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LETTER TO THE EDITOR

Inter-University Network for Healthy Aging, Latin America and the Caribbean (RIES-LAC): a university contribution to the Decade of Healthy Aging

Rede interuniversitária para o envelhecimento saudável, América Latina e Caribe (RIES-ALC): uma contribuição universitária para a década do envelhecimento saudável

Red interuniversitaria de envejecimiento saludable, Latinoamérica y Caribe (RIES-LAC): un aporte universitario a la década del envejecimiento saludable

Iván Palomo[1]*, Margarita Murgieri[2], Rafael Pizarro-Mena[3], Diego Andrés Chavarro-Carvajal[4], María Fernanda Lopez[5], Jeanine Mongelos[6], Aldo Sgaravatti[7], Patrick Alexander Wachholz[8], Jorge Gamonal[9], Robinson Cuadros[10]

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The world's population is aging[1-3], and the Latin America and the Caribbean (LAC) region is no exception.[4-6] Currently, 8% of the LAC population is over 65 years old, and this number is estimated to increase to 30% by 2050.[7]

The aging process is known to involve molecular, physiological, functional, psychosocial, and social changes.[8] We all age; the point is to age healthily. As this is not always the case, the World Health Organization (WHO) declared the period from 2021 to 2030 as the Decade of Healthy Aging.[9] The Decade is a global collaboration involving diverse sectors and stakeholders (governments, civil society, international organizations, professionals, academic institutions, the media, and the private sector) to improve the lives of older people, their families, and communities. The collaboration is centered on four closely interconnected pillars of action: changing how we think, feel, and act towards age and aging; ensuring that communities foster the abilities of older people; providing person-centered integrated care and primary health services responsive to older people; and providing access to long-term care for older people who need it.[9,10]

In light of this situation, what can academics from universities in LAC do? If we organize ourselves and

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unite efforts, we can contribute to the Decade of Healthy Aging and, consequently, influence the quality of life of older people.

Therefore, following the proposal of Dr. Robinson Cuadros, President of the LAC Committee (COMLAT) of the International Association of Gerontology and Geriatrics (IAGG), Professor Iván Palomo, Director of the Inter-University Center for Healthy Aging of public universities in Chile, proposes the creation of an Inter-University Network for Healthy Aging in LAC (RIES-LAC) before COMLAT.

At the session held on Thursday, June 8, 2023, the COMLAT took into con- sideration the following:

- Professor Palomo's letter requesting the creation, within the scope of COMLAT, of RIES-LAC.
- The current and future demographic situation regarding aging of the population in the LAC region.
- WHO's declaration of 2021-2030 as the Decade of Healthy Aging.
- The significant number of academics in the LAC region, from several public and private universities, involved in research/studies on aging and old age.
- The need for professors interested in sharing their research, studies, and activities on aging and old age to connect in a network to enhance the quantity and quality of results.
- COMLAT-IAGG's desire to lead actions and lines of work to link research groups and centers on aging and old age, strengthening each National Society and Association of Geriatrics and Gerontology with members of RIES-LAC, thereby promoting the publication of scientific articles, organizing meetings, promoting derived products, and working collaboratively as a Region.
- The favorable opinion of the Pan American Health Organization regarding the creation of RIES-LAC, expressed by Dr. Enrique Vega, Chief of the Healthy Life Course Unit.
- The enthusiastic support for the proposal (RIES-LAC) from participants at the IX COMLAT-IAGG Congress in May 2023, Medellín, Colombia, which unanimously approved the creation of RIES-LAC.

The initial governance of the Network will include a Coordinator, Area Coordinators (Geriatrics and Gerontology), and Inter-Area Managers (collaboration networks, research, advanced human capital formation, interaction with the environment, and public policies). A Substitute Coordinator, Substitute Area Coordinator,and Substitute Inter-Area Manager will also be designated. Additionally, within each area, members will be part of micronetworks/thematic lines, each managed by a leader. Two collegiate bodies will be created: the Central Committee (Coordinator, Substitute Coordinator, and Coordinators of the two areas) and the Executive Committee (Central Committee plus Inter-Area Managers). RIES-LAC will interact with COMLAT through the Education area.

The general objective of RIES-LAC is to promote net- work collaboration among academics from universities in the LAC region, strengthen research and human capital formation in aging and old age, and, consequently, establish connections with the environment and develop proposals for public policies that promote healthy aging and improve the quality of life of older people.

The specific objectives in the domain of aging are:

- To promote the creation of Collaborative Networks.
- To foster basic and applied research (clinical and others).
- To collaborate with advanced human capital formation.
- To encourage interaction with the environment.
- To generate proposals for public policies.

The micronetworks, depending on the area, are as follows:

- Gerontology (Physical Activity and Healthy Eating; Psychoneurology, Neurosciences, and Mental Health; Functionality, Rehabilitation, and Accessibility; and Social, Community, and Institutional Gerontology).
- Geriatrics (Clinical; Psychogeriatrics; Functionality and Social).

Currently, 140 academics are affiliated with 83 uni- versities in 17 countries in the LAC region (in decreasing order of membership: Chile, Argentina, Brazil, Colombia, Mexico, Venezuela, Bolivia, Ecuador, Paraguay, Peru, Costa Rica, El Salvador, Panama, Uruguay, Cuba, Guatemala, Dominican Republic). Approximately 60% work in the field of Gerontology and 40% in Geriatrics. There is gender par- ity (45% of men and 55% of women), involving both older and younger individuals from diverse professions (over 30), postgraduates, and specialists.

Some of the expected outcomes are as follows:

- Collaborative networks (intra-areas and inter-areas).
- Research (projects funded by national and international sources and scientific publications).
- Human capital formation (international coordination projects, thesis co-supervision, internships for doctoral students, academic visits).

- Interaction with the environment (conferences, lectures, workshops, videos, interviews, social media, website).
- Public policies (documents on healthy aging and older people to be presented to COMLAT-IAGG, university rectors, government authorities, legislators, international organizations, etc.).

RIES-LAC's vision is to be internationally recognized as a leading network in Gerontology and Geriatrics, characterized by collaboration between academics and universities for innovation and development of research, advanced human capital formation, and connections with the environment, contributing to the formulation of public policies, with an interdisciplinary approach and excellence to achieve healthy aging.

We hope that RIES-LAC will transform the perspective of universities in the LAC region regarding healthy aging. Therefore, we invite academics from universities to continue joining the Network and publishing their research in LAC journals.

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To the Latin American and Caribbean Committee (COMLAT) of the International Association of Gerontology and Geriatrics (IAGG).

CONFLICTS OF INTEREST

PAW is the Editor-in-Chief of *Geriatrics, Gerontology and Aging*.

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AUTHOR CONTRIBUTIONS

IP: conceptualization, validation, visualization, writing – original draft, writing – review & editing. MM: conceptualization, validation, visualization, writing – original draft, writing – review & editing. RPM: conceptualization, validation, visualization, writing – original draft, writing – review & editing. DACC: conceptualization, validation, visualization, writing – original draft, writing – review & editing. MFL: conceptualization, validation, visualization, writing – original draft, writing – review & editing. JM: conceptualization, validation, visualization, writing – original draft, writing – review & editing. AS: conceptualization, valida- tion, visualization, writing – original draft, writing – review & editing. PAW: conceptualization, validation, visualization, writing – original draft, writing – review & editing. JG: conceptualization, validation, visualization, writing – original draft, writing – review & editing. RC: conceptualization, validation, visualization, writing – original draft, writing – review & editing.

REFERENCES

1. Beard JR, Biggs S, Bloom DE, Fried LP, Hogan P, Kalache A, et al. Global population ageing: peril or promise. Geneva: World Economic Forum; 2011.
2. The health of aging populations. Preparing for an aging world: the case for cross- national research. In: National Research Council (US) Panel on a Research Agenda and New Data for an Aging World. Washington (DC): National Academies Press (US); 2001.
3. World Health Organization. World report on ageing and health [Internet]. Geneva: World Health Organization; 2015. Available from: https://apps.who. int/iris/handle/10665/186463. Accessed Nov 3, 2021.
4. Keating N, Rodriguez Mañas L, De Francisco A. Toward healthy aging in Latin America and the Caribbean: leaving no one behind? Rev Panam Salud Publica. 2021;45:e113. https://doi.org/10.26633/RPSP.2021.113
5. Pan American Health Organization. The sociodemographic and economic context of aging in Latin America [Internet]. Washington: Pan American Health Organization; 2023. Available from: https://iris.paho.org/handle/10665.2/57773. Accessed Oct 9, 2023.
6. Economic Commission for Latin America and the Caribbean. Ageing in Latin America and the Caribbean: inclusion and rights of older persons [Internet]. Santiago: ECLAC; 2022. Available from: https://repositorio.cepal.org/bitstream/handle/11362/48568/4/S2201042_en.pdf. Accessed Mar 5, 2023.
7. Pan Americam Health Organization. The decade of healthy aging in the Americas (2021–2030) [Internet]. 2020. Available from: https://www.paho.org/en/decade-healthy-aging-americas-2021-2030. Accessed Aug 8, 2022.
8. Felipe Salech M, Rafael Jara L, Luis Michea A. Cambios fisiológicos asociados al envejecimiento. Rev Med Clin Condes. 2012;23(1):19-29.
9. World Health Organization. Decade of healthy ageing: plan of action 2021–2030 [Internet]. Geneva: World Health Organization; 2020. Available from: https://www.who.int/docs/default-source/decade-of-healthy-ageing/final-decade-proposal/decade-proposal-final-apr2020-en.pdf. Accessed Jan 7, 2021.
10. Década del Envejecimiento Saludable. La Plataforma. ¿Qué es la década del envejecimiento saludable? [Internet]. 2023. Available from: https://www. decadeofhealthyageing.org/es/about/about-us/what-is-the-decade. Accessed Oct 9, 2023.

THE JOURNAL OF LATIN AMERICAN GERIATRIC MEDICINE CARTA AL EDITOR

Red interuniversitaria de envejecimiento saludable, Latinoamérica y Caribe (RIES-LAC): un aporte universitario a la década del envejecimiento saludable

Inter-University Network for Healthy Aging, Latin America and the Caribbean (RIES-LAC): a university contribution to the Decade of Healthy Aging

Rede interuniversitária para o envelhecimento saudável, América Latina e Caribe (RIES-ALC): uma contribuição universitária para a década do envelhecimento saudável

Iván Palomo[1]*, Margarita Murgieri[2], Rafael Pizarro-Mena[3], Diego Andrés Chavarro-Carvajal[4], María Fernanda Lopez[5], Jeanine Mongelos[6], Aldo Sgaravatti[7], Patrick Alexander Wachholz[8], Jorge Gamonal[9], Robinson Cuadros[10]

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La población mundial está envejeciendo[1-3] y Latinoamérica y Caribe (LAC) no son una excepción.[4-6] Actualmente, el 8% de la población en LAC tiene sobre 65 años, y se proyecta un aumento al 30% para 2050.[7]

Es conocido que el proceso de envejecimiento implica cambios moleculares, fisiológicos, funcionales, psicoafectivos y sociales.[8] Todos envejecemos, el punto es envejecer saludablemente. Como no siempre ocurre así, la Organización Mundial de la Salud (OMS) ha declarado a este período (2021–2030) como la Década del Envejecimiento Saludable.[9] La Década es una iniciativa de colaboración mundial de distintos sectores y partes interesadas (gobiernos, sociedad civil, organizaciones internacionales, profesionales, instituciones universitarias, medios de comunicación y el sector privado) para mejorar la vida de las personas mayores, sus familias y comunidades. La colaboración se centra en cuatro pilares de actuación estrechamente interconectados: cambiar nuestra forma de pensar, sentir y actuar con respecto a la edad y el envejecimiento; asegurar que las comunidades fomenten las capacidades de las personas mayores; ofrecer una atención integrada y centrada en las personas, y servicios de salud primarios que respondan a las necesidades de las personas mayores; y proporcionar acceso a la atención a largo plazo para las personas mayores que lo necesiten.[9,10]

Ante esta situación, el envejecimiento de la población, y la declaración de la OMS, ¿Qué podemos hacer los académicos de las universidades de Latinoamérica

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y el Caribe? Si nos organizamos y sumamos esfuerzos, podremos ser un aporte a la Década del Envejecimiento Saludable y, como consecuencia, influir en la calidad de vida de las personas mayores.

Es así que luego de un planteamiento del Dr. Robinson Cuadros, presi- dente del Comité Latinoamericano y del Caribe (COMLAT) de la Asociación Internacional de Gerontología y Geriatría (*International Association of Gerontology and Geriatrics* — IAGG), el Prof. Iván Palomo, director del Centro Interuniversitario de Envejecimiento Saludable, de las universidades del Estado de Chile, plantea la creación de una Red Interuniversitaria de Envejecimiento Saludable en Latinoamérica y Caribe (RIES-LAC) ante dicho Comité.
En su sesión del jueves 08 de junio de 2023, el COMLAT, teniendo en consideración:

- La carta del Prof. Palomo, en el que solicita crear, en el contexto del COMLAT, la RIES-LAC;
- La situación demográfica actual y futura sobre el envejecimiento poblacional en LAC;
- Que la OMS ha declarado al período 2021-2030 como la Década del Envejecimiento Saludable;
- Que en LAC existe un importante número de académicos, de muchas universidades, públicas y privadas, que investigan/estudian el envejecimiento y la vejez;
- La necesidad de que los profesores universitarios interesados en aportar con sus investigaciones, estudios y actividades en envejecimiento y vejez, se relacionen en red para potenciar la cantidad y calidad de los resultados;
- El interés de COMLAT-IAGG que exista la instancia para liderar acciones y líneas de trabajo para vincular grupos y semilleros de investigación en envejecimiento y vejez, y así fortalecer cada Sociedad y Asociación nacional de Geriatría-Gerontología con los integrantes de la RIES-LAC, y así articular y fomentar la publicación de artículos científicos, desarrollar encuentros, promover productos derivados de ellos y trabajar en equipo como Región;
- La buena opinión de la Organización Panamericana de la Salud sobre la creación de la RIES-LAC, expresada por el Dr. Enrique Vega, director del Departamento de Curso de Vida; y
- El entusiasta apoyo a la propuesta (RIES-LAC) por parte de los asistentes del IX Congreso COMLAT-IAGG en mayo de 2023, Medellín, Colombia, por unanimidad aprobó la creación de la RIES-LAC.

La gobernanza inicial de la Red incluirá: Coordinador(a), Coordinadores de áreas (Geriatría y Gerontología) y Encargados Interáreas (Redes de colaboración, Investigación, Formación de capital humano avanzado, Vinculación con el medio y Políticas públicas). Se designarán Coordinador(a) alterno(a), Coordinador(a) de área alterno(a), Encargado(a) de interáreas alterno(a). Además, en cada área, lo integrantes formarán parte de microrredes/líneas temáticas, cada una a cargo de un(a) líder. Se generarán dos cuerpos colegiados: el Comité Central (Coordinador(a), Coordinador(a) alterno(a) y Coordinadores de las dos áreas, y el Comité Ejecutivo (Comité Central más Encargados de Interáreas). La RIES-LAC estará relacionada con el COMLAT a través del área de Educación.

El objetivo general de la RIES-LAC es promover la colaboración en red entre académicos de universidades de LAC, para fortalecer la investigación y la formación de capital humano en envejecimiento y vejez, y como consecuencia de ello, realizar vinculación con el medio y desarrollar propuestas de políticas públicas que impulsen el envejecimiento saludable y mejoren la calidad de vida de las personas mayores. Los objetivos específicos en el ámbito del envejecimiento son:

- Fomentar la generación de Redes de Colaboración;
- Impulsar la Investigación básica y aplicada (clínica y otros);
- Colaborar en la Formación de Capital humano avanzado;
- Incentivar la Vinculación con el medio; y
- Generar propuestas de Políticas Públicas.

Las Micro-Redes, según el área, son las siguientes:

- Gerontología (Actividad Física y Alimentación Saludable; Psiconeurología, Neurociencias y Salud Mental; Funcionalidad, Rehabilitación y Accesibilidad; y Gerontología Social, Comunitaria e Institucional) y
- Geriatría (Clínica; Psicogeriatría; Funcionalidad y Social).

Los 140 académicos, a la fecha, tienen afiliación a 83 universidades de 17 países de Latinoamérica y el Caribe; en orden decreciente de número de integrantes (Chile, Argentina, Brasil, Colombia, México, Venezuela, Bolivia, Ecuador, Paraguay, Perú, Costa Rica, El Salvador, Panamá, Uruguay, Cuba, Guatemala, República Dominicana). Alrededor del 60% participa en el área Gerontología y 40% en Geriatría. Existe paridad de género (hombres 45% y mujeres 55%), participan *seniors* y jóvenes, de varias profesiones (mayores de 30), postgraduados y Especialistas.
Entre otros, se esperan los siguientes resultados:

- Redes de colaboración (intra-áreas y inter-áreas);
- Investigación (proyectos postulados a fondos nacionales e internacionales y publicaciones científicas);
- Formación de capital humano (proyectos de vinculación internacional, co-tutorías de tesis, pasantías de tesistas, visitas académicas);

- Vinculación con el medio (conferencias, charlas, mesas de trabajo, video-cápsulas, entrevistas, redes sociales, sitio *web*); y
- Políticas públicas (documentos sobre envejecimiento saludable y personas mayores a presentar ante COMLAT-IAGG, rectores de universidades, autoridades de gobiernos, legisladores, organismos internacionales etc.).

La visión de la RIES-LAC es ser reconocida internacionalmente como una red referente en Gerontología y Geriatría, caracterizada por la colaboración entre académicos y universidades, para el desarrollo de investigación e innovación, formación de capital humano avanzado, vinculación con el medio, aportando en la formulación de políticas públicas, con enfoque interdisciplinar y excelencia para el logro del envejecimiento saludable.

Esperamos que la RIES-LAC transforme la mirada de las universidades de *Latinoamérica* y el *Caribe* frente al Envejecimiento Saludable. Por tal, invitamos a los académicos de las Universidades a seguir sumándose a la Red y a publicar en las Revistas de Latinoamérica y Caribe sus investigaciones.

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CONFLICTO DE INTERESES

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REFERENCIAS

1. Beard JR, Biggs S, Bloom DE, Fried LP, Hogan P, Kalache A, et al. Global population ageing: peril or promise. Geneva: World Economic Forum; 2011.
2. The health of aging populations. Preparing for an aging world: the case for cross- national research. In: National Research Council (US) Panel on a Research Agenda and New Data for an Aging World. Washington (DC): National Academies Press (US); 2001.
3. World Health Organization. World report on ageing and health [Internet]. Geneva: World Health Organization; 2015. Disponible en: https://apps.who. int/iris/handle/10665/186463. Accedido el Nov 3, 2021.
4. Keating N, Rodriguez Mañas L, De Francisco A. Toward healthy aging in Latin America and the Caribbean: leaving no one behind? Rev Panam Salud Publica. 2021;45:e113. https://doi.org/10.26633/RPSP.2021.113
5. Pan American Health Organization. The sociodemographic and economic context of aging in Latin America [Internet]. Washington: Pan American Health Organization; 2023. Disponible en: https://iris.paho.org/handle/10665.2/57773. Accedido el Oct 9, 2023.
6. Economic Commission for Latin America and the Caribbean. Ageing in Latin America and the Caribbean: inclusion and rights of older persons [Internet]. Santiago: ECLAC; 2022. Disponible en: https://repositorio.cepal.org/bitstream/handle/11362/48568/4/S2201042_en.pdf. Accedido el Mar 5, 2023.
7. Pan Americam Health Organization. The decade of healthy aging in the Americas (2021–2030) [Internet]. 2020. Disponible en: https://www.paho.org/en/decade-healthy-aging-americas-2021-2030. Accedido el Ago 8, 2022.
8. Felipe Salech M, Rafael Jara L, Luis Michea A. Cambios fisiológicos asociados al envejecimiento. Rev Med Clin Condes. 2012;23(1):19-29.
9. World Health Organization. Decade of healthy ageing: plan of action 2021–2030 [Internet]. Geneva: World Health Organization; 2020. Disponible en: https://www.who.int/docs/default-source/decade-of-healthy-ageing/final-decade-proposal/decade-proposal-final-apr2020-en.pdf. Accedido el Ene 7, 2021.
10. Década del Envejecimiento Saludable. La Plataforma. ¿Qué es la década del envejecimiento saludable? [Internet]. 2023. Disponible en: https://www. decadeofhealthyageing.org/es/about/about-us/what-is-the-decade. Accedido el Oct 9, 2023.

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CARTA AO EDITOR

Rede interuniversitária para o envelhecimento saudável, América Latina e Caribe (RIES-ALC): uma contribuição universitária para a década do envelhecimento saudável

Inter-University Network for Healthy Aging, Latin America and the Caribbean (RIES-LAC): a university contribution to the Decade of Healthy Aging

Red interuniversitaria de envejecimiento saludable, Latinoamérica y Caribe (RIES-LAC): un aporte universitario a la década del envejecimiento saludable

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A população mundial está envelhecendo[1-3] e a América Latina e o Caribe (ALC) não são exceção.[4-6] Atualmente, 8% da população da ALC tem mais de 65 anos e prevê-se que esse número aumente para 30% até 2050.[7]

Sabe-se que o processo de envelhecimento envolve alterações moleculares, fisiológicas, funcionais, psicoafetivas e sociais.[8] Todos envelhecemos, a questão é envelhecer com saúde. Como nem sempre é esse o caso, a Organização Mundial da Saúde (OMS) declarou esse período (2021-2030) como a Década do Envelhecimento Saudável.[9] A Década é uma iniciativa global de colaboração de diferentes setores e partes interessadas (governos, sociedade civil, organizações internacionais, profissionais, instituições universitárias, meios de comunicação social e setor privado) para melhorar a vida de pessoas idosas, suas famílias e comunidades. A colaboração centra-se em quatro pilares de ação estreitamente interligados: mudar a forma como pensamos, sentimos e agimos em relação à idade e ao envelhecimento; garantir que as comunidades promovam as capacidades dos idosos; fornecer cuidados integrados e centrados nas pessoas e serviços de saúde primários que respondam às necessidades dos idosos; e fornecer acesso a cuidados de longo prazo para idosos que deles necessitem.[9,10]

Diante dessa situação, do envelhecimento da população e da declaração da OMS, o que podem fazer os

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acadêmicos das universidades da ALC? Se nos organizarmos e unirmos esforços, poderemos contribuir para a Década do Envelhecimento Saudável e, como consequência, influenciar a qualidade de vida dos idosos.

Assim, após a proposta do Dr. Robinson Cuadros, presidente do Comitê LatinoAmericano e do Caribe (COMLAT) da Associação Internacional de Gerontologia e Geriatria (*International Association of Gerontology and Geriatrics* — IAGG), o Prof. Iván Palomo, diretor do Centro Interuniversitário de Envelhecimento Saudável das universidades do Estado do Chile, propõe a criação de uma Rede Interuniversitária para o Envelhecimento Saudável na América Latina e Caribe (RIES-LAC) perante o referido Comitê.

Na sessão de quinta-feira, 8 de junho de 2023, a COMLAT, levando em consideração:

- A carta do Prof. Palomo, na qual solicita a criação, no âmbito da COMLAT, da RIES-LAC;
- A situação demográfica atual e futura em relação ao envelhecimento da população na ALC;
- Que a OMS declarou o período 2021-2030 como a Década do Envelhecimento Saudável;
- Que na ALC há um número significativo de acadêmicos, de muitas universidades, públicas e privadas, que pesquisam/estudam o envelhecimento e a velhice;
- A necessidade de professores universitários interessados em contribuir com suas pesquisas, estudos e atividades sobre envelhecimento e velhice se conectarem em rede para potencializar a quantidade e a qualidade dos resultados;
- O interesse da COMLAT-IAGG em ter a oportunidade de liderar ações e linhas de trabalho para vincular grupos e centros de pesquisa sobre envelhecimento e velhice, fortalecendo cada Sociedade Nacional e Associação de Geriatria-Gerontologia com os membros da RIES-LAC, e assim articular e promover a publicação de artigos científicos, desenvolver encontros, promover os produtos deles derivados e trabalhar em equipe como uma Região;
- A boa opinião da Organização Pan-Americana da Saúde sobre a criação da RIES-LAC, expressa pelo Dr. Enrique Vega, diretor do Departamento de Curso de Vida; e
- O Apoio entusiástico à proposta (RIES-LAC) por parte dos participantes do IX Congresso COMLAT-IAGG em maio de 2023, Medellín, Colômbia, aprovou por unanimidade a criação da RIES-LAC.

A governança inicial da Rede incluirá: Coordenador(a), Coordenadores de Áreas (Geriatria e Gerontologia) e Gestores Interáreas (Redes de Colaboração, Pesquisa, Formação de capital humano avançado, Articulação com o meio ambiente e Políticas Públicas). Serão designados(as) Coordenador(a) Suplente, Coordenador(a) Suplente de Área e Gerente Suplente Interárea. Além disso, em cada área, os integrantes farão parte de microrredes/linhas temáticas, cada uma geren- ciada por um(a) líder. Serão criados dois órgãos colegiados: o Comitê Central (Coordenador(a), Coordenador(a) Suplente e Coordenadores das duas áreas), e o Comitê Executivo (Comitê Central mais Gestores Interáreas). A RIES-LAC se relacionará com a COMLAT por meio da área de Educação.

O objetivo geral da RIES-LAC é promover a colaboração em rede entre acadêmicos das universidades da ALC, fortalecer a pesquisa e a formação de capital humano no enve- lhecimento e na velhice e, como consequência, estabelecer vínculos com o meio ambiente e desenvolver propostas de políticas públicas que promovam o envelhecimento saudável e melhorem a qualidade de vida dos idosos.

Os objetivos específicos no domínio do envelhecimento são:

- Promover a geração de Redes de Colaboração;
- Promover a investigação básica e aplicada (clínica e outras);
- Colaborar com a Formação de Capital humano avançado;
- Incentivar a ligação com o meio ambiente; e
- Gerar propostas de Políticas Públicas.

As Microrredes, dependendo da área, são as seguintes:

- Gerontologia (Atividade Física e Alimentação Saudável; Psiconeurologia, Neurociências e Saúde Mental; Funcionalidade, Reabilitação e Acessibilidade; e Gerontologia Social, Comunitária e Institucional) e
- Geriatria (Clínica; Psicogeriatria; Funcionalidade e Social).

Até o momento, os 140 acadêmicos estão afiliados a 83 universidades em 17 países da ALC; em ordem decrescente de número de membros (Chile, Argentina, Brasil, Colômbia, México, Venezuela, Bolívia, Equador, Paraguai, Peru, Costa Rica, El Salvador, Panamá, Uruguai, Cuba, Guatemala, República Dominicana). Cerca de 60% atuam na área de Gerontologia e 40% em Geriatria. Há paridade de gênero (homens 45% e mulheres 55%), participam idosos e jovens, de diversas profissões (acima de 30), pós-graduados e especialistas. Entre outros, são esperados os seguintes resultados:

- Redes de colaboração (intra-áreas e interáreas);
- Pesquisa (projetos indicados para fundos nacionais e internacionais e publicações científicas);
- Formação de capital humano (projetos de articulação internacional, cotutorias de teses, estágios para alunos de teses, visitas acadêmicas);
- Articulação com o meio ambiente (conferências, palestras, *workshops*, vídeos, entrevistas, redes sociais, *website*); e
- Políticas públicas (documentos sobre envelhecimento saudável e idosos a serem apresentados ao COMLAT- IAGG, reitores de universidades, autoridades governamentais, legisladores, organismos internacionais etc.).

A visão da RIES-LAC é ser reconhecida internacionalmente como uma rede líder em Gerontologia e Geriatria, caracterizada pela colaboração entre acadêmicos e universidades, para o desenvolvimento de pesquisa e inovação, formação de capital humano avançado, vínculos com o meio ambiente, contribuindo na formulação de políticas públicas, com abordagem interdisciplinar e excelência para alcançar um envelhecimento saudável.

Esperamos que a RIES-LAC transforme a perspectiva das universidades da ALC em direção ao Envelhecimento Saudável. Por isso, convidamos acadêmicos das Universidades a continuarem ingressando na Rede e publicando suas pesquisas em revistas Latino-Americanas e do Caribe.

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REFERÊNCIAS

1. Beard JR, Biggs S, Bloom DE, Fried LP, Hogan P, Kalache A, et al. Global population ageing: peril or promise. Geneva: World Economic Forum; 2011.
2. The health of aging populations. Preparing for an aging world: the case for cross- national research. In: National Research Council (US) Panel on a Research Agenda and New Data for an Aging World. Washington (DC): National Academies Press (US); 2001.
3. World Health Organization. World report on ageing and health [Internet]. Geneva: World Health Organization; 2015. Disponível em: https://apps.who. int/iris/handle/10665/186463. Acessado em Nov 3, 2021.
4. Keating N, Rodriguez Mañas L, De Francisco A. Toward healthy aging in Latin America and the Caribbean: leaving no one behind? Rev Panam Salud Publica. 2021;45:e113. https://doi.org/10.26633/RPSP.2021.113
5. Pan American Health Organization. The sociodemographic and economic context of aging in Latin America [Internet]. Washington: Pan American Health Organization; 2023. Disponível em: https://iris.paho.org/handle/10665.2/57773. Acessado em Out 9, 2023.
6. Economic Commission for Latin America and the Caribbean. Ageing in Latin America and the Caribbean: inclusion and rights of older persons [Internet]. Santiago: ECLAC; 2022. Disponível em: https://repositorio.cepal.org/bitstream/handle/11362/48568/4/S2201042_en.pdf. Acessado em Mar 5, 2023.
7. Pan Americam Health Organization. The decade of healthy aging in the Americas (2021–2030) [Internet]. 2020. Disponível em: https://www.paho.org/en/decade-healthy-aging-americas-2021-2030. Acessado em Ago 8, 2022.
8. Felipe Salech M, Rafael Jara L, Luis Michea A. Cambios fisiológicos asociados al envejecimiento. Rev Med Clin Condes. 2012;23(1):19-29.
9. World Health Organization. Decade of healthy ageing: plan of action 2021–2030 [Internet]. Geneva: World Health Organization; 2020. Disponível em: https://www.who.int/docs/default-source/decade-of-healthy-ageing/final-decade-proposal/decade-proposal-final-apr-2020-en.pdf. Acessado em Jan 7, 2021.
10. Década del Envejecimiento Saludable. La Plataforma. ¿Qué es la década del envejecimiento saludable? [Internet]. 2023. Disponível em: https://www. decadeofhealthyageing.org/es/about/about-us/what-is-the-decade. Acessado em Out 9, 2023.

THE JOURNAL OF LATIN AMERICAN GERIATRIC MEDICINE ORIGINAL ARTICLE

Could neutrophil-to-lymphocyte ratio predict the development of delirium in older adults with hip fracture? A pilot study

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Abstract

Background: *The neutrophil-to-lymphocyte ratio (NLR) is an inflammatory biomarker.* **Objective:** *To evaluate if levels were associated with the development of delirium in older adults hospitalized for hip fracture.* **Methods:** *An observational, prospective, analytical pilot study was conducted. Forty participants ≥ 65 years old hospitalized for hip fractures were included. NLR levels were collected from the medical records during the first 24 h of admission of each patient and every 72 h.* **Results:** *Twelve participants had delirium. There was no significant difference in the NLR median value at admission in the delirium group versus the no-delirium group (p = 0.768). We found a significant age difference (p = 0.02), cognition (p = 0.004), and activities of daily living (p = 0.004) between groups. In univariate analysis, age ≥ 80 (odds ratio [OR]: 4.22; 95% confidence interval [CI]: 1.0-17.79; p = 0.05), cognitive impairment (OR: 27.0; 95% CI: 2.72-267.79; p = 0.005), and a Lawton and Brody test < 3 score (OR: 13.8; 95% CI: 2.71-7.12; p = 0.002) were associated with an increased risk of delirium.* **Conclusion:** *The association between the NLR value and the development of delirium was not observed, but advanced age, moderate/severe cognitive impairment, and decreased instrumental activities of daily living performance were associated with a higher risk of delirium in older adults hospitalized for hip fracture with an increased risk of delirium.*

Keywords: *Older adults. Neutrophil-to-lymphocyte ratio. Hip fracture.*

¿Podría el índice neutrófilo-linfocito predecir el desarrollo de delirium en adultos mayores con fractura de cadera? Un estudio piloto

Resumen

Antecedentes: *El índice neutrófilo-linfocito (INL) es un biomarcador inflamatorio fácil de aplicar.* **Objetivo:** *Evaluar si sus niveles se asociaban con el desarrollo de delirium en adultos mayores hospitalizados por fractura de cadera.* **Métodos:** *Estudio piloto observacional, prospectivo y analítico. Se incluyeron 40 participantes ≥ 65 años hospitalizados por fractura de cadera. Se midió el INL durante las primeras 24 horas de ingreso y cada 72 horas.* **Resultados:** *12 participantes presentaron delirium. No hubo diferencias significativas en el valor mediano del INL al ingreso en el grupo con delirium frente al grupo sin (p = 0.768). Se encontraron diferencias significativas entre los grupos en cuanto a edad (p = 0.02), cognición (p = 0,004) y actividades de la vida diaria (p = 0.004). En el análisis univariante, la edad ≥ 80 (OR: 4.22; p = 0.05), el deterioro cognitivo (OR: 27.0; p = 0.005) y una puntuación < 3 en el test de Lawton y Brody (OR: 13.8; p = 0.002) se asociaron con un mayor riesgo de delirium.* **Conclusiones:** *Aunque no se observó correlación entre el NLR y el delirium, la edad, el deterioro cognitivo y disminución de las actividades instrumentadas se asociaron con un mayor riesgo de delirium en adultos mayores hospitalizados por fractura de cadera.*

Palabras clave: *Adultos mayores. Índice neutrófilos-linfocitos. Fractura de cadera.*

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INTRODUCTION

Hip fracture is one of the most common causes of hospitalization in older adults. An annual global incidence of 1.7 million cases is estimated, and an increase of up to 6.26 million is predicted by 2050[1,2]. Hip fracture impacts the physical, psychological, and environmental aspects, producing a functional deterioration that affects the quality of life of this population[3].

An important complication among older patients with hip fractures is delirium, with a prevalence that can be as high as 13-70% of hospitalized patients. This is highly relevant as it is associated with adverse outcomes such as impaired functional and cognitive recovery, increased length of hospital stay, hospital costs, and mortality[4]. Inflammation and oxidative stress have been reported to play a key role in the development of delirium[5,6], which is why some authors have focused their work on the research of inflammatory markers for the identification and early detection of individuals at higher risk of developing delirium. It has been found that the elevation of C-reactive protein (CRP), interleukin (IL) 6, IL-8, IL-10, and alpha tumoral necrosis factor (α-TNF) may be associated with delirium in these patients[7-9].

The neutrophil-to-lymphocyte ratio (NLR), obtained easily from blood samples, has been shown to be an important predictor of inflammation and oxidative stress in some patients[10]. It is a simple, rapid, inexpensive marker of systemic inflammation, like CRP and white blood cell (WBC) count, and predicts prognosis in various pathological conditions[11,12]. A pilot study conducted in 2017 by Angelique Egberts and Francesco US Mattace-Raso found that acutely ill hospitalized patients with delirium had higher levels of NLR than patients without delirium. As a retrospective study, in which the measure of NLR was made within the first 24 h after admission, it was not able to perform stratified analyses for "delirium on admission" and "incident delirium"[13]. A multicenter prospective study conducted in 2020 by He et al., with a sample of 780 older adults, concluded that NLR could be used as a potential marker for predicting post-operative delirium after hip surgery. Some limitations of this study were that there was no discrimination between the type of delirium (hyperactive, hypoactive, or mixed) and that older adults with cognitive impairment were excluded from the study[14].

Since delirium is one of the main complications in hospitalized patients with hip fracture, it is necessary to assess whether inflammatory markers such as NLR could be useful in predicting this critical complication.

This pilot study was carried out with the objective of evaluating the association between elevated NLR and the development of delirium in older adults hospitalized for hip fracture and identifying the main clinical and biochemical risk factors associated with in-hospital delirium.

METHODS

Study design

This was an observational, prospective, analytical pilot study. The protocol, informed consent, and amendments were approved by the Local Independent Ethics Committee and the Institutional Review Board (Ethics Committee of the UANL School of Medicine) with the registration number GE21-00003. All potential candidates for the study were given a current copy of the informed consent form to read. The investigators explained all aspects of the study in simple lay language. When a candidate could not consent, the caregiver consent for patient participation was taken.

Participants

A total of 76 subjects older than 65 years old with a hip fracture diagnosis were screened from July 1, 2021, to March 3, 2022, in the Orthopedic Service and Emergency room of "Dr. José Eleuterio González." Inclusion criteria were patients 65 years old and over, hospitalized for hip fracture, and with an estimated hospital stay > 48 h. Patients were excluded when they had delirium at the time of hospital admission, a history of oncological disease, psychosis or schizophrenia, use of antipsychotic drugs or corticosteroids, heavy chronic consumption of alcohol or illegal substances, or current infection by SARS-CoV-2. Forty subjects were recruited; 12 developed preoperative delirium, which formed the case group, and 28 who did not develop delirium were included in the control group (Fig. 1).

Data collection

Subjects were assessed by the investigators within 24 h of admission. Demographic and clinical characteristics were recorded. The presence of comorbidities was evaluated with the Charlson index[15]. Function cognitive was assessed with the Pfeiffer questionnaire (Short Portable Mental Status Questionnaire

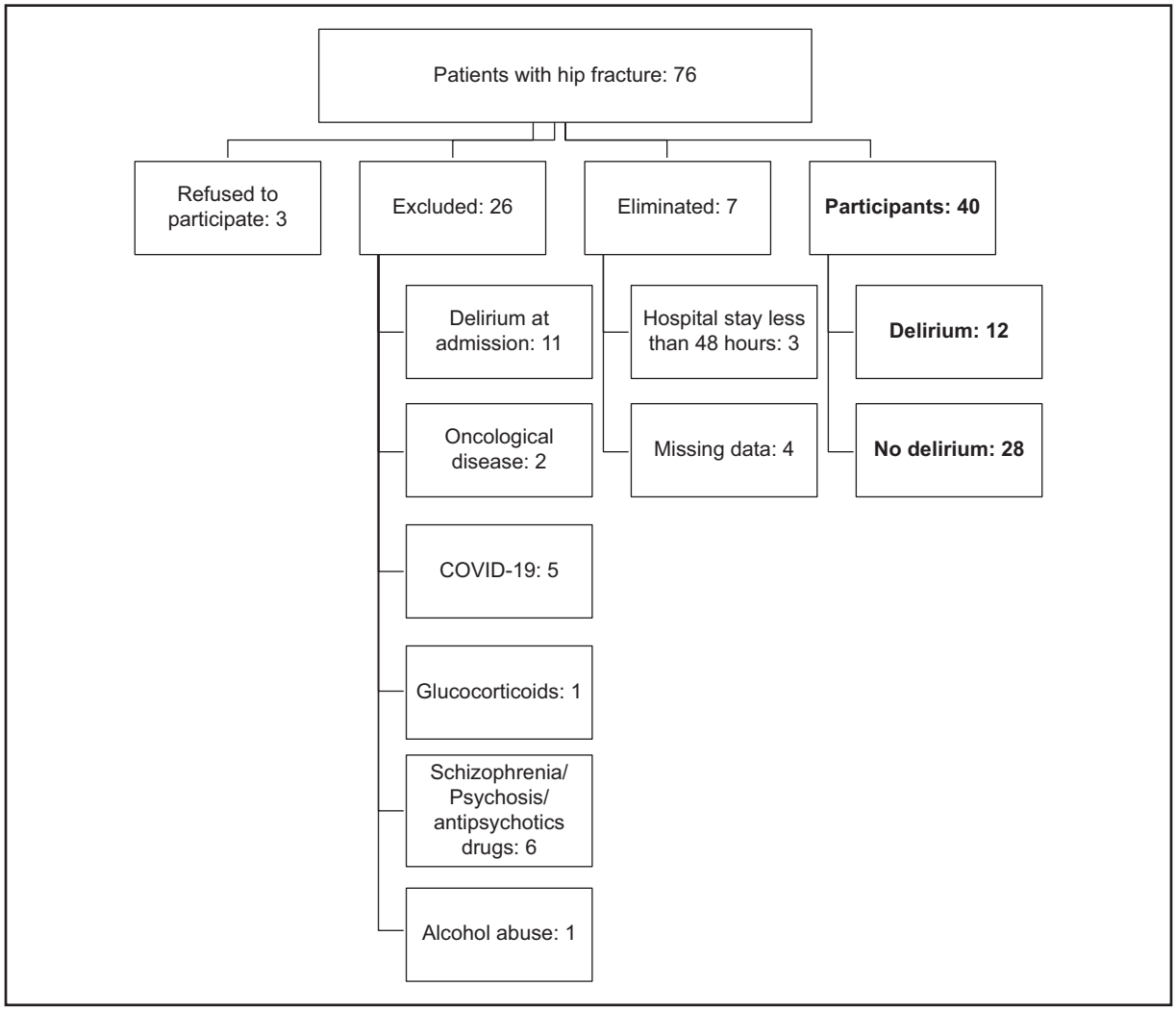

Figure 1. *Patients' recruitment flowchart.*

– SPMSQ)[16], the depressive symptoms were evaluated with the Geriatric Depression Scale (GDS)[17], the functional status was evaluated with Katz Index for basic activities[18] and Lawton and Brody Scale[19] for instrumental activities, nutritional status was assessed with a mini nutritional assessment (MNA)[20], frailty was evaluated with the clinical frailty scale (CFS)[21].

Biochemical parameters were collected during the first 24 h of the patient's admission and included WBC count, hemoglobin, hematocrit, neutrophils, lymphocytes, platelets, blood urea nitrogen, creatinine, sodium, chlorine, potassium, albumin, lactic dehydrogenase, and CRP. The NLR was obtained from the division of total neutrophils and total lymphocyte count. This was collected during the first 24 h of admission and every 72 h until the development of delirium, discharge, or 14 days of hospital stay.

The confusion assessment method (CAM) was used for delirium screening. The CAM instrument assesses four criteria: (1) Acute onset and fluctuating course, (2) inattention, (3) disorganized thinking, and (4) altered level of consciousness[22]; a delirium diagnosis was made if the subject presented the 1 and 2 criteria plus either 3 or 4. It was applied at the admission of the subject and every 24 h until the development of delirium, discharge, or 14 days of hospital stay.

Statistical analysis

Descriptive statistics were used. Data were presented as mean (standard deviation) or median (interquartile range). Student's t-test or Mann–Whitney's U test was used for continuous variables. To evaluate differences in categorical variables, the χ^2 test was used.

Correlations between NLR and inflammatory biomarkers were evaluated with Spearman's correlation coefficient. Adjusted logistic regression analysis was performed to determine the main risk factors associated with the development of delirium in older adults hospitalized for hip fracture. SPSS version 23.0 was used for statistical analysis. A $p < 0.05$ was considered significant.

RESULTS

Characteristics of the study population

The comparison of baseline characteristics between participants with delirium and no delirium is presented in table 1. Most of the subjects were female, lived with relatives, and none lived in institutionalization before their hospital stay. Regarding marital status, more than a third were widowed. The mean age of the total number of participants was 78.4 ± 7.1 years old. The intertrochanteric fracture was the most prevalent (65%), followed by cervical (27.5%) and subtrochanteric (7.5%) fractures. Hypertension and diabetes were present in 57.5% and 30%, respectively. The delirium group was characterized by older age, worst cognitive impairment (SPMSQ), and lower performance in instrumental activities of daily living (Lawton and Brody Scale). Patients who were single or divorced and those who lived alone did not present delirium during hospitalization. We do not find differences with respect to comorbidities (Charlson Comorbidity Index), nutritional status (MNA), depression (GDS), or fragility (CFS).

Biochemical parameters

The laboratory data of both groups are presented in table 2. The NLR median value at admission was 8.2 (interquartile range [IQR] = 5.–13.3) in the delirium group versus 7.3 (IQR = 3.9-13.7) no-delirium group; this difference was not significant ($p = 0.768$). Similarly, NLR was calculated every 72 h in both groups without a significant difference between groups. We detected the presence of leukocytosis and neutrophilia in both groups. A WBC count value > 11.0 K/uL was recorded in 52.5%, and a neutrophil value > 6.9 K/uL in 72.5% among all patients. Nevertheless, only five cases of hospital-acquired infection were recorded, and the predominant type was urinary tract infection. We did not find any differences in the biochemical parameters between both groups.

Spearman's rank correlation coefficient

Spearman's correlation coefficient was performed between the NLR, the WBC count, neutrophils, lymphocytes, and the CRP value of the total subjects (Fig. 2). A moderate positive correlation was found between NLR and WBC count ($r = 0.627$, $p < 0.001$), a strong positive correlation between NLR and neutrophil count ($r = 0.765$, $p < 0.001$), and a strong negative correlation between NLR and lymphocyte count ($r = -0.901$, $p < 0.001$). Opposite to what was expected, a negative correlation was found between NLR and CRP level, without statistical significance value ($r = -0.058$, $p = 0.724$).

Univariate and multivariate analysis

The logistic regression analysis that evaluated the potential risk factors for the development of delirium in patients with hip fracture is presented in table 3. In the univariate analysis, age older than 80-years-old (odds ratio [OR]: 4.22; 95% confidence interval [CI]: 1.0-17.79; $p = 0.05$), the presence of moderate/severe cognitive impairment measured by the SPMSQ (OR: 27.0; 95% CI: 2.72-267.79; $p = 0.005$) and a Lawton and Brody Scale score < 3 points (OR: 13.8; 95% CI: 2.71-70.12; $p = 0.002$) were identified as a potential risk factor for the development of delirium. However, when the multivariate analysis was performed, no association was found. We did not identify the NLR as a potential risk factor for delirium among all subjects.

DISCUSSION

The objective of this pilot study was to evaluate if the elevated NLR was associated with the development of delirium in older adults hospitalized for hip fractures. Although the NLR was slightly higher in the delirium group than in those without delirium, we did not find a significant statistical association between these two variables.

It is well known that delirium is a behavioral syndrome caused by dysregulation of neuronal activity secondary to systemic disturbances, such as peripheral inflammation[5]. Hence, it was expected that the NLR would be elevated in those patients who developed delirium.

This association had previously been studied, and the results were ambiguous. As an example, Kotfis et al. (2019) reported, similarly to our pilot study, no significant difference between the NLR value of patients

Table 1. Comparison of baseline characteristics between participants with delirium and no delirium

Characteristic	Total participants	Delirium group	No delirium group	P
n	40	12	28	
Gender, n (%)				0.071
Female	28 (70.0)	6 (50.0)	22 (78.6)	
Male	12 (30.0)	6 (50.0)	6 (21.4)	
Age (years), mean±SD	78.4 ± 7.1	82.4 ± 8.2	76.7 ± 5.9	**0.020**
Place of residence, n (%)				0.057
Home - Living with relatives	33 (82.5)	12 (100)	21 (75.0)	
Home - Living alone	7 (17.5)	0 (0.0)	7 (25.0)	
Marital status, n (%)				**0.023**
Widowed	18 (45.0)	5 (41.7)	13 (46.4)	
Married	10 (25.0)	4 (33.3)	6 (21.4)	
Single	7 (17.5)	0 (0.0)	7 (25.0)	
Cohabitation	3 (7.5)	3 (25.0)	0 (0.0)	
Divorced	2 (5.0)	0 (0.0)	2 (7.1)	
Years of education, median (IQR)	3 (1-6)	3 (0-6)	3 (2-6)	0.601
Type of Fracture, n (%)				0.841
Intertrochanteric	26 (65.0)	7 (58.3)	19 (67.9)	
Cervical	11 (27.5)	4 (33.3)	7 (25.0)	
Subtrochanteric	3 (7.5)	1 (8.3)	2 (7.1)	
Pain intensity, median (IQR)	6 (5-8)	6 (4-8)	6 (5-8)	0.650
Comorbidities, n (%)				
Hypertension	23 (57.5)	7 (58.3)	16 (57.1)	0.944
Diabetes mellitus	12 (30.0)	4 (33.3)	8 (28.6)	0.763
Atrial fibrillation	2 (5.0)	0 (0.0)	2 (7.1)	0.342
Myocardial infarction	1 (2.5)	0 (0.0)	1 (3.6)	0.507
Heart failure	1 (2.5)	0 (0.0)	1 (3.6)	0.507
Stroke	1 (2.5)	1 (8.3)	0 (0.0)	0.122
Charlson Comorbidity Index, n (%)				0.674
Severe	20 (50.0)	7 (58.3)	13 (46.4)	
Moderate	19 (47.5)	5 (41.7)	14 (50.0)	
Mild	1 (2.5)	0 (0.0)	1 (3.6)	
MNA, n (%)				0.776
Risk of malnutrition	18 (45.0)	5 (41.7)	13 (46.4)	
Normal nutritional status	17 (42.5)	6 (50)	11 (39.3)	
Malnutrition	5 (12.5)	1 (8.3)	4 (14.3)	
GDS, n (%)				0.409
No depressive symptoms	21 (52.5)	6 (50.0)	15 (53.6)	
Mild depression	13 (32.5)	3 (25.0)	10 (35.7)	
Moderate depression	5 (12.5)	2 (16.7)	3 (10.7)	
Severe depression	1 (2.5)	1 (8.3)	0 (0.0)	
SPMSQ, n (%)				**0.004**
Normal	22 (55.0)	3 (25.0)	19 (67.9)	
Mild deterioration	11 (27.5)	3 (25.0)	8 (28.6)	
Moderate deterioration	6 (15.0)	5 (41.7)	1 (3.6)	
Severe deterioration	1 (2.5)	1 (8.3)	0 (0.0)	
Katz Index, median (IQR)	5 (5-6)	5 (4-6)	6 (5-6)	0.118
Lawton and Brody Scale, median (IQR)	5 (3-8)	2 (1-4)	6 (4-8)	**0.004**
Clinical Frailty Scale, median (IQR)	4 (4-5)	5 (4-6)	4 (3-5)	0.164

SD: standard deviation; IQR: interquartile range; MNA: mini nutritional assessment; GDS: geriatric depression scale; SPMSQ: short portable mental state questionnaire; P-value ≤ 0.05 is considered significant.

Table 2. Comparison of laboratory data at admission between patients with delirium versus no delirium

Characteristic	Total participants	Delirium group	No delirium group	P
n	40	12	28	
Hemoglobin (g/dL), median (IQR)	11.8 (10.9-13.0)	12.3 (11.0-13.7)	11.6 (10.9-12.9)	0.341
Hematocrit (%), median (IQR)	35.5 (33.0-40.4)	36.3 (33.2-40.4)	35.1 (33.0-40.2)	0.679
WBC count (K/uL), median (IQR)	11.3 (8.7-13.3)	11.9 (8.8-13.3)	10.9 (8.7-13.3)	0.787
WBC count ≥ 11.0 K/uL, n (%)	21 (52.5)	7 (58.3)	14 (50.0)	0.629
Neutrophil count (K/uL), median (IQR)	9.3 (6.7-11.5)	10.5 (6.8-11.0)	8.8 (6.7-11.5)	0.750
Neutrophil count ≥ 6.9 K/uL, n (%)	29 (72.5)	9 (75.0)	20 (71.4)	0.817
Lymphocyte count (K/uL), median (IQR)	1.3 (0.7-1.6)	1.1 (0.8-1.4)	1.3 (0.7-1.8)	0.735
Lymphocyte count < 0.6 K/uL, n (%)	4 (10.0)	1 (8.3)	3 (10.7)	0.818
Platelet count (K/uL), median (IQR)	201.0 (165.0-241.2)	185.0 (156.0-235.0)	218.0 (174.7-241.2)	0.420
NLR value, median (IQR)	7.3 (4.5-13.4)	8.2 (5.2-13.3)	7.3 (3.9-13.7)	0.768
CRP (mg/dL), median (IQR)	2.0 (0.7-8.1)	2.2 (0.8-8.4)	2.0 (0.7-7.7)	0.929
LDH (IU/L), median (IQR)	173.0 (150.2-209.2)	179.0 (143.2-207.7)	171.5 (151.5-214.5)	0.627
BUN (mg/dL), median (IQR)	15.5 (11.2-23.5)	16 (11.2-24.7)	14.5 (11.2-22.0)	0.615
Serum creatinine (mg/dL), median (IQR)	0.7 (0.5-1.0)	0.9 (0.6-1.1)	0.7 (0.5-0.9)	0.223
Sodium (mmol/L), median (IQR)	138.0 (135.0-139.7)	139.0 (134.9-140.4)	137.7 (135.0-139.7)	0.431
Chloride (mmol/L), median (IQR)	103.5 (101.9-106.2)	104.6 (102.8-108.2)	102.6 (101.8-105.6)	0.095
Potassium (mmol/L), median (IQR)	4.1 (3.7-4.6)	4.1 (3.5-4.2)	4.2 (3.7-4.8)	0.461
Albumin (g/dL), median (IQR)	3.5 (3.2-3.7)	3.4 (3.1-3.6)	3.5 (3.2-3.7)	0.514
Infection cases, n (%)	5 (12.5)	3 (25.0)	2 (7.1)	0.118
Type of infection, n (%)				0.329
Urinary tract	3 (60.0)	2 (66.7)	1 (50.0)	
Pneumonia	1 (20.0)	1 (33.3)	0 (0.0)	
Skin and soft tissue	1 (20.0)	0 (0.0)	1 (50.0)	

IQR: interquartile range; WBC: white blood cell; NLR: neutrophil-to-lymphocyte ratio; CRP: c-reactive protein; LDH: lactic dehydrogenase; BUN: blood urea nitrogen.

undergoing cardiac surgery who developed post-operative delirium versus those who did not present delirium and in patients with an acute cerebrovascular event, a cutoff of 4.86 presents a sensitivity of 42% and a specificity of 74% for the detection of delirium, making it a non-ideal test[23]. On the other hand, there are reports that elevated NLR could be a risk factor and a biomarker for delirium in older adults hospitalized for acute pathology[13,24], undergoing surgery for lower limb fracture[25], and with total hip arthroplasty for hip fracture[14].

In the same way, in our population, no significant difference was demonstrated between the group that developed delirium and the group without delirium regarding the CRP, serum creatinine, and albumin values. This differs from the literature, where it has been reported that in patients with delirium, an increase in CRP and serum creatinine and a decrease in albumin levels are observed[26].

Respecting the elevated percentage of participants with leukocytosis and neutrophilia in both groups, it has been described that hip fractures represent a state of acute stress for individuals, especially older adults, which could explain this inflammatory response with an increase in the level of neutrophils and monocytes, reflecting a transient activation of the innate immune response[26].

Otherwise, we found that variables such as advanced age, cognitive impairment, and alteration in the performance of the instrumental activities of daily living were presented more frequently in the group that developed delirium. Regarding marital status, it is striking that patients who were single or divorced and those who lived alone did not present delirium during hospitalization with a higher tendency to develop delirium in widowers, similar to what has been reported in other

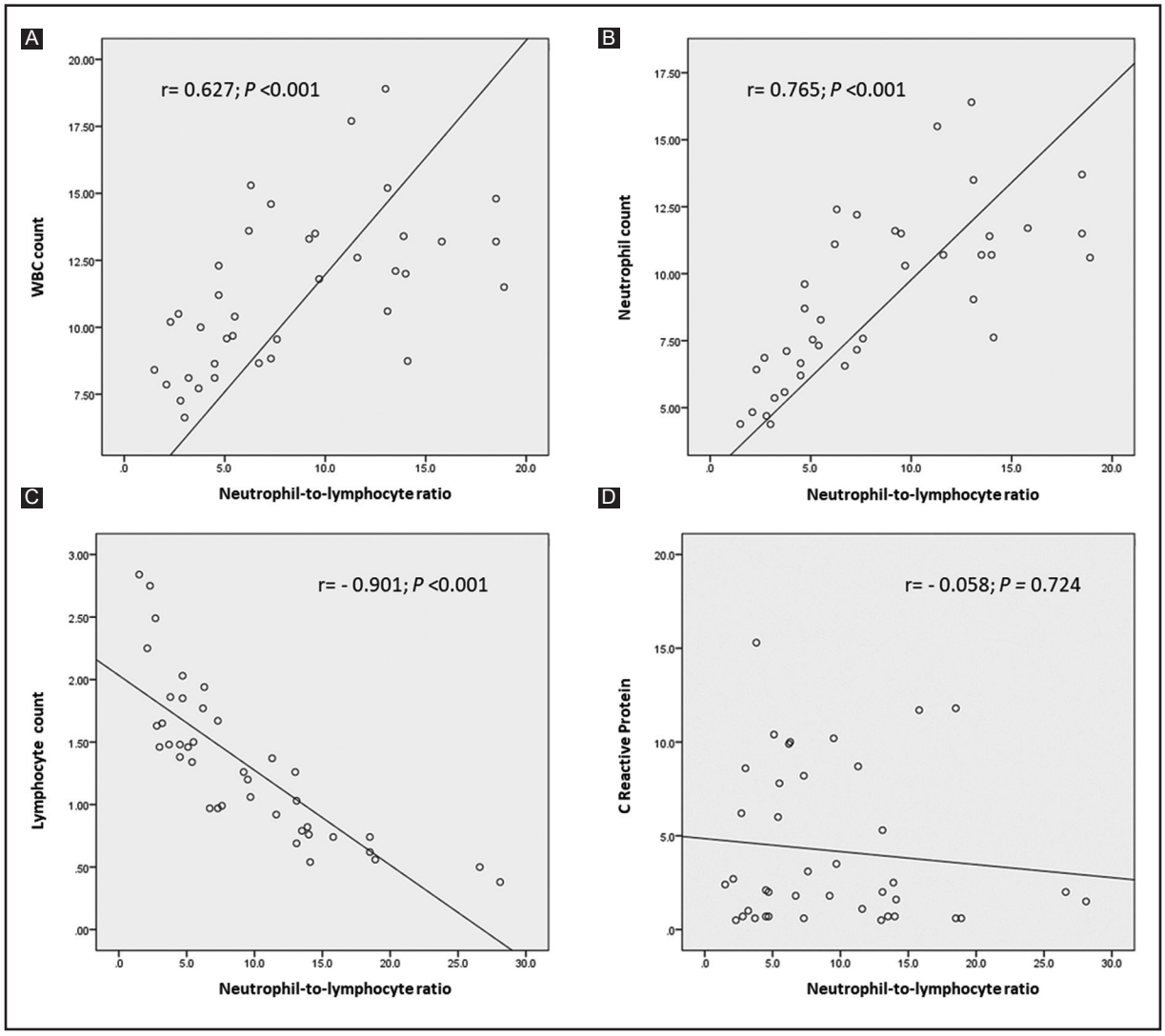

Figure 2. *Correlations between neutrophil-to-lymphocyte ratio value and white blood cell count (***A***), neutrophil count (***B***), lymphocyte count (***C***), and C-reactive protein (***D***) at admission. r: Spearman's rank correlation coefficient.*

Table 3. Univariate and multivariate logistic regression analysis of potential risk factors for delirium

Variable	OR (95% CI)	p
Univariate logistic regression analysis		
Male	3.66 (0.86-15.59)	0.079
Age		
> 80 years old	4.22 (1.00-17.79)	**0.05**
> 85 years old	8.33 (1.60-43.28)	**0.012**
Moderate/severe cognitive impairment*	27.00 (2.72-267.79)	**0.005**
Lawton and Brody Scale < 3 points	13.80 (2.71-70.12)	**0.002**
Multivariate logistic regression analysis		
Male	2.69 (0.40-18.07)	0.307
> 80 years old	1.20 (0.16-8.88)	0.854
Moderate/severe cognitive impairment*	13.08 (0.90-190.03)	0.060
Lawton and Brody Scale < 3 points	5.43 (0.78-37.53)	0.086

*Measured by SPMSQ (Short Portable Mental State Questionnaire).
OR: odds ratio; CI: confidence interval; P-value ≤ 0.05 is considered significant.

studies of hospitalized patients[27], including the nursing homes[28]. At present, these characteristics have already been described as predisposing and precipitant factors for delirium, along with others, such as low education level, frailty, depression, nutritional disorders, and a greater comorbidities burden[28,29]. These last variables in our population did not present a significant difference.

We observed that age over 80 years, the presence of moderate/severe cognitive impairment, and a decrease in instrumental activity performance could be risk factors for the development of delirium. However, when performing the multivariate analysis, this association did not appear. As has been described in previous studies, it is common to observe that neurocognitive disorders occur more frequently in advanced age[30] and, likewise, their association with impaired functionality is widely described as being diagnostic criteria for these disorders[31].

These results lead us to think that these characteristics and their association with the development of delirium are not independent variables, and, as have been previously described, the development of delirium is a consequence of the accumulation of multiple factors[28] that lead to metabolic, inflammatory, and neurological alterations[6,32] which means that, at present, it is not possible to identify an ideal biomarker for its early detection and diagnosis.

This pilot study has important strengths; it is one of the few prospective protocols that has been carried out to describe if there is an association between the NLR and the development of delirium in older adults and even more in those who are hospitalized for a hip fracture. Despite the relevance of the current work, we recognize that we have several limitations. First, as this was a pilot study in a relatively small group of patients, the findings need to be confirmed in a larger study; the small sample size could affect the values obtained in terms of serum biomarkers, mainly NLR, which did not present significant differences. Second, the measurement of other biomarkers that in previous studies were associated with the presence of delirium (IL-6, IL-8, IL-10, α-TNF, and Procalcitonin) was not performed in this pilot study. Third, and as we mentioned previously, except for the detection of SARS-CoV-2 infection, other pre- and post-operative infections were not excluded, which could lead to the presence of leukocytosis and neutrophilia observed and the lack of significant difference in the value of the NLR.

CONCLUSION

We did not find an association between the NLR value and the development of delirium. However, in univariate logistic regression analysis, advanced age, moderate/severe cognitive impairment, and decreased instrumental activities of daily living performance were associated with a higher risk of delirium in older adults hospitalized for hip fracture.

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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 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. Baroni M, Serra R, Boccardi V, Ercolani S, Zengarini E, Casucci P, et al. The orthogeriatric comanagement improves clinical outcomes of hip fracture in older adults. Osteoporos Int. 2019;30:907-16.
2. Ehlers MM, Nielsen CV, Bjerrum MB. Experiences of older adults after hip fracture: an integrative review. Rehabil Nurs. 2018;43:255-66.
3. Alexiou K, Roushias A, Varitimidis S, Malizos K. Quality of life and psychological consequences in elderly patients after a hip fracture: a review. Clin Interv Aging. 2018;13:143-50.
4. Mosk C, Mus M, Vroemen J, Van der Ploeg T, Vos D, Elmans L, et al. Dementia and delirium, the outcomes in elderly hip fracture patients. Clin Interv Aging. 2017;12:421-30.
5. Krogseth M, Watne LO, Juliebø V, Skovlund E, Engedal K, Frihagen F, et al. Delirium is a risk factor for further cognitive decline in cognitively impaired hip fracture patients. Arch Gerontol Geriatr. 2016;64:38-44.
6. Maldonado JR. Neuropathogenesis of delirium: review of current etiologic theories and common pathways. Am J Geriat Psychiatry. 2013;21:1190-222.
7. Beloosesky Y, Hendel D, Weiss A, Hershkovitz A, Grinblat J, Pirotsky A,

et al. Cytokines and C-reactive protein production in hip-fracture-operated elderly patients. J Gerontol A Biol Sci Med Sci. 2007;62:420-6.
8. De Rooij SE, Van Munster BC, Korevaar JC, Levi M. Cytokines and acute phase response in delirium. J Psychosom Res. 2007;62:521-5.
9. McGrane S, Girard TD, Thompson JL, Shintani AK, Woodworth A, Ely EW, et al. Procalcitonin and C-reactive protein levels at admission as predictors of duration of acute brain dysfunction in critically ill patients. Crit Care. 2011;15:R78.
10. Kulaksizoglu B, Kulaksizoglu S. Relationship between neutrophil/lymphocyte ratio with oxidative stress and psychopathology in patients with schizophrenia. Neuropsychiatr Dis Treat. 2016;12:1999-2005.
11. Celikbilek M, Dogan S, Ozbakır O, Zararsız G, Kücük H, Gürsoy S, et al. Neutrophil-lymphocyte ratio as a predictor of disease severity in ulcerative colitis. J Clin Lab Anal. 2013;27:72-6.
12. Wang D, Yang JX, Cao DY, Wan XR, Feng FZ, Huang HF, et al. Preoperative neutrophil-lymphocyte and platelet-lymphocyte ratios as independent predictors of cervical stromal involvement in surgically treated endometrioid adenocarcinoma. Onco Targets Ther. 2013;6:211.
13. Yan W, Liu C, Li R, Mu Y, Jia Q, He K. Usefulness of the Neutrophil-to-Lymphocyte Ratio in Predicting Adverse Events in Elderly Patients With Chronic Heart Failure. Int Heart J. 2016 Sep 28;57(5):615–21.
14. Egberts A, Mattace Raso F. Increased neutrophil-lymphocyte ratio in delirium: a pilot study. Clin Interv Aging. 2017;12:1115-21.
15. He R, Wang F, Shen H, Zeng Y, LijuanZhang. Association between increased neutrophil-to-lymphocyte ratio and postoperative delirium in elderly patients with total hip arthroplasty for hip fracture. BMC Psychiatry. 2020;20:496.
16. 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.
17. Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. J Am Geriatr Soc. 1975;23:433-41.
18. Reisberg B, Ferris SH, De Leon MJ, Crook T. The global deterioration scale for assessment of primary degenerative dementia. Am J Psychiatry. 1982;139:1136-9.
19. 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.
20. 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.
21. Rockwood K, Song X, MacKnight C, Bergman H, Hogan DB, McDowell I, et al. A global clinical measure of fitness and frailty in elderly people. CMAJ. 2005;173:489-95.
22. Inouye SK. Clarifying confusion: the confusion assessment method. A new method for detection of delirium. Ann Intern Med. 1990;113:941.
23. Kotfis K, Bott-Olejnik M, Szylińska A, Rotter I. Could neutrophil-to-lymphocyte ratio (NLR) serve as a potential marker for delirium prediction in patients with acute ischemic stroke? A prospective observational study. J Clin Med. 2019;8:1075.
24. Zhao Y, Yue J, Lei P, Lin T, Peng X, Xie D, et al. Neutrophil-lymphocyte ratio as a predictor of delirium in older internal medicine patients: a prospective cohort study. BMC Geriatr. 2021;21:334.
25. Li X, Wang G, He Y, Wang Z, Zhang M. White-cell derived inflammatory biomarkers in prediction of postoperative delirium in elderly patients undergoing surgery for lower limb fracture under non-general anaesthesia. Clin Interv Aging. 2022;7:383-92.
26. Toft K, Tontsch J, Abdelhamid S, Steiner L, Siegemund M, Hollinger A. Serum biomarkers of delirium in the elderly: a narrative review. Ann Intensive Care. 2019;9:76.
27. Banerdt JK, Mateyo K, Yan Y, Liu D, Zuo Y, Gravio CD, et al. Risk factors for delirium among hospitalized patients in Zambia. PLoS One. 2021;16:e0249097.
28. Wilson JE, Mart MF, Cunningham C, Shehabi Y, Girard TD, MacLullich AM, et al. Delirium. Nat Rev Dis Primers. 2020;6:90.
29. Hshieh TT, Inouye SK, Oh ES. Delirium in the elderly. Psychiatr Clin North Am 2018;41:1-17.
30. Cao Q, Tan CC, Xu W, Hu H, Cao XP, Dong Q, et al. The prevalence of dementia: a systematic review and meta-analysis. J Alzheimers Dis. 2020;73:1157-66.
31. Sachdev PS, Blacker D, Blazer DG, Ganguli M, Jeste DV, Paulsen JS, et al. Classifying neurocognitive disorders: the DSM-5 approach. Nat Rev Neurol. 2014;10:634-42.
32. Maldonado JR. Delirium pathophysiology: an updated hypothesis of the etiology of acute brain failure. Int J Geriatr Psychiatry. 2018;33:1428-57.

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ORIGINAL ARTICLE

Hospital indicators of the orthogeriatric unit in older ecuadorian adults with hip fracture

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Abstract

Background: *With the global population aging, the incidence of hip fractures (HFs) in elderly individuals presents a significant public health challenge due to associated morbidity, mortality, and health-care costs.* **Objective:** *This study aimed to evaluate the impact of implementing an Orthogeriatric Unit (OU) at Hospital de la Policia No. 1 Quito (HPNQ1) on patient care and outcomes. It compared hospital care indicators, and sociodemographic, clinical, and geriatric variables before and after the OU's establishment.* **Methods:** *An observational, retrospective analysis was conducted on 77 patients aged 65 and older admitted with HFs from 2012 to 2017. Patients were divided into two groups: those treated before and those treated after the OGU's establishment in March 2015. Data on demographic variables, health conditions, functionality (using the Barthel Index), hospitalization length, mortality, and associated costs were collected and analyzed. Information was obtained from the clinical history, and confidentiality measures were used to handle information according to bioethics principles.* **Results:** *The study found no significant difference in the average age and gender distribution between the groups. While most patients exhibited mild dependency in daily activities, the OGU managed a higher proportion of patients with total dependency. Although the OU had lower mortality rates, this did not reach statistical significance. The length of hospitalization was significantly reduced in the OU group, indicating a more efficient treatment and recovery process despite a higher median cost. Before creating the OU, the hospital indicators showed an average stay of 11 days. After the implementation of the unit, this was reduced to an average of only 7 days. Cost decreased by 30% ($13588.22 vs. $9814.04, before and after implementing an OU, respectively).* **Conclusion:** *The establishment of the OU at HPNQ1 contributed to more efficient management of elderly patients with HFs, as evidenced by reduced hospitalization lengths. These findings support the potential benefits of OGUs in improving healthcare processes and outcomes for this vulnerable population despite the higher associated costs. Further research is warranted to explore the long-term impacts of OGUs on patient functionality and mortality rates.*

Keywords: *Geriatrics. Orthogeriatric. Hip fracture. Hospital indicators. Ecuadorian. Elderly.*

Indicadores hospitalarios de la unidad de ortogeriatría en adultos mayores ecuatorianos con fractura de cadera

Resumen

Antecedentes: *Con el envejecimiento de la población global, la incidencia de fracturas de cadera (FC) en individuos mayores presenta un importante desafío de salud pública debido a la morbilidad, mortalidad y costos de atención médica asociados.* **Objetivo:** *Este estudio tuvo como objetivo evaluar el impacto de la implementación de la Unidad Ortopediátrica en el Hospital de la Policía No. 1 Quito (HPNQ1) en la atención y resultados de los pacientes. Se compararon indicadores de atención hospitalaria, variables sociodemográficas, clínicas y geriátricas antes y después del establecimiento de la OU.* **Métodos:** *Se realizó un análisis observacional, retrospectivo sobre 77 pacientes de 65 años o más admitidos con FC desde 2012 hasta 2017. Los pacientes se dividieron en dos grupos: los tratados antes y aquellos tratados después del establecimiento de la OU en marzo de 2015. Se*

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recopilaron y analizaron datos sobre variables demográficas, condiciones de salud, funcionalidad (usando el Índice de Barthel), duración de la hospitalización, mortalidad y costos asociados. La información se obtuvo de la historia clínica y se utilizaron medidas de confidencialidad para manejar la información de acuerdo con los principios de bioética. **Resultados:** *El estudio no encontró diferencias significativas en la edad promedio y la distribución de género entre los grupos. Mientras que la mayoría de los pacientes exhibieron dependencia leve en actividades diarias, la OU gestionó una proporción más alta de pacientes con dependencia total. Aunque la OU tuvo tasas de mortalidad bajas, esto no alcanzó significación estadística. La duración de la hospitalización se redujo significativamente en el grupo de la OU, indicando un proceso de tratamiento y recuperación más eficiente a pesar de un costo medio más alto. Antes de crear la Unidad Ortopediátrica, los indicadores del hospital mostraron que la estancia promedio fue de 11 días. Después de la implementación de la unidad, esto se redujo a un promedio de solo siete días. El costo total disminuyó 30% ($13588.22 vs $9814.04, antes y después de la unidad de ortogeriatría, respectivamente).* **Conclusión:** *El establecimiento de la Unidad Ortopediátrica en el HPNQ1 contribuyó a una gestión más eficiente de los pacientes mayores con fracturas de cadera, como lo demuestra la reducción de las longitudes de hospitalización. Estos hallazgos apoyan los beneficios potenciales de las OU en la mejora de los procesos y resultados de atención médica para esta población vulnerable, a pesar de los costos asociados más altos. Se justifica más investigación para explorar los impactos a largo plazo de las OU en la funcionalidad de los pacientes y las tasas de mortalidad.*

Palabras clave: *Geriatría. Ortogeriátrico. Fractura de cadera. Indicadores hospitalarios. Ecuatoriano. Ancianos.*

INTRODUCTION

Aging is characterized by changes that can increase the risk of presenting chronic diseases or mortality[1]. Globally, societies are experiencing a noticeable rise in life expectancy, leading to significant changes in population demographics and many public health concerns[2]. In Ecuador, according to the 2010 census of the National Institute of Statistics and Censuses (INEC)[3], the population of adults over 65-years-old surpasses 940,905, with projections indicating a rise in life expectancy from 75 to 80.5 years by 2050[3]. The demographic transition leads to an increase in the occurrence and prevalence of various health problems in the elderly population, particularly hip fractures (HFs). These fractures are considered a significant public health concern because they have serious consequences on the health and survival of older individuals[4,5].

In Spain, between 50,000 and 60,000 HFs were recorded in 2013, with a hospitalization rate of 100 admissions per 100,000 habitants. In-hospital mortality was 6%, with an average stay of 13-15 days[6]. The 6-month extra-hospital mortality was 13.5%, and after 1 year, the mortality was 24%[4]. According to statistics from the US, one in six women suffer from HFs[7], 30% of all fractures occur in men, and the mortality is higher, reaching double, in men compared to women[8].

HF involves three main difficult aspects: social, clinical, and economic. First, in the social aspect, impacts increase the risk of dependence and institutionalization since it is a source of disability, due to only 50% of the patients recovering their baseline functionality within 3 months[6]. Just 25% recover their ability to perform basic and instrumental activities of daily living within a year[4]. Then, in the clinical setting, HF requires urgent hospitalization, surgical intervention, early post-operative mobilization, and functional recovery[9]. At present, there is a great diversity in the types of care the patients receive and the results obtained in the different care parameters[10]. Finally, HF causes high costs at all levels of care[11] since 50-60% of the hospital budget is spent on this pathology because it requires attention on the acute phase, the recovery, and the subsequent rehabilitation[12].

HFs are mostly multifactorial[13]. Still, 90% of fractures are estimated to be secondary to falls[14]. Still, their causes include diabetes mellitus[15], polypharmacy[16], multimorbidity[17], cognitive decline[18], and disability to perform activities of daily living[19]. In Latin America, Chile is the country that does the most research on HF, and it has been reported that early surgery and orthogeriatric management are responsible for decreased mortality from HFs[20].

Due to the complexity of hospitalized older patients, Orthogeriatric units (OU) were created in the 1970s to provide interdisciplinary care to patients with HFs[21]. This model consists of cooperation between geriatrics and orthopedics, in which they provide joint care from admission until discharge, with shared responsibility for caring for older people with fractures to provide suitable clinical and functional recovery[11].

Research of these units is contradictory or at least limited[22]. Moreover, there is no conclusive evidence on which model (geriatric medicine consultation service, geriatric medical ward with orthopedic surgeon consultation service, or integrated care model) has better results for the patient[23]. Thereby, OUs are increasingly recommended in caring for patients with HFs because there is moderate-quality evidence that these units reduce the length of stay, hospital

mortality, and 1-year mortality in patients with HFs and may reduce complications and costs[24].

In Ecuador, the information about these units is scarce. Therefore, this study aims to analyze hospital indicators of care, sociodemographic, clinical, and geriatric variables before and after the implementation of the OU for older adults with an acute HFs at the Hospital de la Policia No. 1 Quito (HPNQ1) which is a third level hospital in Quito, Ecuador. It is important to recall that this unit is the only one in Ecuador.

METHODS

Participants

This study was observational, retrospective, and conducted at a single center. A non-probabilistic sampling method was used. It included participants aged 65 and older admitted to HPNQ1 from January 1, 2012, to December 31, 2017. The cohort comprised 77 older adults, with 36 patients enrolled before and 41 after the inauguration of the Orthogeriatrics unit. Eligibility for inclusion required admission due to HFs, as indicated by the international classification of diseases code (10, S72). Exclusion criteria encompassed individuals below 65 years of age, those with HFs resulting from high-energy trauma, or fractures secondary to pathological causes (e.g., malignancy). In addition, cases with incomplete medical records were omitted from the analysis.

Orthogeriatric unit

The OU was established at HPNQ1 in March 2015 to enhance the care of older adults with acute HFs. Before establishing the unit, these patients were primarily under the care of the Orthopedics service. Consultations with a geriatrician or internist occurred solely at the discretion of the orthopedic surgeon. With the advent of the OU, a collaborative approach was adopted between the Geriatrics and Orthopedics services, ensuring continuous medical oversight. This change instituted a new standard of care, characterized by uninterrupted geriatric evaluation of all patients from 2015 onward. The unit conducts a comprehensive geriatric assessment preoperatively to devise a personalized care plan. This plan focuses on stabilizing chronic conditions, averting potential complications, and enhancing the patient's readiness for surgery. Postoperatively, the emphasis shifts to encouraging early mobilization as part of the recovery process.

Data collection and measures

This study's data were extracted from patient medical records. Demographic variables such as age and sex were gathered, along with key health indicators commonly associated with HFs-specifically, osteoporosis, diabetes mellitus Type 2, dementia, and the overall burden of comorbidities.

Geriatric assessments were conducted at two critical junctures: upon admission and during the hospital stay. Before establishing the OU, comprehensive geriatric assessments were not systematically documented. However, three pivotal geriatric syndromes were consistently recorded, including the presence of polypharmacy, which aligns with the World Health Organization's definition of consuming five or more medications, a factor known to elevate the risk of falls[25], frailty[26], fractures[27], and disability[28].

Functional status before the occurrence of HFs was quantified using the Barthel Index. This scale assesses an individual's independence in ten essential daily activities such as feeding, personal hygiene, dressing, and mobility. The scoring cutoffs are as follows: > 99 for independence, 60 for mild dependence, 40 for moderate dependence, 20 for severe dependence, and five points for total dependence. Cognitive function was assessed with the Mini-Mental State Examination, a widely utilized screening tool developed by Folstein et al. in 1975, which evaluates various cognitive domains[29].

In addition, hospital care indicators, including perioperative and post-operative stays, overall hospitalization duration, mortality, and bed-day costs, were captured for a comprehensive analysis. The impact of geriatric interventions on clinical outcomes, healthcare processes, and economic factors was determined by contrasting the pre- and post-establishment periods of the OU. Thus, the effect of the unit's inception was discerned by comparing these hospital care indicators and economic implications from when only internal medicine services were available (before 2015) to after the unit began operations.

Statistical analyses

We reviewed the medical records of all patients surgically treated for HFs at HPNQ1 between January 1, 2012, and December 31, 2017. This study was designed to compare patient characteristics, comorbidities, and outcomes between the prior OU (POU) and the OU. Descriptive statistics were used to summarize

demographic and clinical data, with continuous variables expressed as mean and standard deviation (SD) for normally distributed data and median with range for non-normally distributed data. The normality of distribution for continuous variables was assessed using the Shapiro–Wilk test. Categorical variables were described using counts and percentages.

For normally distributed data, continuous variables between the two units were compared using an independent group t-test, which included variables such as patient age. The U Mann–Whitney test was employed for non-normally distributed data, such as the length of hospitalization and total cost. The Chi-square test (Pearson) was utilized to evaluate the association between units and categorical variables, including sex, marital status, presence of osteoporosis, occurrence of diabetes mellitus Type 2, and polypharmacy. The expected frequencies were too low for the Chi-square test, such as with the mortality variable, Fisher's exact test was applied to ensure accurate p-values, even with small sample sizes. The age-adjusted Charlson comorbidity index was analyzed using the U Mann–Whitney test due to its ordinal nature, and it was reported using median and range.

p-values were interpreted within a two-tailed hypothesis test framework with a conventional alpha level of 0.05 for statistical significance. All statistical analyses were conducted using SPSS Statistics 22 (IBM Corporation©).

RESULTS

Our analysis compared the outcomes of patients treated in a POU with those in a newly established OU, examining a range of variables to assess impacts on patient care and outcomes (Table 1). The study included 41 patients in the POU and 36 in the OU. The average age of patients in the POU was 82.02 years (SD = 7.6), compared to 83.06 years (SD = 9.5) in the OU, with no significant difference between the groups (p = 0.599). Gender distribution showed 61.0% females in the POU and 72.2% in the OU, which was not statistically significant (p = 0.298).

Marital status varied, with 12.2% single in the POU compared to none in the OU, suggesting a potential impact on social support structures post-treatment. However, this difference was not statistically significant (p = 0.120). Most patients in both units were married, indicating similar social status.

Health conditions and comorbidities

The prevalence of osteoporosis and diabetes mellitus Type 2 was similar, with no significant differences observed (p = 0.075 and p = 0.977, respectively). This suggests that the baseline health conditions of patients were comparable, allowing for a more direct comparison of the units' impacts. Significant differences were noted in polypharmacy, with the OU showing a higher percentage of patients not requiring more than three pharmaceuticals (86.1% vs. 48.8% in the POU, p = 0.001). This indicates a potentially more effective medication management strategy in the OU.

Functional outcomes and mortality

Based on the Barthel Index and other functionality measures, the groups' functionality scores did not significantly differ, suggesting that most patients in both units exhibit a similar level of functionality, predominantly categorized as mild dependency in performing basic daily activities. However, it is noteworthy that the OU managed a higher proportion of patients with total dependency (8.3%) compared to the POU, which accounted for only 2.4%.

Interestingly, mortality was 7.3% in the POU, with no deaths reported in the OU during the study period. However, this did not reach statistical significance (p = 0.243), possibly due to the small sample size.

Hospitalization and economic impact

The median length of hospitalization was significantly reduced in the OU (7 days) compared to the POU (35 days, p = 0.025), indicating a more efficient treatment and recovery process. In addition, the total cost was higher in the OU, with a median of $1238.78 compared to $942.55 in the POU (p = 0.025), reflecting the potential financial implications of the improved care model (Fig. 1).

DISCUSSION

The transition to an OU demonstrated a clear benefit regarding reduced hospitalization time, potentially reflecting enhanced efficiency in patient management and care processes. While the increase in total cost requires further analysis, it may suggest that the initial investment in specialized care can lead to more efficient use of resources in the long term.

Table 1. Demographic and health condition comparisons between prior and current orthogeriatric units

Variables	Prior orthogeriatric unit (n = 41)	Orthogeriatric unit (n = 36)	p-value
Age, mean, SD	82.02 ± 7.6	83.06 ± 9.5	0.599
Sex, n (%)			
Female	25 (61.0)	26 (72.2)	0.298
Male	16 (39.0)	10 (27.8)	
Marital status, n (%)			
Single	5 (12.2)	0 (0.0)	0.120
Married	26 (63.4)	24 (66.7)	
Widower	10 (24.4)	11 (30.6)	
Divorced	0 (0.0)	1 (2.8)	
Osteoporosis, n (%)			
No	18 (43.9)	15 (41.7)	
Yes	9 (22.0)	2 (5.6)	0.075
Without densitometry	14 (34.1)	19 (52.8)	
Diabetes mellitus 2, n (%)			
No	32 (78.0)	28 (77.8)	0.977
Yes	9 (22.0)	8 (22.2)	
Charlson index, median [range]	0 [0-4]	1 [0-5]	0.819
Age-adjusted charlson comorbidity index, median [range]	4 [2-9]	5 [2-9]	0.422
Polypharmacy, n (%)			
No (≤ 3 pharmaceuticals)	20 (48.8)	31 (86.1)	0.001
Yes (≥ 4 pharmaceuticals)	21 (51.2)	5 (13.9)	
Functionality, barthel index			
Independence	1 (2.4)	1 (2.8)	0.763
Slight dependency	28 (68.3)	25 (69.4)	
Moderate dependency	7 (17.1)	5 (13.9)	
Severe dependency	4 (9.8)	2 (5.6)	
Total dependency	1 (2.4)	3 (8.3)	
Cognition, n (%)			
No impairment	8 (19.5)	9 (25.0)	0.891
Doubtful	10 (24.4)	10 (27.8)	
Mild dementia	16 (39.0)	10 (27.8)	
Moderate dementia	6 (14.6)	6 (16.7)	
Severe dementia	1 (2.4)	1 (2.8)	
Mortality, n (%)*			
No	38 (92.7)	36 (100.0)	0.243
Yes	3 (7.3)	0 (0.0)	
Length of hospitalization (days), median [range]	35 [1-36]	7 [1-47]	0.025
Total cost (USD)**, median [range]	942.55 [26.93-969.48]	1238.78 [26.93-1265.71]	0.025

*Fisher exact test. Prior orthogeriatric unit = Internal Medicine. n, (%) Chi Pearson square. Median, [ ] U Mann–Whitney. Mean, SD t-test independent group.

Despite the non-significant differences in mortality and certain health conditions between the units, the significant reduction in polypharmacy prevalence and hospital stay length underlines the OU's effectiveness. These outcomes hint at the broader implications for healthcare systems aiming to integrate specialized geriatric care into their service offerings, suggesting that such models can lead to improved patient outcomes and potentially more sustainable healthcare practices.

According to the INEC registry, 3484 hospital discharges due to HFs are reported in Ecuador, with an annual rate of 314/100,00018[3]. This study evaluated 77 participants, with an average age of 82.5 (SD = 8.51). This is similar to the study published by Leal and his collaborators, who studied a cohort of 33,152 patients with HFs (mean age 83 years (SD 8.2)[11]. The sex prevalence is higher in women. It is very similar to the report by the INEC[3] and, at the international level, to the study of Close et al.[30]. In the same

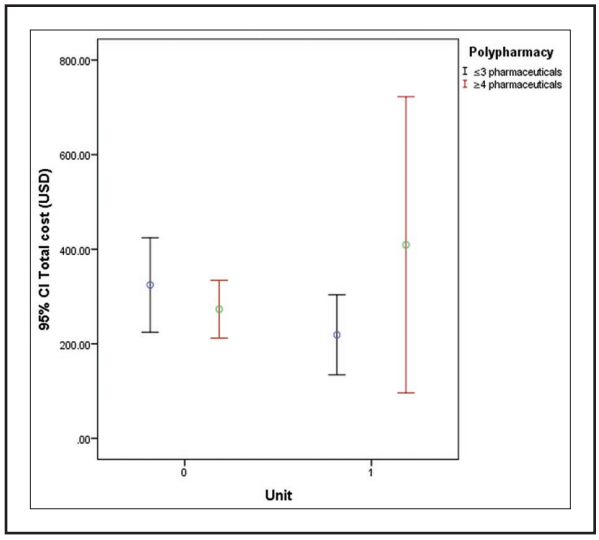

Figure 1. *Total cost comparison by pharmaceutical use between prior unit and orthogeriatric unit.*
Total hospitalization costs are stratified by the number of Pharmaceuticals used in the prior unit (0) and orthogeriatric unit (1). Error bars represent the 95% confidence interval for total costs. Blue indicates patients with ≤ 3 pharmaceuticals and red indicates patients with ≥ 4 pharmaceuticals.

vein with previous evidence, the results of this thesis indicate that the clinical characteristics are common, that is, there are no particularities in the OU.

The comorbid burden expressed by the Charlson index is a useful indicator for the prognosis and mortality of chronic diseases in the older population[31]. However, this study did not find a significant association within the HF, neither before nor after implementing the OU.

With this information, this study found that hospital indicators improve with implementing the OU. This goes in line with previous reports in which the hospital indicators have reported an improvement with the creation of this unit, as indicated by Sáez[32]. Likewise, the Balvis study carried out in Spain to investigate the utility of the OU, demonstrated that mortality during admission decreased from 10% in 2012 to 3.6% in 2017 (p = 0.004), while mortality at 30 days decreased (10.5% vs. 7%) (p = 0.123) and 1 year (28.9% vs. 24.9%) (p = 0.277). In the same study, they also reported a significant reduction in hospital stay time, surgical delay, and post-operative admission[33], with an estimated total annual economic savings thanks to integrated orthogeriatric care amounts to €1,017,084.94[10].

Our study showed that the pre-surgical stay was 48 h before and after implementing the OU, which shows that we are within international standards in HFs surgery[33]. Regarding economic factors, we showed that the establishment of the OU reduced about 30% of the budget allocated to HFs. However, the heterogeneity of the TNS (Ecuadorian national health tariff) and the surgical treatments did not allow for establishing a cost for each type of procedure, nor is it detailed in comparison.

The study's main strength is that, as far as the authors are aware, it is the first study in Ecuador to investigate the joint care between Geriatrics and Orthopedics and compare the hospital indicators before and after implementing an OU. In most of the studies on older adults with HFs, the demographic characteristics, mortality, complications, and functional recovery are analyzed; however, this work stands out for analyzing new variables concerning the existence of an OU such as three syndromes geriatric and hospital indicators. In the same vein, this study serves as the basis for generating improvement policies of care and promoting the development of Orthogeriatric programs that could be useful in other Ecuadorian and Latin American hospitals.

Limitations include the fact that this is a retrospective cohort study; the sample size was small for several reasons: first, there was a lack of budget designated for the acquisition of hip prostheses. Second, there is a lack of orthopedic surgeons trained in joint replacement. Third, orthopedic surgeries were prioritized for younger patients with few diseases, and it was a single-center study.

CONCLUSION

The introduction of an OU at HPNQ1 has been instrumental in improving hospital indicators for elderly patients with HFs. Our findings demonstrate that despite no significant differences in mortality rates and certain health conditions, the integration of geriatric expertise into orthopedic care has led to a substantial reduction in polypharmacy and the length of hospital stays.

Our analysis, one of the first in Ecuador to examine joint care between Geriatrics and Orthopedics, indicates that hospital indicators improve post-implementation of the OU. This aligns with international evidence suggesting enhanced outcomes and reduced costs with the creation of such units.

Our findings advocate for continued research into the long-term effects of integrated orthogeriatric care on patient outcomes, including functionality and mortality. Such efforts are crucial to reinforce the

evidence base for geriatric-orthopedic collaborative care models and to optimize resource allocation for HFs treatment in aging populations.

FUNDING

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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 no patient data appears 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 protocol of this study was reviewed and approved by the Institutional Ethics Committee at the HPNQ1 and the Human Research Ethics Committee of the Pontificia Universidad Católica del Ecuador (CB-105-2018). The study was conducted in accordance with the guidelines of the Declaration of Helsinki, Good Clinical Practice, and the rights of the Ecuadorian elderly. Informed consent was obtained from all participants despite the fact that this is a retrospective study and the data were analyzed anonymously.

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.

AVAILABILITY OF DATA AND MATERIALS

The datasets generated and/or analyzed during the current study must be requested from the main author through email.

REFERENCES

1. Mas-Bargues C, Alique M, Barrús-Ortiz MT, Borrás C, Rodrigues-Díez R. Special issue "Oxidative stress in aging and associated chronic diseases." Antioxidants. (Basel). 2022;11:701.
2. Schietzel S, Chocano-Bedoya PO, Sadlon A, Gagesch M, Willett WC, Orav EJ, et al. Prevalence of healthy aging among community dwelling adults age 70 and older from five European countries. BMC Geriatr. 2022;22:174.
3. Instituto Nacional de Estadística y Censos. Estadísticas Vitales en el Ecuador. Argentina: Instituto Nacional de Estadística y Censos; 2010.
4. Hannan EL, Magaziner J, Wang JJ, Eastwood EA, Silberzweig SB, Gilbert M, et al. Mortality and locomotion 6 months after hospitalization for hip fracture. JAMA. 2001;285:2736.
5. Alpantaki K, Papadaki C, Raptis K, Dretakis K, Samonis G, Koutserimpas C. Gender and age differences in hip fracture types among elderly: a retrospective cohort study. Maedica (Bucur). 2020;15:185-90.
6. Guevara X, Iparraguirre M, Menéndez R. Fractura de cadera. In: González P, Gutierrez J, editors. Manual del Residente en Geriatría. 1st ed. Madrid: Grupo ENE Life Publicidad, S.A; 2011. p. 461-70. Available from: https://www.segg.es/media/descargas/acreditacion%20de%20calidad%20segg/centrosdia/manualresidentegeriatria-2.pdf
7. Magaziner J, Simonsick EM, Kashner TM, Hebel JR, Kenzora JE. Predictors of functional recovery one year following hospital discharge for hip fracture: a prospective study. J Gerontol. 1990;45:M101-7.
8. Cawthon PM, Shahnazari M, Orwoll ES, Lane NE. Osteoporosis in men: findings from the osteoporotic fractures in men study (MrOS). Ther Adv Musculoskelet Dis. 2016;8:15-27.
9. Tarazona-Santabalbina FJ, Belenguer-Varea A, Rovira-Daudi E, Salcedo-Mahiques E, Cuesta-Peredó D, Doménech-Pascual JR, et al. Early interdisciplinary hospital intervention for elderly patients with hip fractures -functional outcome and mortality. Clinics (Sao Paulo). 2012;67:547-56.
10. Sermon A, Slock C, Coeckelberghs E, Seys D, Panella M, Bruyneel L, et al. Quality indicators in the treatment of geriatric hip fractures: literature review and expert consensus. Arch Osteoporos. 2021; 16:152.
11. Leal J, Gray AM, Prieto-Alhambra D, Arden NK, Cooper C, Javaid MK, et al. Impact of hip fracture on hospital care costs: a population-based study. Osteoporos Int. 2016;27:549-58.
12. Airam Pareja-Ríos P. Fractura de cadera en el anciano. A propósito de un caso. Ene. 2014;8(1). http://dx.doi.org/10.4321/S1988- 348X2014000100009.
13. Guerado E, Sandalio RM, Caracuel Z, Caso E. Understanding the pathogenesis of hip fracture in the elderly, osteoporotic theory is not reflected in the outcome of prevention programmes. World J Orthop. 2016;7:218-28.
14. Marks R. Hip fracture epidemiological trends, outcomes, and risk factors, 1970-2009. Int J Gen Med. 2010;3:1-17.
15. Gulcelik NE, Bayraktar M, Caglar O, Alpaslan M, Karakaya J. Mortality after Hip fracture in diabetic patients. Exp Clin Endocrinol Diabetes. 2011;119:414-8.
16. Lai SW, Liao KF, Liao CC, Muo CH, Liu CS, Sung FC. Polypharmacy correlates with increased risk for Hip fracture in the elderly. A population-based study. Medicine (Baltimore). 2010;89:295-9.
17. Menzies IB, Mendelson DA, Kates SL, Friedman SM. The impact of comorbidity on perioperative outcomes of hip fractures in a geriatric fracture model. Geriatr Orthop Surg Rehabil. 2012;3:129-34.
18. Chaudhry H, Devereaux PJ, Bhandari M. Cognitive dysfunction in hip fracture patients. Orthop Clin North Am. 2013;44:153-62.
19. Beaupre LA, Binder EF, Cameron ID, Jones CA, Orwig D, Sherrington C, et al. Maximising functional recovery following hip fracture in frail seniors. Best Pract Res Clin Rheumatol. 2013;27:771-88.
20. Dinamarca Montecinos J, Améstica Lazcano G, Carrasco Buvinic A. Mortalidad intrahospitalaria en adultos mayores chilenos con fractura de cadera: incidencia, causas y otros elementos de interés. Rev Chil Ortop Traumatol. 2018;59:41-6.
21. Grigoryan KV, Javedan H, Rudolph JL. Orthogeriatric care models and outcomes in hip fracture patients: a systematic review and meta-analysis. J Orthop Trauma. 2014;28:e49-55.
22. Long Y, Wang T, Xu X, Ran G, Zhang H, Dong Q, et al. Risk factors and outcomes of extended length of stay in older adults with intertrochanteric fracture surgery: a retrospective cohort study of 2132 patients. J Clin Med. 2022;11:7366.
23. Shigemoto K, Sawaguchi T, Horii T, Goshima K, Iwai S, Higashikawa T, et al. Multidisciplinary care model for geriatric patients with hip fracture in Japan: 5-year experience. Arch Orthop Trauma Surg. 2021;142:2205-14.
24. Van Heghe A, Mordant G, Dupont J, Dejaeger M, Laurent MR, Gielen E. Effects of orthogeriatric care models on outcomes of hip fracture patients: a systematic review and meta-analysis. Calcif Tissue Int. 2022;110:162-84.
25. WHO. The Third WHO Global Patient Safety Challenge: Medication without Harm. Switzerland: World Health Organization; 2019.
26. Pratt NL, Ramsay EN, Kalisch Ellett LM, Nguyen TA, Barratt JD, Roughead EE. Association between use of multiple psychoactive medicines and hospitalization for falls: retrospective analysis of a large healthcare claim database. Drug Saf. 2014;37:529-35.

27. Mahoney FI, Barthel DW. Functional evaluation: the barthel index. Md State Med J. 1965;14:56-61.
28. Varghese D, Ishida C, Hasser Koya H. Polypharmacy. In: StatPearls. Treasure Island, FL: StatPearls Publishing; 2024. Available from: https://www.ncbi.nlm.nih.gov/books/NBK532953 [Last accessed on 2023 Aug 28].
29. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975;12:189-98.
30. Close J, Swartz K, Deu R. Hip fracture in older patients: tips and tools to speed recovery. J Fam Pract. 2013;484-92.
31. Silva YG, Manteca YA, Fernández-Gómez M, Martín-Vallejo MJ, Martín-Vallejo J, Gallego HD. Utilidad del índice de comorbilidad de Charlson en personas ancianas. Concordancia con otros índices de comorbilidad. Rev Clin Med Fam. 2021;14:64-70.
32. Sáez M. Registro Nacional de Fracturas de Cadera por Fragilidad. Madrid; 2018. Available from: https://rnfc.es/wp-content/uploads/2019/11/informe-anual-rnfc-2018-1.pdf
33. Balvis-Balvis PM, Dominguez-Prado DM, Ferradás-García L, Pérez-García M, Garcia-Reza A, Castro-Menendez M. [Translated article] Influence of integrated orthogeriatric care on morbidity and mortality and length of hospital stay for hip fracture. Rev Esp Cir Ortopéd Traumatol. 2022;66:T29-37.

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ORIGINAL ARTICLE

Biochemical parameters for delirium in hospitalized older patients with COVID-19

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Abstract

Background: *Delirium marked by its significant impact on mortality during the coronavirus disease 19 (COVID-19) pandemic, exhibits different biochemical parameters.* **Objective:** *The objective of this study was to identify differences in biochemical parameters among patients who developed delirium during hospitalization, with and without COVID-19.* **Methods:** *Retrospective single-center study, persons aged 65 and older with delirium were enrolled, comparing those with and without COVID-19. Analyses encompassed biochemical parameters, comorbidities, hospital stays, and 30-day mortality. Descriptive and inferential statistics were incorporated.* **Results:** *Among 157 delirium patients, 61 had COVID-19. The COVID-19 group, characterized by older age, higher sodium, and lower albumin levels, extended hospital stays, and higher mortality, exhibited a significant difference in 30-day mortality through Kaplan–Meier analysis. Cox regression revealed a negative association between lower albumin levels and increased mortality. In the subgroup analysis, non-COVID-19 patients with mortality displayed lower glucose and albumin levels and prolonged hospital stays compared to the survival group. COVID-19 patients with mortality had lower hemoglobin, hematocrit, and albumin levels; and higher potassium compared to the survival group.* **Conclusion:** *We identified biochemical differences between COVID-19 and non-COVID-19 patients with delirium. Lower albumin levels were associated with increased mortality in delirium across both populations.*

Keywords: *Delirium. Coronavirus disease 19. Serum albumin.*

Parámetros bioquímicos de delirium en adultos mayores hospitalizados con COVID-19

Resumen

Antecedentes: *El delirium, marcado por su impacto significativo en la mortalidad durante la pandemia de COVID-19, demuestra diferentes paramétros bioquímicos.* **Objetivo:** *Identificar diferencias en parámetros bioquímicos entre pacientes con delirium hospitalizados, con y sin COVID-19.* **Métodos:** *Estudio retrospectivo en personas de 65 años o más con delirium, comparando aquellos con y sin COVID-19. Se analizaron los parámetros bioquímicos, comorbilidades, estancia hospitalaria y mortalidad a 30 días. Se incorporaron estadísticas descriptivas e inferenciales.* **Resultados:** *De 157 pacientes con delirium, 61 tenían COVID-19. El grupo COVID-19 eran más añosos, tenían niveles más altos de sodio y más bajos de albúmina, estancia hospitalaria prolongada y mayor mortalidad a 30 días mediante Kaplan-Meier. La regresión de Cox reveló asociación negativa entre niveles más bajos de albúmina y mayor mortalidad. En subgrupos, pacientes no COVID-19 con mortalidad mostraron niveles más bajos de glucosa y albúmina, y estancia hospitalaria prolongada. Los pacientes COVID-19 con mortalidad presentaron niveles más bajos de hemoglobina, hematocrito y albúmina, y niveles más altos de potasio.* **Conclusión:** *Existen diferencias bioquímicas entre pacientes con delirium, con y sin COVID-19, que bajos niveles de albúmina se asocian con mayor mortalidad en ambos grupos.*

Palabras clave: *Delirium. Coronavirus disease 19. Albúmina sérica.*

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INTRODUCTION

Considering the significant impact of delirium, particularly during the coronavirus disease 19 (COVID-19) pandemic, it becomes crucial to further explore the parameters associated with this condition. Delirium, characterized as an expensive, underrecognized, and fatal problem[1], exhibits varying prevalence rates across different populations[2,3]. In the community, its prevalence stands at 1-2%, while in hospitalized patients, it escalates to 15-30%[2,3]. Notably, reports from the US highlight that delirium complicates 20% of the 12.5 million hospitalized geriatric patients[2,4]. Its incidence rises with age, becoming more common in the 75-80 years age group, and varies based on the hospital context[5,6].

In Mexico, public institutions report a prevalence of 38.3% and an incidence of 12%, ranking delirium as the eighth cause of hospital admission[3]. Amidst the COVID-19 pandemic, the prevalence of delirium within this population surged to 24.3%, correlating with increased mortality among older patients affected by the disease[7]. In response to this concerning trend, guidelines, and recommendations have been formulated[8,9].

Furthermore, scales incorporating comorbidities and biochemical parameters have been developed to predict mortality in older adults with COVID-19[10]. Considering these developments and the existing gaps in understanding, our study aims to investigate the biochemical parameters related to delirium in patients within our population. The primary objective is to identify differences in biochemical parameters between patients who developed delirium during hospitalization with and without COVID-19. In addition, we seek to address the secondary objective of comparing survival rates in this population.

METHODS

Study design

This is a retrospective single-center study conducted at a general hospital in northeastern Mexico. This study was approved by our institutional board review with registration number R-2022-1909-04.

Participants

We enrolled patients aged 65-years and older who were admitted in our unit and developed delirium during their hospital stay. Delirium diagnosis required the presence of an acute onset, a fluctuating course, inattention, and either disorganized thinking or an altered level of consciousness, in accordance with the confusion assessment method.

Our study included two different populations. The control group comprised patients who did not receive a diagnosis of COVID-19 and were admitted between September 2019 and March 2020. Meanwhile, the study group consisted of individuals who had been diagnosed with COVID-19 using either PCR or antigen testing and were admitted in September 2020.

We excluded patients with a diagnosis of malignancy, end-stage renal disease undergoing replacement therapy, and cirrhosis or incomplete medical records.

Variables

Biochemical variables were assessed on patients' admission, encompassing a complete blood count, basic metabolic panel, albumin, and electrolyte values. In addition, we documented data on patients' comorbidities, as well as the length of hospital stays and mortality within 30 days from the initial admission.

Statistical methods

Distribution analysis was conducted using the Kolmogorov–Smirnov test. For parametric variables, the t-student test was employed, whereas non-parametric variables underwent analysis using the Mann–Whitney test. Binary variables were assessed using either the Chi-square or Fisher test. To estimate survival rates, Kaplan–Meier analysis and Cox regression were performed. The Statistical Package for the Social Sciences version 29 was utilized for data analysis.

RESULTS

A total of 157 patients who developed delirium during hospitalization were analyzed, with 61 of them diagnosed with COVID-19. Patient demographics are outlined in Table 1. The COVID-19 group showed a significantly older age (82.1 vs. 74.4 years, $p = 0.01$), higher serum sodium levels (140.7 vs. 137.3, $p = 0.004$), lower albumin levels (2.7 vs. 3, $p < 0.001$), longer hospital stay (9.7 vs. 5.6 days, $p < 0.001$), and higher mortality (47.5% vs. 14.5 %, $p < 0.001$) compared to the group without COVID-19.

Kaplan–Meier analyses revealed a noteworthy distinction in 30-day mortality following admission between the COVID-19 and non-COVID-19 groups (χ^2 [2] = 17.912, $p < 0.001$), indicating a statistically

Table 1. Patient demographics and biochemical parameters in Non-COVID-19 and COVID-19 groups

n = 157	Non COVID-19, n = 96 (%)	COVID 19, n = 61 (%)	p-value
Age** (years)	74.4 (7.1)	82.1 (7.5)	0.01
Male*	36 (37.5)	38 (62)	1.00
Female	60 (62.5)	23 (38)	
Comorbidities*			
Hypertension	75 (78.1)	40 (65.5)	0.83
Diabetes mellitus	51 (53.1)	23 (37.7)	0.07
Chronic kidney disease	24 (25)	8 (13.1)	0.06
Ischemic heart disease	18 (18.7)	10 (16.3)	0.7
Heart failure	17 (17.7)	6 (9.8)	0.17
Hypothyroidism	15 (15.6)	9 (14.7)	0.88
Chronic obstructive pulmonary disease	8 (8.3)	4 (6.5)	0.68
Hepatopathy	7 (7.2)	1 (1.6%)	0.11
Biochemical parameters**			
Hemoglobin (gr/dL)	11.2 (2.5)	11.3 (2.5)	0.75
Hematocrit (%)	33.7 (7.7)	34.2 (7.1)	0.67
White blood cells ($\times 10^9$/L)	9.9 (5.1)	11.3 (7.7)	0.17
Neutrophils ($\times 10^9$/L)	7.7 (5)	8.9 (6.1)	0.17
Platelets ($\times 10^9$/L)	221.2 (178.3)	220.4 (108.6)	0.97
Glucose (mg/dL)	141.3 (91.6)	136.5 (77.1)	0.73
Creatinine (mg/dL)	2.3 (3.2)	1.7 (1.8)	0.14
Blood urea nitrogen (mg/dL)	37.4 (31)	38.1 (32.2)	0.88
Urea (mg/dL)	80.1 (66.3)	81.7 (69.1)	0.88
Sodium (mEq/L)	137.3 (5.4)	140.7 (8.3)	0.004
Potassium (mEq/L)	4.2 (0.8)	3.9 (0.9)	0.8
Albumin	3 (0.5)	2.7 (0.6)	< 0.001
Discharge			
Hospital stay** (days)	5.6 (4.3)	9.7 (7.6)	< 0.001
Death– 30 days*	14 (14.5)	29 (47.5)	< 0.001

*Chi-square/fisher test; percent. **t student: standard deviation.
COVID-19: coronavirus disease 19.

significant difference. Survival curves depicted a clear separation between the two groups, with the COVID-19 group experiencing a significantly lower probability of survival over the observed period. Fig. 1 illustrates this difference in survival.

The Cox regression analysis revealed a significant association between lower albumin levels and increased mortality ($p = 0.04$). The coefficient for albumin levels was −1.12, indicating a negative effect on the log hazard. Exponentiating the coefficient (exp [−1.12]) yielded a hazard ratio of 0.32, with a 95% confidence interval of 0.15-0.69. This suggests that for each unit decrease in albumin levels, the hazard of mortality increased by a factor of 0.32, highlighting the heightened risk of mortality associated with lower albumin levels.

Sub analysis group

Within the non-COVID-19 group, 14 individuals experienced mortality within 30 days. These patients showed significantly lower levels of glucose (92.9 vs. 150.4, $p = 0.016$) and albumin (2.6 vs. 3.1, 0.022), as well as an extended hospital stay (6.6 vs. 5.4 days) compared to those who survived beyond the initial 30-day period (Table 2).

Within the COVID-19 group, 29 individuals experienced mortality within 30 days. These patients exhibited significantly lower levels of hemoglobin (10.6 vs. 12.1, $p = 0.016$), hematocrit (32.3 vs. 35.9, $p = 0.027$), and albumin (2.9 vs. 4.3, $p = 0.027$); higher levels of potassium (4.3 vs. 3.6, $p = 0.016$); and a higher prevalence of chronic obstructive pulmonary disease (COPD) (4 vs. 0, $p = 0.046$) compared to those who survived beyond the initial 30-day period (Table 3).

DISCUSSION

The study aimed to explore the influence of biochemical parameters on delirium among elderly patients, comparing those with and without COVID-19.

Table 2. Sub analysis of mortality within 30 days in Non-COVID-19 group

(n = 96)	Alive (82%)	Death (14%)	p-value
Age** (years)	74.3 (11)	76 (13)	0.32
Male*	29 (35.4)	7 (50)	0.29
Female	53 (64.6)	7 (50)	
Comorbidities*			
Hypertension	66 (80.5)	9 (64.3)	0.17
Diabetes mellitus	43 (52.4)	8 (57.1)	0.74
Chronic kidney disease	21 (25.6)	3 (23.1)	0.84
Ischemic heart disease	17(20.7)	1 (7.15)	0.22
Heart failure	13 (15.9)	4 (28.6)	0.24
Hypothyroidism	12 (14.6)	3 (14)	0.51
Chronic obstructive pulmonary disease	6 (7.3)	2 (14.3)	0.38
Hepatopathy	5 (6.1)	2 (14.3)	0.27
Biochemical parameters**			
Hemoglobin (gr/dL)	11.3 (3.7)	10.5 (4.5)	0.19
Hematocrit (%)	33.8 (9.6)	32 (13.6)	0.24
White blood cells (× 10^9/L)	9.6 (5.1)	11.5(9.4)	0.16
Neutrophils (× 10^9/L)	7.3 (4.4)	9.2(9.6)	0.17
Platelets (× 10^9/L)	227.6 (98)	179.6 (174)	0.18
Glucose (mg/dL)	150.4 (87)	92.9 (57.8)	0.016
Creatinine (mg/dL)	2.2 (1)	2.8 (1.5)	0.4
Blood Urea Nitrogen (mg/dL)	36.7 (29)	43.1 (31.3)	0.24
Urea (mg/dL)	78.6 (62.1)	51.5 (66.9)	0.26
Sodium (mEq/L)	137.1 (5)	138.4 (6)	0.73
Potassium (mEq/L)	4.2 (0.9)	4.2 (0.8)	0.95
Albumin	3.1 (0.7)	2.66 (0.7)	0.022
Discharge			
Hospital stay** (days)	5.4 (3)	6.6 (5)	0.041

*Chi-square/fisher test; percent. **Mann–Whitney U-test; interquartil range.
COVID-19: coronavirus disease 19.

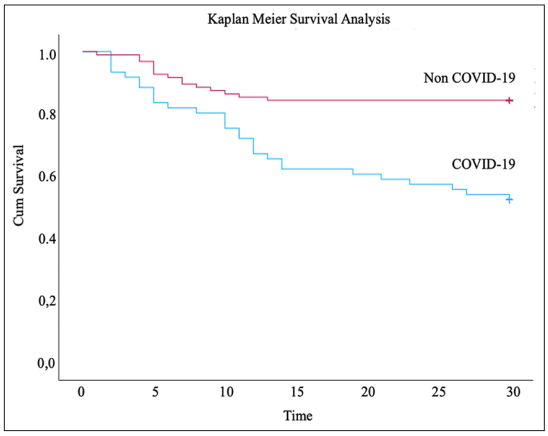

Figure 1. *Survival analysis: 30-day follow-up in non-COVID-19 and COVID-19 groups.*

In our study, electrolytes like sodium and potassium differed significantly between the two groups. Despite the difference, both values remained within normal ranges. In contrast, albumin levels were significantly low, indicating hypoalbuminemia, in both the COVID-19 and non-COVID-19 groups.

Our subgroup analysis further underscored the association between lower albumin levels and increased mortality in delirium, encompassing both COVID-19 and non-COVID-19 patient groups.

In older patients who developed delirium during hospitalization, albumin levels below 3.5 g/dL were a predictor of post-discharge mortality[11]. Hypoalbuminemia, often observed in acute illness due to increased capillary leak or reduced protein synthesis, inflammation, malnutrition, or synthetic liver dysfunction, a well-established predictor of mortality in hospitalized patients[12].

Recent research has highlighted the association between albumin levels and mortality. Chen et al. demonstrated that age independently predicted decreased albumin in COVID-19 patients, with a 4.4% increased risk of hypoalbuminemia per additional year of age[13].

Table 3. Sub analysis of mortality within 30 days in the COVID-19 group

(n = 61)	Alive (32)	Death (29)	p-value
Age** (years)	81.7	82.4	0.22
Male*	13 (40.6)	10 (34.5)	0.62
Female	19 (59.4)	19 (65.5)	
Comorbidities*			
Hypertension	20 (62.5)	20 (68.9)	0.59
Diabetes mellitus	11 (34.3)	12 (41.3)	0.57
Chronic kidney disease	3 (9.3)	5 (17.2)	0.36
Ischemic heart disease	4 (12.5)	6 (20.6)	0.38
Heart failure	1 (3.1)	5 (17.2)	0.064
Hypothyroidism	5 (15.6)	4 (13.7)	0.84
Chronic obstructive pulmonary disease	0	4 (13.7)	0.046
Hepatopathy	1 (3.1)	0	0.33
Biochemical parameters**			
Hemoglobin (gr/dL)	12.1 (2.2)	10.6 (3.9)	0.016
Hematocrit (%)	35.9 (7.5)	32.3 (10)	0.027
White blood cells ($\times 10^9$/L)	10.8 (6.7)	11.8 (6.35)	0.41
Neutrophils ($\times 10^9$/L)	8.9 (5.7)	8.9 (6.8)	0.44
Platelets ($\times 10^9$/L)	211.9 (116.4)	229.6 (151.5)	0.95
Glucose (mg/dL)	142 (75)	130.1 (90.5)	0.3
Creatinine (mg/dL)	1.2 (1)	2.2 (2.4)	0.35
Blood urea nitrogen (mg/dL)	28 (21)	49.3 (56.8)	0.9
Urea (mg/dL)	59.9 (44.9)	105.7 (119)	0.07
Sodium (mEq/L)	140 (7)	141. 5 (10)	0.49
Potassium (mEq/L)	3.6 (0.6)	4.3 (1.1)	0.016
Albumin	4.3 (1)	2.9 (0.5)	0.027
Discharge			
Hospital stay** (days)	9.1 (6)	10.3 (9)	0.46

*Chi-square/fisher test; percent. **Mann–Whitney U-test; interquartil range.
COVID-19: coronavirus disease 19.

Earlier studies indicated a decline in serum albumin concentrations, particularly in the presence of sepsis, poor liver function, and severe disease, with a more pronounced effect in men and, notably, in the context of COVID-19[14,15]. Reduced albumin in the elderly may be linked to factors such as altered dietary intake, changes in taste and smell, hormonal shifts affecting gastrointestinal motility, and variations in mood[16-18]. Electrolyte disorders and decreased blood volume in the systemic circulation during shock would probably cause multi-organic injuries throughout the body and accelerate the death of patients[19], therefore high-risk patients identified by our prediction rule may be appropriate candidates for interventions designed to prevent or reduce the impact of post-operative delirium. Strategies include close monitoring and correction of perioperative hypoxemia, hypotension, fluid and electrolyte imbalance, and severe anemia[20,21]. Predictive scales that consider biochemical aspects, such as the frailty index, include medical comorbidities, premorbid function in activities of daily living, laboratory markers (serum albumin and hemoglobin levels at admission), and geriatric syndromes such as malnutrition and cognitive impairment[10,22]. Other markers, such as lymphocyte and neutrophil counts, urea nitrogen, and aspartate transaminase, were associated with higher mortality in previous studies[18,23].

Kammar-García et al. demonstrated that diabetes, high blood pressure, and obesity were the only comorbidities that were statistically significant in adverse events suggesting that metabolic diseases are associated with COVID-19 severity[24].

The biochemical parameters hemoglobin, hematocrit, and albumin were notably diminished in the deceased patients, according to a sub-analysis of COVID-19 patients. Despite there being no gender difference in our analysis, deceased patients had anemia. Furthermore, while albumin levels in living patients were within normal ranges, those in deceased patients were significantly lower, indicating

hypoalbuminemia. Anemia is frequently associated with delirium and mortality in older adults, which is thought to be due to impaired oxygen transport to the brain[25,26]. Unfortunately, treating anemia with blood transfusions has not proven effective in treating delirium[27]. In a meta-analysis, anemia increased the risk of mortality 1.47 in COVID-19 patients, and our study aligns with that evidence[28].

The precise mechanism underlying the relationship between hypoalbuminemia and delirium has yet to be fully established. Nevertheless, there is a theory suggesting that protein-calorie malnutrition could potentially impact brain metabolism, considering the crucial function of albumin in the transportation of drugs and toxic substances. A low level of albumin in the blood may increase the concentration of drugs or toxic substances that are not bound to the blood-brain barrier, facilitating their absorption, and causing toxicity[29]. The previous reports have indicated that hypoalbuminemic patients experienced prolonged hospitalization and higher mortality rates, findings that align with our own study results[30,31].

The prevalence of diabetes mellitus, hypertension, and chronic kidney disease was found to be higher among patients without COVID-19; however, these differences did not reach statistical significance. It is important to mention that there exists a correlation between higher comorbidities and elevated susceptibility to delirium and mortality within this type of population[32,33]. When contemplating the potential reasons behind the lower prevalence of comorbidities among COVID-19 patients, it is pertinent to acknowledge that the frequency of delirium is higher in severe cases of COVID 19[34,35]. This may be attributed to its shared mechanisms with brain injury, such as endothelial dysfunction, silent hypoxia, and inflammation response[36]. However, some authors have proposed that there is no difference in the incidence of delirium[37,38].

In addition, COPD was present in the deceased but not in survivors in COVID-19 patients. It is worth noting that the prevalence of this comorbidity among patients was low. However, COPD doubles the risk of death in COVID-19 patients, delirium is common among this group, and our study observed this tendency[39,40].

It is imperative to acknowledge certain limitations in the study. The retrospective nature of the research inherently introduces constraints. We were unable to specify the cause of delirium. In addition, the relatively small sample size in both patient groups raise concerns about the generalizability of the findings, and potential selection bias in the comparison group necessitates careful consideration.

CONCLUSION

Patients who developed delirium with COVID-19 exhibited lower levels of albumin compared to those without COVID-19. In addition, lower levels of albumin were identified as being associated with an increased hazard of death within 30 days in patients diagnosed with delirium, regardless of whether they were afflicted by COVID-19. This study underscores the importance of investigating biochemical parameters in the context of a delirium, particularly in the presence of COVID-19. While the identified associations provide valuable insights, further research on a larger scale is necessary to enhance our understanding of long-term recovery and restoration to pre-hospitalization health status in affected patients.

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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. The authors have obtained approval from the Ethics Committee for the analysis and publication of routinely obtained clinical data. Informed consent from the patient was not required as it was a 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. Pranata R, Huang I, Lim MA, Yonas E, Vania R, Kuswardhani RA. Delirium and mortality in coronavirus disease 2019 (COVID-19) - a systematic review and meta-analysis. Arch Gerontol Geriatr. 2021;95:104388.
2. Inouye SK, Westendorp RG, Saczynski JS. Delirium in elderly people. Lancet. 2014;383:911-22.
3. Villalpando-Berumen JM, Pineda-Colorado AM, Palacios P, Reyes-Guerrero J, Villa AR, Gutiérrez-Robledo LM. Incidence of delirium, risk factors, and long-term survival of elderly patients hospitalized in a medical specialty teaching hospital in Mexico City. Int Psychogeriatr. 2003;15:325-36.
4. Inouye SK, Charpentier PA. Precipitating factors for delirium in hospitalized elderly persons. Predictive model and interrelationship with baseline vulnerability. JAMA. 1996;275:852-7.
5. Marcantonio ER. Delirium in hospitalized older adults. N Engl J Med. 2017;377:1456-66.
6. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382:1708-20.
7. Shao SC, Lai CC, Chen YH, Chen YC, Hung MJ, Liao SC. Prevalence, incidence and mortality of delirium in patients with COVID-19: a systematic review and meta-analysis. Age Ageing. 2021;50:1445-53.
8. Ruiz-Manríquez CA, García-Lara JM, Hernández-Ruiz VA, Negrete-Najar JP. Coronavirus disease-19 in the older persons: recommendations for a comprehensive inpatient care. J Latin Am Geriatr Med. 2020;6:55-61.
9. Aguilar-Navarro SG, Duarte-Flores JO, Granados-Valdéz MC, Suing-Ortega MJ, Mimenza-Alvarado AJ. Prevention, diagnosis and treatment of delirium in older adults with COVID-19. Literature review. Salud Mental. 2020;43:319-27.
10. Camacho-Moll ME, Ramírez-Daher Z, Escobedo-Guajardo BL, Dávila-Valero JC, Rodríguez-de la Garza BL, Bermúdez de León M. ABC-GOALScl score predicts admission to the intensive care unit and mortality of COVID-19 patients over 60 years of age. BMC Geriatr. 2023;23:138.
11. Lima DP, Ochiai ME, Lima AB, Curiati JA, Farfel JM, Filho WJ. Delirium in hospitalized elderly patients and post-discharge mortality. Clinics (Sao Paulo). 2010;65:251-5.
12. Kim TW, Ko RE, Na SJ, Chung CR, Choi KH, Park CM, et al. Associations of albumin and nutritional index factors with delirium in patients admitted to the cardiac intensive care unit. Front Cardiovasc Med. 2023;10:1100160.
13. Chen C, Zhang Y, Zhao X, Tao M, Yan W, Fu Y. Hypoalbuminemia - an indicator of the severity and prognosis of COVID-19 patients: a multicentre retrospective analysis. Infect Drug Resist. 2021;14:3699-710.
14. Zerbato V, Sanson G, De Luca M, Di Bella S, di Masi A, Caironi P, et al. The impact of serum albumin levels on COVID-19 mortality. Infect Dis Rep. 2022;14:278-86.
15. Huang J, Cheng A, Kumar R, Fang Y, Chen G, Zhu Y, et al. Hypoalbuminemia predicts the outcome of COVID-19 independent of age and co-morbidity. J Med Virol. 2020;92:2152-8.
16. Cabrerizo S, Cuadras D, Gomez-Busto F, Artaza-Artabe I, Marín-Ciancas F, Malafarina V. Serum albumin and health in older people: review and meta analysis. Maturitas. 2015;81:17-27.
17. Sullivan DH. What do the serum proteins tell us about our elderly patients? J Gerontol A Biol Sci Med Sci. 2001;56:71-4.
18. Luo Y, Xue Y, Mao L, Yuan X, Lin Q, Tang G, et al. Prealbumin as a predictor of prognosis in patients with coronavirus disease 2019. Front Med (Lausanne). 2020;7:374.
19. Qiu P, Zhou Y, Wang F, Wang H, Zhang M, Pan X, et al. Clinical characteristics, laboratory outcome characteristics, comorbidities, and complications of related COVID-19 deceased: a systematic review and meta-analysis. Aging Clin Exp Res. 2020;32:1869-78.
20. Marcantonio ER, Goldman L, Mangione CM, Ludwig LE, Muraca B, Haslauer CM, et al. A clinical prediction rule for delirium after elective noncardiac surgery. JAMA. 1994;271:134-9.
21. Pun BT, Badenes R, Heras La Calle G, Orun OM, Chen W, Raman R, et al. Prevalence and risk factors for delirium in critically ill patients with COVID-19 (COVID-D): a multicentre cohort study. Lancet Respir Med. 2021;9:239-50.
22. Lim JP, Low KY, Lin NJ, Lim CZ, Ong SW, Tan WY, et al. Predictors for development of critical illness amongst older adults with COVID-19: beyond age to age-associated factors. Arch Gerontol Geriatr. 2021;94:104331.
23. Mesas AE, Cavero-Redondo I, Álvarez-Bueno C, Sarriá Cabrera MA, Maffei de Andrade S, Sequí-Dominguez I, et al. Predictors of in-hospital COVID-19 mortality: a comprehensive systematic review and meta-analysis exploring differences by age, sex and health conditions. PLoS One. 2020;15:e0241742.
24. Kammar-García A, Vidal-Mayo JJ, Vera-Zertuche JM, Lazcano-Hernández M, Vera-López O, Segura-Badilla O, et al. Impact of comorbidities in Mexican sars-cov-2-positive patients: a retrospective analysis in a national cohort. Rev Invest Clin. 2020;72:151-8.
25. Culleton BF, Manns BJ, Zhang J, Tonelli M, Klarenbach S, Hemmelgarn BR. Impact of anemia on hospitalization and mortality in older adults. Blood. 2006;107:3841-6.
26. Al Farsi RS, Al Alawi AM, Al Huraizi AR, Al-Saadi T, Al-Hamadani N, Al Zeedy K, et al. Delirium in medically hospitalized patients: prevalence, recognition and risk factors: a prospective cohort study. J Clin Med. 2023;12:3897.
27. van der Zanden V, Beishuizen SJ, Swart LM, de Rooij SE, van Munster BC. The effect of treatment of anemia with blood transfusion on delirium: a systematic review. J Am Geriatr Soc. 2017;65:728-37.
28. Wang Y, Nan L, Hu M, Zhang R, Hao Y, Wang Y, et al. Significant association between anemia and higher risk for COVID-19 mortality: a meta-analysis of adjusted effect estimates. Am J Emerg Med. 2022;58:281-5.
29. Dickson LR. Hypoalbuminemia in delirium. Psychosomatics. 1991;32:317-23.
30. Klonoff-Cohen H, Barrett-Connor EL, Edelstein SL. Albumin levels as a predictor of mortality in the healthy elderly. J Clin Epidemiol. 1992;45:207-12.
31. Arnau-Barrés I, Pascual-Dapena A, López-Montesinos I, Gómez-Zorrilla S, Sorlí L, Herrero M, et al. Severe hypoalbuminemia at admission is strongly associated with worse prognosis in older adults with SARS-CoV-2 infection. J Clin Med. 2021;10:5134.
32. Seiler A, Blum D, Deuel JW, Hertler C, Schettle M, Zipser CM, et al. Delirium is associated with an increased morbidity and in-hospital mortality in cancer patients: results from a prospective cohort study. Palliat Support Care. 2021;19:294-303.
33. McCusker J, Cole M, Abrahamowicz M, Primeau F, Belzile E. Delirium predicts 12-month mortality. Arch Intern Med. 2002;162 457-63.
34. Otani K, Fukushima H, Matsuishi K. COVID-19 delirium and encephalopathy: pathophysiology assumed in the first 3 years of the ongoing pandemic. Brain Disord. 2023;10:100074.
35. Pagali S, Fu S, Lindroth H, Sohn S, Burton MC, Lapid M. Delirium occurrence and association with outcomes in hospitalized COVID-19 patients. Int Psychogeriatr. 2021;33:1105-9.
36. Anaya-Escamilla A, Martínez-Bravo LE, Jiménez-Castillo GA. COVID-19 and diabetes mellitus in cognitive impairment an undrawn relationship. Rev Mex Neuroci. 2023;24:13-1.
37. Bernard-Valnet R, Favre E, Bernini A, Oddo M, Chiche JD, Du Pasquier RA, et al. Delirium in adults with COVID-19-related acute respiratory distress syndrome: comparison with other etiologies. Neurology. 2022;99:e2326-35.
38. Dias R, Caldas JP, Silva-Pinto A, Costa A, Sarmento A, Santos L. Delirium severity in critical patients with COVID-19 from an Infectious Disease Intensive Care Unit. Int J Infect Dis. 2022;118:109-15.
39. Fu X, Wang L, Wang G, Liu X, Wang X, Ma S, et al. Delirium in elderly patients with COPD combined with respiratory failure undergoing mechanical ventilation: a prospective cohort study. BMC Pulm Med. 2022;22:266.
40. Poucineau J, Khlat M, Lapidus N, Espagnacq M, Chouaïd C, Delory T, et al. Impact of the COVID-19 pandemic on COPD patient mortality: a nationwide study in France. Int J Public Health. 2024;69:1606617.

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Gastric antral vascular ectasia (GAVE) in the elderly, from diagnostic inertia to resolution. Case report

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Abstract

Introduction: *Anemia due to gastrointestinal (GI) bleeding is common among the elderly. An important unusual etiology is gastric antral vascular ectasia (GAVE). Older patients are a heterogeneous population, that make them more vulnerable to disease approach discrimination.* **Case presentation:** *An 81-year-old woman with severe chronic anemia attributed to multifactorial causes. She had a story of melena for months and recurrent admissions with high transfusion requirements. After many hospitalizations at emergency room, she was assigned to the geriatrics service, requesting an upper endoscopy with the finding of GAVE, which was treated with an argon plasma application.* **Discussion***: Anemia is a common condition in up to 24% of the elderly. Although the etiology may be multifactorial, most of those with severe anemia have evidence of bleeding. The inertia of attributing its etiology to age and comorbid burden may lead to the neglect of intensive study approaches, limiting diagnostic accuracy and specific treatment.* **Conclusions:** *GAVE is an unusual cause of gastrointestinal tract bleeding, with up to 89% of patients suffering from iron deficiency anemia. Therefore, when approaching anemia etiology, it is essential to consider clinical history, due to the association with specific pathologies in the context of the complexity of the elderly person.*

Keywords: *Anemia. Gastric antral vascular ectasia. Elderly person.*

Ectasia vascular antral gástrica (EVAG) en adultos mayores, de la inercia diagnóstica a la resolución. Caso clínico

Resumen

Introducción: *La anemia debida a hemorragia gastrointestinal es frecuente entre adultos mayores. Una importante etiología inusual es la Ectasia Vascular Antral Gástrica (GAVE). Los pacientes de edad avanzada constituyen una población heterogénea, que los hace más vulnerables a la discriminación en el abordaje de la enfermedad.* **Presentación de caso:** *Mujer de 81 años con anemia crónica grave atribuida a causas multifactoriales. Presentaba un cuadro de melenas desde hacía meses e ingresos recurrentes con alta necesidad transfusional. Tras numerosas hospitalizaciones en urgencias, fue asignada al servicio de geriatría, solicitando endoscopia digestiva alta con hallazgo de GAVE, que fue tratada con aplicación de plasma de argón.* **Discusión:** *La anemia es una patología frecuente hasta en el 24% de los adultos mayores. Aunque la etiología puede ser multifactorial, la mayoría de los que presentan anemia grave tienen evidencia de hemorragia. La inercia de atribuir la etiología de la anemia a la edad y a la carga comórbida puede llevar a descuidar los enfoques de estudio, limitando la precisión diagnóstica y el tratamiento específico.* **Conclusiones:** *La GAVE es una causa inusual de hemorragia digestiva, con hasta un 89% de pacientes que padecen anemia ferropénica. Por lo tanto, al abordar la etiología de la anemia, es fundamental considerar la historia clínica, debido a la asociación con patologías específicas en el contexto de la complejidad del adulto mayor.*

Palabras clave: *Anemia. Ectasia vascular antral gástrica. Adulto mayor.*

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INTRODUCTION

Among the elderly, comorbidity, such as anemia due to gastrointestinal (GI) tract bleeding, is common. An infrequent but notable etiology is gastric antral vascular ectasia (GAVE), which is more common in women[1,2].

Anemia is a syndrome of high prevalence in the elderly (24%), which is directly associated with increased morbidity and death. It is caused in 34% by nutritional deficiency, 33% in relation to chronic diseases, and another 33% by an undetermined cause[3-5]. GI bleeding is a frequent cause of anemia and hospitalization in older adults. Mostly related to the high prevalence of the use of drugs such as non-steroidal anti-inflammatory drugs, Helicobacter pylori infection, and GI reflux[6,7].

GAVE, also known as "watermelon stomach", is caused by malformation of the blood capillaries, mainly in the gastric antrum. It is characterized by tortuous and dilated capillaries, in isolated or diffuse form, which can cause bleeding[8,9]. It represents 4% of non-variceal upper GI bleeding cases. Approximately 62% of patients present some autoimmune pathology, such as multiple sclerosis, hypothyroidism, or connective tissue such as systemic lupus erythematosus, 30% are associated with liver cirrhosis[8,10], it is also associated with chronic kidney disease, systemic arterial hypertension, arterial disease, components of metabolic syndrome, and bone marrow transplantation, among other entities[1,2,8,11].

It is estimated to be more common in women in the sixth and eighth decades of life[1,2,12]. Although pathophysiology is not entirely clear, it has been related to lesions mediated by hormonal alterations and mechanical damage, such as increased prostaglandin E2 levels, gastric mucosal protein antibody cross-reactions, and increased antrum pressure[12]. Recently, its association with metabolic syndrome is been investigated, use of tyrosine kinase inhibitors and mTOR inhibitors[13,14]. Patients with this condition may be asymptomatic or have manifestations of upper GI bleeding with melena and hematemesis[15]. A common sign is the presence of persistent iron deficiency anemia, needing multiple transfusions[4,16].

Diagnosis is made by endoscopy, where characteristically red and angiomatous lesions are observed. At present, 3 phenotypes are known: type 1 or classic, which has the characteristic "watermelon lines"; type 2, which presents scattered angiodysplasias with diffuse antral distribution; and type 3, which represents a nodular variant[11]. It is worth mentioning that this pathology can also present in the proximal cardia as a patch. Histologically, the presence of dilated mucosal capillaries with fibrin thrombi, spindle cells, and fibromuscular hyperplasia of the lamina propria is appreciated, although histopathology is not essential to making the diagnosis[8,11,17]. Endoscopy makes it possible to identify the origin of the bleeding and to choose the most appropriate therapy. This study has the same indications in the elderly and in young people, being safe as long as comorbidities are taken into account and it is identified if any increased risk of complications during endoscopy and relevant recommendations are made[6].

Pharmacological treatment has not demonstrated efficacy[12,17], so the endoscopic treatment modality by means of argon plasma coagulation is considered the first line of treatment. In the second place, radiofrequency ablation is the treatment of choice, with antrectomy remaining in last place for refractory cases[11,12].

At present, in Mexico, 12% of the population is made up of people over 60 years old[18]. Due to the progressive aging of the population in our country, patients present greater complications and comorbidities[6,7]. The elderly are a heterogeneous and complex population, which makes them vulnerable to discriminatory attitudes, and Mexico is a country with a high prevalence of agism[19-21].

CLINICAL CASE

The patient is an 81-year-old female with severe chronic anemia, with repercussions on her quality of life since she has required multiple admissions to the emergency department. She has presented with a clinical picture characterized by asthenia, adynamia, and dyspnea for several months of evolution, with the addition of melena for the past 6 months. The patient has an important history: severe aortic stenosis in protocol by cardiology for transcatheter aortic valve implantation, primary hypothyroidism, clinical stage IV clear cell renal cancer with bone metastases, for which she required a left nephrectomy in 2015 and was treated with pazopanib (a tyrosine kinase inhibitor) for 4 years until before her hospital admission. Due to her multiple comorbidities, the patient has been evaluated by multiple specialties, including nephrology, medical oncology, cardiology, and hematology, attributing, all of them, severe chronic anemia to multifactorial situations in relation to her comorbidities. It should be noted that once the patient recovers hemoglobin levels above 7 g/dL, she is totally independent.

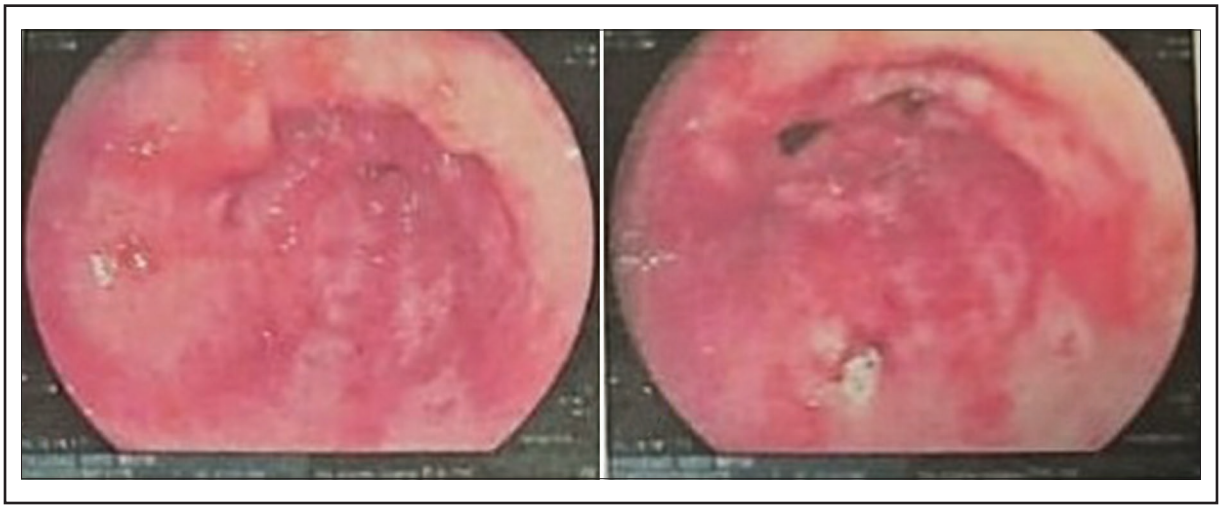

Figure 1. *Endoscopic images showing the presence in the gastric antrum of subepithelial vascular lesions radiating to the pylorus, with adherent clot, hypervascular mucosa.*

After exacerbation of asthenia, adynamia, and dyspnea, the patient was transferred by her son to the emergency department where she was identified with severe anemia (hemoglobin 3.9 g/dL), so transfusion of blood products was started, and she was admitted to the internal medicine floor where she was evaluated and accepted by the geriatrics department. In the direct interrogation, it was detected that in the past 6 months, the patient had visited the emergency department four times for anemia, requiring transfusion of erythrocyte concentrates in all of them: five in the first stay, three in the second, four in the third, and four in the fourth. Despite this alarming situation, she has only been treated, in addition to the transfusions, with ferrous fumarate, folic acid, B complex, and erythropoietin. No exhaustive protocol has been set up to establish possible etiologies other than her underlying comorbidities. Due to the lack of compatible donors with her hematotype, the transfusion time was prolonged, and, therefore, an upper endoscopy was performed. When this study was performed, antral gastric vascular ectasia was identified (Fig. 1), which was treated with argon plasma coagulation. After this procedure, she was kept under surveillance for 96 hours without bleeding data, so she was discharged home with hemoglobin of 9.1 g/dL and surveillance in the outpatient clinic due to the risk of recurrence. After diagnosis, she has required two argon plasma coagulations; the last one was in June 2023. Since then, there has been no evidence of GI bleeding or severe anemia.

Ethical considerations

This report contains a clinical case; it was necessary to get the approval of the directors and education coordinators of the hospital. In addition to the authorizations and signatures of informed consent by the patient.

DISCUSSION

Upper GI bleeding in the elderly is a common pathology, representing up to 63% of all cases in the general population[22]. The GAVE clinical characteristic presentation is the presence of melena and iron deficiency anemia[9]. Although anemia is a prevalent condition in older adults, it is also associated with comorbidities such as cognitive impairment, depression, decreased quality of life and functionality, and increased mortality[4]. Given these potential negative outcomes, it is extremely important to perform an exhaustive and orderly protocol to identify treatable causes of anemia. In this case, the assessment by multiple specialists who attributed the anemia to multifactorial situations and even to avoid denying specific treatment. Another particular situation is the delay in the performance of paraclinical studies due to the shortages that exist in the health sector of our country, added to the fact that the prioritization of older adults places them at the bottom of the hierarchical list, to the detriment of their health. In this case, the endoscopy took 3 weeks to be performed.

Although GAVE only represents 4% of non-variceal GI tract bleeding[4,8], in our country, there are still no statistics on this pathology. Therefore, it is important to identify patients with other causes of bleeding as generators of anemic syndromes in the elderly.

In this case, the patient has comorbidities that are related to a higher prevalence of GAVE, such as hypothyroidism, a history of clear cell renal cancer treated for 4 years with a tyrosine kinase inhibitor (pazopanib), renal disease secondary to nephrectomy, and valvular heart disease with severe aortic stenosis.

The treatment of choice in this pathology is endoscopy with argon plasma coagulation, with an efficacy of 90-100%; however, it has a recurrence rate of 35.5% at 2 years[11].

CONCLUSION

Antral vascular ectasia is a rare pathology of upper GI tract bleeding, which in 89% of patients causes episodes of iron deficiency anemia[8]. Anemia is associated with an increased decrease in quality of life, physical and cognitive impairment, as well as increased morbidity and mortality[5]. Considering that up to 24% of patients with anemia are older adults, who generally present multiple comorbidities[21], it is extremely important to investigate the etiology of anemia so as not to fall into diagnostic and therapeutic inertia, since GAVE is usually associated with specific and guiding pathologies in the context of the complexity of the older adult.

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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. 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. Parrado RH, Lemus HN, Coral-Alvarado PX, López GQ. Gastric antral vascular ectasia in systemic sclerosis: current concepts. Int J Rheumatol. 2015;2015:762546.
2. Kichloo A, Solanki D, Singh J, Dahiya DS, Lal D, Haq KF, et al. Gastric antral vascular ectasia: trends of hospitalizations, biodemographic characteristics, and outcomes with watermelon stomach. Gastroenterol Res. 2021;14:104-11.
3. Gómez-Ramírez S, Remacha-Sevilla AF, Muñoz-Gómez M. Anemia del anciano. Med Clin (Bar). 2017;149:496-503.
4. Ershler WB. Unexplained anemia in the elderly. Clin Geriatr Med. 2019;35:295-305.
5. Manzarbeitia-Arambarri J, Avira-Rasal B, De la Fuente Gutiérrez C. Anemia en el anciano. En: Abizanda-Soler P, editor. Tratado de Medicina Geriátrica. Segunda Edición. España: Elsevier; 2020. p. 1054-63.
6. Plaza-Santos R, Froilán-Torres C, Martín-Arranz MD, Suárez De Parga JM, Adelguel-Martínez M. La hemorragia digestiva alta en el paciente anciano mayor de 80 años. Rev Esp Geriatr Gerontol. 2012;47:110-3.
7. Martínez-Reig M, Romero-Rizos L, Abizanda-Soler P. Enfermedades más frecuentes del tracto intestinal en el anciano. En: Abizanda-Soler P, editor. Tratado de Medicina Geriátrica. España: Elsevier; 2020. p. 1130-43.
8. Fortuna L, Bottari A, Bisogni D, Coratti F, Giudici F, Orlandini B, et al. Gastric Antral Vascular Ectasia (GAVE) a case report, review of the literature and update of techniques. Int J Surg Case Rep. 2022;98:107474.
9. Mali P, Komanapalli S, Rall C. Gastric Antral Vascular Ectasia (GAVE): when to suspect as the cause of anemia or bleeding. Official Journal of the American College of Gastroenterology ACG. 2015;110:1018-9.
10. Hajj WE, Nahon S. Hemorragia digestiva alta. EMC. 2022;0(E):1-0650.
11. Domínguez-García MR, Hernández-Mondragón OV, Solórzano-Pineda OM. Tratamiento endoscópico con argón plasma híbrido en ectasias vasculares refractarias a argón plasma convencional. Endoscopia. 2020;32:360-72.
12. Peng M, Guo X, Yi F, Shao X, Wang L, Wu Y, et al. Endoscopic treatment for gastric antral vascular ectasia. Ther Adv Chronic Dis. 2021;12:1-11.
13. Smith E, Davis J, Caldwell S. Gastric antral vascular ectasia pathogenesis and the link to the metabolic syndrome. Curr Gastroenterol Rep. 2018;20:1-7.
14. Hata K, Yasue K, Ishii G, Kimura T, Egawa S. Everolimus-induced gastric antral vascular ectasia in advanced renal cancer. IJU Case Rep. 2020;3:293-6.
15. Hsu WH, Wang YK, Hsieh MS, Kuo FC, Wu MC, Shih HY, et al. Insights into the management of gastric antral vascular ectasia (watermelon stomach). Ther Adv Gastroenterol. 2018;11:1-9.
16. Smith E, Tekola B, Patrie J, Cornella S, Caldwell S. Clinical characterization of gastric antral vascular ectasia: a potential manifestation of the metabolic syndrome. Am J Med. 2016;129(12):1329.e19-23.
17. Olivia OJ, Romero AV, Soto JC, Oyala MD, Balbuena MV, Baeza GC, et al. Ectasia vascular gástrica antral: reporte de un caso. Endoscopia. 2014;26(3):104-8.
18. Organización Mundial de la Salud. Década de Envejecimiento Saludable 2020-2030 (Internet); 2020. Available from: https://www.who.int/es/publicationsm/item/decade-of-healthy-ageing-plan-of-action [Last accessed on 2023 Mar 02].
19. INEGI. Estadísticas a Propósito del día Internacional de las Personas Adultas Mayores (October 1st) 2021. Available from: https://www.inegi.org.mx/contenidos/saladeprensa/aproposito/2021/eap_adulmayor_21.pdf [Last accessed on 2023 Mar 02].
20. Organización Mundial de la Salud. Informe Mundial Sobre el Envejecimiento y la Salud; 2015. Available from: https://www.who.int/es/publications/i/item/9789241565042 [Last accessed on 2023 Mar 02].
21. Milton C, De la Fuente-Nuñez V, Officer A, Krug E. Ageism: a social determinant of health that has come of age. Lancet. 2021;397(10282):1333-4.
22. Rivilla-Marugán L, Lorente-Aznar T, Molinero-Rodriguez M, García-Erce JA. Anciano y anemia: revisión crítica de su definición y prevalencia. Rev Esp Geriatr Gerontol. 2019;54(4):189-94.

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Use of social networks in the elderly: impact on well-being and health-related decision making

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Abstract

There is limited information regarding the use of social media and its impact on older individuals. An anonymous survey was performed through Survey Monkey platform on the use of social media, their impact on well-being and influence on health-related decision making among people over 60 years of age. A descriptive analysis was conducted on the answers using IBM SPSS Statistics. One hundred and seventy-eight people answered anonymously. About 92.7% claimed to use social media. About 87.6% use social media 1-4 h daily. The purpose of use was entertainment (25%) and keeping in touch with family and friends (49.4%). About 45% made health-related decisions based on information received from social media. About 51% reported an improved perception of well-being. About 84.8% considered it important for the elderly to know how to use them. Nine out of 10 people over 60 years of age use social media on a daily basis. Of these adults, one out of two stated that their use influences their well-being and close to half of them have made a health-related decision based on the information received. This observational study confirms the relevance of technological advancement in conjunction with global aging.

Keywords: *Social media. Elderly. Well-being. Decision-making.*

Uso de redes sociales en la persona mayor: impacto en bienestar y decisiones relacionadas a salud

Resumen

Existe poca información del uso de redes sociales y su impacto en la persona mayor. Se realizó una encuesta anónima mediante la plataforma Survey Monkey a personas mayores de 60 años sobre uso de redes sociales, impacto en bienestar e influencia en la toma de decisiones relacionadas a salud. Se realizó un análisis descriptivo de las respuestas en IBM SPSS Statistics. 178 personas contestaron anónimamente. 92.7% afirmó usar redes sociales. 87.6% usan las redes 1 a 4 horas diarias. Los objetivos de uso fueron entretenimiento (25%) y mantener contacto con familia y amigos (49.4%). 45% tomó decisiones relacionadas a salud por información recibida de redes y 51% refirieron mejoría en su percepción de bienestar. El 84.8% considera importante que las personas mayores sepan utilizarlas. 9 de cada 10 personas mayores de 60 años usan redes sociales diariamente. De estos adultos, uno de cada dos refieren que su uso influye en bienestar y casi la mitad ha tomado alguna decisión relacionada a salud con la información recibida. Este estudio observacional nos confirma la relevancia del avance tecnológico en conjunto con el envejecimiento global.

Palabras clave: *Redes sociales. Adultos mayores. Bienestar. Toma de decisiones.*

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INTRODUCTION

With the current global aging, the use of social media in the elderly population is becoming increasingly frequent and there is limited evidence in the literature describing the effects of its use in this sector of the population. According to cotton's review[1], 45% of individuals aged 65 years or older use social networks, with Facebook being the most used, however, the percentage of its use in institutionalized individuals is lower. The elderly use social networks to maintain contact with family and friends, as social isolation due to geographic location, changes in social support and companionship networks, or functional limitations are common. During the coronavirus disease 19 pandemic, many families and friends kept in touch through digital platforms, which demonstrated a relation with the decrease of negative emotions in the elderly. Three previous studies indicate that there is a relationship between the use of social networks and video calls with a decrease in the perception of loneliness in this population. Older adults who did not use these means of communication felt a greater sense of abandonment by their loved ones than those who did use them[2,3].

The ENDUTIH Survey (Encuesta Nacional sobre Disponibilidad y Uso de Tecnologías de la Información en los Hogares) performed in México in 2022, reported that in urban areas, 83.8% of the population aged 6 and older used the internet, whereas in rural areas, 62.3% of the population utilized this tool. The primary uses of the internet were for communication (93.8%) and entertainment (89.6%). The age group with the highest percentage of internet users was the 18 to 24 age, with a participation rate of 95.1%. The age group with the lowest internet usage was those aged 55 or older, with a participation rate of 47.6%[4].

Social networks are also used as a platform for health information distribution that is easily accessible to the public, although there is no entity that moderates or filters the information adequately[5].

In a study on the influence of social networks on health motivation, it was reported that elderly people find the information useful and entertaining, playing an important role in their motivation, directly encouraging them to continue using the tools proposed by physicians[6]. A cross-sectional study including 100 participants aged 60 years or older, recruited from geriatrics clinics of a tertiary care university, reported that the use of mobile phone was of 55% and it was associated 70% of lower probability of having a diagnosis of depression after age, sex, partner status, comorbidities and global cognitive performance ($p < 0.005$)[7]. The aim of this study was to determine the prevalence and characteristics of the use of social networks in individuals over 60 years of age, as well as their impact on self-perception of well-being and health-related decision-making.

METHODS

An electronic survey was conducted among individuals aged over 60 years through the Survey Monkey platform (Survey Monkey, https://www.surveymonkey.com/). The survey could be answered by anyone over 60 years of age with the ability to use electronic devices and consent to anonymous participation. The survey was disseminated through the social media platforms Facebook and WhatsApp. It was shared with geriatrics specialists who further distributed it among their patients. The survey remained open for 30 days, during which time the data was collected.

Results were then coded in Excel (Microsoft Office Excel, Microsoft) and a descriptive statistical analysis was conducted using SPSS (SPSS Statistics, IBM). Categorical variables were described with the absolute number of patients and their respective percentages. Given the descriptive nature of this study, no statistical tests were performed to estimate values of statistical significance (p-value).

RESULTS

One hundred and seventy-eight patients met the inclusion criteria and decided to answer the survey anonymously. The proportion of patients in each age range, the prevalence of social media usage, and characteristics of their usage time are presented in Table 1. The vast majority of patients (148, 83.1%) fell within the 60-70 age range, while fewer were in the 71-80 age group (20, 11.2%), and almost none were aged 81-90 and over 90 years (9, 5.1% and 1, 0.6%, respectively). The majority of the sample population reported using social networks (165, 92.7%). Among all social media platforms, the most used was Facebook (104, 58.4%), followed by Instagram (17, 9.6%). Few individuals use Twitter or TikTok (4, 2.2% each). Thirty-six patients (20.2%) reported using another social network not included in these options. Of these patients, the vast majority reported using WhatsApp (33, 18.5% of the total sample).

Subsequently, patients reported their daily usage time for social media. The vast majority responded using them < 1 h or 2-4 h daily (38.2% and 49.4%,

Table 1. Characteristics of social media usage in people over 60 years old

Variable	Absolute result (percentage)
Age range/	
60-70	148 (83.1)
71-80	20 (11.2)
81-90	9 (5.1)
Over 90	1 (0.6)
Uses social media/	
Yes	165 (92.7)
No	13 (7.3)
Most used social media/*	
Facebook	104 (58.4)
Instagram	17 (9.6)
Twitter	4 (2.2)
Tik Tok	4 (2.2)
Other	36 (20.2)
Use of another social media not mentioned in previous categories/*	
Whatsapp	33 (18.5)
Equal usage of all	1 (0.6)
Whatsapp and Youtube	3 (1.7)
Whatsapp and Messenger	1 (0.6)
Youtube	5 (2.8)
Hours per day spent on social media/*	
Less than an hour	68 (38.2)
2-4 hours daily	88 (49.4)
5-7 hours daily	7 (3.9)
8-10 hours daily	1 (0.6)
Main purpose for using social media/*	
Learning	13 (7.3)
Finding a partner	2 (1.1)
Entertainment	45 (25.3)
Global news	7 (3.9)
Health information	4 (2.2)
Keeping in touch with family and friends	88 (49.4)
Other	5 (2.8)
Other objective (s)/*	
Work	1 (0.6)
Providing a service	1 (0.6)
News and tutorials	1 (0.6)
Viewing information about friends and family and other topics of interest	1 (0.6)
Viewing information about family and health topics	1 (0.6)

/Result expressed in absolute number (percentage).
*Some patients did not have a response available in this section, so the sum of the (percentage) is not 100%.

respectively). When asked about the primary purpose for using social media, the two most common responses were entertainment and staying in touch with family and friends (45, 25.3% and 88, 49.4%).

Furthermore, participants were asked the following questions: (1) Has the information you obtain from social media led you to make decisions related to your health?, (2) Do you believe that social media contributes to making you feel better on a daily basis?, (3) Do you consider it important for all elderly individuals to know how to use social media?, (4) Do you believe that social media has a negative impact on your health?, (5) Why do you believe that social media has a negative impact on your health?, and (6) What activity would you do instead, if social media did not exist? The distribution of responses to these questions is summarized in Table 2. Responses regarding the influence of social media on health-related decisions and daily well-being were evenly split, with similar proportions for those who did and did not report such effects. However, a significant majority (84.8%) expressed the importance of elderly individuals being proficient in using social media. Conversely, a majority (78.7%) believed social media had a negative impact on health, citing

Table 2. Use of social media and wellness perception

Variable	Results
Has the information you obtain from social media led you to make decisions related to your health?/*	
Yes	80 (44.9)
No	85 (47.8)
Do you believe that social media contributes to making you feel better on a daily basis?/*	
Yes	91 (51.1)
No	74 (41.6)
Do you consider it important for all elderly individuals to know how to use social media?/*	
Yes	151 (84.8)
No	13 (7.3)
Do you believe that social media has a negative impact on your health?/*	
Yes	22 (12.4)
No	140 (78.7)
Why do you believe that social media has a negative impact on your health?/*	
Distraction	4 (2.2)
Addiction and time consumption	18 (10.1)
Generates misinformation and misleading health information	22 (12.4)
Does not specify what is negative	24 (13.5)
Affects eyesight	2 (1.1)
Affects memory	1 (0.6)
There is negative content on social media	1 (0.6)
Due to the pandemic	1 (0.6)
Negatively impacts learning	1 (0.6)
What activity would you do instead, if social media did not exist?	
Physical activity	32 (18.0)
Read	47 (26.4)
Watch TV	18 (10.1)
Socialize with people	29 (16.3)
Knit and other manual activities	11 (6.2)
Listen to music	3 (1.7)
Garden and household chores	4 (2.2)
Have personal time	1 (0.6)
Take outdoor walks	2 (1.1)

/Result expressed in absolute number (percentage).
*Some patients did not have a response available in this section, so the sum of the (percentage) is not 100%.

potential addiction and the spread of misinformation as primary concerns. Regarding alternative activities, reading, socializing, physical activity, and watching TV were among the most mentioned pursuits.

DISCUSSION

In a study conducted by Rachel Clark and Gail Moloney investigating the relationship between older adults and the use of Facebook to meet their psychological needs, it was shown that using this social network generates a sense of competence, connection, autonomy, and higher levels of mobility, which are necessary for older adults to increase their quality of life and perception of well-being[8]. A systematic review evaluated quantitative and qualitative studies published in English between 2002 to 2015 on the effectiveness of Information and Communication Technologies (ICT) mediated social isolation interventions for elderly people. Twenty-five publications were included in the review. ICT use was consistently found to affect social support, social connectedness, and social isolation positively. Although most of the studies were positive, some studies found a nonsignificant or negative impact[9]. In this descriptive exploratory study, we identified that nine out of 10 individuals aged over 60 use social media for various reasons, primarily to stay in touch with family and friends, entertainment, and learning activities. The prevalent usage time ranges from 2 to 4 h daily. In 44% of individuals, the information received on social media has made them make decisions related to their health and in more than half of this population; using social media has contributed to an improvement in their daily lives.

Most of this population (78.7%) does not consider that the use of social networks has a negative impact on health, although they do recognize that they can generate misleading information and addiction. When asked about activities they would engage in if they did not have access to social media, the responses highlight physical activity, reading, and socializing, which are highly associated with improved well-being. Surprisingly, watching television ranks fourth in prevalence.

Astacio and colleagues conducted a systematic review with the aim of evaluating the efficacy of interventions based on the use of ICT for the promotion of active aging in people older than or equal to 65 years who live in the community. The use of virtual reality was demonstrated for exercise, memory training, rehabilitation and adherence to medical treatment in multiple studies. The greatest barrier to their use was the lack of knowledge about the access and use to these technologies[10].

Evidence prove that the use of social media can provide physical and mental health benefits for the elderly[11]. This initial descriptive study provides information on the impact on well-being perception and health-related decision-making in this population group, emphasizing its significance as a medium for information distribution and as platforms for social connection and entertainment. This study also motivates us to promote access to these technologies through training and education on their use among the elderly population. This objective requires multidisciplinary efforts in the public, educational, and healthcare sectors, as well as within the social and familial core of the elderly individual.

The dissemination of the survey in this study was through social media, thus introducing a selection bias in participant recruitment. Another limitation is that this is a study with descriptive objectives; however, it paves the way for new research endeavors with analytical purposes that could guide new actions towards the introduction of ICTs among the elderly population.

CONCLUSION

The use of social media can provide physical and mental health benefits for the elderly. However, there are risks that must be considered. This initial exploratory study provides information on the impact on well-being perception and health-related decision-making in this population group, emphasizing its significance as a medium for information distribution and as a platforms for social connection and entertainment.

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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. 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. Cotten SR, Schuster AM, Seifert A. Social media use and well-being among older adults. Curr Opin Psychol. 2022;45:101293.
2. Hajek A, König HH. Social isolation and loneliness of older adults in times of the COVID-19 pandemic: can use of online social media sites and video chats assist in mitigating social isolation and loneliness? Gerontology. 2021;67:121-4.
3. Guzman AA, Brecht ML, Doering LV, Macey PM, Mentes JC. Social media use and depression in older adults: a systematic review. Res Gerontol Nurs. 2023;16:97-104.
4. Encuesta Nacional sobre Disponibilidad y Uso de Tecnologías de la Información en los Hogares ENDUTIH (2022) México. Avaiable in: https://www.inegi.org.mx/programas/dutih/2022/
5. Leist AK. Social media use of older adults: a mini-review. Gerontology. 2013;59:378-84.
6. Cao C, Li D, Xu Q, Shao X. Motivational influences affecting middle-aged and elderly users' participation intention in health-related social media. Int J Environ Res Public Health. 2022;19:11240.
7. Díaz-Ramos JA, Suárez-Alvarez IM, Avelar-González AK, Valdez-Ramos ALM, Alanís-González M, Leal-Mora D. The mobile phone use and its associations with depressive symptoms among older adults. J Lat Am Geriatric Med 2018;4(1):23-28.
8. Clark R, Moloney G. Facebook and older adults: fulfilling psychological needs? J Aging Stud. 2020;55:100897.
9. Chen YR, Schulz PJ. The Effect of Information Communication Technology Interventions on Reducing Social Isolation in the Elderly: A Systematic Review. J Med Internet Res. 2016 Jan 28;18(1):e18. doi: 10.2196/jmir.4596. PMID: 26822073; PMCID: PMC4751336.
10. Astasio-Picado Á, Cobos-Moreno P, Gómez-Martín B, Verdú-Garcés L, Zabala-Baños MDC. Efficacy of Interventions Based on the Use of Information and Communication Technologies for the Promotion of Active Aging. Int J Environ Res Public Health. 2022 Jan 29;19(3):1534. doi: 10.3390/ijerph19031534.
11. Kusumota L, Diniz MA, Ribeiro RM, da Silva IL, Figueira AL, Rodrigues FR, et al. Impact of digital social media on the perception of loneliness and social isolation in older adults. Rev Lat Am Enfermagem. 2022;30:e3573. Erratum in: Rev Lat Am Enfermagem. 2022;30:e3751. PMID: 35613252; PMCID: PMC9132132.