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ORIGINAL ARTICLE

Nutritional assessment using the MNA scale in hospitalized elderly patients

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Abstract

Objective: *Describe the nutritional status of older adults hospitalized in geriatrics and analyze the rate of nutritional intervention.* ***Method:*** *This is a descriptive cross-sectional study. Patients hospitalized during the year 2022 were included. Nutritional status was assessed using the mini nutritional assessment short-form (MNA-SF) and mini nutritional assessment (MNA) scales, along with other clinical variables.* ***Results:*** *A total of 330 patients were included. The mean age was 87.8 years, with 51.8% being females. Total dependence (Barthel Index < 20) was present in 51.8% of cases. Ambulation with a walker was observed in 24.2% of patients, whereas 55.2% were immobile. Cognitive impairment was present in 55.8% of cases and dysphagia in 41.2%. Using the MNA-SF, the mean score was 6.21 points, with 70.6% classified as malnourished, 27.6% at risk of malnutrition, and 1.8% with normal nutritional status. With the MNA, the mean score was 13 points, with 73.6% classified as malnourished, 23.6% at risk of malnutrition, and 2.7% with good nutritional status. Nutritional intervention was implemented in 60% of cases, involving dietary adaptation (54.5%) and oral nutritional supplements (45.5%).* **Conclusion:** *The proportion of individuals classified as malnourished far exceeds those at risk of malnutrition or having normal nutritional status. Nutritional intervention was conducted in over half of the cases.*

Keywords: *Nutrition. Elderly. Malnutrition. Hospitalized.*

Valoración nutricional mediante escala MNA en mayores hospitalizados

Resumen

Objetivo: *Describir el estado nutricional de los adultos mayores hospitalizados en Geriatría y analizar la tasa de intervención nutricional.* ***Método:*** *Estudio descriptivo transversal. Se incluyeron pacientes hospitalizados durante el año 2022. Se evaluó el estado nutricional mediante las escalas MNA-SF y MNA, junto con otras variables clínicas.* ***Resultados:*** *Se incluyeron 330 pacientes. La edad media fue de 87.8 años, siendo el 51.8% mujeres. La dependencia total (Índice de Barthel < 20) estaba presente en el 51.8% de los casos. La deambulación con andadera se observó en el 24.2% de los pacientes, mientras que el 55.2% estaban inmóviles. El deterioro cognitivo estaba presente en el 55.8% de los casos, y la disfagia en el 41.2%. Con el MNA-SF, la puntuación media fue de 6.21 puntos, con un 70.6% clasificado como desnutrido, un 27.6% en riesgo de desnutrición y un 1.8% con un estado nutricional normal. Con el MNA, la puntuación media fue de 13 puntos, con un 73.6% clasificado como desnutrido, un 23.6% en riesgo de desnutrición y un 2.7% con buen estado nutricional. Se realizó intervención nutricional en el 60% de los casos, con adaptación de la dieta (54.5%) y suplementos nutricionales orales (45.5%).* **Conclusión:** *La proporción de individuos clasificados como desnutridos supera con creces a los que están en riesgo de desnutrición o tienen un estado nutricional normal. Se realizó intervención nutricional en más de la mitad de los casos.*

Palabras clave: *Nutrición. Adultos mayores. Desnutrición. Hospitalizados.*

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INTRODUCTION

The aging of the population is a globally increasing phenomenon. The nutritional status of elderly adults is a critical factor affecting their health and quality of life. Malnutrition and undernutrition are common issues in this population and are associated with increased vulnerability to diseases and disabilities[1]. Therefore, an accurate assessment of the nutritional status of elderly patients is essential to identify those who may require specific nutritional interventions.

The prevalence of hospital malnutrition or the risk of malnutrition in elderly patients in Spain is considerable (30-50%). This is primarily due to challenges in identifying and properly managing at-risk patients[2,3].

The European Society for Clinical Nutrition and Metabolism recommends detecting malnutrition in all hospitalized patients[4]. The Mini Nutritional Assessment (MNA) tool is widely recognized and validated for assessing nutritional status in older adults. Developed by Guigoz, et al. in 1994, the MNA has proven to be an effective instrument for detecting malnutrition and the risk of malnutrition in this population[5].

The MNA questionnaire consists of two parts: the first part involves a rapid assessment with questions about involuntary weight loss, mobility, body mass index, psychological state, and patient's food intake. The second part includes a more detailed assessment conducted by health-care professional, involving questions about the patient's subjective perception of health status, nutritional status, and physical evaluation. Together, these two parts, comprising 18 items, provide a comprehensive view of the elderly patient's nutritional status and classify them into three categories: well-nourished (24-30 points), at risk of malnutrition (17-23.5 points), and malnourished (< 17 points)[3,6].

There is also an abbreviated version called the mini nutritional assessment short-form (MNA-SF), developed by Rubenstein et al. in 2001[7]. To reduce the time required for nutritional assessment, this abbreviated version was created as a two-step evaluation process. The MNA-SF includes the six questions with the strongest correlation in the original MNA. This brief form was validated in outpatient settings as a quicker way to assess large groups of individuals and eliminated the need to complete the full MNA when a patient exhibits adequate nutritional status. When the MNA-SF classifies a subject as at risk of malnutrition (≤ 11 points), the complete 18-question MNA should be administered to determine if the patient is truly malnourished[5].

Therefore, the nutritional status of elderly patients is a relevant topic that requires specialized and evidence-based attention. Early detection of malnutrition and undernutrition, as well as the implementation of appropriate nutritional interventions, are essential for improving the quality of life and preventing health complications in older adults.

Objective

- To describe the nutritional status of elderly patients hospitalized in the geriatrics department
- To study the rate of nutritional and dietary intervention in hospitalized elderly patients.

MATERIALS AND METHODS

This is a descriptive cross-sectional study. All patients requiring hospitalization in the Geriatrics Department of Hospital San José (Teruel) from January 1st to December 31st, 2022, were included, except those admitted to the palliative care unit in an end-of-life situation. Electronic medical records were reviewed. The main variable was the determination of nutritional status using the MNA tool, differentiating between well nourished (24-30 points), at risk of malnutrition (17-23.5 points), and malnourished (< 17 points) categories according to the MNA criteria. Other variables, including sociodemographic, clinical, and specific factors related to nutritional status, were analyzed. Data were collected anonymously, accessible only to the principal investigators of this study, and analyzed using the Statistical Package for the Social Sciences.

RESULTS

A total of 330 patients were included, with a mean age of 87.8 years (standard deviation [SD] 6.7 years) and a median age of 89 years. The youngest patient was 66 years old, and the oldest was 102 years old. Using the MNA-SF screening questionnaire, a mean score of 6.21 points (SD of 2.46 points) and a median score of 6 points were obtained. The patient with the lowest score achieved 1 point, whereas the patient with the best nutritional status achieved 12 points. After applying the MNA-SF, in our study population, 70.6% of patients were classified as malnourished, 27.6% were at risk of malnutrition, and only 1.8% with normal nutritional status. Following the full MNA

questionnaire, an average score of 13 points (SD 5.12) with a median of 14 points was identified. We found 73.6% of individuals with malnutrition, 23.6% at risk of malnutrition, and only 2.7% with good nutritional status. Predominant clinical characteristics in our study population (Table 1) included females (51.8%), hypertension (77.6%), diabetes (37%), dyslipidemia (45.5%), cardiac history (51.5%), respiratory history (83%), history of stroke (17.6%), history of cancer (26.4%), and history of dysphagia (41.2%). Furthermore, observed disability factors included total dependence (51.8%), immobility (55.2%), and cognitive impairment (55.8%), with an advanced-severe level observed in 21.5% of cases.

The reasons for admission to our geriatrics department have been diverse, with infectious processes predominating (47.9%), followed by acute or exacerbated chronic renal failures (10.6%), heart failure (7%), functional deterioration, and oncological processes, both groups with equal percentages (6.4%). This was followed by other admission reasons such as rehabilitation following stroke (5.8%) and transfers from orthogeriatrics (5.4%). Less frequent were admissions due to delirium, ulcers, and thromboembolism.

One of the aspects analyzed in both MNA-SF and MNA is whether the patients have experienced stress or acute illness in the last 3 months, and it has been observed that 86.7% answered affirmatively. Moreover, 94.5% were taking more than three medications regularly.

Finally, we conducted structured and documented nutritional intervention in 60% of the admitted patients (Fig. 1).

Table 1. Clinical and functional characteristics

Variable	Category	n (%)
Gender	Male	159 (48.2)
	Female	171 (51.8)
Hypertension	Yes	256 (77.6)
	No	74 (22.4)
Diabetes	No	208 (63)
	Yes	122 (37)
Dyslipidemia	No	180 (54.5)
	Yes	150 (45.5)
Cardiological history	No	160 (48.5)
	Yes	170 (51.5)
Respiratory history	No	56 (17)
	Yes	274 (83)
Stoke history	No	272 (82.4)
	Yes	58 (17.6)
Oncological history	No	243 (73.6)
	Yes	87 (26.4)
Dysphagia	No	194 (58.8)
	Yes	136 (41.2)
Barthel index	Independent	15 (4.5)
	Mildly dependent	58 (17.6)
	Moderately dependent	41 (12.4)
	Severely dependent	45 (13.6)
	Totally dependent	171 (51.8)
Mobility	Without assistive device	32 (9.7)
	Cane	36 (10.9)
	Walker	80 (24.2)
	No mobility	182 (55.2)
Cognitive impairment	No	146 (44.2)
	Yes	184 (55.8)
Dementia level	Mild	48 (14.5)
	Moderate	67 (20.3)
	Severe	71 (21.5)

DISCUSSION

The nutritional status of elderly patients holds great significance in medical care and has been extensively studied. With the aging global population, addressing nutritional needs becomes crucial to enhance quality of life and prevent health issues linked to malnutrition. To investigate this, we undertook a study to determine malnutrition prevalence among hospitalized patients and its associated characteristics.

Guigoz et al.[3] estimated that around 15% of community-dwelling older adults and up to 50% of hospitalized elderly patients might experience some degree of undernutrition[4]. This could stem from factors such as age-related physiological changes, reduced appetite, swallowing difficulties, chronic illnesses, and polypharmacy.

In our study, we observed a much higher rate of malnutrition than those initial studies, as well as more recent ones like those by Martínez-Reig et al.[2]. The work of Milne et al.[6] highlighted the importance of conducting proper nutritional assessment in elderly patients, including both clinical evaluation and the use of validated tools to detect malnutrition and the risk of malnutrition. Early detection of these conditions allows for appropriate nutritional interventions to improve health status and prevent complications.

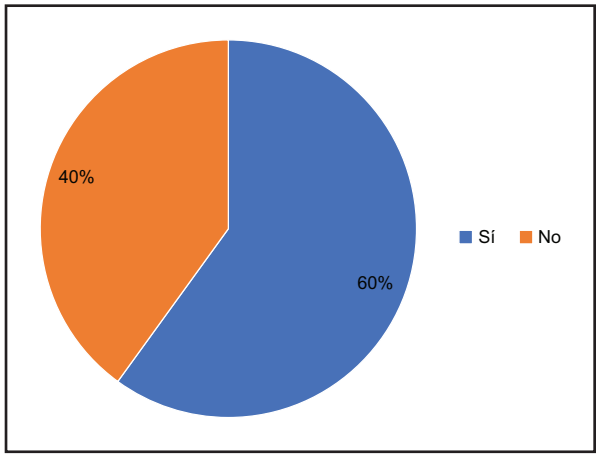

Figure 1. *Nutritional intervention.*

In this regard, we have incorporated MNA-SF as a standard assessment, aiding identification, intervention, and future prevention strategies.

Numerous studies, like that of Volkert et al.,[7] have shown that proper nutritional intervention in elderly patients can have a positive impact on physical function, quality of life, and mortality. Strategies such as nutritional supplementation, dietary counseling, and modification of food textures can contribute to improving nutritional intake and health status in this population[5]. At the hospital, the dietary adaptation strategy involves adjusting the texture and enriching protein content. This approach has been standardized in all treatment plans. The intervention strategy in other cases has been to add oral nutritional supplements to dietary adaptation. These supplements may be normocaloric and hyperproteic, hypercaloric and hyperproteic, or tailored to specific underlying conditions.

Following the line of action, we want to continue like the studies of Matheson et al.[8], who demonstrated that oral nutritional supplements improve strength in malnourished elderly hospitalized patients with cardiovascular and pulmonary diseases.

Several studies have investigated the effectiveness and utility of the MNA in detecting undernutrition and malnutrition in older adults. A study by Kaiser et al. evaluated the validity and reliability of the MNA in a hospitalized geriatric population and concluded that it is a valid and reliable instrument for detecting the risk of malnutrition in this population[5]. Similarly, another study by Rubenstein et al. examined the ability of the MNA to predict relevant clinical outcomes in elderly patients and found that a low MNA score was significantly associated with higher mortality and hospitalization rates[9]. Our experience leads us to believe that the MNA comprehensively gathers nutritional assessment data, which aligns well with comprehensive geriatric assessment.

The main limitation of our study is its inability to establish causal inferences, primarily due to temporal ambiguity. Another limitation is the sample selection, which despite being broad in terms of collection time, 1 year, and heterogeneous, does not uniformly represent the entire elderly population admitted to hospitals in Spain. Comparing our study to others like those of Martínez-Reig et al.[2], Hersberger et al.[10], or Volkert et al.[4], we can note variations. Some studies, like that of Yuan[11], included a high percentage of individuals with a modified Rankin score > 3.

Finally, our study highlights the significant prevalence of undernutrition among hospitalized elderly patients, emphasizing the importance of addressing their nutritional needs to improve their overall health and quality of life. Implementing the MNA as a standard and mandatory evaluation tool has allowed us to identify cases of undernutrition and intervene promptly, whether through dietary adaptation or oral nutritional supplementation. These interventions have the potential to positively impact physical function and mortality rates in this vulnerable population.

Overall, the MNA has proven to be a reliable and effective tool for detecting undernutrition and guiding appropriate nutritional interventions[7]. By addressing undernutrition comprehensively and promptly, we can make significant strides in improving the well-being of elderly patients and reducing the burden of complications related to undernutrition in our hospital setting.

CONCLUSION

In our setting, the proportion of malnourished individuals among hospitalized patients is much higher than those at risk of malnutrition or with normal nutritional status.

In over half of the cases, we have implemented nutritional intervention, providing not only dietary adaptation recommendations but also prescribing hyperproteic and hypercaloric supplementation.

FUNDING

The authors declare that they have not received funding.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

ETHICAL DISCLOSURES

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

Use of artificial intelligence for generating text. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript nor for the creation of images, graphics, tables, or their corresponding captions.

REFERENCES

1. Liu H, Jiao J, Zhu M, Wen X, Jin J, Wang H, et al. An early predictive model of frailty for older inpatients according to nutritional risk: protocol for a cohort study in China. BMC Geriatr. 2021;21:465.
2. Martínez-Reig M, Gómez-Arnedo L, Alfonso-Silguero SA, Juncos-Martínez G, Romero L, Abizanda P**.** Nutritional risk, nutritional status and incident disability in older adults. The FRADEA study. J Nutr Health Aging. 2014;18:270-6.
3. Guigoz Y, Vellas B, Garry PJ. Mini nutritional assessment: a practical assessment tool for grading the nutritional state of elderly patients. Facts Res Gerontol. 1994;Suppl 2:15-59.
4. Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, et al. ESPEN guideline on clinical nutrition and hydration in geriatrics. Clin Nutr**.** 2019**;**38:10-47.
5. Kaiser MJ, Bauer JM, Ramsch C, Uter W, Guigoz Y, Cederholm T, et al. Validation of the mini nutritional assessment short-form (MNA-SF): a practical tool for identification of nutritional status. J Nutr Health Aging. 2009;13:782-8.
6. Milne AC, Potter J, Vivanti A, Avenell A. Development of a method for the evaluation of the scientific literature. J Nutr Health Aging. 2009;13:417-24.
7. Volkert D, Chourdakis M, Faxen-Irving G, Frühwald T, Landi F, Suominen MH, et al. ESPEN guidelines on nutrition in dementia. Clin Nutr**.** 2015**;**34:1052-73.
8. Matheson EM, Nelson JL, Baggs GE, Luo M, Deutz NE**.** Specialized oral nutritional supplement (ONS) improves handgrip strength in hospitalized, malnourished older patients with cardiovascular and pulmonary disease: a randomized clinical trial. Clin Nutr**.** 2021**;**40:844-9.
9. Rubenstein LZ, Harker JO, Salvà A, Guigoz Y, Vellas B. Screening for undernutrition in geriatric practice: developing the short-form mini-nutritional assessment (MNA-SF). J Gerontol A Biol Sci Med Sci. 2001;56:M366-72.
10. Hersberger L, Dietz A, Bürgler H, Bargetzi A, Bargetzi L, Kägi-Braun N, et al. Individualized nutritional support for hospitalized patients with chronic heart failure. J Am Coll Cardiol**.** 2021**;**77:2307-19.
11. Yuan F, Yang et al. OPENS study group. Optimizing early enteral nutrition in severe stroke (OPENS): protocol for a multicentre randomized controlled trial. BMC Neurol. 2019 Feb 12;19(1):24. doi: 10.1186/s12883-019-1253-2.

THE JOURNAL OF LATIN AMERICAN GERIATRIC MEDICINE ORIGINAL ARTICLE

Aging with metabolic syndrome in Mexico: an analysis of prevalence and risk for geriatric syndromes

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Abstract

Background: *An increasing prevalence of the metabolic syndrome (MS) has been observed among older persons (OPs). Its presence affects cardiovascular risk and may influence the development of certain geriatric syndromes (GS). However, a direct association between MS and GS has not been definitively described.* **Methods:** *This cross-sectional study enrolled 668 participants (aged > 60 years) attending a geriatric care unit at a university hospital in Guadalajara, Mexico. Participants were conveniently recruited over 1 year. Medical records were reviewed, and a comprehensive geriatric assessment was conducted to diagnose MS and GS. Logistic regression analysis was employed to determine any association risk between MS and GS.* **Results:** *The mean age of participants was 76.2 years (standard deviation 5.63), with 85.4% being women. The frequency of MS was 6%. Multivariate analysis indicated a statistically significant association between the presence of MS and polypharmacy (OR = 2.44; 95% CI: 1.1-5.4, p = 0.027). The association was marginally significant for disability (OR = 1.87; 95% CI: 0.97-3.60, p = 0.05).* **Conclusion:** *The frequency of MS among OP at a university hospital in Guadalajara, Mexico, was lower compared to other population-based studies. The presence of MS was associated with an increased likelihood of disability and polypharmacy.*

Keywords: *Metabolic syndrome. Geriatric syndrome. Obesity. Older persons.*

Envejecimiento con síndrome metabólico en México: un análisis de prevalencia y riesgo de síndromes geriátricos

Resumen

Antecedentes: *Se ha observado una creciente prevalencia del Síndrome Metabólico (SM) entre las Personas Mayores (PM). Su presencia afecta el riesgo cardiovascular y podría influir en el desarrollo de ciertos síndromes geriátricos (SG). Sin embargo, no se ha descrito definitivamente una asociación directa entre SM y SG.* **Métodos:** *Este estudio transversal inscribió a 668 participantes (de edad >60 años) que asistían a una unidad de atención geriátrica en un hospital universitario en Guadalajara, México. Los participantes fueron reclutados por conveniencia durante 1 año. Se revisaron los registros médicos y se llevó a cabo una evaluación geriátrica integral para diagnosticar SM y SG. Se utilizó un análisis de regresión logística para determinar cualquier riesgo de asociación entre SM y SG.* **Resultados:** *La edad promedio de los participantes fue de 76.2 años (DE 5.63), 85.4% fueron mujeres. La frecuencia de SM fue del 6%. El análisis multivariado indicó una asociación estadísticamente significativa entre la presencia de SM y polifarmacia (OR= 2.44; IC del 95% 1.1-5.4, p = 0.027). La asociación fue marginalmente significativa para discapacidad (OR = 1.87; IC del 95% 0.97-3.60, p = 0.05).* **Conclusión:** *La frecuencia del SM entre las PM en un hospital universitario fue menor en comparación con otros estudios poblacionales. La presencia de SM estuvo asociada con una mayor probabilidad de discapacidad y polifarmacia.*

Palabras clave: *Síndrome metabólico. Síndrome geriátrico. Obesidad. Personas mayores.*

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INTRODUCTION

The ongoing demographic transition is marked by a rise in the number of older persons (OPs) and a notable decline in younger populations. Consequently, public health strategies should be geared toward ensuring most individuals age with better quality and fewer comorbidities. In 2016, Mexico had 10 million OP, accounting for 8.9% of its population. Predictions suggest that by 2050, this number will quadruple[1]. Among the elderly population, there has been a noted increase in the prevalence of metabolic syndrome (MS) components such as systemic arterial hypertension (SAH), type 2 diabetes (T2D), and obesity (body mass index [BMI] ≥ 30 kg/m^2), implying that the risk of MS tends to escalate with age[2].

The presence of MS influences cardiovascular risk and might contribute to the onset of geriatric syndromes (GS)[3,4]. GS is marked by a reduced adaptive response to heightened demands and has been linked to the loss of independence in older age. An association between MS and some GS remains undefined. However, it is plausible to deduce its adverse effects on the OP population, given its evident link with disabling outcomes. This association, however, remains under-researched.

With the global population aging, comprehending how MS intertwines with the biological processes of aging and recognizing the necessity for age-specific diagnostic strategies becomes crucial[5-7].

Despite ongoing debates around its definition, the presence of MS and its components has often been viewed as an aging model, both due to its shared pathophysiology and its ties to unfavorable outcomes[8-11].

The primary objective of this study was to gauge the prevalence of MS and assess its risk association with certain GS (disability, polypharmacy, malnutrition, frailty, and depression) in OP (> 60 years) at a geriatric care unit in a university hospital in Mexico.

MATERIALS AND METHODS

Participants

This cross-sectional study incorporated 668 participants (> 60 years old) from a geriatric care unit in a university hospital in Guadalajara, Mexico. Participants were conveniently recruited between March 2018 and March 2019. Eligible OPs were asked to partake in the study and granted written informed consent on their geriatric consultation day. The study's protocol underwent review and approval by the local Ethics Committee.

Measures

Dependent variables: GS

Five conditions deemed GS were assessed as dependent variables: disability, polypharmacy, malnutrition, frailty, and depression. Every participant underwent a comprehensive geriatric assessment administered by trained professionals. Frailty was characterized as per the phenotype proposed by Fried, and depression was gauged using the Geriatric Depression Scale[3]. Disability was identified as having ≥ 1 challenge with basic or instrumental daily activities, and polypharmacy was defined as the use of ≥ 3 prescription drugs[1]. Malnutrition was assessed through the Mini Nutritional Assessment™[12].

Independent variable

MS was examined as the independent variable. The International Diabetes Federation's (IDF) diagnostic criteria for MS were utilized[13]. Medical records were also scrutinized to affirm the diagnoses of SAH, T2D, and the respective medicinal treatments. BMI was calculated using Quetelet's equation. Consistent with conventions, obesity was classified as a BMI ≥ 30 kg/m^2. Other factors studied included age, sex, and sociodemographic variables.

Statistical analysis

Continuous variables are depicted as mean and standard deviation (SD), while categorical ones are presented as percentages. The Chi-square Pearson test facilitated frequency comparison. Multivariate logistic regression analyses were employed to discern the association between MS and GS. All statistical tests utilized 95% confidence intervals (CI) with a $p < 0.05$ indicating statistical significance. Analyses were conducted using the SPSS Statistical Package for Windows® (SPSS Inc., Chicago, IL v. 20).

RESULTS

The average age of participants was 76.2 (SD 5.63), and 85.4% were women. The MS prevalence was 6.1%; participants with MS exhibited a higher likelihood of polypharmacy (51%). Among the GS presents with MS, the most prevalent after disability and polypharmacy were depression (7.8%) and frailty (6.8%). Table 1 details the demographic, pathological, and

Table 1. Sociodemographic and geriatric characteristics according to the presence of MS

Sociodemographic and geriatric variables	MS		p-value
	No 627 (93.9%)	Yes 41 (6.1%)	
Sex			
Women	441 (92.6)	35 (7.4)	0.039
Man	186 (96.9)	6 (3.1)	
Age (years)			
60-75	222 (92.9)	17 (7.1)	0.561
76-90	370 (94.1)	23 (5.9)	
> 91	35 (97.2)	1 (2.8)	
Schooling			
Illiteracy	415 (93.7)	28 (6.3)	0.912
1-3 years	137 (93.8)	9 (6.2)	
> 3 years	75 (94.9)	4 (5.1)	
Place of residence			
Urban	508 (93.9)	33 (6.1)	0.864
Rural	115 (93.5)	8 (6.5)	
Smoke			
No	392 (93.6)	27 (6.4)	0.203
Yes	48 (90.6)	5 (9.4)	< 0.001
Obesity	102 (71.3)	41 (28.7)	< 0.001
Systemic arterial hypertension	355 (89.6)	41 (10.4)	< 0.001
Diabetes	202 (83)	41 (16.9)	0.202
Polypharmacy	149 (49)	155 (51)	
Disability			
IADL	466 (94.9)	25 (5.1)	0.056
BADL	341 (94.7)	19 (5.3)	0.296
Frailty	275 (93.2)	20 (6.8)	0.728
Malnutrition	110 (95.7)	5 (4.3)	0.377
Depression	259 (92.2)	22 (7.8)	0.208

MS: metabolic syndrome; BADL: basic activities of daily life; IADL: instrumental activities of daily life.

geriatric characteristics of the participants, categorized by those with and without MS.

The multivariate analysis revealed a marginal, positive association between the presence of MS and disability (OR = 1.87; 95% CI: 0.97-3.60, p = 0.05). The odds ratio for MS and polypharmacy was 2.44, remaining statistically significant after adjusting for age and sex (95% CI: 1.1-5.4, p = 0.027). Table 2 displays the results of the multivariate logistic regression for the analyzed GS.

DISCUSSION

In our study, 41 participants (6%) met the criteria for MS (BMI ≥ 30 kg/m^2 + T2D + SAH), and 24 of them were over 75 years old. The overall prevalence of MS was notably lower than figures reported in other Latin populations: 35% Lima, 69% Cuba, 57% Porto Alegre, 47% Tenerife, and 67% Zaragoza[6,7,14-16]. However, another study reported a prevalence lower than these aforementioned studies but still higher than our reported figure (11.3% in women and 12.5% in men aged ≥ 70 years old)[17].

The prevalence of MS varies significantly across studies due to the chosen population sample and the diagnostic criteria[7,14]. Consequently, in 2004, the IDF introduced a new MS criterion emphasizing central obesity, identified by measuring waist circumference (WC)[13]. Using this criterion, a higher prevalence of MS was observed in most populations, especially among the OP[18]. If the BMI exceeds 30 kg/m^2, central obesity is assumed, eliminating the need for WC measurement[13]. Unfortunately, our study lacked certain data, such as lipid profiles and WC measurements, which were not included in our MS diagnosis.

Remarkably, the MS frequency in our study is among the lowest reported. One issue could stem from the lack of standardized cutoff points for some MS components, particularly as aging affects anthropometric

Table 2. Multivariate logistic regression of metabolic syndrome*

Geriatric syndrome	OR (95% CI)	p-value
Disability		
BADL	1.40 (0.743-2.639)	0.298
IADL	1.87 (0.97-3.60)	0.059
Polypharmacy	2.44 (1.1-5.4)	0.027
Malnutrition	1.53 (0.589-4)	0.381
Frailty	1.11 (0.594-2.10)	0.729
Depression	1.59 (0.79-2.9)	0.210

*Adjusted by age and sex. OR: odds ratio; CI: confidence intervals; BADL: basic activities of daily life; IADL: instrumental activities of daily life.

characteristics[19]. Consequently, WC and BMI appear to lose the directly proportional relationship that is observed in youth[20,21].

In our study, of the participants diagnosed with obesity, only 28.7% had both SAH and T2D. Put another way, only about a third of subjects with a BMI > 30 kg/m^2 could be classified as having MS in this sample. This finding aligns with reports from some authors but contrasts with others[14-16,22]. The mean BMI in our study (33.5, SD 3) was consistent with other research, where similar values were observed in general populations and those diagnosed with MS using IDF criteria[7].

Does WC typically increase with age? Some studies suggest an average BMI of at least 30 in older adults, irrespective of the diagnostic criteria used[7,23,24]. Furthermore, not all elderly participants with a BMI > 30 displayed other MS components.

These findings suggest that the diagnostic criteria for MS may have a weakness in adequately considering the variations caused by fat distribution in OP. This issue might arise from the inherent difficulty of maintaining a constant WC and body fat percentage as people age[25]. It leads us to contemplate that perhaps we should persistently advocate for reevaluating the cut-off points for diagnosing MS in OP. Both WC and BMI might need revision, possibly with differing values for various racial groups.

The current study revealed a significantly higher prevalence of MS in women (85%). While this is in line with earlier research, our findings show a notably greater percentage than most other studies in the Hispanic and Latin American populations (25% Lima, 78.9% Cuba, 63% Porto Alegre, 57% Tenerife, and 73% Zaragoza)[6,7,14-16].

Interestingly, variables such as age, schooling, and place of residence showed no significant differences in the MS group. Similarly, there was no notable distribution difference across all GS. Of note, a majority of obese participants (71%) did not meet the criteria for MS ($p < 0.001$) (Table 1).

The results from our study indicate challenges in applying current obesity definitions to the diagnosis of MS in the elderly. It is evident that the prevalence of MS varies among older individuals, potentially due to complexities in defining certain heterogeneous components in the elderly, such as the body's distribution of adipose tissue and weight.

We advocate for regional studies to determine the prevalence of MS among specific ethnic groups and age brackets. Additionally, long-term prospective studies seem indispensable. These should encompass analyses of varying parameters to correlate MS, obesity, and even previously unexamined outcomes in the elderly, like GS[21,26].

Unlike some other research, our study could not establish a risk association between GS and other factors, aside from polypharmacy and disability, especially frailty[27].

However, to our knowledge, this is the pioneering study in Mexico that incorporates GS in its evaluations. Our findings concur with prior research showing that MS and its constituents are risk factors for functional loss in OP[10,11,15,20,28].

CONCLUSION

In summary, our study revealed that the prevalence of MS in OP at a university hospital in Guadalajara is 6%, a figure considerably lower than that reported in other population-based studies. The presence of MS increased the likelihood of being categorized into the disability and polypharmacy group although the association was marginally significant for the former.

Given that this is a preliminary study, the results should be interpreted with the inherent limitations of cross-sectional research in mind. Future studies should adopt a longitudinal approach to determine whether OP necessitates specific criteria for diagnosing MS, especially when evaluating central obesity.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

ETHICAL DISCLOSURES

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. Right to privacy and informed consent. The authors have obtained approval from the ethics committee for analysis and publication of routinely acquired clinical data and informed consent was not required for this retrospective observational study.

Use of artificial intelligence for generating text. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

REFERENCES

1. Oliva-Armas G, Asencio-del Real G, Fraga-Ávila C, Van Dick-Puga MA, Leal-Mora D, Díaz-Ramos JA. Frailty and its associations with geriatric syndromes, among older adults in Western Mexico. J Lat Am Geriat Med. 2018;4:8-12.
2. Dominguez LJ, Barbagallo M. The cardiometabolic syndrome and sarcopenic obesity in older persons. J Cardiometab Syndr. 2007;2:183-9.
3. Inouye SK, Studenski S, Tinetti ME, Kuchel GA. Geriatric syndromes: clinical, research, and policy implications of a core geriatric concept. J Am Geriatr Soc. 2007;55:780-91.
4. Kim YJ, Kim DK, Ryu JS, Eom WS, Cho JH, Cho YJ, et al. Relationship between metabolic syndrome and coronary heart disease in elderly. J Korean Geriatr Soc. 2003;7:305-12.
5. Natow AB, Heslin JA. Nature of the aging process. J Nutr Gerontol Geriatr. 1982;1:89-100.
6. Fonte MN, Sanabría NJ, Bencomo FL. Factores de riesgoasociados y prevalencia de síndromemetabólico en la terceraedad. Rev Cienc Méd. 2014;18:963-73.
7. Rigo JC, Vieira JL, Dalacorte RR, Reichert CL. Prevalence of metabolic syndrome in an elderly community: comparison between three diagnostic methods. Arq Bras Cardiol. 2009;93:85-91.
8. Ellis A, Crowe K, Lawrence J. Obesity-related inflammation: implications for older adults. J Nutr Gerontol Geriatr. 2013;32:263-90.
9. Solano Jaurrieta JJ. Síndrome metabólico y envejecimiento. Rev Esp Geriatr Gerontol. 2009;44:335-41.
10. Mottillo S, Filion KB, Genest J, Joseph L, Pilote L, Poirier P, et al. The metabolic syndrome and cardiovascular risk a systematic review and meta-analysis. J Am Coll Cardiol. 2010;56:1113-32.
11. Wilson PW, D'Agostino RB, Parise H, Sullivan L, Meigs JB. Metabolic syndrome as a precursor of cardiovascular disease and type 2 diabetes mellitus. Circulation. 2005;112:3066-72.
12. Salvà Casanovas A. The mini nutritional assessment. Twenty years contributing to nutritional assessment. Rev Esp Geriatr Gerontol. 2012;47:245-6.
13. Alberti KG, Zimmet P, Shaw J. The metabolic syndrome--a new worldwide definition. Lancet. 2005;366:1059-62.
14. Aliaga E, Tello T, Varela L, Seclén S, Ortiz P, Chávez H. Frecuencia de síndrome metabólico en adultos mayores del distrito de San Martin de Porres de Lima, Perú según los criterios de ATP III y de la IDF. Rev Med Herediana. 2014;25:142-8.
15. Moreno P, Rodríguez-Álvarez C, Santiago M, Rijo MC, Aguirre-Jaime A, Abreu R, et al. Metabolic syndrome and mortality in population over 65 years of the Island of Tenerife. Nutr Clín Diet Hosp. 2014;34:63-70.
16. Castro Vilela ME, Quílez-Pina RM, Bonafonte-Marteles JL, Morlanes-Navarro T, Calvo-Gracia F. Prevalence of metabolic syndrome in elderly patients. Rev Esp Geriatr Gerontol. 2014;49:20-3.
17. Guize L, Thomas F, Pannier B, Bean K, Danchin N, Bénétos A. Metabolic syndrome: prevalence, risk factors and mortality in a French population of 62 000 subjects. Bull Acad Natl Med. 2006;190:685-97.
18. Adams RJ, Appleton S, Wilson DH, Taylor AW, Dal Grande E, Chittleborough C, et al. Population comparison of two clinical approaches to the metabolic syndrome: implications of the new international diabetes federation consensus definition. Diabetes Care. 2005;28:2777-9.
19. Park HM. Current status of sarcopenia in Korea: a focus on Korean geripausal women. Ann Geriatr Med Res. 2018;22:52-61.
20. Woo J, Ho SC, Yu AL, Sham A. Is waist circumference a useful measure in predicting health outcomes in the elderly? Int J Obes Relat Metab Disord. 2002;26:1349-55.
21. Motta M, Bennati E, Cardillo E, Passamonte M, Ferlito L, Malaguarnera M. The metabolic syndrome (MS) in the elderly: considerations on the diagnostic criteria of the international diabetes federation (IDF) and some proposed modifications. Arch Gerontol Geriatr. 2009;48:380-4.
22. De Luis DA, López-Mongil R, González-Sagrado M, López-Trigo JA, Mora PF, Castrodenza-Sanz J, et al. Prevalence of metabolic syndrome with international diabetes federation criteria and ATP III program in patients 65 years of age or older. J Nutr Health Aging. 2010;14:400-4.
23. Garaulet M, Puy M, Pérez-Llamas F, Cuadrado C, Leis R, Moreno MJ. Obesidad y ciclos de vida del adulto. Rev Esp Nutr Comunitaria. 2008;14:150-5.
24. Chang SH, Beason TS, Hunleth JM, Colditz GA. A systematic review of body fat distribution and mortality in older people. Maturitas. 2012;72:175-91.
25. Moon JH, Kim JS. The cutoff value in body fat percentage for increased risk of metabolic syndrome in elderly people with normal body weight. J Korean Geriatr Soc. 2015;19:16-24.
26. Maggi S, Noale M, Gallina P, Bianchi D, Marzari C, Limongi F, et al. Metabolic syndrome, diabetes, and cardiovascular disease in an elderly caucasian cohort: the Italian longitudinal study on aging. J Gerontol A Biol Sci Med Sci. 2006;61:505-10.
27. Lohman MC, Rescinti NV, Wirth MD, Shivappa N, Hébert JR. Obesity, dietary inflammation, and frailty among older adults: evidence from the national health and nutrition examination survey. J Nutr Gerontol Geriatr. 2019;38:18-32.
28. Ravaglia G, Forti P, Maioli F, Bastagli L, Chiappelli M, Montesi F, et al. Metabolic syndrome: prevalence and prediction of mortality in elderly individuals. Diabetes Care. 2006;29:2471-6.

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ORIGINAL ARTICLE

Relationship between age and sexual activity in the elderly attended in a second-level hospital in Mexico

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Abstract

Older people (OP) continue to be sexually active and sexual experiences have been associated with the preservation of psychological and physical well-being. **Objective:** *The objective of this study was to determine the existence of a relationship between the frequency of sexual activity and age.* **Materials and methods:** *Descriptive, cross-sectional, and quantitative study, through a survey, carried out in a second-level Hospital in the geriatrics service, in Mexico.* **Results:** *Ninety-two subjects were included, with a mean age of 77.7 ± 8 years, 64.1% had a partner, and 44.6% of the total maintained sexual activity, determining that the subjects who are at younger ages located in the age group between 65 and 79 years, there is the highest percentage of subjects with sexual activity (35.9%) (p < 0.001), 88% of the subjects registered presenting some problem that hinders their sexual activity.* **Conclusion:** *The OP in our population continues to present sexual activity, age being an important but not determining factor for people to maintain an active sexual life.*

Keywords: *Older person. Sexual activity. Age.*

Relación de la edad y la actividad sexual en la persona mayor atendida en un hospital de segundo nivel en México

Resumen

Las Personas Mayores (PM) continúan siendo sexualmente activos y las experiencias sexuales se han asociado con la preservación del bienestar psicológico y físico. **Objetivo:** *Determinar la existencia de una relación en la frecuencia de la actividad sexual y la edad.* **Material y métodos:** *Estudio descriptivo, transversal, cuantitativo, mediante encuesta, realizado en un Hospital de Segundo Nivel en el servicio de Geriatría, en México.* **Resultados:** *Se incluyeron 92 sujetos, con edad media de 77.7 ± 8 años. El 64.1% tenía pareja y el 44.6% del total mantenía actividad sexual, determinando que los sujetos que se encuentran en edades más tempranas ubicados en el grupo de edad entre 65 a 79 años, se encuentra el mayor porcentaje de sujetos con actividad sexual (35.9%) (p < 0.001), el 88% de los sujetos registraron presentar algún problema que dificulta su actividad sexual.* **Conclusión:** *La PM en nuestra población continúan presentando actividad sexual, siendo la edad un factor importante pero no determinante para que las personas mantengan una vida sexual active.*

Palabras clave: *Persona mayor. Actividad sexual. Edad.*

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INTRODUCTION

Older people (OP) continue to be sexually active and have been associated with benefits, having reduced physical and mental health problems, suggesting that age not a barrier to sex in old age[1]. Age stereotypes in OP as lacking sexual desire, even in health professionals, often present difficulties in incorporating sexuality into comprehensive care, in addition to finding factors that condition their sexuality[2-4].

The phases of the sexual response are compromised with aging, presenting non-linear changes in these stages, influenced by physiological and psychological factors related to age[5,6]. Studies report that the prevalence of sexual activity decreases with age: 73% among people between 57 and 64 years, 53% between 65 and 74 years, and 26% in people between 75 and 85 years, in addition to age, also there is a gender difference, women are less likely than men of the same age to be sexually active[7-10].

Sexual problems increase with age, approximately 50% of sexually active OP present sexual problems, causing the person to present challenges for satisfaction in relationships and moods[11-13]. Among the problems found, erectile dysfunction and dyspareunia as the main causes of dissatisfaction, it has also been reported that 26.9% of men and 17.1% of women report having a health condition that affects their sexual life[14-16].

Some authors have documented sexual activity as an indicator of functionality in OP, relating it to the independence to carry out activities of daily living, stating that maintaining sexual activity is a factor dependent on functionality, this being already important. Which within the geriatric assessment can be an indicator of functionality[17]. Our objective was to determine the existence of a relationship between the frequency of sexual activity and age.

MATERIALS AND METHODS

A descriptive, observational, and cross-sectional study was carried out in a second-level care hospital, using a data collection sheet applied to the OP for a period of 3 months, identifying the frequency of sexual activity and determining its clinical characteristics. People over 65 years of age from the outpatient clinic of the Geriatrics service were included in the study. The participants signed informed consent. Subjects who did not agree to participate or could not understand the questionnaire were excluded from the study. The population was divided into two groups by age, 65-79 years and > 80 years. The type of sampling was non-probabilistic at convenience, for an established period of 3 months. The clinimetry was applied by a geriatric. A survey was applied to determine the sociodemographic variables, clinical characteristics, and data necessary to comply with the variables chosen for the investigation, for the functional assessment the Katz index survey was used[18,19].

Data were analyzed from September to November of the year 2022; the data were presented as measures of central tendency and dispersion (Mean ± SD or percentages depending on the variable). To compare categorical variables, x^2 was used, while for the relationship between groups because our sample had a non-linear behavior, the Kruskal–Wallis test was applied the Dunnette *post hoc* test. Statistical analysis was performed with the statistical package SPSS version 20.0. This research was approved by the Local Research and Ethics Committee No. 1602 and 16028 of the Mexican Institute of Social Security, with registration number R-2022-1603-006.

RESULTS

A total of 92 subjects were analyzed. The distribution by gender in the patients included in the sample registered a slight predominance of the female gender (55.4%). The results by age reported a mead of 77.74 ± 8 years (65-95). Table 1 shows the sociodemographic results of the study population (Table 1).

The frequency of active sexual life, 46.7% of the participants still had some type of sexual relationship, in the female gender group the subjects with a sexual life (27.2%) and without an active sexual life (28.3%), compared to gender male with active sexual life (19.6%) and without active sexual life (25%), even so, the group with less sexual activity was found in the group of the female gender. Regarding the division by age, a very similar distribution was found between the group of 65-79 years (56.5%) and the group over 80 years of age (43.5%), finding that the largest number of subjects without sexual activity (32.6%) was found within the older age group. The record for the presence of problems to have an active sexual life was documented by 88% of the subjects with some type of problem to maintain sexual relations (Table 2).

When making a comparison between marital status, mobility problems, comorbidities, and problems in the sexual act with being sexually active or not, we found statistically significant differences (Table 3).

Table 1. Demographic characteristics

	Total (n = 92)	Female (n = 51)	Male (n = 41)	p-value
	Mean ± SD	Mean ± SD	Mean ± SD	
Age	77.74 ± 8.00	76.18 ± 8.35	79.68 ± 7.18	
	n (%)	n (%)	n (%)	
Marital status				
Single	7 (7.6)	7 (7.6)	0 (0)	0.016
Married	59 (64.1)	32 (34.8)	27 (29.3)	0.829
Widows	26 (28.3)	12 (13)	14 (15.2)	0.352
Occupation				
Housewife	41 (44.6)	41 (44.6)	0 (0)	> 0.00
Employe	19 (20.7)	3 (3.3)	16 (17.4)	> 0.00
Professional	10 (10.9)	4 (4.3)	6 (6.5)	0.332
Merchant	4 (4.3)	1 (1.1)	3 (3.3)	0.320
Other	18 (19.6)	2 (2.2)	16 (17.4)	< 0.00
Education				
Without	13 (14.1)	6 (6.5)	7 (7.6)	0.553
Primary	42 (45.7)	27 (29.3)	15 (16.3)	0.143
Secondary	18 (19.6)	11 (12)	7 (7.6)	0.611
Preparatory	10 (10.9)	4 (4.3)	6 (6.5)	0.332
Degree	7 (7.6)	2 (2.2)	5 (5.4)	0.235
Postgraduate	2 (2.2)	1 (1.1)	1 (1.1)	0.876
Katz				
A	49 (53.3)	28 (30.4)	21 (22.8)	0.834
B	17 (18.5)	10 (10.9)	7 (7.6)	0.756
C	13 (14.1)	4 (4.3)	9 (9.8)	0.072
D	10 (10.9)	6 (6.5)	4 (4.3)	1.000
E	3 (3.3)	3 (3.3)	0 (0)	0.251
Mobility problems	15 (16.3)	5 (5.4)	10 (10.9)	0.088
Sleep disorder	12 (13)	4 (4.3)	8 (8.7)	0.125
Disease	90 (97.8)	49 (53.3)	41 (44.6)	0.50
MD	43 (46.7)	25 (27.2)	18 (19.6)	0.678
SAH	67 (72.8)	40 (43.5)	27 (29.3)	0.239
RA	5 (5.4)	4 (4.3)	1 (1.1)	0.376
Incontinence	15 (16.3)	7 (7.6)	8 (8.7)	0.573
Stroke	36 (39.1)	26 (28.3)	10 (10.9)	0.011
CD	4 (4.3)	3 (3.3)	1 (1.1)	0.626
Surgery	30 (33)	12 (13.2)	18 (19.8)	0.072
Other	14 (15.2)	10 (10.9)	4 (4.3)	0.249

SD: standard deviations; MD: mellitus diabetes; SAH: systemic arterial hypertension; RA: rheumatoid arthritis; CD: cardiovascular disease. To compare categorical variables x^2 was used.

On the other hand, in table 4, between the age range and sexual activity being less frequent in people aged 80 and over, with statistical significance, being the most important result in our study.

Regarding the functional state assessed by the Katz index, a similar distribution was documented between the group that is totally independent for the basic activities of daily life, representing 53.3% and 47.1% of the total population presented a or more dependence on basic activities of daily living, the highest percentage of the sexually active population was found in the group with a Katz A index (totally independent) (Table 5).

The results obtained in the Kruskal-Wallis test to determine if there is a difference between the different groups depending on the functionality in the basic activities of daily life, it was determined that there is a difference between belonging to the group

Table 2. Relationship sexual activity with gender. To compare categorical variables x^2 was used

	Total (n = 92)	Female (n = 51)	Male (n = 41)	p-value
	n (%)	n (%)	n (%)	
Sexual activity				
Sexually active	43 (46.7)	25 (27.2)	18 (19.6)	0.678
Sexually inactive	49 (53.3)	26 (28.3)	23 (25)	
Type of relationship				
With coito	41 (44.6)	22 (23.9)	19 (20.7)	0.834
Without coito	51 (55.4)	29 (31.5)	22 (23.9)	
Lac of partner	33 (35.9)	20 (39.2)	13 (31.7)	0.516
Sexual problems	81 (88)	45 (48.9)	36 (39.1)	1.00
Pain	20 (21.7)	18 (19.6)	2 (2.2)	< 0.00
Lac of energy	19 (20.7)	4 (4.3)	15 (16.3)	0.001
Decreased excitement	24 (26.1)	15 (16.3)	9 (9.8)	0.479
Erectile dysfunction	24 (26.1)		19 (20.7)	< 0.00
Erectile dysfunction in couple		5 (5.4)		
Other problems	6 (6.5)	6 (6.5)	0 (0)	0.032

Table 3. Relationship sexual activity with marital status, mobility, sleep disorder disease, lack of partner, and sexual problems

	Total (n = 92)	Sexually active (n = 43)	Sexually inactive (n = 49)	p-value
	n (%)	n (%)	n (%)	
Marital status				
Single	7 (7.6)	2 (2.2)	5 (5.4)	0.442
Married	59 (64.1)	41 (44.6)	18 (19.6)	< 0.00
Widows	26 (28.3)	0 (0)	26 (28.3)	< 0.00
Mobility problems	15 (16.3)	2 (2.2)	13 (14.1)	0.005
Sleep disorder	12 (13)	3 (3.3)	9 (9.8)	0.130
Disease	90 (97.8)	43 (46.7)	47 (51.1)	0.497
MD	43 (46.7)	21 (22.8)	22 (23.9)	0.834
SAH	67 (72.8)	32 (34.8)	35 (38)	0.817
RA	5 (5.4)	2 (2.2)	3 (3.3)	1.000
Incontinence	15 (16.3)	7 (7.6)	8 (8.7)	1.000
Stroke	36 (39.1)	12 (13)	24 (26.1)	0.054
CD	4 (4.3)	0 (0)	4 (4.3)	0.120
Surgery	30 (33)	12 (13.2)	18 (19.8)	0.377
Other	14 (15.2)	5 (5.4)	9 (9.8)	0.401
Lac of partner	33 (35.9)	0 (0)	33 (35.9)	< 0.00
Sexual problems	81 (88)	34 (37)	47 (51.1)	0.021
Pain	20 (21.7)	14 (15.2)	6 (6.5)	0.023
Lac of energy	19 (20.7)	4 (4.3)	15 (16.3)	0.019
Decreased excitement	24 (26.1)	8 (8.7)	16 (17.4)	0.156
Erectile dysfunction	24 (26.1)	9 (9.8)	15 (16.3)	0.346
Other problems	6 (6.5)	2 (2.2)	4 (4.3)	0.681

MD: mellitus diabetes; SAH: systemic arterial hypertension; RA: rheumatoid arthritis; CD: cardiovascular disease.
To compare categorical variables x^2 was used.

Table 4. Relationship sexual activity with age

Age	Total (n = 92)	Sexually active (n = 43)	Sexually inactive (n = 49)	p-value
	n (%)	n (%)	n (%)	
65-79 years	52 (56.5)	33 (35.9)	19 (20.7)	< 0.00
80 years or more	40 (43.5)	10 (10.9)	30 (32.6)	

To compare categorical variables x^2 was used.

Table 5. Frequency of sexual activity in the different groups by Katz index

Katz	Total (n = 92)	Sexually active (n = 43)	Sexually inactive (n = 49)
	n (%)	n (%)	n (%)
A	49 (53.3)	36 (39.1)	13 (14.1)
B	17 (18.5)	7 (7.6)	10 (10.9)
C	13 (14.1)	0 (0)	13 (14.1)
D	10 (10.9)	0 (0)	10 (10.9)
E	3 (3.3)	0 (0)	3 (3.3)

Table 6. Relationship sexual activity with difference between groups by Katz index

Katz	Median range	Difference of means	p-value
A	34.20		
B	49.06		
C	68.00		
D	68.00		
E	68.00		
Groups			
A-B		0.323	0.230
A-C		0.735	0.000
A-D		0.735	0.000
A-E		0.735	0.000
B-C		0.412	0.037
B-D		0.412	0.037
B-E		0.412	0.037
C-D		0.000	> 0.05
C-E		0.000	> 0.05
D-E		0.000	> 0.05

To analyze the relationship between groups, the analysis of variance test, and the Kruskal–Wallis *post hoc* test, IC 95% were used.

that presents total independence (Katz A), loss of one of the activities of daily living (Katz B), and belonging to some group that presents some degree of dependency (Katz C, D, and E), this being a statistically significant result (Table 6).

DISCUSSION

In Mexico, there are few studies on the frequency of sexual activity in the OP, our study fulfilled its objective, determining the relationship between the frequency of sexual activity and the age of the OP, as well as the clinical characteristics that influence the frequency of sexual activity and the relationship that exists with the functional state in the basic activities of daily life. Studies have shown in this age group how sexual relations are an important part of their lives, as reported in the *National Survey on the Quality of life of Older Adults in Argentina*, reporting that 54% of men and 46% of women people over 60 years of age believe that their sexual life is important[20]. Our results confirm what has been reported in other studies where they report that the population that maintains sexual activity ranges from 77 to 83% and that they have concluded that sexual desire is maintained despite the age[21,22].

Based on our results, a dependency is established between the sexual activity of the OP and the age group, finding the highest frequency of sexual activity among people in the younger age group, an expected result, and correlated with the report obtained by Lindau et al., demonstrating that with the passage of time it is expected that the frequency of sexual activity in OP decreases, but a significant percentage of the population remains sexually active, determining that age influences sexual activity but is not a determining factor, this result obtained reinforces the concept of OP as people with sexual activity, helping to eliminate the stereotype of asexual people[7].

Regarding the frequency of sexual activity, our population reported a lower frequency compared to what was found in the study by Guadarrama et al. even

though the number of the sample is equivalent to that of our study, they reported an increased frequency of sexual activity. This difference in frequency is probably due to the fact that 92% of its population corresponds to the age group of 60-75 years, being this age group the one with the highest reported sexual activity, compared to our study that this age group only represented approximately 50%, in addition to the fact that in our study one of the most reported problems and with statistical significance was not having a partner, and in their study 90% of the population had a partner, compared to 59% in our population, being another of the factors why the frequency of sexual activity reported in their study is inconsistent with our results[22].

The frequency obtained in our study is closer to that reported by Muñoz et al., where they obtained 68% of OP who maintained sexual activity and 95% of this group reported that they had coital activity at least once a month[21].

Another of our results in terms of sexual activity depending on gender, being higher among men in our population, similar to those reported by Wang et al., where the male gender had 1.7 times more sexual activity than the female gender, 27 in our study did not find a significant difference in relation to the gender of our population, even so, the existence of a difference in interest depending on gender has been documented by Orihuela et al.[23,24].

In our study, only sexual activity or manifestation of sexuality in OP was reported, intercourse, since this variable is the most objective that can be considered to document the frequency of sexual activity within our population, since taking as variables as expression of the sexuality of the subjects such as touching, hugging, kissing and masturbation may not be so objective to measure the frequency of sexual activity of the population included in the study, this being our main objective. From the aforementioned, it follows that aging is not by itself a factor that causes a decrease in sexual interest, but that it is also associated with gender, since after the menopause period in women[25].

The perception of problems to maintain an active sexual life had a significantly statistical impact, and more frequently than that registered in other studies, obtaining 88% in our population compared to 50% by Lindau et al.[7]. Among the problems found, the presence of pain (78%), lack of energy (79%), and low mobility (83%), within the pathologies related to low sexual activity, a significant result was found associated with the antecedent of presenting a cerebrovascular accident, probably secondary to the impact it has on mobility and functional dependence in people, another of the registered problems is erectile dysfunction, found in 26% of men and a small group of women's partners. Women (5.4%) perceive the fact that their partner presents erectile dysfunction as a problem for their sexual life, these results are lower compared to what is reported in other studies that document a condition of 45% of men aged 60 years and more than 70% of men aged 70 or over[14,15].

Regarding the marital status of the subjects, 44% sexually active were within the group of married people, the most affected group being the people who were widows since no subject within this group was sexually active, so the marital status of the subjects had a significant impact on the frequency of sexual activity, a result similar to that of Wang et al., where 86% of their population was in a current marriage, this group being the one with the highest sexual activity, in comparison with sexual activity for widowed men (7.9%) and widowed women (19%), as well as those who never married with 0.2% for men and 1.5% for women, demonstrating the great importance of having a partner in this population to continue with an active sexual life[15].

The relationship that exists between being an independent OP and an active sexual life, it was documented that those subjects with a Katz A index maintain an active sexual life, being statistically significantly comparing this group with those subjects who present some degree of dependence in two or more activities of daily life, being similar to that obtained by Fernández-Hernández et al., where they report that the Katz index is a factor dependent on sexual activity within the population studied, finding that those women who have sexual relations (96%) were with a Katz index A[21].

For all of the aforementioned, we can determine the importance of the analysis of sexuality in the OP within the integrated geriatric assessment. Our study is one of the few developed in our country that evaluates sexuality in OP, in addition, the importance of sexuality in relation to prevention or detection of sexually transmitted diseases should be emphasized, since they are not immune to these infectious agents, in addition to the fact that there are reports of increased rates of sexually transmitted infections.[26] Speaking of people living with HIV, OP are perceived as a group with a lower risk of contracting the infection, as a consequence, almost half of OP living with HIV are diagnosed late and this presentation causes OP to receive care delay, and everything that this infection involves, the increase in polypharmacy, premature and pathological aging, greater risk of prevalence of frailty,

greater risk of falls and greater prevalence of cognitive impairment; hence, it goes beyond the impact of the infection itself[27,28].

CONCLUSION

The sexual activity of the OP decreases with age, presenting a higher frequency in the age group between 65 and 79 years, in comparison with the lower frequency found in the age group over 80 years, this being a statistically significant result. In our population, we can conclude that age has an important but not decisive weight for the presence of sexual activity in OP.

The frequency of sexual activity is dependent on the Katz index, demonstrating that some degree of dependence on the basic activities of daily life determines a decrease in the presence of sexual activity in OP.

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ETHICAL DISCLOSURES

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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REFERENCES

1. Flynn TJ, Gow AJ. Examining associations between sexual behaviours and quality of life in older adults. Age Ageing. 2015;44:823-8.
2. Haesler E, Bauer M, Fetherstonhaugh D. Sexuality, sexual health and older people: a systematic review of research on the knowledge and attitudes of health professionals. Nurse Educ Today. 2016;40:57-71.
3. Ricoy-Cano AJ, Obrero-Gaitán E, Caravaca-Sánchez F, De La Fuente-Robles YM. Factors conditioning sexual behavior in older adults: a systematic review of qualitative studies. J Clin Med. 2020;9:1716.
4. Gutiérrez-Herrera RF, Ramírez-Muñiz R, Solís MV, Gómez-Gómez C, Riquelme-Heras HM, Martínez-Lazcano F, et al. Attitude of family doctor towards the sexual activity in older patients. A multi-center study in México. Rev Méd Paz. 2020;26:29-37.
5. De Andrade Palmeira R. Sexualidad del adulto mayor. Rev Cient UPAP. 2021;1:75-81.
6. Srinivasan S, Glover J, Tampi RR, Tampi DJ, Sewell DD. Sexuality and the older adult. Curr Psychiatry Rep. 2019;21:97.
7. Morton L. Sexuality in the older adul. Prim Care. 2017;44:429-38.
8. Lindau ST, Schumm LP, Laumann EO, Levinson W, O'Muircheartaigh CA, Waite LJ. A Study of sexuality and health among older adults in the United States. N Engl J Med. 2007;357:762-74.
9. Waite LJ, Charme C. Sexuality over the life course. In: International Encyclopedia of the Behavioral and Social Science. 2nd ed. Amsterdam: Elsevier; 2015. p. 840-5.
10. Valle AR, Alcocer BS, Ceh JG. Factores psicológicos y socioculturales en la vida sexual de los adultos mayores. Rev Iberoam Cien Salud. 2015;4:73-88.
11. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington: American Psychiatric Association; 2013.
12. Wang X, Yang X, Cai Y, Wang S, Weng W. High prevalence of erectile dysfunction in diabetic men with depressive symptoms: a meta-analysis. J Sex Med. 2018;15:935-41.
13. Hartmans C, Comijs, H, Jonker C. The perception of sexuality in older adults and its relationship with cognitive functioning. Am J Geriatr Psychiatry. 2015;23:243-52.
14. Mitchell CM, Guthrie KA, Larson J, Diem S, LaCroix AZ, Caan B, et al. Sexual frequency and pain in a randomized clinical trial of vaginal estradiol tablets, moisturizer, and placebo in postmenopausal women. Menopause. 2019;26:816-22.
15. Wang V, Depp CA, Ceglowski J, Thompson WK, Rock D, Jeste DV. Sexual health and function in later life: a population-based study of 606 older adults with a partner. Am J Geriatr Psychiatry. 2015;23:227-33.
16. Erens B, Mitchell KR, Gibson L, Datta J, Lewis R, Field N, et al. Health status, sexual activity and satisfaction among older people in Britain: a mixed methods study. PLoS One. 2019;14:e0213835.
17. Fernández-Hernández M, Gaviria Cano MN, Muñoz González F, Miguel Calvo I, Coll Torres E, Fuentes Ferrer ME. Sexualidad en las mujeres mayores. Aten Primaria. 2006;37:504-9.
18. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged. The index of adl: a standardized measure of biological and psychosocial function. JAMA. 1963;185:914-9.
19. Cabañero Martínez MJ, Cabrero García J, Richart Martínez M, Muñoz Mendoza CL. The Spanish versions of the Barthel index (BI) and the Katz index (KI) of activities of daily living (ADL): a structured review. Arch Gerontol Geriatr. 2009;49:e77-84.
20. Instituto Nacional de Estadística y Censos. Encuesta Nacional Sobre Calidad de Vida de Adultos Mayores. Argentina: Instituto Nacional de Estadística y Censos; 2012.
21. Muñoz RL, Alarcón E, Berasain, Boid G, Conejeros O. Tipo, frecuencia y calidad de las relaciones sexuales en la tercera edad. Ars Med. 2002;8:102-125.
22. Guadarrama RM, Ortiz Zaragoza MC, del Carmen Moreno Castillo Y, Pedraza Avilés AG. Características de la actividad sexual de los adultos mayores y su relación con su calidad de vida. Rev Espec Med Quir. 2010;15:72-9.
23. Wang TF, Lu Ch, Chen IJ, Yu S. Sexual knowledge, attitudes and activity of older people in Taipei, Taiwan. J Clin Nurs. 2008;17:443-450.
24. Orihuela de la Cal J, Gómez Vital M, Fumero Naranjo M. Sexualidad en el anciano: un elemento importante en su calidad de vida. Rev Cubana Med Gen Integr. 2001;17:545-7.
25. Padero MC, Bhasin S, Friedman TC. Androgen supplementation in older women: too much hype, not enough data. J Am Geriatric Soc. 2002;50:1131-40.
26. Van Epps P, Musoke L, McNeil CJ. Sexually transmitted infections in older adults: increasing tide and how to stem it. Infect Dis Clin North Am. 2023;37:47-63.
27. Chu Q, Zhang X, Lan J, Zhang Q, Wei T, Fu Y, et al. Prevalence and factors associated with late diagnosis among older adults living with HIV in Liuzhou, China: 2010-2020. J Med Virol. 2023;95:e28288.
28. The Lancet Healthy Longevity. Ageing with HIV. Lancet Healthy Longev. 2022;3:e119.

THE JOURNAL OF LATIN AMERICAN GERIATRIC MEDICINE REVIEW ARTICLE

Bioethics in end-of-life care: statistical review

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Abstract

In Mexico, according to data from the National Institute of Statistics and Geography, during 2020, a total of 1,086,743 deaths were recorded. End-of-life care is expensive, with up to a quarter of the health insurance budget devoted to caring for patients who die that year. Aggressive interventions are frequently used even when evidence is lacking, while palliative care is often underused despite evidence that it increases patients' quality of life without decreasing life expectancy. Recently, there has been a shift toward patient-centered outcomes that better reflect patient values in end-of-life care. Although the evidence for patients' preferences regarding the place of death is unclear and contradictory, posing the home as the best/preferred place of death remains a central objective for end-of-life care.

Keywords: *Bioethics. Palliative care. Euthanasia. Dysthanasia. Orthothanasia.*

Bioética en los cuidados al final de la vida: análisis estadístico

Resumen

En México, según datos del Instituto Nacional de Estadística y Geografía, durante 2020 se registraron un total de 1,086,743 defunciones. La atención al final de la vida es costosa, ya que hasta una cuarta parte del presupuesto del seguro médico se destina a atender a los pacientes que fallecen ese año. Con frecuencia se recurre a intervenciones agresivas aunque no haya pruebas que lo demuestren, mientras que los cuidados paliativos suelen infrautilizarse a pesar de que está demostrado que aumentan la calidad de vida de los pacientes sin disminuir su esperanza de vida. Recientemente se ha producido un cambio hacia unos resultados centrados en el paciente que reflejen mejor sus valores en los cuidados al final de la vida. Aunque las pruebas sobre las preferencias de los pacientes en cuanto al lugar de la muerte son confusas y contradictorias, plantear el domicilio como el lugar de muerte mejor/preferido sigue siendo un objetivo central en lo que respecta a los cuidados al final de la vida.

Palabras clave: *Bioética. Cuidados paliativos. Eutanasia. Distanasia. Ortotanasia.*

INTRODUCTION

In Mexico, according to data from the National Institute of Statistics and Geography, during 2020, a total of 1,086,743 deaths were recorded. The registered death rate per 10,000 population was 86; 58.8% (639,277) of the deaths correspond to men, whereas 41.1% (446,709) to women. By age group, the highest proportion of deaths is concentrated in people aged 65 years and over (605,973, equivalent to 55.8%). 92.4% (1,004,083) of deaths were due to diseases and related health problems and 7.6% (82,660) were to external causes. By health problems, the four leading causes of death nationwide were heart disease (218,704, 20.1%), COVID-19 (200,256, 18.4%), diabetes mellitus (151,019, 13.9%), and malignant tumors (90,603, 8.3%). By site of occurrence, 46.6% (506,910) of registered deaths took place at home and 43.0% (467,282) in public and private hospitals[1].

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Many low- and middle-income countries are devastated by significant socioeconomic and healthcare challenges, including a rapid escalation of non-communicable diseases, particularly cancer. Between 1990 and 2013, 70% increase in cancer mortality occurred in those countries, with 196.3 million disability-adjusted life yearslost[2]. Globally, cancer incidence is projected to increase to 22.2 million new cancer cases by 2030, with low- and middle-income countries bearing the greatest burden[3].

End-of-life care is expensive, with up to a quarter of the health insurance budget devoted to caring for patients who die that year[4]. Despite significant expenditures and resources devoted to end-of-life care, such care often does not pay sufficient attention to the multiple problems experienced by patients in palliative care, including distressing symptoms, emotional, social, and spiritual needs[5].

Aggressive interventions are frequently used even when evidence is lacking, while palliative care is often underused despite evidence that it increases patients' quality of life without decreasing life expectancy[6]. Even with the lack of support for aggressive interventions and the recognition that most patients prefer to spend as much time at home as possible when faced with advanced disease, most patients experience at least one indicator of aggressive care in their end-of-life care, with 75% admitted to hospital and 40% in the intensive care unit in the past 6 months of life[7].

Recently, there has been a shift toward patient-centered outcomes that better reflect patient values in end-of-life care, with increasing attention on the time patients spend at home[5].

The paucity of research on the role of end-of-life medical care hinders global progress in alleviating suffering and improving the quality of life for patients and their families. It is estimated that each death potentially affects the lives of, on average, five people in terms of care and bereavement. By 2030, approximately 74 million deaths per year will occur, increasing the number of people annually affected by death to 370 million[8]. Policy initiatives to promote the integration of palliative care deserve urgent attention, as well as discussion of the good dying while respecting the values and informed decisions of the patient and their families.

Palliative care is born from the approach to improving the quality of life of patients and their families with life-threatening illnesses, through the impeccable assessment and treatment of pain and other problems, and is applicable early in the course of the disease, along with other therapies aimed at prolonging life[9]. Although the evidence for patients' preferences regarding the place of death is unclear and contradictory, posing the home as the best/preferred place of death remains a central objective for end-of-life care[10].

The act of killing, letting die, or helping another person to die for their good or in their interest has been called euthanasia. It is a naturally compassionate act, aimed at alleviating the intense suffering of a person who is either approaching death or experiencing health conditions that severely and irreversibly impact their quality of life. The issue has given rise to multiple controversies: from what we should properly understand by euthanasia, through the ethical implications of the problem, to the convenience of its legalization. Philosophers, doctors, lawyers, religious, psychologists, humanists, and many more have reflected on this question without reaching conclusive conclusions so far. There is always a doubt, a bad taste in the mouth that has not just been removed, the inevitable feeling of helplessness that human feel when they face death. Part of the complexity of the matter is a consequence of the multiplicity of assumptions that are associated with euthanasia and for which it is not always possible to find homogeneous solutions[11].

Nowadays, it is important to objectively understand the different medicolegal terms that accompany care and interventions at the end of life:

- Euthanasia, at present, is conceptualized as the action that aims to remove the life of the human being for humanistic considerations for the person or with society[12], it is ethically and legally incorrect in Mexico
- Dysthanasia is synonymous with futile or useless treatment, without benefits for the person in his terminal phase. It is the process by which only the process of dying is prolonged and not life itself, resulting in a prolonged, slow, and often prolonged death, accompanied by suffering, pain, and agony. When you invest in healing, in the face of an incurable case, it is an assault on the dignity of that person[13].
- Orthothanasia is the art of dying well, humanly, and correctly, without being victimized by dysthanasia and without shortening life, that is, resorting to euthanasia. It has as a great challenge the rescue of the dignity of the human being in its final process, where there is a commitment to the promotion of the well-being of the person in his terminal phase[12].

Mexico, like many other countries, lacks national policies, infrastructure, skilled labor, financial resources, technology, and an information system for the treatment of terminal illnesses and quality end-of-life care. In most cases, late presentation is common and palliative care is the only treatment option. In addition, many low- and middle-income countries are unable to provide the 52 cancer medicines and 22 pain and palliative care medicines on the WHO list of essential medicines.[3] People living with a terminal illness suffer a significant personal burden of symptoms and need psychological support, as well as better care and information for their families while coping. For example, more than 50% of patients with advanced cancer report pain, fatigue, and shortness of breath, while their families commonly report anxiety and inadequate assistance when seeking support[14]. As a result, 80% of people living in low- and middle-income countries have little or no access to pain relief[3].

Research shows that end-of-life care requires a strong care network involving professional support services, as well as an engaged person taking responsibility for the care process, usually represented by a family member living in the same household[15]. The principles of ethics should always be applied in the clinical care of persons in the terminal stage of illness and whose life expectancy is relatively short. It is in those moments when the patient and his family go through situations that deeply affect the psychological and emotional aspects.

The main reason that leads patients to hospitalization is the family collapse due to psychological and physical exhaustion and the lack of qualified caregivers for the management of this type of patient at home; to a lesser extent, the difficulty in controlling symptoms; some studies suggest that the average number of symptoms per patient at the time of their medical care was 10.5 with a range of 6–13 symptoms; being the most common: asthenia (92%), anorexia (88%), pain (78%), dyspnea (65%), depression (61%), and nausea and vomiting (58%)[5].

Until there are adequate health policies in our country, palliative care has helped in serious illnesses with better communication, symptom control, and knowledge about treatment options and goals[16]. Advance care planning is a process that supports patients and their caregivers in their reflection on the meaning and consequences of current and future medical care and treatment. The goal of advanced end-of-life care planning is to help patients identify their wishes and values regarding their treatment and care to communicate those values to their families and caregivers so that coordinated treatment arrangements can be made. Studies show that the quality of care toward the end of life increases through adequate advance care planning, especially due to improved coordination between a better-informed patient, as well as their nuclear family and/or primary caregivers. On top of that, it improves profitability by avoiding unnecessary hospital stays and treatments. Advance care planning prevented between 9% and 26% of unnecessary hospital stays at the end of life[17]. The sole goal of good palliative care at the end of life should be to maintain the best possible quality of life for the patient and family.

CONCLUSION

End-of-life bioethics in Mexico is an evolving field that requires a comprehensive approach that considers not only medical but also cultural, ethical, and legal aspects. It is critical to advance the development of clear policies and protocols that respect patient autonomy, promote equitable access to palliative care, and address diverse cultural perspectives to ensure ethical and compassionate care for those at the end of their lives.

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The authors declare no conflicts of interest.

ETHICAL DISCLOSURES

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article. Furthermore, they have acknowledged and followed the recommendations as per the SAGER guidelines depending on the type and nature of the study.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

Use of artificial intelligence for generating text. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

REFERENCES

1. National Institute of Statistics and Geography (INEGI). Characteristics of Deaths Registered in Mexico During 2020. Press Release No. 592/21; 2021. Available from: https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2021/EstSociodemo/DefuncionesRegistradas2020preliminar.pdf [Last accessed on 2023 Feb 22].
2. Global Burden of Disease Cancer Collaboration, Fitzmaurice C, Allen C, Barber RM, Barregard L, Bhutta ZA, et al. Global, regional, and national cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life-years for 32 cancer groups, 1990 to 2015: a systematic analysis for the global burden of disease study. JAMA Oncol. 2017;3:524-48.
3. Donkor A, Luckett T, Aranda S, Phillips J. Barriers and facilitators to implementation of cancer treatment and palliative care strategies in low- and middle-income countries: systematic review. Int J Public Health. 2018;63:1047-57.
4. Riley GF, Lubitz JD. Long-term trends in Medicare payments in the last year of life. Health Serv Res. 2010;45:565-76.
5. Lam MB, Riley KE, Zheng J, Orav EJ, Jha AK, Burke LG. Healthy days at home: a population-based quality measure for cancer patients at the end of life. Cancer. 2021;127:4249-57.
6. Kavalieratos D, Corbelli J, Zhang D, Dionne-Odom JN, Ernecoff NC, Hanmer J, et al. Association between palliative care and patient and caregiver outcomes: a systematic review and meta-analysis. JAMA. 2016;316:2104-14.
7. Henson LA, Gomes B, Koffman J, Daveson BA, Higginson IJ, Gao W, et al. Factors associated with aggressive end of life cancer care. Support Care Cancer. 2016;24:1079-89.
8. De Lima L, Pastrana T. Opportunities for palliative care in public health. Annu Rev Public Health. 2016;37:357-74.
9. Nevin M, Hynes G, Smith V. Healthcare providers' views and experiences of non-specialist palliative care in hospitals: a qualitative systematic review and thematic synthesis. Palliat Med. 2020;34:605-18.
10. Kieninger J, Wosko P, Pleschberger S. Support towards the end of life and beyond: non-kin care commitment for older people living alone in Austria. Health Soc Care Community. 2022;30:e5196-203.
11. Cano Valle, F., Díaz Aranda, E., & Maldonado de Elizalde, E. (2001). Euthanasia: Legal, philosophical, medical and religious aspects. National Autonomous University of Mexico. Institute of Legal Research.
12. Pessini L, Barchifontaine CP. Euthanasia: Why Shorten Life? In: Problemas atuAis de Bioética. 7th ed. São Paulo: Loyola; 2005. p. 371-406.
13. Amorim Biondo C, Paes da Silva MJ, Dal Secco LM. Distanásia, euthanásia e ortotanásia: percepções dos enfermeiros de unidades de terapia intensiva e implicações na assistência. Rev Latin Am Enferm. 2009;17:613-9.
14. Philip J, Le Gautier R, Collins A, Nowak AK, Le B, Crawford GB, et al. Care plus study: a multi-site implementation of early palliative care in routine practice to improve health outcomes and reduce hospital admissions for people with advanced cancer: a study protocol. BMC Health Serv Res. 2021;21:513.
15. Rosenberg JP, Horsfall D, Leonard R, Noonan K. Informal caring networks for people at end of life: building social capital in Australian communities. Health Sociol Rev. 2015;24:29-37.
16. Ferrell B, Chung V, Hughes MT, Koczywas M, Azad NS, Ruel NH, et al. A palliative care intervention for patients on phase 1 studies. J Palliat Med. 2021;24:846-56.
17. Cerulus M, Bossuyt I, Vanderhaeghen B. An integrative literature review of the implementation of advance care planning in hospital settings. J Clin Nurs. 2021;30:3099-110.

THE JOURNAL OF LATIN AMERICAN GERIATRIC MEDICINE BRIEF COMMUNICATION

Protective role of statins against sepsis complications in the context of geriatric syndromes

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Abstract

Background: *Sepsis complications in the elderly arise from factors such as comorbidities and malnutrition. The role of 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors (statins) in mitigating these complications remains underexplored.* **Methods:** *We analyzed 2008-2011 data for sepsis patients aged 65+. Cases had sepsis complications; controls did not. Patients were matched 1:1 on several factors. The association between statin use and complications was examined using multivariate conditional logistic regression, adjusting for geriatric syndromes.* **Results:** *Of participants (average age 78.5; 55.7% female), 40% used statins. Statin intake before hospitalization was less common in cases (25.2% vs. 54.8%; p < 0.001). Regression showed an inverse association between statin use and sepsis complications, consistent even after geriatric syndrome adjustments (odds ratios 0.26; 95% confidence intervals 0.12-0.55, p < 0.001).* **Conclusion:** *Statins appear protective against sepsis complications in the elderly. However, due to study design and existing ambiguities, results should be interpreted cautiously. Further research is advocated.*

Keywords: *Sepsis complications. Geriatric syndrome. 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors (statins)*

Rol protector de las estatinas contra las complicaciones de la sepsis en el contexto de los síndromes geriátricos

Resumen

Antecedentes: *Las complicaciones de la sepsis en los ancianos surgen de factores como las comorbilidades y la malnutrición. El papel de los inhibidores de la HMG-CoA reductasa (estatinas) en la mitigación de estas complicaciones sigue siendo poco explorado.* **Métodos:** *Analizamos datos de 2008 a 2011 de pacientes con sepsis de 65 años o más. Los casos tenían complicaciones de sepsis; los controles no. Los pacientes se emparejaron 1:1 en varios factores. Se examinó la asociación entre el uso de estatinas y las complicaciones mediante regresión logística condicional multivariante, ajustando por síndromes geriátricos.* **Resultados:** *De los participantes (edad promedio 78.5; 55.7% mujeres), el 40% usaba estatinas. La ingesta de estatinas antes de la hospitalización fue menos común en los casos (25.2% vs. 54.8%; p < 0.001). La regresión mostró una asociación inversa entre el uso de estatinas y las complicaciones de la sepsis, consistente incluso después de los ajustes por síndromes geriátricos (OR 0.26; IC del 95% 0.12 a 0.55, p < 0.001).* **Conclusión:** *Las estatinas parecen proteger contra las complicaciones de la sepsis en los ancianos. Sin embargo, debido al diseño del estudio y las ambigüedades existentes, los resultados deben interpretarse con precaución. Se aboga por más investigación.*

Palabras clave: *Complicaciones de la sepsis. Síndrome geriátrico. Inhibidores de la HMG-CoA reductasa (estatinas).*

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INTRODUCTION

Sepsis has emerged as a significant health concern globally and continues to challenge the medical community, particularly within the elderly population[1,2]. The complexity of sepsis, characterized by its multifaceted nature and the body's overwhelming response to infection, has rendered it a condition difficult to combat effectively. Despite advancements in health care, sepsis remains a leading cause of mortality and critical illness, as highlighted by the global "Surviving Sepsis Campaign", which underscores the urgency for improved treatment protocols and preventive strategies[3,4]. In the elderly, sepsis presents a unique set of challenges, often exacerbated by a pre-existing tapestry of geriatric syndromes (GSs) such as frailty – a condition associated with increased vulnerability to stressors. Evidence suggests that the presence of frailty markedly elevates the risk of developing sepsis and its severe manifestations, creating a substantial burden on this demographic[5].

The potential of 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors, or statins, in mitigating sepsis complications presents an intriguing avenue for research. While statins are hypothesized to provide a therapeutic edge, their full impact in the context of sepsis, especially amidst the complex interplay of geriatric syndromes, has yet to be fully explored[6,7].

Our study aims to bridge this knowledge gap by meticulously examining the relationship between statin therapy and the incidence of sepsis-related complications in the elderly, with a particular focus on disentangling the effects of geriatric syndromes that could confound this relationship.

MATERIALS AND METHODS

Participants

In this retrospective case-control study, we evaluated data from 2008 to 2011 involving 104 older adults diagnosed with sepsis at a Mexico City university hospital. We distinguished between patients who developed complications, such as septic shock or death, and those who did not. All participants had been prescribed statins for at least 1 month before their sepsis diagnosis. The research adhered to strict ethical standards, receiving institutional ethics committee approval and aligning with local and international research guidelines.

Measures

In our study, participants were all individuals aged 65 or older with a confirmed diagnosis of sepsis, including a spectrum of infections ranging from pneumonia, urinary tract and soft-tissue infections to abdominal sepsis, septic arthritis, and meningitis. Cases were delineated as patients who developed complications from sepsis (CoS), such as septic shock or death, using established clinical criteria, while controls included sepsis patients without these complications[8,9]. We meticulously gathered data through comprehensive medical chart reviews to ascertain statin use, categorizing patients as statin users if they had been prescribed and had taken any statin medication for more than 1 month before their diagnosis. Furthermore, standardized assessments were conducted to uniformly evaluate the presence of geriatric syndromes, thereby ensuring a consistent approach in the measurement of our study variables across all participants. To ensure comparability, each case patient was meticulously matched with one control subject on a 1:1 basis according to gender, age, Charlson Comorbidity Index score, and the type of infection encountered.

A comprehensive assessment was carried out to account for GS. This assessment included evaluations of disability for instrumental and basic activities of daily living using the Lawton and Katz scales, respectively, nutritional status assessed by the Dépistage Nutrionnel des Ainés tool, cognitive function using the mini-mental state examination (MMSE) with a threshold of 24 indicating impairment, depressive symptoms assessed by a geriatric depression scale (GDS) score > 5, polypharmacy characterized by the use of three or more prescription drugs, as well as the occurrence of pressure ulcers, falls (two or more in the previous year), and delirium as determined by the confusion assessment method.

Statistical analysis

A multivariate conditional logistic regression was utilized to evaluate the association between statin usage and CoS. Adjustments were made for the presence of various GS. All statistical tests utilized 95% confidence intervals (CIs) with a $p < 0.05$ indicating statistical significance. Analyses were conducted using the SPSS statistical package for Windows® (SPSS Inc., Chicago, IL v. 20).

RESULTS

The study encompassed participants with an average age of 78.5 years (SD = 6.2), with females constituting 55.7% of the sample. Statin use was prevalent among 40% of the participants. Of those who experienced CoS, a significant majority (86.5%) suffered from septic shock, and there were 14 fatalities. Atorvastatin was identified as the most commonly used statin, prescribed to 27% of those on statin therapy.

Clinimetric assessments yielded average scores indicative of the participants' health status: A mean MMSE score of 24 pointed to normal cognitive function or mild cognitive impairment, a GDS score of 4.06 suggested minimal depressive symptoms, and a mini nutritional assessment score of 20.04 indicated a moderate risk of malnutrition among the study population.

A notable difference was observed in statin administration before hospital admission between the cases and controls, with only 25.2% of cases having used statins compared to 54.8% of controls ($p < 0.001$) (Table 1).

The statistical analysis incorporated multivariate conditional logistic regression, adjusting for continuous scores from geriatric assessment scales. This analysis resulted in the categorization of the data into three domains: Functional status, neuropsychological, and nutritional. The adjusted odds ratios (OR) for statin use in relation to the CoS, as presented in table 2, showed no significant deviation from the univariate analysis. In the initial unadjusted model, an inverse relationship was found between statin use and the incidence of sepsis complications (OR 0.27; 95% CI 0.14-0.52, $p < 0.001$). This inverse association persisted even after adjustments for GS (OR 0.26; 95% CI 0.12-0.55, $p < 0.001$).

Table 1. Sociodemographic and functional characteristics of cases and controls

	Control (n = 104)	Case (n = 104)	p-value
Use of statins, n (%)	57 (54.8)	26 (25.2)	< 0.001
Age, median (IQR)	78 (9.5)	78 (8.5)	0.790
Charlson index, median (IQR)	5 (2)	5 (2)	0.433
Female, n (%)	58 (55.8)	58 (55.8)	0.999
Urinary tract infection, n (%)	44 (42.3)	44 (42.3)	0.999
Polypharmacy, n (%)	65(62.5)	68(65.38)	0.665
Pressure ulcers, n (%)	7 (7)	23 (22.5)	< 0.001
Delirium, n (%)	20 (21.5)	24 (24)	0.37
Cognitive impairment, n (%)	31 (33.6)	21 (20.2)	0.029
Depressive symptoms, n (%)	16 (15.9)	22 (21.1)	0.281
Disability for ADL, n (%)	30 (28.8)	26 (25.2)	0.559
Disability for IADL, n (%)	47 (45.2)	50 (48.1)	0.676
Nutritional Risk, n (%)	16 (15.4)	17 (16.3)	0.849
Falls, n (%)	30 (28.8)	20 (19.2)	0.104

IQR: interquartile range; ADL: activities of daily living; IADL: instrumental activities of daily living.

Table 2. Conditional logistic regression

Model	OR	95% CI	p-value
1	0.24	0.11-0.52	< 0.0001
2	0.23	0.10-0.54	< 0.001
3	0.22	0.11-0.47	< 0.0001

1: Statin, Katz, Lawton, Barthel (functionality); 2: Statin, mini–mental state examination, geriatric depression scale (neuropsychological status); 3: Statin, DNA (nutritional status). OR: odds ratios; CI: confidence intervals.

DISCUSSION

Despite the varied perspectives in literature regarding statin efficacy in protecting against sepsis, our study supports a potential beneficial association, aligning with recent findings across a spectrum of inflammatory conditions[10-14]. Our findings mirror the trend observed in the study by Izkhakov et al. where pre-admission statin use was associated with a diminished rate of adverse outcomes in older adults hospitalized for COVID-19[15].

The association between statin therapy and decreased severity of infections is not unprecedented. Almog et al. demonstrated a lower incidence of severe sepsis among statin users, corroborating our findings that statin therapy is associated with reduced CoS[14]. The anti-inflammatory properties of statins, particularly their ability to modulate cytokine response and improve endothelial function, may underpin the therapeutic benefits observed in others cohorts[13,14]. These mechanisms, which are especially pertinent in geriatric patients with inherently elevated inflammatory states, warrant further exploration to elucidate the pathways

through which statins may exert their protective effects in sepsis. Although the studies included in the meta-analysis demonstrated significant heterogeneity, the general trend indicated a reduction in CoS among statin users.

However, the landscape of evidence is not uniform. Kopterides and Falagas; Tralhão et al. provided a more nuanced perspective, reporting inconsistent outcomes regarding the impact of statins on sepsis[11,12]. While some cohort studies indicated a benefit, randomized controlled trials failed to demonstrate a significant mortality benefit. Similarly, highlighted the beneficial outcomes of statin use in infections but cautioned against definitive conclusions due to the observational nature of the majority of the studies.

Finally, a systematic review underscored the potential positive role of statins in the management of sepsis and infections. Although many studies pointed toward reduced mortality and risk of sepsis, the review emphasized the need for randomized controlled trials to conclusively determine the clinical benefits of statins in these contexts[10].

Integrating these diverse perspectives with our own findings suggests that statins could modulate the inflammatory response in sepsis, potentially reducing the severity and complications associated with this condition. This modulatory effect, which might be especially significant in geriatric patients with preexisting elevated inflammatory states, merits further investigation to understand the therapeutic potential of statins fully. The potential for statins to disrupt this pathological process may explain the reduced complications observed in our study.

Nevertheless, our study's limitations, including its retrospective design, must temper any direct clinical extrapolations, a caution also suggested by Izkhakov et al.[15]. To address the inherent limitations of our retrospective design, future studies should utilize randomized controlled trials with age and comorbidity stratification to more firmly establish a causal relationship between statin use and reduced sepsis complications. These studies could incorporate inflammatory biomarkers to elucidate the pharmacodynamic effects of statins in septic patients. Investigations should also consider the timing, dosage, and duration of statin therapy to optimize potential therapeutic strategies. Future research directions could profitably explore the long-term effects of statins on sepsis recovery, including post-hospitalization quality of life, rehabilitation duration, and incidence of chronic sepsis-related sequelae.

CONCLUSION

Our findings advocate for the potential repurposing of statins in managing sepsis, highlighting a prospective therapeutic avenue for the geriatric population. While the evidence points toward a beneficial direction, it is imperative that we proceed with methodical and controlled research to unravel the full scope of statins' role in sepsis treatment and their integration into clinical practice. Indeed, the chapter on statins and sepsis is far from closed, signaling a clear mandate for continued investigation in this vital area of medical research.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

ETHICAL DISCLOSURES

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. Right to privacy and informed consent. The authors have obtained approval from the Ethics Committee for analysis and publication of routinely acquired clinical data and informed consent was not required for this retrospective observational study.

Use of artificial intelligence for generating text. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript nor for the creation of images, graphics, tables, or their corresponding captions.

REFERENCES

1. Baine WB, Yu W, Summe JP. The epidemiology of hospitalization of elderly Americans for septicemia or bacteremia in 1991-1998. Application of medicare claims data. Ann Epidemiol. 2001;11:118-26.
2. Opal SM, Girard TD, Ely EW. The immunopathogenesis of sepsis in elderly patients. Clin Infect Dis. 2005;41 Suppl 7:S504-12.
3. Martin GS, Mannino DM, Moss M. The effect of age on the development and outcome of adult sepsis. Crit Care Med. 2006;34:15-21.
4. El Solh AA, Akinnusi ME, Alsawalha LN, Pineda LA. Outcome of septic shock in older adults after implementation of the sepsis "Bundle". J Am Geriatr Soc. 2008;56:272-8.

5. Girard TD, Ely EW. Bacteremia and sepsis in older adults. Clin Geriatr Med. 2007;23:633-47.
6. Kwak B, Mulhaupt F, Myit S, Mach F. Statins as a newly recognized type of immunomodulator. Nat Med. 2000;6:1399-402.
7. Shovman O, Levy Y, Gilburd B, Shoenfeld Y. Antiinflammatory and immunomodulatory properties of statins. Immunol Res. 2002;25:271-85.
8. Singer M, Deutschman CS, Seymour CW, Shankar-Hari M, Annane D, Bauer M, et al. The third international consensus definitions for sepsis and septic shock (sepsis-3). JAMA. 2016;315:801-10.
9. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis. 1987;40:373-83.
10. Falagas ME, Makris GC, Matthaiou DK, Rafailidis PI. Statins for infection and sepsis: a systematic review of the clinical evidence. J Antimicrob Chemother. 2008;61:774-85.
11. Kopterides P, Falagas ME. Statins for sepsis: a critical and updated review. Clin Microbiol Infect. 2009;15:325-34.
12. Tralhão AF, Cés de Souza-Dantas V, Salluh JI, Póvoa PM. Impact of statins in outcomes of septic patients: a systematic review. Postgrad Med. 2014;126:45-58.
13. Tleyjeh IM, Kashour T, Hakim FA, Zimmerman VA, Erwin PJ, Sutton AJ, et al. Statins for the prevention and treatment of infections: a systematic review and meta-analysis. Arch Intern Med. 2009;169:1658-67. Erratum in: Arch Intern Med. 2010;170:42.
14. Almog Y, Shefer A, Novack V, Maimon N, Barski L, Eizinger M, et al. Prior statin therapy is associated with a decreased rate of severe sepsis. Circulation. 2004;110:880-5.
15. Izkhakov E, Vilian Y, Buch A, Denysov V, Namouz D, Nathan A, et al. Routine statins use is associated with less adverse outcome in patients above 70 years of age admitted to hospital with COVID-19. BMC Geriatr. 2023;23:473.