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FACTORS ASSOCIATED WITH COVID-19 MORBIDITY AND MORTALITY IN THE ELDERLY: SCOPING REVIEW

Fatores associados a morbimortalidade por Covid-19 em idosos: revisão de escopo

Factores asociados con la morbilidad y mortalidad por Covid-19 en ancianos: revisión de alcance

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ABSTRACT

Objective: to identify the scientific evidence on the factors that are associated with morbidity and mortality from covid-19 in the elderly **Methods:** this is a scope review, carried out from a search in five databases/libraries. To guide the preparation of this study, the recommendations of the Joanna Briggs Institute were followed. The PCC strategy was used to elaborate the following guiding question: what factors are associated with morbidity and mortality from covid-19 in the elderly? 38 articles were included in the final sample. **Results:** the presence of comorbidities, especially cardiovascular and endocrine diseases; advanced age; male; laboratory alterations, among other factors, may be predictive of worse clinical outcomes. **Conclusion:** the elderly population was one of the most affected by the pandemic and some factors corroborate a worse prognosis.

DESCRIPTORS: Aged; COVID-19; Indicators of morbidity and mortality; Review.

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RESUMO

Objetivo: identificar as evidências científicas sobre os fatores que estão associados a morbimortalidade por covid-19 em idosos **Métodos**: trata-se de uma revisão de escopo, realizada a partir da busca em cinco bases de dados/bibliotecas. Para nortear a elaboração desse estudo foram seguidas as recomendações do Instituto Joanna Briggs. A estratégia PCC foi utilizada para elaborar a seguinte questão norteadora: quais fatores estão associados a morbimortalidade por covid-19 em idosos? Foram incluídos 38 artigos na amostra final. **Resultados**: a presença de comorbidades, especialmente, as doenças cardiovasculares e endócrinas; idade avançada; sexo masculino; alterações laboratoriais, dentre outros fatores podem ser preditivos de piores desfechos clínicos. **Conclusão:** a população idosa foi uma das mais afetadas pela pandemia e alguns fatores corroboram para pior prognóstico.

DESCRITORES: Idoso; COVID-19; Indicadores de morbimortalidade; Revisão.

RESUMEN

Objetivo: identificar la evidencia científica sobre los factores que se asocian a la morbimortalidad por covid-19 en ancianos **Métodos:** se trata de una revisión de alcance, realizada a partir de una búsqueda en cinco bases de datos/bibliotecas. Para orientar la elaboración de este estudio se siguieron las recomendaciones del Instituto Joanna Briggs. Se utilizó la estrategia PCC para elaborar la siguiente pregunta orientadora: ¿qué factores están asociados a la morbimortalidad por covid-19 en el adulto mayor? En la muestra final se incluyeron 38 artículos. **Resultados:** la presencia de comorbilidades, especialmente enfermedades cardiovasculares y endocrinas; edad avanzada; masculino; las alteraciones de laboratorio, entre otros factores, pueden ser predictivas de peores resultados clínicos. **Conclusión:** la población anciana fue una de las más afectadas por la pandemia y algunos factores corroboran un peor pronóstico.

DESCRIPTORS: Anciano; COVID-19; Indicadores de morbimortalidad; Revisión.

INTRODUCTION

The year 2020 brought with it what is considered one of the world's greatest public health challenges, the covid-19 pandemic, which has caused the deaths of thousands of people around the world. The first cases of pneumonia were reported in December 2019 and the infected had one thing in common, they had frequented a seafood market located in Wuhan, China, the first epicenter of the pandemic. Due to its high transmissibility it did not take long for the virus to be able to cross geographical barriers and spread. In March 2020 the World Health Organization (WHO) declared the covid-19 pandemic, since then infection rates have fluctuated and the world population has been trying to cope.[1–2]

Since its inception, until April 22, 2022,505,817,953 cases of infection have been recorded worldwide,6,213,876 people have died as a result of the disease. In Brazil, the first case was recorded on February 26, 2020, and by April 22, 2022, there were already 30,330,629 infections and 662,506 Brazilians have already lost their lives.[3–4]

Infected individuals may be asymptomatic or symptomatic, with symptoms varying from mild to moderate to severe. Some factors are associated with worse clinical prognoses, including the presence of comorbidities and age, which can corroborate the evolution of respiratory distress syndrome and other clinical emergencies that require intensive care.[5–6]

In view of the above, the elderly population was one of the groups most affected by the pandemic, and this fact can be explained by several factors: greater chance of presenting comorbidities, a factor that is linked to worse prognoses; atypia in the presentation of symptoms that can lead to a delay in diagnosis; and immunosenescence, a physiological process of aging, which results in the cessation of cell cycle growth and, consequently, leads to an increase in inflammatory factors.[7–8]

Therefore, the infection and death rates in the elderly population are high and some factors are linked to worse prognoses in this population. Taking into account that this is an ongoing pandemic, where discoveries are constant and subsidize the development of solutions/strategies for its confrontation, studies such as this are of great relevance, as they provide the summarization/mapping of evidence that point to which factors are associated with morbidity and mortality from covid-19 in the elderly, providing managers and professionals involved in direct care with a scientific framework for decision making.

However, the present study aims to identify the scientific evidence on the factors that are associated with morbidity and mortality from covid-19 in the elderly.

METHODS

This is a scope review, defined as one that aims to map concepts from a given area of knowledge, for which its construction must be based on a rigorous and transparent method.[9]

To guide the preparation of this article, we followed the recommendations of the Joanna Briggs Institute (JBI) and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist.[10–11] However, this study has no protocol available.

The search was conducted from September to November 2021 in the following databases/libraries: Medical Literature

Analysis and Retrieval System Online (MEDLINE) via PubMed, Scopus, Latin American and Caribbean Literature on Health Sciences (LILACS), Web of Science, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The search strategy used was PCC – acronym for Population (P), Concept (C) and Context (C) – considering P (Elderly), C (Morbidity and Mortality) and C (COVID-19). Thus, the following guiding question was established: Which factors are associated with covid-19 morbidity and mortality in the elderly?

To search for articles, the following descriptors were defined: Descriptors in Health Sciences (DECS): Aged, elderly, older person; Morbidity and Mortality Indicators, morbidity and mortality; Coronavirus Infections, Coronavirus Disease 2019-nCoV, COVID-19, Coronavirus Infection 2019-nCoV; and Medical Subject Headings (MeSH): Aged, Adult; Morbidity and Mortality, Coronavirus Infections, Sars-CoV-2, COVID-19. The Boolean operators used were: AND, OR and NOT. The descriptors and Boolean operators were combined and applied to the databases/libraries, resulting in the following search keys: PubMed: (("Aged"[Mesh]) NOT "Adult"[Mesh]) AND "Morbidity"[Mesh]) OR "Mortality"[Mesh]) AND ("Coronavirus Infections"[Mesh]) OR "COVID-19"[Mesh]) OR "SARS-CoV-2"[Mesh]), LILACS: ("Aged" AND elderly not "Adult") AND (morbidity OR mortality) AND ("Coronavirus Infections" OR "COVID-19" OR "Sars-CoV-2") AND (db:("LILACS"), Scopus: TITLE-ABS-KEY ((("Aged" AND elderly AND not "Adult") AND (morbidity OR mortality) AND("Coronavirus Infections" OR "COVID-19" OR "Sars-CoV-2"))) AND (LIMIT-TO (OA , "all")), Web of Science: TS=(Aged AND Elderly NOT Adult) AND TS=(Morbidity OR Mortality) AND TS=("Coronavirus Infections" OR "COVID-19" OR "Sars-CoV-2"), CINAHL: ("Aged" AND Elderly NOT "Adult") AND (Morbidity OR Mortality) AND ("Coronavirus Infections" OR "COVID-19" OR "Sars-CoV-2").

The eligibility criteria were: articles available in full, with no cost for access, published in Portuguese, English or Spanish, carried out with the elderly, and that addressed covid-19 morbidity and mortality. There was no time limitation, since it is a recent theme and new facts on the subject are constantly being presented. Review articles, meta-analysis, repeated studies, and case studies were excluded.

The variables investigated in the articles included in the sample were: authors, type of study, year of publication, country of publication, and sample. Information related to factors associated with morbidity and mortality, i.e., morbidity and/or the event of death, whether social, biological, behavioral, or health-related, was extracted. The information was described in running text and arranged in tables, according to the articles included in this review and discussed based on the literature.

After searching the articles in the databases/libraries, the results were exported to a reference manager, the EndNote software, free version, where it was possible to verify the existence of duplicate articles. Next, the articles were exported to Rayyan, which is a software, available for free on the web, whose purpose is to ensure speed in performing reviews, offering a variety of resources for this, while ensuring blinding among reviewers.

The selection of articles took place in two stages. First, the titles and abstracts of the articles were read, and those to be read in full were selected. In a second step, the articles previously selected were read in their entirety and selected according to the proposed eligibility criteria.

In the identification phase, 1,380 publications related to the theme were found. After applying the eligibility criteria, reading the titles and abstracts, and reading the full text of the selected studies, the final sample consisted of 38 articles (Figure 1).
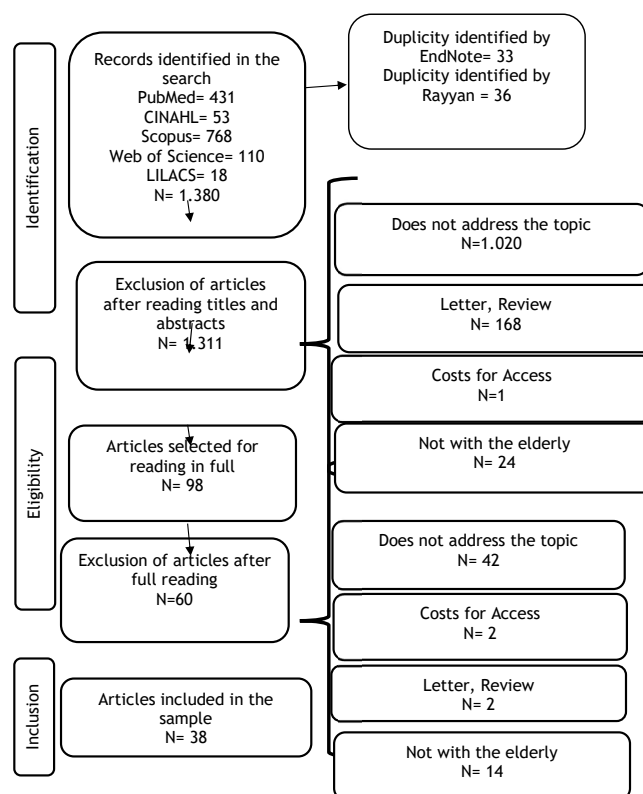
Figure 1 – Flowchart, following PRISMA – SCR recommendations, of search and selection of articles on covid-19 morbidity and mortality in the elderly. João Pessoa, PB, Brazil, 2021

RESULTS

Among the 38 articles included in this review, 31 (81.57%) were retrospective cohort studies, six (15.78%) were prospective cohort studies, and one (2.63%) was observational.

Regarding the year of publication, 26 articles published in 2020 (68.42%) predominated, the year that marks the beginning of the pandemic and the race for research that seeks to elucidate various factors related to infection. In the year 2021, 12 (31.57%) were found.

Regarding the country where the studies were carried out, it is noteworthy that China concentrates the largest number of publications, 10 (26.31%), followed by the United States six (15.78%), Spain three (7.89%), Italy three (7.89%), South Korea two (5.26%), United Kingdom two (5.26%), Iran, Sweden, United

Arab Emirates, Switzerland, Belgium, Norway, Brazil, Bangladesh, England, Japan, Malaysia and France one (2.63%) each.

The characterization of the studies included in this review is shown in Chart 1.

Table 1 presents the factors associated with morbidity, morbidity, and the event of death in elderly patients affected by covid-19, according to the review findings.

Chart 1 – Characterization of the selected studies, according to authors, country/year of publication, study design and sample. João Pessoa, PB, Brazil, 2021

Study/authors	Country/Year of Publication	Delineation	Sample
1) Islam MZ, et al.	Bangladesh/2020	Retrospective cohort	1.016
2)Halem KV, et al.	Belgium /2020	Retrospective cohort	319
3) Sousa GJB, et al.	Brazil/2020	Retrospective cohort	2.070
4) Asfahan S, et al.	China/2020	Retrospective cohort	44.672
5) Chen R, et al.	China/2020	Retrospective cohort	1.590
6) Chen Y, et al.	China/2020	Retrospective cohort	192
7) Du Y, et al.	China/2020	Retrospective cohort	85
8) Gao S, et al.	China/2020	Retrospective cohort	210
9) Yang X, et al.	China/2020	Retrospective cohort	52
10) Wang L, et al.	China/2020	Retrospective cohort	339
11) Leung C	China/2020	Retrospective cohort	154
12) Niu S, et al.	China/2020	Retrospective cohort	60
13) Wei C, et al.	China/2020	Retrospective cohort	307
14) Lee JY, et al.	South Korea /2020	Retrospective cohort	98
15) Hwang JM, et al.	South Korea /2020	Retrospective cohort	103
16) Deeb A, et al.	United Arab Emirates/2021	Retrospective cohort	1.075
17) Mostaza JM, et al.	Spain /2020	Retrospective cohort	404
18) Poblador-Plou B, et al.	Spain /2020	Retrospective cohort	4412
19) Meis-Pinheiro U, et al.	Spain /2021	Retrospective cohort	2.092
20) Alkhouli M, et al	USA/2020	Retrospective cohort	14.712
21) Ioannou GN, et al.	USA/2020	Retrospective cohort	10.131
22) Alser O, et al.	USA/2021	Retrospective cohort	235
23) Gupta R, et al.	USA/2021	Retrospective cohort	529
24) Sands KE, et al.	USA/2021	Retrospective cohort	6.180
25) Cardemil CV, et al.	USA/2021	Retrospective cohort	621
26) Vrillon A, et al.	France /2020	Prospective cohort	76
27) Miles A, et al.	England /2020	Prospective cohort	217
28) Amanat M, et al.	Iran /2021	Prospective cohort	873
29) Iaccarino G, et al.	Italy /2020	Observational	1.591
30) Bavaro DF, et al.	Italy /2021	Retrospective cohort	206
31) Corradini E, et al.	Italy /2021	Prospective cohort	3.170
32) Tanaka K, et al.	Japan /2021	Retrospective cohort	3.192
33) Mat Din H, et al.	Malaysia /2021	Retrospective cohort	81
34) Telle KE, et al.	Norway /2021	Prospective cohort	8569
35) Chinnadurai R, et al.	United Kingdom /2020	Retrospective cohort	215
36) Brill SE, et al.	United Kingdom /2020	Retrospective cohort	450
37) Hägg S, et al.	Sweden /2020	Retrospective cohort	250
38) Mendes A, et al.	Switzerland /2020	Retrospective cohort	235

Table 1 – Factors associated with covid-19 morbidity and mortality in the elderly, extracted from the articles selected for this review. João Pessoa, PB, Brazil, 2021

Associated Factors	Morbidity n (%)	Mortality n (%)	Total n (%)
Non-modifiable/biological factors			
Idade	1 (2,6)	29 (76,3)	30 (78,9)
Male gender	-	8 (21,0)	8 (21,0)
Comorbities			
Cardiovascular Disease	5 (13,1)	16 (42,1)	21 (55,2)
Endocrine Diseases	4 (10,5)	8 (21,0)	12 (31,5)
Hypertension	5 (13,1)	7 (18,4)	12 (31,5)
Lung diseases	4 (10,5)	8 (21,0)	12 (31,5)
Chronic kidney disease	4 (10,5)	6 (15,8)	10 (26,3)
Acute Kidney Disease	2 (5,3)	5 (13,1)	7 (18,4)
Neurological disease	1 (2,6)	6 (15,8)	7 (18,4)
Cerebrovascular Disease	1 (2,6)	5 (13,2)	6 (15,8)
Liver disease	1 (2,6)	2 (5,3)	3 (7,9)
Cancer	-	3 (7,9)	3 (7,9)
Obesity	1 (2,6)	2 (5,3)	3 (7,9)
Presence of at least one comorbidity	6 (15,8)	8 (21,0)	8 (21)
Factors related to the clinical picture			
Dyspnea	2 (5,3)	10 (26,3)	12 (31,6)
Initial severe presentation	2 (5,3)	4 (10,5)	6 (15,8)
Acute Respiratory Distress Syndrome	2 (5,3)	3 (7,9)	5 (13,2)
Decreased SpO2	-	3 (7,9)	3 (7,9)
Invasive/non-invasive ventilation	-	2 (5,3)	2 (5,3)
O2 Requirement	-	1 (2,6)	1 (2,6)
Fever	-	1 (2,6)	1 (2,6)
Factors related to laboratory test changes			
C-Reactive Protein	-	8 (21,0)	8 (21,0)
Thrombocytopenia	-	6 (15,8)	6 (15,8)
Increased lactate dehydrogenase	-	4 (10,5)	4 (10,5)
Eosinophilia	-	1 (2,6)	1 (2,6)
Other related factors			
Fragile Elderly	1 (2,6)	3 (7,9)	3 (7,9)
Delay in seeking assistance	-	1 (2,6)	1 (2,6)
Smoking	1 (2,6)	1 (2,6)	1 (2,6)
Polypharmacy	-	1 (2,6)	1 (2,6)
Resident in nursing homes	-	1 (2,6)	1 (2,6)
Community Care	-	1 (2,6)	1 (2,6)

n=number of articles that cited the associated factor. %=how many percent corresponds to n, considering a sample of 38 articles. The same factor may be associated with morbidity and/or death.

DISCUSSION

In this review, retrospective studies were predominant, those that allow collecting previous information of exposure, through medical records and/or information storage systems, and then follow up for a certain period of time. Cohort studies allow the measurement of exposure and outcome factors; they are expensive and time consuming studies, but they allow the definition of the Relative Risk (RR), that is, how often the occurrence of the outcome in those exposed is greater than in those not exposed.[12]

The distribution of publications by country reveals that China has the largest number of publications, a fact that may be related

to the greater incentive and promotion of science. Moreover, it reveals that the scientific race began in the country that was the first epicenter of the pandemic.[13]

Taking into account the demographic transition process that the world is currently going through, where birth and mortality rates are falling sharply, consequently, the number of people in younger age groups is decreasing, while a considerable increase in the elderly population is expected.[14]

The elderly population was one of the most affected by the pandemic of covid-19 studies show that the elderly have worse prognoses/clinical outcomes when compared to other age groups.[15–16] Over the years the immune system undergoes changes due to the physiological process, a process called immunosenescence, which consists of decreased ability to renew the defense cells, consequently, there is an exacerbation of inflammatory components that contribute to the worsening of the disease.[17]

In the spectrum of biological factors that may corroborate for worse clinical outcomes, in cases of elderly patients affected by covid-19, we have immunosenescence and a greater chance of presenting comorbidities. The fact that a person has more years of life is proportionally related to greater exposure to agents that can cause the onset of comorbidities, so it is expected that a significant number of elderly people have comorbidities.[6]

The presence of morbidities can lead to worse clinical outcomes, especially in the elderly population. A Chinese study revealed that approximately 72% of the patients admitted to the Intensive Care Unit (ICU) had morbidities.[18]

Regarding comorbidities, in this review study, the following were noteworthy: Diabetes Mellitus (endocrine diseases), Cardiovascular Diseases, Systemic Arterial Hypertension, Chronic Obstructive Pulmonary Disease (pneumopathies) and kidney disease, respectively. Results of national and international studies corroborate the findings of this research. A national, population-based study found that (33.6%) of the elderly affected by covid-19 were diabetics, (57.4%) had cardiovascular disease, (5.5%) chronic kidney disease, and (3.9%) had pneumopathies; in Espirito Santo, of the 220 deaths recorded as a result of covid-19, 65.7% had some form of pneumopathy, 64.9% had some form of cardiovascular disease, and 84.2% had some form of kidney disease.[19–20]

In the international scenario, a study conducted in New York, with 5700 people, identified that diabetes affected (33.8%) of the sample and hypertension (56.6%); in China, of the 191 participants in a study (30%) were hypertensive and (19%) diabetic; in Italy, of the 1591 people who participated in a study (49%) were hypertensive and (21%) had some cardiovascular disease, it was also detected that (76%) of the elderly in the sample had at least 1 comorbidity.[15,21–22]

Being male was one of the attributes for worse clinical/ death outcomes noted in this review. Men tend to have worse habits such as smoking, drinking, and are more likely to have comorbidities.[23] Furthermore, it is believed that women have stronger immune and adaptive responses when compared to men, which may be associated with X-chromosome protection and sex hormones.[24–25]

The social conditions in which the subject is inserted interfere directly in their conditions of access to health, therefore, people with low levels of education and income may be more affected in pandemic scenarios, because low wages have a direct impact on the choice of means of transportation and the safest ones are bypassed, as well as contributing directly to the restriction of access to hygiene and protection supplies.[26]

As for the changes in laboratory tests found in this review, the most noteworthy were thrombocytopenia and elevated C-reactive protein (CRP). The patient with covid presents alterations in laboratory parameters and many can be considered predictors of mortality. Among the wide spectrum of laboratory changes that the patient can present, it is worth noting that the most frequent are: increased CRP around 75 to 93%, and the white series can oscillate up or down.[27] Patients can present thrombocytopenia at any stage of the disease and its activation mechanism can be linked to some factors, especially platelet destruction, cytokine release, and platelet aggregation that results in platelet consumption.[28]

Therefore, laboratory tests that are widely available in public and private health care institutions can be used to assist in the diagnosis and clinical follow-up of patients affected by covid-19, since studies point to the ability to predict worse prognoses.[29]

Furthermore, some other factors corroborate the greater vulnerability of the elderly in pandemic situations, such as: behavioral factors, related to the lifestyle adopted by the person; sociological factors, related to housing conditions and access to health care; and health factors, related to the greater chances of the elderly to frequent hospital environments, where exposure to certain pathogens is greater.[30]

Thus, nursing, as a profession that provides direct assistance to patients and the largest category of health services, plays a very important role in terms of disease promotion and prevention, thus, the findings of this review can encourage the development of activities/actions aimed at reaching the elderly population.

CONCLUSION

Given the above, it is evident that the elderly population was one of the most affected by the pandemic and that some factors contribute to a worse prognosis. The proposed objective was achieved, since it was possible to list the factors that are associated with covid-19 morbidity and mortality in the elderly. The presence of comorbidities, advanced age, male gender, laboratory changes, among other factors that may be predictive of worse clinical outcomes.

The findings of this study are relevant because they provide a scientific framework that can encourage reflection and the adoption of strategies/actions, by professionals involved in management and care, aimed at tackling covid-19 in the elderly population.

Because it is an ongoing pandemic, where the incessant search to elucidate some factors leads to constant production of new knowledge, the results of this study may not reflect the reality

of the factors associated with morbidity and mortality from covid-19 in the elderly in the months following the pandemic.

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