the maintenance of life. Nutrients are components of the food we consume that are converted at the cellular level to ensure the proper functioning of the body. They are substances that the human body requires throughout all stages of life, and as people age, they become increasingly important, given that their nutritional needs change as the human body requires these nutrients to perform various functions, which can be obtained through the foods that nature provides.<sup>(8)</sup> It is essential that older adults pay special attention to their diet in order to maintain good health and prevent nutritional deficiencies.

### *Nutritional needs*

Nutrition is a crucial factor in human life, but its importance increases significantly in older adults. As the most vulnerable group, older adults are more prone to nutritional problems, which makes adequate nutritional status and sufficient nutrient intake essential for maintaining an optimal quality of life. In other words, adequate nutrition is a prerequisite for well-being in old age. It is an issue that goes beyond simple food intake and is closely related to broader factors that affect people's lives.<sup>(9)</sup> Therefore, the constitution recognizes food as an essential element for the well-being and fulfillment of the right to health of Ecuadorian citizens, and also highlights the importance of health as a fundamental right.

### *Nutrients*

Older adults have specific nutritional needs and should pay attention to getting enough vitamin B12, vitamin B6, magnesium, fiber, water, calcium, protein, and fiber through a balanced and healthy diet. Most older adults need to consume the same amount of most nutrients as younger adults, although, in general, this should be achieved with total food intakes substantially higher in nutrients than the nutritional recommendations for older adults.

### *Malnutrition and types*

Malnutrition is defined as a disorder resulting from an unbalanced, insufficient, or excessive diet, or from impaired absorption, assimilation, or utilization of food. The risk of developing nutritional deficiencies increases with age. It is important for older adults to eat a balanced and healthy diet to avoid malnutrition and stay strong and healthy. Symptoms of nutritional problems include weight loss, dizziness, disorientation, lethargy, and decreased appetite.<sup>(10)</sup> The most common types of malnutrition are:

Malnutrition is a condition in which the body does not receive the nutrients it needs to function properly. This can be due to insufficient food intake, poor diet quality, or problems with nutrient absorption. Overweight: can lead to a number of health problems, such as type 2 diabetes, hypertension, heart disease, and certain types of cancer. It can also affect quality of life and increase the risk of joint and respiratory disorders. Obesity: is a chronic disease characterized by excessive accumulation of body fat, which can be harmful to health. It is commonly measured by body mass index (BMI). Sarcopenia: is a progressive and generalized musculoskeletal disease characterized by a decrease in muscle mass, strength, and function associated with aging.<sup>(11)</sup>

*Identifying poor nutrition: excess and deficiency*

Identifying poor nutrition, whether due to excess or deficiency, refers to detecting imbalances in nutrient intake that can lead to health problems in older adults. Excess or deficiency leaves a metabolic imprint and affects the health of the fetus and the child in their early years and in later stages of life through adulthood.<sup>(12)</sup>

Poor nutrition due to excess food intake is one of the potential risk factors for many of today's chronic diseases. When the body is in a poor nutritional state, it begins to show changes such as weight gain, overweight, and obesity.

Poor nutrition due to deficiency occurs when the body does not receive enough essential nutrients to function properly. This can affect people of all ages, but is especially concerning in vulnerable populations such as children and the elderly. This condition can be caused by insufficient food intake, difficulties in nutrient absorption, or increased nutritional needs due to specific diseases or conditions.<sup>(13)</sup>

*Nutritional Status*

It is essential for preventing chronic diseases, improving quality of life, and promoting longevity. Older adults are a highly vulnerable population group in which malnutrition problems frequently occur, either due to obesity or nutrient deficiency, along with a high prevalence of chronic diseases. Physiological changes, health problems, and psychosocial and functional factors must be considered when assessing and planning an adequate diet, implementing strategies that ensure a balanced nutritional intake, adequate hydration, and physical activity.

*Assessment of nutritional status*

Nutritional status assessment is a process that allows the health and well-being of an individual or population to be determined from a nutritional point of view. Knowing a person's nutritional status allows for the design of an appropriate treatment plan. This is especially important in older adults, as malnutrition is a major risk factor for morbidity and mortality in older people. This involves the assessment of several factors, including body composition, eating habits, and nutrient intake to maintain better well-being in older age.<sup>(14)</sup>

*Nutrition in older adults*

Nutrition is essential for older adults, as an inadequate diet can contribute to malnutrition, obesity, and the onset of chronic diseases. It is important that older adults receive high-quality food and nutritional assistance and that their diet is strictly balanced and nutritious. Poor nutrition includes the incidence of multimorbidity, which causes chronic diseases or disabilities, the prevalence of which increases in the geriatric population, making it necessary to correct habits and lifestyles in order to achieve an active and satisfying old age.<sup>(15)</sup>

*Eating Habits - Concept*

Eating habits in older adults are extremely important for maintaining their health, preventing disease, and improving their quality of life. As people age, their nutritional and metabolic needs change, making it essential to adapt their eating habits by promoting essential nutrients such as proteins, vitamins, minerals, and fiber, ensuring that they have a varied diet that meets their needs and contributes to their well-being.<sup>(16,17)</sup>

*Strategies for improving eating habits*

Strategies to address common challenges that arise when following a healthy diet, such as resisting the temptation to eat unhealthy foods and overcoming psychological barriers that may be preventing weight loss, malnutrition, undernourishment, and chronic diseases in older adults. To improve eating habits in older adults, several strategies can be implemented, such as selecting nutrient-rich foods, increasing the intake of fruits, vegetables, proteins, and carbohydrates, controlling portion sizes, and maintaining moderate physical activity in older adults.<sup>(18)</sup>

*Modification of habits and behavior*

Changing habits and behaviors refers to intentional changes in a person's behavior and is related to eating habits in older adults in the sense of promoting healthy eating adapted to their needs. Habits are acquired and formed progressively from a very early age, from the first years of life. They are essential for improving quality of life and preventing health problems related to malnutrition, undernourishment, and disease. They become consolidated during adolescence and the early years of older adulthood.

*Types of habits: healthy and unhealthy*

Eating habits are patterns of behavior that are repeated over time and can be good or bad. They have a significant impact on the health of older adults. Unhealthy habits can lead to weight gain, increase the risk of chronic diseases, and worsen the overall well-being of older adults. Therefore, it is important to promote

healthy eating habits in older adults to prevent nutritional deficiencies and maintain good health during this stage of life, thereby ensuring their well-being.

#### *Determinants of eating habits*

Eating habits are a determining factor that influences the choice of foods we consume. The factors we have are psychological, socioeconomic, environmental, and physiological. In addition, eating habits are influenced by many complex determinants and interactions in lifestyle and develop over time.

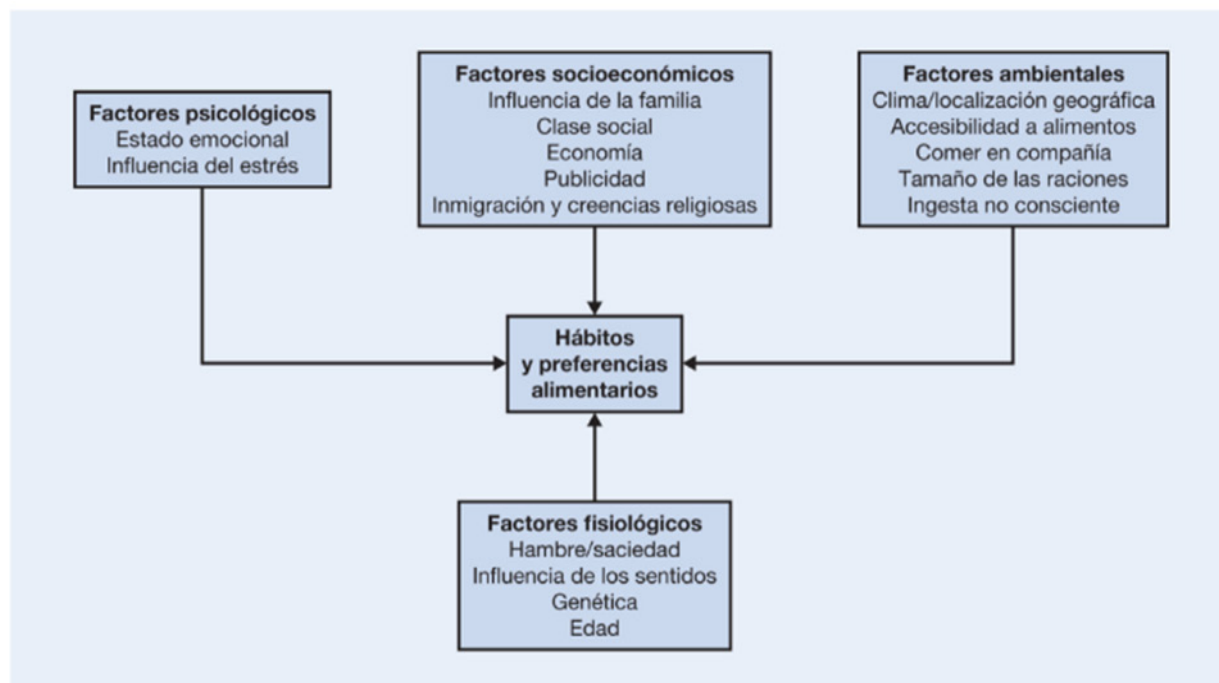


Figure 1. Factors that condition the eating habits and preferences of the population

#### *Influence of eating habits on health*

Eating habits have a major impact on our lives even before we are born. Eating well is one of the best decisions you can make to protect and improve your health. It is therefore important to understand and adapt the eating habits of older adults to ensure adequate nutrition that meets their nutritional needs and contributes to their well-being.<sup>(19,20)</sup>

#### *Nutrition education for older adults*

Despite the importance of nutritional status on the health-disease process in older adults, a large proportion of older adults have problems with malnutrition, undernourishment, overweight, and obesity, which increase their risk of disease. For all these reasons, education is used as a framework for promoting good eating habits and preventing disease, as health education is of utmost importance for improving the health of individuals and communities.<sup>(21,22)</sup> Nutrition education for older adults is a process that seeks to provide information and training on healthy eating habits, involving the family, schools, and community where the older adult lives.

## CONCLUSIONS

The analysis confirmed that nutrition in old age was a key determinant of well-being, autonomy, and functionality. It was found that malnutrition—due to deficiency and excess—coexisted with high frequency and was associated with chronic morbidity, sarcopenia, and deterioration in quality of life. In this context, it was concluded that the quality of dietary practices should be understood as adequacy to the specific needs of older adults (diversity, balance, safety, and affordability), beyond mere caloric compliance.

Betty Neuman's Systems Model provided a useful framework for interpreting and addressing the problem. The conception of older adults as an open system exposed to physiological, psychological, sociocultural, and environmental stressors made it possible to organize primary, secondary, and tertiary preventiv l actions aimed at preserving the stability of the system. It was inferred that interventions that strengthened the lines of defense—nutritional education, social support, and improved access to healthy foods—were more promising than isolated and exclusively biomedical approaches.

It was stated that the determinants of eating habits operated in an interdependent manner: emotional



state and stress management conditioned intake; socioeconomic factors (income, family support, advertising) and environmental factors (accessibility, portion size, eating in company) modulated choices and portions; physiological changes associated with aging affected appetite, taste, satiety, and requirements. Consequently, effective strategies had to integrate behavioral and contextual components, in addition to dietary adjustments.

The synthesis highlighted operational priorities: (1) systematic nutritional assessment with anthropometric and functional indicators for early detection of malnutrition, obesity, and risk of sarcopenia; (2) prescription of dietary patterns rich in high biological value proteins and critical micronutrients (B12, B6, calcium, magnesium, fiber, and water); (3) continuous, person-centered nutrition education, with the participation of family and caregivers; (4) community interventions that improved the accessibility and affordability of healthy foods; and (5) promotion of adapted physical activity as an adjunct to nutritional status and functionality.

Local gaps in the characterization of dietary habits and in the evaluation of cost-effective strategies were recognized. It was recommended to consolidate programs based on the Neuman model, with longitudinal follow-up and measurement of clinical and quality of life outcomes, as well as to adapt interventions to heterogeneities in gender, socioeconomic status, and social support. This was projected to have a sustainable impact on the prevention of malnutrition and the prolongation of independence in the geriatric population.

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