



System of educational actions to improve the nutritional status of older adults from an andragogical approach

Sistema de acciones educativas para mejorar el estado nutricional en adultos mayores desde un enfoque andragógico

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ABSTRACT

Introduction: Population aging represents a global phenomenon that has generated challenges in the field of health and in improving the quality of life of older adults. Objective: To develop a system of educational actions to improve the nutritional status of older adults from an andragogical approach. Methodological design: A quasi-experimental, prospective study was conducted at CMF 141 of GBT No. 2 of the Hermanos Cruz Polyclinic in the municipality of Pinar del Río, from October 2024 to November 2025, inclusive. The universe consisted of 62 older adults, with a sample of 43 selected through intentional non-probabilistic sampling, meeting the inclusion criteria for this study. Results: Of the participants, 60.5% were men, and most were between 76 and 83 years old (41.8%). The majority had no employment ties (53.5%) and had completed basic secondary education (41.8%). A total of 58.1% used dental prostheses; 44.1% had associated diabetes mellitus and arterial hypertension, and 67.4% presented polypharmacy. Statistically significant changes were observed in biochemical and anthropometric parameters, as well as in the evaluation of nutritional status according to the Mini Nutritional Assessment, across the three measurement points before and after the intervention. Conclusions: A system of educational actions is proposed to promote the nutritional status of older adults, based on the essential elements identified in the study, in order to reduce the incidence of malnutrition in patients aged 60 years and older.

Keywords: older adult, nutritional status, population aging, health promotion, Primary Health Care.

RESUMEN

Introducción: El envejecimiento poblacional representa un fenómeno global que ha generado desafíos en el ámbito de la salud y el mejoramiento de la calidad de vida de los adultos mayores. Objetivo: Desarrollar un sistema de acciones educativas para mejorar el estado nutricional en adultos mayores desde un enfoque andragógico. Diseño metodológico: Se realizó un estudio cuasi experimental, prospectivo en el CMF 141 del GBT nro. 2 del policlinico Hermanos Cruz en el municipio Pinar del Río, de octubre de 2024 a noviembre de 2025 ambos incluidos. El universo estuvo constituido por 62 adultos mayores para una muestra de 43 de ellos seleccionados por muestreo no probabilístico de tipo intencional que cumplieran los criterios de inclusión para este estudio. Resultados: El 60,5 % fueron hombres y la mayoría tenía de 76 a 83 años, con un 41,8 %. La mayor parte no poseía vínculo laboral (53,5%) y tenían estudios terminados en secundaria básica (41,8 %). El 58,1 % usaba prótesis dental; un 44,1 % tenía asociado diabetes mellitus e hipertensión arterial y el 67,4 % presentó polifarmacia. Existieron cambios estadísticamente significativos en los parámetros bioquímicos, antropométricos y la evaluación del estado nutricional según Mini Nutritional Assessment en los tres momentos de medición antes y después de la intervención. Conclusiones: Se propone un sistema de acciones educativas para favorecer el estado nutricional en los adultos mayores a partir de los elementos esenciales identificados en el estudio para modificar la incidencia de la malnutrición en los pacientes de 60 años y más.

Palabras clave: adulto mayor, estado nutricional, envejecimiento poblacional, promoción de salud, Atención Primaria de Salud.

INTRODUCTION

Demographic aging is unprecedented; it is a process without parallel in the history of humanity. The Cuban population is aging at an accelerated rate, which implies great challenges for society and the health system. In the year 2019 there were a total of 11 193 470 people in the country, of which 2 328 344 were over 60 years of age, representing 20,8% of the total population, in other words, 1 in every 5 citizens in Cuba is classified as an older adult.(1)

The world demographic picture has been considered among the five main drivers of global change, inspiring innovation in national and international policies, in the sciences, in institutions from the most diverse spheres, and in society in general. It is a very complex and multifaceted topic that involves professionals from the most diverse specialties, in order to face social, political, cultural, and economic challenges, with the aim of satisfying needs, guaranteeing spaces and guarantees for this increasingly growing population, and to a large extent healthy and active. (1)

Cuba is among the most aged countries in Latin America and the Caribbean, and this aging has a good measure of social achievements, together with scientific and technological achievements, but the challenges faced are clear, so that this prolonged life may be of quality, in terms of conditions that facilitate it, with recognition of the rights of older persons and with the necessary personal and social satisfaction of this population segment.(1)

To begin with, old age accounts for a set of phenomena and processes that are part of a more global concept: aging. Hence, looking at aging and old age separately would currently be a mistake when trying to understand the subjective configuration of the aging process, since a fragmented view would ignore the complexity of said process, in which biological, psychological, and social aspects coincide. There is no moment when aging stops, and therefore aging is a concept that encompasses old age; they cannot be separated and must be defined in an articulated manner.(2)

In approaching the concepts of aging and old age, it becomes evident that the definitions found in studies and theoretical productions are multiple and diverse, since it is a topic of interest for different areas of knowledge, drawing on the contributions of sociology, psychology, medicine, biology, economics, among others, as scientific production on the subject increases, changes are occurring in its explanatory paradigms. (2)

The evaluation of nutritional status is performed using clinical, biochemical, anthropometric, and dietary indicators. It allows the care team to know or estimate the nutritional status of infants upon admission to the institution, identify those at risk of malnutrition (by deficit and excess), prevent it, and carry out surveillance and monitoring of targeted nutritional management. (3)

Energy balance is conceived as the state in which energy intake, in the form of food, equals energy expenditure mainly through basal metabolism and physical activity. The balance between energy needs and caloric intake is the main determinant of body weight. When there is a positive balance and the diet provides more energy than needed, the excess is stored as fat, leading to overweight and obesity (excess malnutrition). Conversely, when energy intake is lower than expenditure, body fat and protein reserves are used, producing a decrease in weight that may result in undernutrition (deficit malnutrition). (3)

There are various screening instruments that help assess nutritional status, such as the MNA test, which in various studies has demonstrated that it can anticipate the appearance of other biochemical markers of malnutrition by detecting a population at risk before the immune response is altered.

The potential cost of malnutrition is high; however, it is demonstrated yet again that with one simple and inexpensive tool such as the MNA test we can diagnose a malnourished patient or a patient at risk of malnutrition to carry out a nutritional intervention that will result in a shorter hospital stay, consequently lower healthcare costs, and ultimately a better quality of life for patients. (4-5)

In the field of health education, andragogy becomes a particularly relevant approach. Older adults require educational strategies that respect their autonomy, value their experiences, and allow them to apply what they have learned to improve their quality of life. In this sense, nutrition education based on andragogical principles favors understanding the importance of a balanced diet, stimulates the adoption of healthy eating habits, and strengthens the capacity for self-management of health. (6)

In light of the above, this research arises with the objective of developing a system of educational actions to improve the nutritional status of older adults from an andragogical approach.

METHODS

Context and classification of the study

Study type: A quasi-experimental, prospective technological development research was conducted with a mixed-methods approach.

It was carried out at CMF# 141 of the Hermanos Cruz University Polyclinic in the municipality of Pinar del Río, in the province of Pinar del Río. The study was conducted during the period from October 2024 to November 2025.

Universe and sample: The universe consisted of 62 older adults, for one sample of 43 of them selected by non-probabilistic intentional sampling who met the inclusion criteria for this study:

1. Persons aged 60 years and older, as confirmed by identity card.
2. They resided in CMF area # 141 for more than 18 months.

Excluded:

1. Patients with a disabling or incapacitating disease.
2. Patients with a diagnosis of dementia.

The dependent variable was nutritional status, an ordinal qualitative variable assessed through the Mini Nutritional Assessment survey; data were obtained through the survey and physical examination of the patients. The Mini Nutritional Assessment survey includes anthropometric measurements and questions about dietary habits, lifestyles, diseases, and self-perception of health status related to nutrition (100).

Intervention Structure

Targeted at: Older adults.

Duration: 8 weeks.

Responsible: Dr. Frank Hernández Ávila.

Health Center: CMF# 141 of the Hermanos Cruz Polyclinic in the municipality of Pinar del Río.

Organizational Form: workshops, educational talks, home visits, nutritional assessment.

Phase I: Educational intervention

Training sessions lasted 45-90 minutes and were held 3 times per week, depending on the topic, its complexity, and the objectives to be achieved. The sample was divided into 5 subgroups to facilitate the development of the activities.

At the 3 time points (initial visit, 6 months after completion of the intervention, and 12 months after completion of the intervention), participants were individually interviewed to complete the MNA questionnaire, which comprises 18 items, each weighted. The resulting score was interpreted as follows: less than 17 points indicated malnutrition (MN); 17 to 23.99 points indicated risk of malnutrition (RMN); and 24 points or more indicated satisfactory nutritional status (ENS). Then, anthropometric measurements not included in the survey were taken, according to parameters established by the Ministry of Public Health of Cuba. Hemoglobin was determined using the manual method (Hemotest, HELFA Diagnóstico). Based on the Hemotest reagent, patients were classified into 3 groups: low hemoglobin (≤ 130 g/l in men and ≤ 120 g/l in women), normal hemoglobin (> 130 g/l and ≤ 170 g/l in men; > 120 g/l and ≤ 150 g/l in women), and high hemoglobin (> 170 g/l in men and > 150 g/l in women).

Following the categorization of patients into 4 categories according to the assessment of their nutritional status based on IMC (underweight, normal nutritional status, overweight, and obesity), and together with their comorbidities, a diet of 1800 or 2000 kcal per day was assigned.

Patients with insufficient weight and an MNA score indicating risk of malnutrition were assigned a 2000 kcal diet after assessment by a nutritionist, together with nutritional supplements to improve their nutritional status.

Phase II: 6 months after the last session, blood collection for the main biochemical variables, measurement of anthropometric parameters, and evaluation of nutritional status according to the Mini Nutritional Assessment (MNA) were performed.

Phase III: 12 months after the last session, blood collection for the main biochemical variables, measurement of anthropometric parameters, and evaluation of nutritional status according to the Mini Nutritional Assessment (MNA) were carried out.

Obtaining the Information

Data compilation was performed directly by reviewing the patients' clinical records, the nutritional survey, biochemical studies, and their respective anthropometric measurements. The data were recorded in an information extraction form.

Statistical Methods

Descriptive statistics were used.

Information processing

The available computing resources included a PC, on which spreadsheets were processed using Microsoft Excel 2010 and text documents using Microsoft Word 2010.

Ethical principles

The patients who comprised the sample were informed of the purpose of the research and their willingness to participate in the study was requested through informed consent.

At the same time, this research was conducted in accordance with the principles of the Declaration of Helsinki, according to its latest version, and with the approval of the Research Ethics Committee of the Policlínico Hermanos Cruz as well as its Scientific Council. Respect for persons was ensured, namely their autonomy, beneficence, non-maleficence, and justice.

RESULTS

The distribution of patients according to demographic variables and initial nutritional status according to the Mini Nutritional Assessment (MNA) is shown in Table 1. Male sex predominated, with 60.5% of the sample. The age group between 78 and 83 years predominated, representing 41.8% of the studied sample. Regarding occupation, unemployed individuals stood out, representing 53.5%. The prevailing educational level was basic secondary education, in 41.8% of the sample.

Table 1: Demographic variables and initial nutritional status according to Mini Nutritional Assessment (MNA)

Sociodemographic variables		Nutritional status according to the Mini Nutritional Assessment (MNA)			
	(MN)		(RMN) (ENS)		Total
	N %	N %	N %	N %	
Age	60-67	5 11,6	6 14,0	2 4,6	13 30,2
	68-75	2 4,6	5 11,6	5 11,6	12 27,9
	76-83	5 11,6	9 20,9	4 9,3	18 41,8
	Total	12 27,9	20 46,5	11 25,6	43 100,0
Sex	Male	7 16,3	15 34,9	4 9,3	26 60,5
	Female	5 11,6	5 11,6	7 16,3	17 39,5
	Total	12 27,9	20 46,5	11 25,6	43 100,0
Occupation	Employee	4 9,3	5 11,6	4 9,3	13 30,2
	Unemployed	6 14,0	11 25,6	6 14,0	23 53,5
	Housewife	2 4,6	4 9,3	1 2,3	7 16,3
	Total	12 27,9	20 46,5	11 25,6	43 100,0
Level Educational	Primary	3 6,9	5 11,6	2 4,6	10 23,3
	Secondary	6 14,0	8 18,6	4 9,3	18 41,8
	Polytechnic	1 2,3	5 11,6	1 2,3	7 16,3
	Pre-university	1 2,3	1 2,3	3 6,9	5 11,6
	University	1 2,3	1 2,3	1 2,3	3 6,9
Total		12 27,9	20 46,5	11 25,6	43 100,0

Table 2 presents the distribution of participants according to the use of dental prostheses, chronic diseases, polypharmacy, and initial nutritional status according to the Mini Nutritional Assessment (MNA), where the majority used dental prostheses at 58.1%. The association of diabetes mellitus with arterial hypertension was the most representative in 44.1% of cases, and polypharmacy was present in 67.4% of the older adults studied.

Table 2: Factors associated with initial nutritional status according to Mini Nutritional Assessment (MNA)

Associated factors	Nutritional status according to the Mini Nutritional Assessment (MNA)				
	(MN)	RMN, ENS		Total	
	N %	N %	N %	N %	
Use of dental prostheses	Yes	7 16,3	11 25,6	7 16,3	25 58,1
	No	5 11,6	9 20,9	4 9,3	18 41,8
	Total	12 27,9	20 46,5	11 25,6	43 100,0
Chronic diseases	DM	3 6,9	4 9,3	3 6,9	10 23,3
	HTA	2 4,6	4 9,3	2 4,6	8 18,6
	DM + HTA	6 14,0	7 16,3	6 14,0	19 44,1
	IRC	1 2,3	5 11,6	- -	6 14,0
	Total	12 27,9	20 46,5	11 25,6	43 100,0
Polypharmacy	Yes	9 20,9	13 30,2	7 16,3	29 67,4
	No	3 6,9	7 16,3	4 9,3	14 32,6
	Total	12 27,9	20 46,5	11 25,6	43 100,0

The evolution of hemoglobin before, at 6 months, and at 12 months after the intervention (Table 3) showed considerable improvement when comparing the initial and final measurements. Due to the lack of reagent, the measurements of albumin, cholesterol, and total protein were excluded from the study.

Hemoglobin at six months behaved normally in 86.0% of the sample and after a year in 100%.

Table 4 shows the evolution of the anthropometric parameters (triceps, subscapular, and suprailiac skinfolds) before, at 6 months, and at 12 months of the intervention.

Table 3: Evolution of hemoglobin before, at 6 months, and at 12 months after the intervention

Variables studied							
Hemoglobin		Before		At 6 months / At 12 months			
		N	%	N	%	N	%
	Normal	31	72,0	37	86,0	43	100
	High	8	18,6	4	9,3	-	
	Low	4	9,3	2	4,6	-	

Table 4. Changes in anthropometric parameters before, at 6 months, and at 12 months post-intervention

Measurement time					
	Percentile position	Skinfolds Triceps/ subscapular		Suprailiac	
		N	%	N	%
Before the intervention	Below 10	16	37,2	17	39,5
	Between 10 and 90	11	25,6	10	23,3
	Above 95	18	41,8	18	41,8
6 months after the intervention	Below 10	10	23,3	9	20,9
	Between 10 and 90	28	65,1	30	69,8
	Above 95	7	16,3	5	11,6
12 months after the intervention	Below 10	1	2,3	-	-
	Between 10 and 90	38	88,3	40	93,0
	Above 95	4	9,3	3	6,9

Thus, considering the initial and final measurements, as well as the percentile position, which corresponds to an adequate nutritional status (between the 10th and 90th percentiles), a satisfactory evolution of the nutritional status of the studied older adults is evidenced. Specifically, for the triceps skinfold it was from 25.6% to 88.3%, for the subscapular skinfold from 69.8% to 93.0%, and for the suprailiac skinfold from 25.6% to 93.0%.

Table 5 shows the evolution of nutritional status according to the Mini Nutritional Assessment (MNA) before, at 6 months, and at 12 months after the intervention. A favorable evolution in nutritional status can be observed, since before the intervention was applied, the greatest number of older adults, representing 48.8%, were at risk of malnutrition. After 6 months of implementing the actions, this figure decreased to 4 patients, meaning 27.9% of the total. After a year of the strategy, 35 older adults, representing 81.4% of the total sample, had a satisfactory nutritional status.

System of educational actions on the nutritional status of older adults from an andragogical approach (Figure 1)

General objective: To develop an integral system of educational actions that promotes the nutritional status of older adults from an andragogical approach.

Table 5. Evolution of nutritional status before, at 6 months, and at 12 months after the intervention

Nutritional status according to the Mini Nutritional Assessment (MNA)			
	Before	At 6 months / at 12 months	
	N %	N %	N %
Malnutrition	10 23,3	6 14,0	--
Risk of malnutrition	21 48,8	12 27,9	8 18,6
Satisfactory nutritional status	12 27,9	25 58,1	35 81,4
	43 100,0	43 100,0	43 100,0

Action 1: Diagnosis.

Objective: To obtain the primary research data related to sociodemographic, laboratory, and anthropometric variables, as well as the preliminary value of the MNA survey.

Task 1: Research preamble to coordinate their support and participation.

Task 2: Development of the model for data collection.

Task 3: Coordination of the basic health team of the clinic to conduct the research. In the case of hemoglobin, coordination was carried out with the laboratory of the Hermanos Cruz University Polyclinic for the assurance and scheduling of sample collection.

Task 4: Execution of the process for the preparation of the primary research data.

Action 2: Comprehensive dietary education with an andragogical approach through workshops, educational talks, and home visits.

Objective: Organize regular sessions on dietary education with an andragogical approach 2 times per week, dividing the study participants into subgroups of no more than 10 people, addressing topics such as physiological changes in older adults, healthy eating, nutritional requirements, and dietary plan according to nutritional assessment.

Task 1: Design of a course to train older adults with an andragogical approach on physiological changes in older adults, healthy eating, nutritional requirements, and dietary plan according to nutritional assessment.

Task 2: Coordination with the basic health team, teacher, schedule, venue, and materials necessary for delivering the course.

Task 3: Course delivery.

Essential Contents

Topic 1: Biological and psychological changes in the older adult. Metabolism, physiology, and nutrition in old age.

Objectives: To identify the modifications that occur during aging and their impact on nutritional health status.

Topic 2. Healthy eating. Healthy eating and nutrition in older adults. Food pyramid. Decalogue for healthy eating in healthy older adults. Myths, falsehoods, and realities in food and nutrition in older adults.

Objectives: To identify the characteristics and components of a healthy diet in older adults. To apply the decalogue for healthy eating in older adults.

Topic 3: Nutritional requirements in the older adult. General recommendations for nutrition in the older adult. Nutritional warning signs.

Objectives: To identify the nutritional requirements of older adults and to identify nutritional warning signs.

Topic 4: Incorporation of a dietary plan using an andragogical approach based on the nutritional assessment. Characteristics of a correct diet. Equivalence of food servings. Recommended proportions for the diet of older adults. Factors that influence food choice.

Objective: To establish the nutritional plan using an andragogical approach based on the nutritional assessment.

Topic 5: Effects of diabetes mellitus and arterial hypertension on the nutritional status of older adults. Nutritional recommendations for patients with arterial hypertension and diabetes mellitus.

Objective: To identify the dietary characteristics of patients with arterial hypertension and diabetes mellitus, and to explain, using an andragogical approach, how diet planning should be performed in patients with arterial hypertension and diabetes mellitus.

Topic 6: Effects of obesity and underweight on the nutritional status of older adults. Nutritional recommendations for patients with obesity and underweight.

Objective: To identify the dietary characteristics of patients with obesity and underweight, and to describe how diet planning should be performed for these patients.

Topic 7: Use of the label and the nutritional traffic light. Content of nutritional information. Presentation. Calculation of the energy and nutrient values declared on the label. Forms of expression of nutritional information. Other additional forms of expression.

Objectives: To identify the nutritional information of foods. To calculate the energy and nutrient values of a food according to the nutrition label. To identify the forms of expression of nutritional information. To apply the daily reference intake in adults according to their nutritional status.

Action 3: Coordinated sociodrama to address the topic of communication and stigmas of nutritional status disorders in older adults.

Objective: To train older adults, using an andragogical approach, in effective communication, listening ability, their characteristics and barriers, as well as in addressing the stigmas and myths of nutritional status disorders at that stage of life.

Task 1: Design and planning of a participatory technique using an andragogical approach to work with participants on communication and stigmas of nutritional status disorders in older adults.

Task 2: Coordination of the activity facilitator, schedule, venue, and materials necessary for its implementation.

Task 3: Execution of the sociodrama.

Task 4: Evaluation and submission of the final activity report.

Action 4: Workshop with caregivers and family members, using an andragogical approach, on the management of nutritional status disorders in older adults.

Objective: To instruct caregivers and family members of older adults, using an andragogical approach, on the main alterations that occur in their nutritional status and the consequences of these alterations for the health of this age group.

Task 1: Development of a continuing education workshop, using an andragogical approach, for caregivers and family members of older adults on the management of the family of the patient with nutritional status disorders at this stage of life.

Task 2: Coordination, with the researcher, of the schedule, venue, and materials necessary for delivery of the workshop.

Task 3: Delivery of the workshop.

Task 4: Evaluation and submission of the final workshop report, including the conduct of case studies.

Action 5: Film-debate on a short film that addresses the theme.

Objective: To promote reflection on how older adult patients and their families experience the negative consequences of nutritional status disorders.

Question guide:

- Name of the short film.
- Attitude of the main characters.
- What positive or negative elements can be highlighted in the short film?
- How can the behavior of the patients and their relatives in the short film be characterized?

Task 1: Selection of the film to be screened according to the theme.

Task 2: Coordination of schedule, venue, and materials needed for the film debate.

Task 3: Projection of the film.

Task 4: Discussion of the observation guide and questions.

Action 6: Course by the EBS on the care and management of nutritional status disorders in older adults, using an andragogical approach.

Objective: To guide the EBS from primary health care, using an andragogical approach, regarding the stages involved in the management of nutritional disorders in older adults.

Task 1: Design of a course, using an andragogical approach, for the EBS on the behavior to be followed by the family physician and nurse in the care of nutritional status disorders in older adults.

Task 2: Coordination of the teachers, schedule, venue, and materials necessary for delivering the course.

Task 3: Teaching the course.

Task 4: Evaluation and delivery of the final course report, including the completion of case studies. Participants: Members of the EBS.

Action 7: Mentoring programs.

Objective: To implement a peer mentoring program in which trained older adults guide other older adults on topics related to the nutritional characteristics of older adults.

Task 1: Design of a peer mentoring program in which trained older adults guide others on topics related to the particularities of nutrition in patients aged 60 years and older.

Task 2: Selection of older adults with the capacity and skills to carry out mentoring.

Task 3: Implementation of the mentoring program.

Task 4: Evaluation and delivery of the final program report. Participants: Older adults selected for their capacity to carry out mentoring.

Action 8: Reevaluation at 6 and 12 months of biochemical and anthropometric variables and administration of the MNA survey.

Objective: To obtain data on biochemical and anthropometric variables, as well as the MNA survey value, for evaluating their evolution at 6 and 12 months.

Task 1: Coordination of the clinic's basic health team, schedule, location, and materials needed for performing the measurements. In the case of hemoglobin, coordination was carried out with the laboratory of the Hermanos Cruz University Polyclinic for assurance and scheduling of sample collection.

Task 2: Implementation of the process for obtaining the research data.

Prevention and access to resources:

Distribution of informational materials: Provide brochures and digital resources with information on nutrition in older adults, using an andragogical approach.

Access to health services: Promote access to health services where older adults can receive guidance and care for their nutritional status.

Awareness campaigns:

Thematic days: Celebrating older adult days through an andragogical approach, with interactive activities and games.

Social media use: Creating social media campaigns to disseminate information and demystify taboos.

Evaluation and Monitoring

Motivational interviews and questionnaires: Conduct periodic evaluations to measure the effectiveness of the implemented actions.

Follow-up meetings: Establish quarterly meetings to review results and adjust strategies as needed.

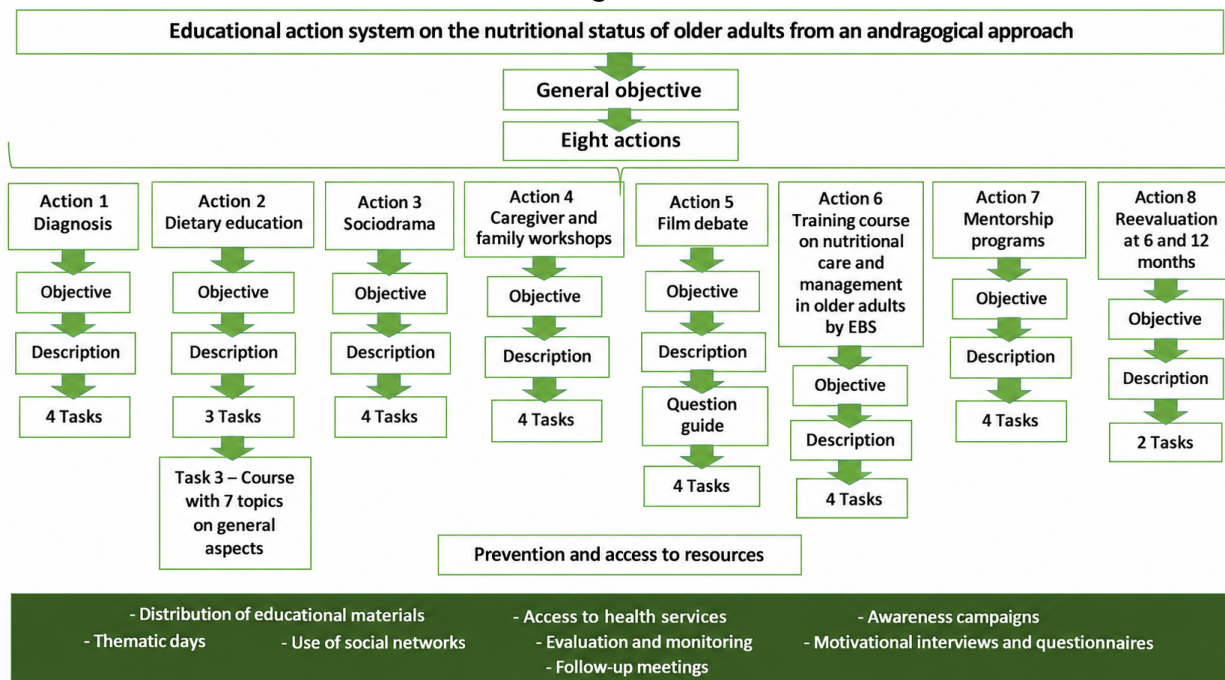
DISCUSSION

In this research, our findings agree with those of Licona Rivera et al. (7): the study participants had a mean age of 72 ± 8.9 years at the time of the interview; 77 (50.2%) were at risk of malnutrition, 28 (18.2%) had malnutrition, and 48 (31.6%) had good nutritional status. Malnutrition in the older adult population was related to age, since older age was associated with greater cognitive impairment and depression. No statistically significant relationship was found between functional dependence and nutritional condition; however, our results differ from the cited study in that the female sex predominated (89, 58%).

Among the factors affecting the oral health of older adults are the teeth. In old age, due to changes in facial contour, highly active older adults engaged in family and social activities require a fully secure prosthesis to speak, eat, drink, and improve aesthetics. On the other hand, good dentition is essential for preventing conditions such as malnutrition and pronunciation problems,

a finding with which this research agrees (8).

Figure 1.



The denture is not merely the repositioning of dental resources, but also a means of integration into family and society, enabling the elderly to create ideal foods and avoid tooth loss. The most important functional element of a prosthesis in the elderly is its sterilization and maintenance (8).

We agree with Yáñez Haro and López-Alegría (9) that the quality of life of older adults, measured by clinical examination or self-perception, is mainly affected by tooth loss, which impacts aspects of functionality (speech, pronunciation), nutrition (mastication, digestion, food selection), mental health (anxiety, depression, cognitive development, self-esteem), and social interaction (loneliness); however, a portion of the older adult population perceives this deterioration as expected for their age range.

In the opinion of the authors of this research, polypharmacy is related to a greater risk of adverse drug reactions, adverse events, inappropriate prescriptions, incorrect use of medications, hospitalizations, and mortality in older adults.

Authors such as Sánchez-Pérez et al. (10) report that several risk factors for polypharmacy have been identified, which are grouped into demographic, health status, and access to health services factors. Among the demographic factors are advanced age, female gender, and low educational level. On the other hand, one recent hospitalization, frailty syndrome, multiple comorbidities, and mood disorders such as depression are collectively considered markers of health status associated with higher rates of polypharmacy. The involvement of multiple treating physicians and greater use of health care services are important characteristics that increase the risk of polypharmacy.

In the geriatric population, inappropriate drug prescribing is considered a public health problem. Internationally, the prescription of potentially inappropriate medications in the hospitalized geriatric population varies between 5.8 and 51.4%. It is associated with increased morbidity and mortality and use of health resources, raising costs up to 7.2 trillion dollars annually in EUA (10).

Anemia is a public health problem that affects low-, middle-, and high-income countries and has adverse impacts on socioeconomic development. Low oxygenation of brain tissues due to anemia can cause impairment of cognitive functions and psychomotor development, especially in children and adolescents. It negatively affects learning. Anemia has a multifactorial etiology such as nutrition, age, sex, social class, lifestyle characteristics, anthropometric factors that are a reflection of obesity such as BMI, dietary habits, and infections. Nutritional anemia is among the most important global health problems and is the most common morbidity among micronutrients and affects the health, education, economy, and productivity of the entire nation. The World Health Organization classifies it among the 10 most serious health problems. (11)

The anthropometric nutritional status corresponded to an adequate weight, average muscularity and fat, and low risk according to CC. There was a predominance of moderate to intense physical activities. Therefore, dietary modifications are required to reduce the risk of malnutrition in the studied group. (12)

The correct application of anthropometric measures and indices would contribute to detecting two elements of interest in the topic at hand: excess weight and the possible increase in abdominal fat. The assessment of both situations would help us in the prediction of dysglycemias and would allow us to act accordingly. (13)

According to Fernández Cedré (14), Crosetto proposes that very subtle changes in the nutritional status of older adults can have adverse effects on their functional status and quality of life. This population group is more susceptible than young adults to nutritional disorders due to a combination of factors, including physiological changes that modify their nutritional requirements and the body's utilization of food, the coexistence of physical or mental illnesses, cultural factors, and the economic situation in which many of them live. Other causes are related to the ingestion of medications that can interfere with or alter nutritional requirements, toxic habits such as alcoholism and smoking, and the inability to adapt to new habits. Based on the above and the results of this research, we agree with the authors' proposal.

Nutritional assessment is a very valuable element in care plans for older adults because it identifies those who are malnourished, enabling early diagnosis and timely treatment. The "full MNA®" test in its original version is a tool designed to identify malnutrition and risk of malnutrition. It is a scale consisting of questions related to weight loss, appetite, mobility, and food intake. Implementing the MNA in institutions for older adults allows for the timely identification and management of nutritional problems, improving their health and well-being. It is a validated instrument that allows nutritional assessment of the older adult in a simple, brief, and practical manner, and is the most widely used method in recent years for nutritional assessment of this population (15).

Interventions aimed at promoting self-care cover a wide range of strategies, from educational programs to the use of digital technologies. Self-management, especially relevant in the context of chronic diseases, focuses on empowering patients to control their symptoms and adapt their lifestyle accordingly, with the aim of improving their quality of life and reducing their dependence on the healthcare system (16).

The medical and healthcare personnel of Primary Care (PC) play a fundamental role in promoting therapeutic education programs and empowering people in health-related matters. Strategies such as the training of expert patients and peer training programs reinforce self-care capacity through the exchange of knowledge and experiences.

In the field of AP, the importance of behavior change through brief and collaborative interventions is emphasized. Patient activation for self-care involves specific strategies such as setting achievable goals and active collaboration in health-related decision-making.

Patient empowerment, facilitated by health literacy and shared decision-making, leads to better health outcomes and greater efficiency in the use of healthcare resources (16).

Therefore, nutritional intervention complementary to pharmacological management is undoubtedly very important among patients at risk of malnutrition, and standardized nutritional support protocols are very useful at this time. (17)

We agree with Pérez Moré et al. (18) when they state that professional practice should be promoted based on the 5 elements of the flowchart approved by the Grupo Asesoramiento Nutricional Nacional: body function and its interrelationship with nutritional status, body composition, health status, and energy and nutritional intake, with the use of the clinical method and the benefits of clinical nutrition. Given the focus on the elderly individual, the family in which an elderly person resides, and a society experiencing a decline in population replacement, it is urgent that the medical university redesign its study programs, since geriatric topics are currently very limited in the training of nursing professionals and other branches. It is vital to reinforce the inclusion of nutritional topics in the undergraduate curricular program and to promote their use and generalization in postgraduate training.

For their part, health institutions must achieve geriatrization of their services by enhancing the comprehensive action of the Basic Work Group and by using nutritional assessment as a tool within the clinical method. Likewise, health system managers at all levels of care should emphasize training in economic and nutritional topics and should demand adherence to the regulations and/or indications of the GAN (Nutritional Support Group). Therefore, scientific activity in health sciences will include this issue in its problem bank, will increase intervention studies on nutritional topics, and will facilitate, in a prioritized manner, the dissemination of their results in the different journals and approved reference sites. (18)

The educational component, which should characterize food and nutrition, should be conceived as a training strategy that requires disaggregating the theory of nutrition into didactic strategies that consider health from a comprehensive perspective and the prevention of chronic noncommunicable diseases from a nutritional perspective. Through this, health prevention, values formation, and identity building are enabled, thereby improving the quality of life of its citizens. (19)

The results indicate that andragogy is a useful and relevant learning theory to integrate into the development of effective team science training in a biomedical research environment. In this study, training effectiveness was measured through participant satisfaction, as evidenced by the quantitative scoring of workshop components and qualitative feedback. These data also fill an important gap in the learning theory literature regarding the functioning of professional teams and team training in the academic health setting. Although adult learning theory has been explored in many disciplines, this study was the first to apply andragogy to team science training at an academic health center through deductive analysis of workshop participant feedback. (20)

Undoubtedly, nutritional food education promotes the active participation of the entire population so that they can take care of their own health and nutrition. Hence the importance of population participation in these programs. Community participation is understood as “the voluntary and active involvement of groups and local communities in all stages of a health promotion program.” That is, it is necessary to rely on the conscious and responsible participation of people residing in communities to address the nutritional and health problem. This is linked to other environmental, economic, social, educational, and cultural factors that further exacerbate the nutritional problem. (21-24)

They receive training and capacity building in workshops, through activities in which parents and teachers participate, on techniques and tools that enable them to improve food and nutrition in the family and community using available resources. The messages of the Dietary Guidelines are used and adapted in activities that take into account and respect the food culture of each region. Teachers receive reinforcement of their knowledge, thereby improving the transfer of content to children. The training incorporates innovative educational strategies, including play, recreational activities, and physical activity, which facilitate learning through enjoyable activities. (21-24)

The aim is to develop community capacities so that communities assume their role in ensuring the sustainability and permanence of projects after the intervention is completed. Sustainability can be defined as the ability to maintain the positive impact of a program, or to achieve further improvements, after it has achieved its objectives. Among these strategies are enabling the community to identify its social reality linked to health and food, and designing viable and feasible community projects to be developed by community members themselves, which seek to alleviate some felt food and nutrition problems in the community. Furthermore, this component promotes social participation and the organization of volunteer groups, so that they collaborate in multiplying the contents, as well as in the role of active entrepreneurs in the community. (21-24)

CONCLUSIONS

The application of the educational action system, based on the andragogical approach, enabled the active and conscious participation of older adults, facilitating the acquisition of practical knowledge about nutrition and health. Recognition of older adults' previous experience, autonomy, and need for meaningful learning proved essential for achieving sustainable changes in their eating habits. The evaluated nutritional status indicators showed progressive improvement, confirming the relevance of nutritional education as a preventive and health-promotion strategy in this population group. The designed system extended beyond the individual scope, generating a positive impact on families and communities by promoting healthy lifestyles and more conscious eating practices. The research demonstrated that education based on an andragogical approach not only improves nutritional status but also strengthens self-esteem, motivation, and the perception of well-being in older adults.

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CONFLICT OF INTEREST

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