Nutritional Status of Older Adults in Antioquia and its Relationship with Diseases and Medication Use

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ARTICLE INFORMATION

ABSTRACT

Introduction: Nutritional status (NS) of older adults (OA) can be affected by aging as well as by diseases and medication use.

Objective: To determine the NS of OA in Antioquia and its relationship with diseases and medication use.

Methods: A cross-sectional study derived from the 2018-2019 Antioquia Food and Nutrition Profile (PANA) was conducted. Information from 1816 OA was collected regarding sociodemographic aspects, NS, diseases, and medication use. Binary logistic regression was applied to establish the association of NS with multimorbidity and polypharmacy.

Results: The majority of OA were female, aged 60-69, and of low educational and socioeconomic status. About 38.5% of OA were overweight, and 20.3% were underweight; according to the Mini Nutritional Assessment (MNA), 33.7% were at risk of malnutrition, and 3.5% were already malnourished. Based on calf circumference, 13.5% were at potential risk of malnutrition, and according to waist circumference, 51.8% had abdominal obesity. Multimorbidity was observed in 49.8% of OA, and polypharmacy in 29.6%. After adjusting for socioeconomic variables, statistically significant associations persisted between multimorbidity and risk of malnutrition (OR = 1.76), malnutrition as per MNA (OR = 5.25), and abdominal obesity (OR = 1.57). Concerning polypharmacy, significant associations were found with the risk of malnutrition as per MNA (OR = 2.04) and abdominal obesity (OR = 1.61).

Conclusions: In OA, the risk of malnutrition and abdominal obesity increases multimorbidity and polypharmacy, while malnutrition is only associated with a higher number of diseases.

Estado nutricional de los adultos mayores de Antioquia y su relación con enfermedades y consumo de medicamentos

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RESUMEN

Introducción: el estado nutricional (EN) de los adultos mayores (AM) puede verse afectado por el envejecimiento, así como por enfermedades o consumo de medicamentos.

Objetivo: determinar el EN y su relación con las enfermedades y el consumo de medicamentos de los AM de Antioquia.

Método: se hizo un estudio transversal derivado del Perfil Alimentario y Nutricional de Antioquia (PANA) 2018-2019. Se recopiló información de 1816 AM sobre aspectos sociodemográficos, EN, enfermedades y consumo de medicamentos. Se aplicó regresión logística binaria para establecer la asociación del EN con la multimorbilidad y la polimedicación.

Resultados: predominaron los AM de sexo femenino, de 60 a 69 años, de bajo nivel educativo y socioeconómico. El 38,5% de los AM tenía exceso de peso y el 20,3% estaba en delgadez; según el Mini Nutritional Assessment (MNA), el 33,7% estaba en riesgo de desnutrición y el 3,5% ya presentaba desnutrición. Según la circunferencia de pantorrilla, el 13,5% tenía un posible riesgo de desnutrición, y según circunferencia de cintura, el 51,8% tenía obesidad abdominal. El 49,8% de los AM presentó multimorbilidad y el 29,6% polimedicación. Al ajustar el modelo de regresión por variables socioeconómicas, persiste la asociación estadísticamente significativa entre la multimorbilidad y el riesgo de desnutrición (odds ratio [OR] = 1,76), desnutrición por MNA (OR = 5,25) y obesidad abdominal por perímetro de cintura (OR = 1,57). Respecto a la polimedicación, se encontró una asociación estadísticamente significativa con el riesgo de desnutrición por MNA (OR = 2,04) y obesidad abdominal (OR = 1,61).

Conclusiones: en los AM el riesgo de desnutrición y la obesidad abdominal incrementan la multimorbilidad y la polimedicación, mientras que la desnutrición solo se asocia con mayor número de enfermedades.

INTRODUCTION

The global population of older adults has been progressively increasing. In Colombia, the percentage of individuals aged 60 or above rose from 9.0% to 13.3% in the last decade (1). Specifically, in Antioquia, this demographic accounted for 14.1% of the country's total population in 2020 (2).

Aging is fundamentally characterized by the gradual accumulation of molecular and cellular damage (3). This life stage is not only marked by psychological, social, environmental, and lifestyle changes (4), but also by alterations in body composition such as an increase in visceral fat and a decrease in lean mass. These conditions render older adults more vulnerable to chronic and acute diseases as well as geriatric syndromes (4,5). Among the anthropometric indicators that have been identified as predictive of cardiovascular risk in older adults are abdominal obesity, as measured by waist circumference, and elevated Body Mass Index (BMI) (6).

It can be posited that the relationship between diseases and nutritional status (NS) during aging is bidirectional (7). On one hand, nutrition can modulate metabolic and functional changes in the body; that is, inadequate nutrition becomes a risk factor for infectious diseases, chronic conditions, and geriatric syndromes. On the other hand, senescence brings about issues such as mastication, swallowing, digestion, absorption, drug-nutrient interactions, sensory decline, depression, hyporexia, and physical inactivity, all of which can lead to malnutrition (7-8).

It is important to note that the majority of diseases in older adults are chronic in nature, are preventable, and incur high healthcare costs due to medical attention and pharmacological treatment (9). Additionally, older adults are more susceptible to polypharmacy, the consequences of which tend to worsen with age. This includes increased drug interactions and adverse reactions, as well as an elevated risk of frailty, falls, and hospitalization—conditions that heighten morbidity and mortality (10). The effects of certain medications or their interactions may cause dyspepsia, anorexia, early satiety, and diarrhea, among other conditions, thereby affecting adequate food intake and ultimately leading to malnutrition (11).

While some studies have examined the relationship between NS, diseases, and polypharmacy (12), there is an urgent need for continued research. Nutritional issues stemming from medication use are more prevalent in older adults suffering from multiple diseases, as they are generally treated with a higher number of medications. Therefore, investigating this relationship would guide public policy formulation as well as interventions for promotion, prevention, and treatment, aiming to achieve an approach consistent with the actual needs of this group and improving their quality of life.

Accordingly, the objective of this study was to determine the nutritional status of older adults in households in Antioquia and to explore its relationship with diseases and medication consumption.

MATERIALS AND METHODS

Study Design

A cross-sectional study was conducted based on the Nutritional and Dietary Profile of Antioquia (PANA) 2018-2019 (13). The target population consisted of non-institutionalized older adults in the Department of Antioquia. The sample was representative of residential area (urban or rural) and across the nine subregions; a probabilistic, stratified, multi-stage sampling process was used for household selection (13). In each selected household, individuals aged 60 or above who resided there permanently and met the following inclusion criteria were evaluated: ability to stand upright, follow directions for anthropometric measurements, and complete questionnaires. Older adults with physical or mental disabilities or conditions that hindered anthropometric measurements or questionnaire responses were excluded.

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Variables

Sociodemographic Characteristics

Factors considered included sex, age, geographic zone, socioeconomic status, educational level, healthcare coverage, and participation in food and nutrition programs.

Anthropometric Data

Weight, height, and arm, calf, and waist circumferences were considered. These measurements were taken by personnel previously trained and standardized according to the protocol by Lohman et al. (14). Each measurement was taken twice, or thrice if the criteria for variability were not met; in such cases, the two measurements falling within acceptable variability were averaged. Weight was measured using a SECA scale with a sensitivity of 0.05 kg; height was measured with a portable SECA stadiometer with an integrated leveler; and circumferences were measured with a flexible Lufkin steel tape measure with a 200 cm capacity and 0.1 cm sensitivity. For individuals with kyphosis, a wooden board was used as an extension of the stadiometer's movable piece.

Anthropometric Interpretation

Body Mass Index (BMI) was calculated and classified based on the criteria set by the Pan American Health Organization (15). Abdominal obesity was determined based on waist circumference, with cut-off points established by Lean et al. (16). Calf circumference was classified according to the cut-off points proposed by Guigoz and Vellas (17). Brachial circumference was interpreted using reference values from the third National Health and Nutrition Examination Survey of the United States (NHANES III) (18).

Nutritional Assessment

The Mini Nutritional Assessment (MNA) was administered in its full version, with a maximum score of 30 points. Nutritional status was categorized into three groups: normal (24-30 points), risk of malnutrition (17-23.5 points), and malnutrition (<17 points).

Health Conditions

Information was gathered on diagnosed diseases and the number of medications prescribed by a physician and consumed daily. For this study, individuals with two or more medical conditions or diseases were classified as having multimorbidity, as defined by the World Health Organization (WHO) (19); polypharmacy was considered as the concurrent use of four or more medications per day (20).

Ethical Considerations

The project was approved by the Ethics Committee of the Institute of Medical Research at the Faculty of Medicine of the University of Antioquia, through Act 012, dated August 18, 2018. Participants received complete information about the project and signed an informed consent form prior to inclusion.

Statistical Analysis

Variables were described using frequencies. The association between variables was explored using the Chi-square test for independence. A p-value of < 0.05 was considered significant. Multivariate binary logistic regression was used to explore the association between medication consumption and the presence of diseases with different nutritional status indicators. This analysis was adjusted for sociodemographic variables. All analyses were weighted according to the expansion factor for the older adult population. Statistical analysis was performed using SPSS v.25, licensed by the School of Nutrition and Dietetics at the University of Antioquia.

RESULTS

Sociodemographic Characteristics

A total of 1,816 older adults were included in the study. Of these, 59.6% were women, and half were aged between 60 and 69 years. A significant majority, 88.9%, had a low educational level, and 63.0% resided in urban areas (Table 1).

Table 1. Sociodemographic Characteristics of Older Adults in Antioquia

	Variables	n	%	95% CI*
Sex	Male	755	40.4	36.8- 44.1
	Female	1061	59.6	55.9-63.2
	Total	1816	100	
Age	60-64	550	29.8	26.5-33.2
	65-69	407	20.2	17.9-22.7
	70-79	568	35.6	31.8-39.6
	80 or more	291	14.4	12.2-16.9
	Total	1816	100	
Subregion	Bajo Cauca	185	5.2	4.2-6.6
	Magdalena Medio	151	2.7	2.2-3.3
	Nordeste	113	4.8	3.9-5.9
	Norte	107	5.3	4.3-6.6
	Occidente	155	5.7	4.8-6.9
	Oriente	184	20.9	16.5-26
	Suroeste	148	9.6	8.1-11.4
	Urabá	309	8.9	7.6-10.4
	Valle de Aburrá (excluding Medellín)	464	36.7	33.5-40.1
	Total	1816	100	
Geographic Location	Urban	1239	63	58.8-67.1
	Rural	577	37	32.9-41.2
	Total	1816	100	
Socioeconomic Status	One	645	31.4	27.6-35.5
	Two	755	42.3	38.7-46
	Three	387	24.2	21.6-26.9
	Four	29	2.2	1.5-3.2
	Total	1816	100	
Educational Level	Preschool/No studies	1044	47.5	43.8-51.1
	Completed Primary	588	41.4	37.5-45.4
	Completed Secondary	112	6.3	5.1-7.8
	Higher Education	69	4.8	3.7-6.2
	Total	1813	100	
Healthcare Coverage	Not affiliated	20	1	0.6-1.7
	Contributory Health Insurance (EPS)	776	47.6	43.9-51.2
	Subsidized Health Insurance (EPS)	1003	51.4	47.7-55.1
	Total	1799	100	
Attendance to Food and Nutrition Programs	No	1794	99	98.4-99.4
	Yes			

*CI: Confidence Interval
Source: Own elaboration

Nutritional Status Indicators

According to the Body Mass Index (BMI), 58.8% of older adults exhibited malnutrition. Those who were overweight nearly doubled the number of older adults who were underweight. As per the Mini Nutritional Assessment (MNA), 33.7% were at risk of malnutrition, and 3.4% were malnourished. Abdominal obesity was present in 51.8% of the participants, while 35.3% had low brachial circumference (CB), and 13.5% showed a potential risk of malnutrition based on calf circumference (CP) (Figure 1).
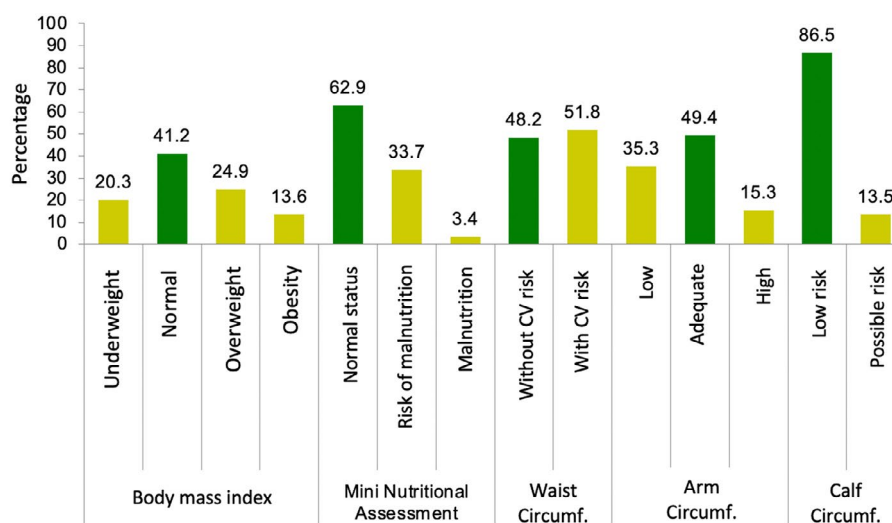

Figure 1. Nutritional Status Based on Various Indicators Among Older Adults in Antioquia

Source: Own elaboration

Multimorbidity and Polypharmacy

Concerning medical conditions and diseases, the predominant group of older adults had 2 to 4 conditions (42.7%); multimorbidity was present in 49.8% of the subjects (95% CI: 46.1%-53.5%) (Table 2).

Table 2. Multimorbidity and Polypharmacy Among Older Adults in Antioquia

Variable	n	%	95% CI
Multimorbidity			
Number of Presented Diseases/Medical Conditions			
None	516	27.4	23.9-31.1
1	430	22.8	20.0-26.0
2 to 4	790	42.7	39.2-46.2
5 to 10	80	7.1	4.8-10.4
Multimorbidity (presence of two or more diseases/medical conditions)			
No	946	50.2	46.5-53.9
Yes	870	49.8	46.1-53.5
Polypharmacy			
Number of Prescribed Medications Consumed Daily			
None	629	34.2	30.5-38.1
1 to 3	689	36.2	32.9-39.7
4 to 5	325	18.4	16.0-21.1
More than 5	172	11.2	8.8-14.0
Polypharmacy (≥4 medications)			
No	1318	70.4	67.0-73.7
Yes	497	29.6	26.3-33.0

Source: Own elaboration

More than half of the participants had hypertension (HTN) (52.3%), followed by 30.1% with dyslipidemia and 16.9% with type 2 diabetes mellitus (T2DM). When analyzing diseases by subgroups, the most frequent were those of the circulatory system (55.4%) and thyroid or metabolic disorders (42.6%). Other common conditions included musculoskeletal disorders (13.7%), nervous system disorders (10.1%), respiratory issues (8.8%), and digestive system diseases (7.8%). Regarding medication, 36.2% of individuals received 1 to 3 drugs per day; and polypharmacy was present in 29.6% of the participants (95% CI: 26.3%-33.0%) (see Table 2).

Nutritional Status Associated with Multimorbidity and Polypharmacy

A significant association was found between the number of diseases and BMI, waist circumference (WC), and arm circumference (AC) ($p < 0.05$). Older adults with low BMI had fewer diseases, while those with abdominal obesity mostly had 2 to 4 diseases (48.6%), as did those with high energy reserves according to CB (49.1%). According to the MNA, 58.6% of those with malnutrition had 2 to 4 diseases (Table 3).

Table 3. Nutritional Status Indicators Relative to the Number of Medical Conditions/Diseases Presented by Older Adults in Antioquia

Variable	n	Presence of Medical Conditions/Diseases								p‡
		None		1		From 2 to 4		From 5 to 10		
		%	CI 95%	%	CI 95%	%	CI 95%	%	CI 95%	
BMI*										
Total	1714	28.2	24.6-32.1	23.3	20.3-26.6	41.5	38.0-45.1	7	4.6-10.5	
Underweight	347	36.7	28.8-45.4	28.4	19.8-38.9	33.5	26.7-41.1	1.4	0.5-4.1	
Normal weight	697	31.4	25.2-38.4	21.1	17.3-25.4	42.2	36.4-48.2	5.3	2.5-11.1	**0.001**
Overweight	427	24.1	18.0-31.4	23.4	18.4-29.2	43.2	36.7-49.9	9.4	4.5-18.5	
Obesity	243	13.6	9.0-20.0	22.3	16.1-30.0	48.1	39.0-57.3	16.1	7.8-30.3	
MNA†										
Total	1541	29.7	25.8-33.9	22.7	19.7-25.9	40.9	37.2-44.7	6.7	4.2-10.6	
Normal nutritional status	958	31.3	26.8-36.3	23.9	20.6-27.6	40.2	36.0-44.5	4.5	2.3-8.8	
At risk of malnutrition	539	37.3	29.4-45.9	29.3	23.8-35.5	16.8	12.9-21.5	16.7	10.6-25.2	0.111
Malnutrition	44	17.3	7.3-35.6	9.5	3.7-22.0	58.6	33.3-80.0	14.7	5.6-33.4	
Waist Circumference										
Total	1661	28.2	24.6-32.1	23.8	20.7-27.1	42.1	38.6-45.8	5.9	3.8-9.0	
Adequate	803	39.6	33.9-45.6	23.5	18.6-29.1	35.2	30.6-40.2	1.7	0.90-3.10	**<0.001**
Abdominal obesity	858	17.6	14.0-22.0	24	20.4-28.0	48.6	43.6-53.6	9.8	6.0 -15.6	
Arm Circumference										
Total	1743	28	24.4-31.9	23.2	20.3-26.4	41.9	38.4-45.5	6.9	4.5-10.4	
Low reserves	596	38.8	32.0-46.0	21.6	17.5-26.3	35.8	30.4-41.6	3.8	1.2-11.8	
Adequate	842	24.7	20.1-29.9	23	18.4-28.3	44.1	38.8-49.5	8.3	4.7-14.2	0.004
High reserves	305	13.7	9.5-19.5	27.8	21.7-34.9	49.1	42.0-56.1	9.4	5.8-14.9	
Calf Circumference										
Total	1591	29.2	25.4-33.4	22.7	19.8-25.9	41.5	37.8-45.2	6.6	4.1-10.4	
Possible risk of malnutrition <31 cm	1393	22.5	15.5-31.5	24.6	14.3-38.9	42.4	30.3-55.6	10.4	3.1-29.9	0.526
Low risk ≥31 cm	198	30.3	26.1-34.8	22.4	19.6-25.5	41.3	37.6-45.1	6	3.6-9.8	

*BMI: body mass index. †MNA: mini nutritional assessment ‡Chi-squared for Independence

Source: Own elaboration

Regarding medication use, a significant association was found with BMI, MNA, waist circumference (WC), and arm circumference (AC) (p <0.05). The majority of older adults (AM) with thinness and normal weight according to BMI did not consume medications (49.7% and 36.4%, respectively). In contrast, those who were overweight (37.2%), obese (33.3%), had abdominal obesity (39.2%), or had high energy reserves according to arm circumference (38.4%), mostly consumed 1 to 3 medications. On the other hand, those with low energy reserves (45.3%) did not consume any (Table 4).

Table 4. Nutritional status indicators concerning the number of daily consumed prescribed medications by older adults in Antioquia

Variable	n	Daily prescribed medications								p*
		None		From 1 to 3		From 4 to 5		More than 5		
		%	CI 95%	%	CI 95%	%	CI 95%	%	CI 95%	
BMI										
Total	1713	35	31.2-39.1	35.8	32.5-39.2	18.6	16.0-21.4	10.6	8.3-13.6	
Underweight	347	49.7	40.8-58.5	35.2	28.2-43.0	11.3	7.8-16.0	3.8	1.8-8.2	
Normal weight	696	36.4	30.2-43.1	36	30.6-41.8	20.5	16.0-25.9	7.1	5.1-9.7	<0.001
Overweight	427	29.3	23.0-36.6	37.2	31.1-43.8	18.9	14.7-24.0	14.6	9.1-22.5	
Obesity	243	19.4	13.9-26.5	33.3	25.7-41.9	22.9	17.0-30.2	24.3	15.2-36.5	
MNA										
Total	1541	35.8	31.7-40.1	35.9	32.4-39.6	17.7	15.1-20.7	10.6	8.0-13.8	
Normal nutritional status	958	35.6	31.1-40.5	39.1	34.9-43.4	18.4	14.9-22.4	6.9	5.2-9.1	
At risk of malnutrition	539	37.3	29.4-45.9	29.3	23.8-35.5	16.8	12.9-21.5	16.7	10.6-25.2	0.014
Malnutrition	44	23.4	10.5-44.2	43.6	17.6-73.7	14.1	5.6-31.2	19	7.8-39.1	
Waist Circumference										
Total	1660	34.8	31.0-38.9	36.9	33.5-40.4	18.6	16.1-21.5	9.7	7.6-12.2	
Adequate	803	47.9	42.1-53.7	34.3	29.7-39.3	13.4	10.7-16.5	4.4	2.9-6.7	<0.001
Abdominal obesity	857	22.7	18.8-27.1	39.2	34.5-44.2	23.6	19.5-28.1	14.5	11.0-19.0	
Arm Circumference										
Total	1742	34.8	31.0-38.8	35.9	32.6-39.4	18.6	16.1-21.4	10.7	8.4-13.7	
Low reserves	596	45.3	38.6-52.1	33.6	28.4-39.3	13.1	10.1-16.8	8	4.3-14.3	
Adequate	841	32.3	26.9-38.3	36.8	31.8-42.0	20.6	16.6-25.3	10.3	7.1-14.6	<0.001
High reserves	305	18.6	13.7-24.7	38.4	31.7-45.5	24.5	19.2-30.8	18.5	13.5-24.8	
Calf Circumference										
Total	1590	35.4	31.5-39.6	35.8	32.4-39.5	18	15.4-20.9	10.8	8.3-13.9	
Possible risk of malnutrition <31 cm	1392	35.8	31.6-40.2	35.6	32.1-39.3	17.6	15.2-20.3	11	8.2-14.5	0.927
Low risk ≥31 cm	198	33.2	22.1-46.5	37.1	25.5-50.4	20.2	10.6-34.9	9.6	5.2-17.1	

Source: Own elaboration

According to the crude logistic regression model, a significant association was found between multimorbidity and the risk of malnutrition as assessed by MNA (OR = 1.52), malnutrition by MNA (OR = 3.71), and abdominal obesity (OR = 2.01). Upon adjusting the regression model for socioeconomic variables, the associations remained significant. Regarding socioeconomic variables, being a woman increased the likelihood of having multimorbidity by 67%. Greater age and higher socioeconomic status also increased the likelihood of having multimorbidity (Table 5).

Table 5. Logistic regression models showing the relationship between multimorbidity, polypharmacy, and various indicators in older adults from Antioquia

Variable		Multimorbidity				Polypharmacy			
		Crude model		Adjusted model*		Crude model		Adjusted model*	
		OR	CI 95%	OR	CI 95%	OR	CI 95%	OR	CI 95%
BMI	Normal weight	1.00		1.00		1.00		1.00	
	Underweight	0.67	0.42-1.08	0.63	0.40-1.01	0.54	0.29-1.03	0.49	**0.27-0.89**
	Overweight	0.77	0.51-1.15	0.88	0.58-1.34	0.94	0.59-1.49	1.14	0.69-1.86
	Obesity	0.90	0.52-1.58	1.01	0.55-1.87	1.32	0.74-2.37	1.69	0.90-3.18
MNA	Normal	1.00		1.00		1.00		1.00	
	Risk of malnutrition	1.52	**1.08-2.13**	1.76	**1.24-2.48**	1.74	**1.20-2.52**	2.04	**1.40-2.98**
	Malnutrition	3.71	**1.67-8.27**	5.25	**2.18-12.67**	2.39	0.61-9.30	3.39	0.89-12.99
Waist circumference	Adequate	1.00		1.00		1.00		1.00	
	Abdominal obesity	2.01	**1.38-2.95**	1.57	**1.03-2.39**	1.94	**1.26-2.98**	1.61	1.00-2.60
Arm circumference	Adequate	1.00		1.00		1.00		1.00	
	Low	0.76	0.51-1.12	0.84	0.57-1.25	0.82	0.53-1.26	0.89	0.57-1.38
	High	1.11	0.70-1.77	0.95	0.58-1.55	1.20	0.75-1.93	0.98	0.60-1.61
Calf circumference	Low risk	1.00		1.00		1.00		1.00	
	Possible risk of malnutrition	1.24	0.71-2.19	0.95	0.54-1.663	1.43	0.62-3.31	1.16	0.48-2.76
Sex	Male			1.00				1.00	
	Female			1.67	**1.21-2.32**			1.28	0.87-1.89
Age	60 – 64			1.00				1.00	
	65 – 69			1.13	0.76-1.66			1.49	0.97-2.30
	70 – 79			1.93	**1.33-2.80**			2.78	**1.82-4.26**
	80 or more			2.22	**1.41-3.51**			3.57	**2.17-5.89**
Socioeconomic status	One			1.00				1.00	
	Two			2.04	**1.42-2.93**			1.73	**1.10-2.73**
	Three			3.23	**2.11-4.92**			3.14	**1.91-5.16**
	Four			4.13	**1.50-11.41**			3.01	**1.06-8.53**
Education level	Secondary			1.00				1.00	
	Preschool/without education			1.32	0.73-2.38			1.76	0.85-3.66
	Primary			1.28	0.72-2.29			1.85	0.90-3.79
	Higher education			1.04	0.47-2.29			1.10	0.41-2.92
Geographic localization	Urban			1.00				1.00	
	Rural			1.04	0.76-1.44			0.81	0.54-1.20

Nagelkerke Coefficient for Multimorbidity: unadjusted model (0.083); adjusted model (0.170). Nagelkerke Coefficient for Polypharmacy: unadjusted model (0.094); adjusted model (0.196).

Source: own elaboration

Regarding polypharmacy, a significant association was found between the risk of malnutrition according to the MNA (OR = 1.74) and abdominal obesity (OR = 1.94). After adjusting for socioeconomic variables, the association persisted only with the risk of malnutrition according to the MNA (OR = 2.04). A directly proportional association was found between age, socioeconomic status, and polypharmacy (see Table 5).

DISCUSSION

Evidence exists confirming the interrelation between multimorbidity, polypharmacy, and malnutrition, most notably among older adults. This study corroborates these findings, revealing that abdominal obesity, risk of malnutrition, and actual malnutrition are significantly associated with multimorbidity, while the risk of malnutrition and abdominal obesity are associated with polypharmacy.

It's worth noting that the term "polypharmacy" has over 24 definitions in medical literature and is generally considered excessive prescription—when a person takes more medications than necessary or has inappropriate prescriptions—with varying thresholds from 4 to 10 or more medications. For this study, polypharmacy was defined as the consumption of four or more medications, which may limit comparisons with other studies using different thresholds.

Regarding diseases in older adults, reviews and meta-analyses have found that hypertension, type 2 diabetes , arthritis, and strokes are the most prevalent, irrespective of the country's income level. Similarly, a study from Turkey found hypertension, type 2 diabetes , and dyslipidemia to be prevalent among women over 60. These findings highlight the high risk of cardiovascular, cerebrovascular, and renal complications in this population, calling for a review of health promotion and disease prevention strategies.

The prevalence of multimorbidity in Antioquia was higher compared to a systematic review by Nguyen et al., which showed a prevalence of 33.1%, 37.9% for high-income countries, and 29.7% for low and middle-income countries. However, it was lower compared to Latin American and Colombian SABE (Health, Well-being, and Aging) surveys. These differences could be attributed to the inclusion of other health-affecting conditions such as depressive symptoms.

Inadequate nutritional status can both result from and contribute to various diseases. Malnutrition in older adults affects the immune system, cognitive state, and increases the risk of falls, fractures, hospital stays, and worsens underlying acute or chronic diseases, thereby deteriorating the quality of life. On the other hand, excess weight and abdominal obesity increase the risk of multimorbidity.

Pharmacological management is the most common therapeutic measure for addressing morbid conditions in older adults. However, due to pharmacokinetic changes that occur with aging, the relevance of the type and quantity of prescribed medications must be carefully analyzed to avoid potential drug-drug or drug-nutrient interactions, which exponentially increase with the number of consumed medications. Therefore, the need for preventive actions such as adequate nutrition and regular physical activity becomes increasingly necessary.

In our study, polypharmacy was less prevalent compared to other studies, possibly because it included a broader community of older adults, not just women from a geriatric clinic. Polypharmacy was found to increase with age, being female, and belonging to higher socioeconomic strata. These findings might be explained by more frequent healthcare consultations among women and older individuals, who may be more likely to receive multiple prescriptions.

While our study did not find an association between malnutrition and polypharmacy, it did find an association between malnutrition and multimorbidity. This could be because excess fat produces a pro-inflammatory state, which is associated with non-communicable chronic diseases requiring pharmacological management, whereas in malnourished older adults, the risks are often osteoporosis, falls, and fractures, which require a different clinical management, including nutritional supplements, vitamins, and minerals.

This study has some limitations. One is related to the assessment of nutritional status, which did not include other biochemical, functional, and food consumption indicators . Also, although the

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survey emphasized that reported medical conditions should be physician-diagnosed, there may be a recall bias. Finally, the cross-sectional nature of the study does not allow for causality inference.

CONCLUSIONS

Elderly adults in Antioquia exhibit a high prevalence of malnutrition, with a frequency of excessive weight that is twice as high as that of weight deficit. Both the risk of malnutrition and actual malnutrition, as well as abdominal obesity, increase the likelihood of multimorbidity. Meanwhile, the risk of malnutrition and abdominal obesity also elevate the incidence of polypharmacy.

The findings of this study warrant reflection and increased awareness among healthcare professionals, caregivers or family members, and the elderly themselves (especially concerning self-medication). An inadequate nutritional status predisposes individuals to a greater number of diseases, which in turn leads to increased medication consumption, creating an interdependent cycle.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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