

**RISK FACTORS ASSOCIATED WITH DEATH OF THE AGED PEOPLE  
HOSPITALIZED BY COVID-19: INTEGRATIVE REVIEW****FATORES DE RISCO ASSOCIADOS AO ÓBITO DE IDOSOS INTERNADOS POR  
COVID- 19: UMA REVISÃO INTEGRATIVA****FACTORES DE RIESGO ASOCIADOS A LA MUERTE DE LAS PERSONAS  
MAYORES HOSPITALIZADAS POR COVID-19: REVISIÓN INTEGRADORA**

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## ABSTRACT

**Objective:** To analyze scientific evidence on risk factors associated with death of elderly hospitalized by COVID-19. **Methodology:** Integrative literature review with data collection in February/2022, in the databases: PubMed, Web of Science, MEDLINE, Latin American and Caribbean Literature in Health Sciences and Nursing Database; Scientific Electronic Library Online. The following inclusion criteria were used: original research articles, available free of charge, in the languages Portuguese, English, Spanish, without time frame. We considered articles whose mean age was 60 years or more, ending in 22 studies. **Results:** Among the factors, they highlighted the presence of chronic non-communicable diseases (NCDs), especially arterial hypertension, diabetes mellitus, cardiovascular diseases, and chronic kidney disease and biomarker changes identified in patients hospitalized for COVID-19. **Conclusion:** the vulnerability of the elderly population, associated with physiological aging and the presence of comorbidities, is highlighted as the factors that contributed to the high rate of hospitalizations and deaths.

**Descriptors:** SARS-CoV-2; Risk Factors; Aged; Aged, 80 and over; death.

## RESUMO

**Objetivo:** Analisar as evidências científicas sobre os fatores de risco associados ao óbito de idosos internados pela COVID-19. **Metodologia:** Revisão integrativa de literatura com coleta de dados em fevereiro/ 2022, nas bases de dados: PubMed, Web of Science, MEDLINE, Literatura Latino-Americana e do Caribe em Ciências da Saúde e Base de Dados de Enfermagem; Scientific Eletronic Library Online. Utilizou-se como critérios de inclusão: artigos de pesquisa originais, disponibilizados de forma gratuita, nos idiomas português, inglês, espanhol, sem recorte temporal. Foi considerado artigos cuja média das idades consta 60 anos ou mais, findando em 22 estudos. **Resultados:** Entre os fatores, destacaram a presença de doenças crônicas não transmissíveis (DCNT), especialmente hipertensão arterial, diabetes mellitus, doenças cardiovasculares, e doença renal crônica e alterações de biomarcadores identificados em pacientes internados pelo COVID-19. **Conclusão:** destaca-se a vulnerabilidade da população idosa, associado o envelhecimento fisiológico e a presença de comorbidades, como os fatores que contribuíram para o elevado índice de internações e mortes.

**Descritores:** SARS-CoV-2 ; Fatores de Risco; Idoso; Idosos de 80 anos ou mais; Morte.

## RESUMEN

**Objetivo:** Analizar la evidencia científica sobre los factores de riesgo asociados a la muerte de ancianos hospitalizados por COVID-19. **Metodología:** Revisión integradora de la literatura con recolección de datos en febrero/2022, en las bases de datos: PubMed, Web of Science, MEDLINE, Latin American and Caribbean Literature in Health Sciences and Nursing Database; Scientific Electronic Library Online. Se utilizaron los siguientes criterios de inclusión: artículos de investigación originales, de libre acceso, en los idiomas portugués, inglés, español, sin marco temporal. Se consideraron los artículos cuya media de edad era de 60 años o más, terminando en 22 estudios. **Resultados:** Entre los factores, destacaron la presencia de enfermedades crónicas no transmisibles (ENT), especialmente hipertensión arterial, diabetes mellitus, enfermedades cardiovasculares y enfermedad renal crónica y cambios en biomarcadores identificados en pacientes hospitalizados por COVID-19. **Conclusión:** la vulnerabilidad de la población anciana, asociada al envejecimiento fisiológico y a la presencia de comorbidades, se destaca como los factores que contribuyeron a la alta tasa de hospitalizaciones y muertes

**Descriptor:** SARS-CoV-2; Factores de Riesgo; Anciano; Anciano de 80 o más Años; Muerte.

## INTRODUCTION

Population aging is a phenomenon that has historically been showing changes in age groups, as well as in life expectancy. As a result of the birth rate decreasing over the decades, the growth of the elderly population is increasing, associated with the improvement in quality of life with advances in health treatments and new technologies, which prolong survival.<sup>1</sup>

The current context of the coronavirus pandemic is worrying and challenging in terms of care, especially for the elderly population.<sup>2</sup> In the last two years, the evolution of a pandemic with an infectious cause called Coronavirus Disease 2019 (COVID-19) whose etiological agent is the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).<sup>3</sup> The transmission of SARS-CoV-2 occurs especially with contact with respiratory droplets from infected patients, and the disease caused mainly affects the respiratory, gastrointestinal, and cardiovascular systems and neurological. COVID-19 can range from asymptomatic to severe forms with significant impairment of the respiratory system and the symptoms can mainly consist of fever, dry cough and dyspnea and with the possibility of complications, such as pneumonia,

The debate about the seriousness of the pandemic and possible measures to face it is connected with the evidence that the

coronavirus infects people of all ages, but two groups are at a greater risk of serious complications from COVID-19: the elderly and those with pre-existing chronic conditions.<sup>3</sup> Data available so far indicate that lethality from the new coronavirus is higher among the elderly, especially those with comorbidities such as hypertension, heart disease, diabetes and respiratory diseases.

From this perspective, with regard to nursing, it is necessary to develop and improve practices that deal with prevention and the minimization of cases on the various aspects of care related to coping with COVID-19. Elderly people with the virus require greater attention and care in the treatment and monitoring of the disease in order to reduce complications and mortality.<sup>2</sup>

This study is justified due to the relevance of the theme, for nursing practice and in view of the current scenario, it is evident the need to know the risk factors related to the death of elderly people hospitalized due to COVID-19 in order to develop prevention actions in the future. contagion by the new coronavirus as well as health promotion, and direct specialized and qualified care, in addition to subsidizing the implementation of public policies aimed at preventing the disease in the elderly.

Given the context, the guiding question is: “What are the risk factors associated with elderly people hospitalized with COVID-19?” And as objective: To identify the scientific evidence on the risk factors associated with the death of elderly people hospitalized by COVID-19.

## METHOD

This is an integrative literature review in light of the six stages: identification of the theme and research question, identification of inclusion and exclusion criteria for studies, sampling and literature search, selection of information to be extracted from the studies found, evaluation of studies that answer the guiding question, analysis of results, presentation of the review.<sup>5</sup>

In the first stage, which consists of identifying the theme and the research question, the theme emerged from the gap in knowledge posed by the pandemic context of COVID-19, the Population/Patient/Problem – Interest - Context, Time (PICoT) strategy was chosen. The acronym “P” (study population) elderly person with COVID-19; as an acronym “I” (interest), the factors associated with the death of the elderly and; the acronym “C” (comparison) elderly hospitalized for COVID-19 as acronym “O” (Outcome or result) death of elderly hospitalized for COVID-19 and as acronym “T” without

temporal cut. The guiding question was: “What scientific evidence is available on the factors associated with the death of elderly people hospitalized due to COVID-19?”.

The second stage comprises the identification of inclusion and exclusion criteria for studies, sampling and literature search. It was established as inclusion criteria: original research articles that answer the research question, available free of charge, in languages (Portuguese, English, Spanish), with no time frame, it was considered original research articles that the average age is 60 years or more. The following exclusion criteria were established: literature review (narrative, integrative, systematic, scope, meta-analysis), experience report, theses, dissertations and monographs, editorials, reflections, pre-print.

The literature search took place in February 2022, by three interdependent researchers on the platforms Web of Science, Virtual Health Library, Medical Literature Analysis and Retrieval System Online (MEDLINE) via National Library of Medicine (PubMed); Latin American and Caribbean Literature in Health Sciences (LILACS) and Nursing Database (BDENF) via the Virtual Health Library (VHL); Scientific Electronic Library Online (SciELO); The strategy used was: “COVID-19” AND “ELDERLY” AND “DEATH”. It was chosen not to use the descriptor Nursing

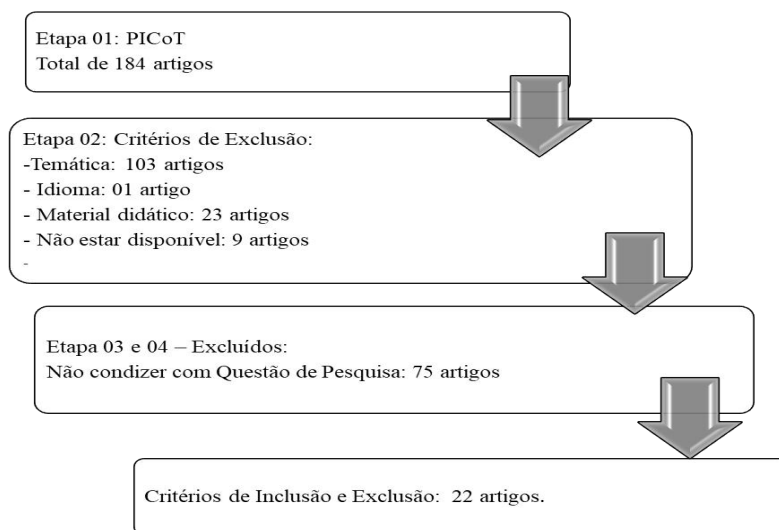
because it significantly reduces the number of studies found.

In the third stage, it refers to the selection of information to be extracted from the studies found. It was decided to synthesize and select the following information to be extracted in a synoptic table: year of publication and country of origin of the study, associated factors for death of elderly people by COVID-19 and level of evidence. The selection of the level of evidence of the included studies was based on the six categories: Level I – Evidence from systematic reviews or meta-analyses of relevant clinical trials; Level II – Evidence derived from at least one well-designed randomized controlled clinical trial, moderate evidence; Level III – Well-designed clinical trials without randomization; Level IV – Well-designed cohort and case-control studies; Level V - Systematic review of descriptive and qualitative studies, weak evidence; Level VI

– Evidence derived from a single descriptive or qualitative study; Level VII – Opinion of authorities or report of expert committees.<sup>7</sup>

The fourth step is the evaluation of the studies that answer the guiding question. Title and abstract reading was performed by three independent researchers in a blinded manner on the Rayyan platform. 184 articles were identified, and a consensus meeting was held with the presence of a fourth reviewer with expertise in the subject. Therefore, 59 studies were identified for reading in full, of which 22 articles were listed for the analysis corpus. Therefore, 103 were excluded for not being related to the topic, one for not being from the languages listed in the survey, 23 for not being a survey, nine for not being available in full, 75 for not answering the research question. There are 22 studies that answer the research question. As shown in the figure below (Figure 01).

**Figure 01.** Demonstrative flowchart of the filter steps for selecting studies.



Source: Data from the research stages, 2022.

## RESULTS

After reading the studies that answered the question in full, 22 articles were listed, which presented content relevant to the theme to compose the corpus of analysis, according to the synoptic table of the corpus of analysis. Table I presents the main information of the articles based on the proposed elements: year of publication and country of origin of the study, associated factors for death of elderly people by COVID-19 and level of evidence.

The articles included came predominantly from the European continent (n=9) with emphasis on Italy with (n=4), eastern continent (n=7) China with (n=6) and American continent (n=6) United States (n=4). The studies used were published in 2020 (n=15) and 2021 (n=7), a pandemic period given the uniqueness of the theme, which demonstrates the scientific community's interest in the topic. And classified with level of evidence N4 (n=17) and N6 (n=5).

**Table I-** Synoptic table of the corpus of analysis

<b>Year of publication and study origin country</b>	<b>Associated factors for death of aged people by COVID-19</b>	<b>Level of Evidence/ Methodology</b>
2021 France <sup>8</sup>	Comorbidities: obesity, cardiovascular disease (CVD), respiratory disease, obstructive sleep apnea, diabetes mellitus (DM), cancer, Hypertension (SAH) nephropathy, chronic tubulointerstitial disease, polycystic kidney disease, vascular nephropathy, glomerular nephropathy. Elevated serum levels of: C-reactive protein (CRP), procalcitonin (PCT), lactate dehydrogenase (LDH), creatine phosphokinase (CPK), creatinemia, neutrophil count, D-dimer. Low serum levels of: ferritin, platelet count.	N4 Cohort Study
2020 Italy <sup>9</sup>	Age 78 years or older. Elevated serum levels of: serum glucose, aspartate aminotransferase (AST), creatine kinase (CK), LDH, urea, creatinine, high-sensitivity cardiac troponin I (hscTnI), prothrombin time/international normalized ratio (PT/INR), activated partial thromboplastin time (APTT), D-dimer, CRP, ferritin, and leukocytes (especially neutrophils). Low serum levels of albumin, hemoglobin (Hb) and lymphocytes.	N6 case-control study
2020 Italy, Iran, Spain and the United Kingdom. <sup>10</sup>	Dementia, SAH, duration and frailty of Parkinson's disease (PD).	N4 cohort study
2020 Italy <sup>11</sup>	Serum levels of: platelets, lymphocytes, LDH, creatinine, alanine aminotransferase (ALT), CRP, neutrophil leukocytes can be considered indicators of early prognosis, while others show statistically significant differences only in a more advanced stage of the disease.	N4 Case Control Study
2021 Canada <sup>12</sup>	Clinical inflammatory biomarkers: CRP, neutrophil-lymphocyte ratio and lymphocyte-white blood cell count ratio.	N4 Cohort Study
2021 Germany <sup>13</sup>	The median age was 72 years, with most patients aged 80 years or older. Comorbidities: SAH, hydroelectrolytic disorders, DM, cardiac arrhythmia, renal failure and congestive heart failure.	N4 Cohort Study

2020 United States <sup>14</sup>	Acute kidney injury greater than or equal to stage 2.	N4 Cohort Study
2020 China <sup>15</sup>	Comorbidities such as DM, cardiovascular and cerebrovascular diseases. High blood glucose serum levels, absolute lymphocyte and D-dimer count, leukocyte count, albumin, LDH, myoglobin, hscTnI, total CT score of pulmonary involvement.	N4 Cohort Study
2021 Türkiye <sup>16</sup>	Comorbidities: SAH, DM and coronary artery disease. Elevated levels of PCT, hs-troponin, D-dimer and CRP, IL-6, hs-troponin, LDH and levels of lymphopenia in severe cases of Covid-19.	N4 Cohort Study
2021 United States <sup>17</sup>	Advanced age, comorbidities: SAH, DM, chronic obstructive pulmonary disease (COPD) and chronic kidney disease (CKD) stage 2 or higher.	N4 Cohort Study
2020 China <sup>18</sup>	Comorbidities: DM, SAH, cardiovascular diseases and COPD. Lower levels of cholesterol, PaO <sub>2</sub> and CD8 <sup>+</sup> cell count. Elevated levels of glucose and PCT.	N6 Cohort Study
2020 China <sup>19</sup>	Comorbidity: SAH. Laboratory analysis showed that there was lymphocytopenia, hypoalbuminemia, elevation of LDH, PCT and CRP.	N4 Retrospective Epidemiological Study
2020 China <sup>20</sup>	Advanced age, comorbidities: coronary heart disease, cerebrovascular disease, DM, SAH and leukocytosis. Elevated serum levels of neutrophil count, CRP and interleukin-6 (IL-6).	N6 Retrospective Epidemiological Study
2020 Italy <sup>21</sup>	Advanced age. Impaired kidney function, elevated serum CRP levels.	N4 Multicentric Study
2020 France <sup>22</sup>	Comorbidities: cardioneurovascular diseases. Elevated serum levels: CRP, PCT, D-dimers, fibrinogen and B-type natriuretic peptide (BNP), Lymphopenia.	N4 Cohort Study
2020 Brazil <sup>23</sup>	Advanced age. Comorbidities: smoking, DM, SAH, obesity.	N6 Cross-sectional study
2020 United States <sup>24</sup>	Age over 71 years, comorbidities: SAH, DM and obesity. Elevated serum levels of D-dimer and CRP.	N4 Cohort Study



2021 China <sup>25</sup>	Comorbidities: SAH, DM, heart disease, cerebrovascular disease, COPD, cancer, CKD, chronic liver disease. Elevated serum levels of: lactate, glucose, white blood cell count (WBC), neutrophil count, percentage of neutrophils, D-dimer, creatinine, CK and LDH, CRP, PCT and IL-6. Reduced serum levels of lymphocytes, platelet counts and albumin levels. Low levels of PaO <sub>2</sub> /FiO <sub>2</sub> .	N4 Retrospective cohort study
2021 Netherlands <sup>26</sup>	Male gender, high serum levels of biomarkers: IL-6 and interleukin-10 (IL-10) associated with severe cases of the disease. Lymphopenia and thrombocytopenia.	N4 Cross-sectional study
2020 Spain <sup>27</sup>	Age over 75 years, clinical severity scales, renal function biomarkers, leukocyte count parameters, total neutrophil/total lymphocyte ratio, and PCT. Variables such as age, glucose, creatinine and total white blood cells.	N6 Cross-sectional study
2020 United States <sup>28</sup>	D-dimer serum levels, CRP and lymphopenia.	N4 Cohort Study
2020 China <sup>29</sup>	Advanced age, serum leukocyte levels.	N4 Case Control Study

Source: Research data, 2022.

## DISCUSSION

As the analysis of the studies evidenced the scarcity of Brazilian studies on the subject directed to the elderly population, as well as the vulnerability of the elderly population to the contamination of COVID-19, it has a higher prevalence of evolving into severe cases of the disease.<sup>30,31</sup> Thus, aging is an inevitable event and a natural process, which is characterized by physical, social and psychological changes that affect each individual in a unique way. For many, more

years make it possible to seek new activities, new experiences, more education, conditioned to one factor, the state of health.

In this sense, although there are physiological changes inherent to the aging process, there are conditions attributed to genetic and extrinsic factors, associated with the way of life of each individual.<sup>32</sup>

As associated factors, studies point to the presence of non-communicable chronic diseases (NCDs), especially high blood pressure, diabetes mellitus, cardiovascular diseases, and chronic kidney disease, which

increases the mortality rate.<sup>8,10,13,15,19,20,30</sup> The clinical presentation of the disease in the elderly is related to laboratory abnormalities and the presence of alterations in certain biomarkers can be precursors to complications.<sup>16</sup> As studies have pointed out, it was the representations of the state of health-disease, in laboratory tests, the state Clinical risk in the elderly is related to laboratory complications such as lymphopenia, and high serum levels of C-reactive Protein (CRP), leukocytes, D-dimers, Lactate dehydrogenase (LDH), Procalcitonin (PCT) and creatinine contributing to the unfavorable prognosis.<sup>11, 12, 22, 26, 28, 29</sup>

Similarly, in a study carried out in China, with 140 patients hospitalized with COVID-19, to identify the clinical and laboratory characteristics between severe and non-severe patients, whose average age was 57 years, pointed out as the most prevalent comorbidities, hypertension (30%), diabetes mellitus (12.1%) followed by cardiovascular diseases. Since the group of severe patients were older and had the highest frequency of comorbidities.<sup>33</sup>

They are multifactorial pathologies and progress with advancing age, being considered a serious public health problem. For the World Health Organization, these diseases were the cause of 63% of deaths in the world and 72.6% of deaths in Brazil, in 2013, causing a great impact on the quality

of life of the affected population.<sup>34</sup> In this scenario, the elderly are highlighted, this is because, with the natural deterioration of the immune system produced by aging, vulnerability to infectious diseases and unfavorable prognosis for those with chronic diseases increases.<sup>33,35</sup>

In another research, arterial hypertension is the comorbidity with the highest prevalence among the elderly, in line with a retrospective study in a hospital network in Italy, including 320 non-surviving patients diagnosed with COVID-19, most of the elderly had more aged 65 years (n=205; 64%), with hypertension being the most frequent comorbidity in this group of patients (n=235; 73%<sup>4</sup>).<sup>36</sup>

Other comorbidities mentioned in the articles were: chronic liver disease, cerebrovascular diseases, obesity, smoking, but being shown with little significance between the results. The first three being the most cited in the studies. They also showed a higher prevalence of pre-existing diseases in elderly patients compared to younger ones.<sup>23,25</sup>

In this sense, it is understood that elderly patients with COVID-19 should be effectively monitored in relation to factors that affect mortality, especially those considered chronic. The selected studies reported the following chronic diseases as factors associated with the death of elderly people with COVID-19: high blood pressure,

diabetes mellitus, cardiovascular diseases, chronic kidney disease, chronic obstructive pulmonary disease and cancer.<sup>19,20,18</sup> In the meantime, deaths are more likely in patients of advanced age, corroborating the findings of a study carried out at a university hospital in Spain, with 834 patients aged 60 years or older, with the objective of analyzing the contribution of comorbidities associated with deaths.<sup>17</sup>

In this context, the role of nurses in different health scenarios is rescued, especially in primary health care (PHC), which develops care in the territory, taking advantage of strategies in the nursing work process, with a greater bond and approximation of the subjects' reality, such as home consultation, individual consultation, nursing consultation, health education using active methodologies, such as carrying out health promotion and protection groups.<sup>37</sup>

## CONCLUSIONS

In this work, the vulnerability of the elderly population is evidenced by associating it with the risk factors of elderly people hospitalized for COVID-19, since the deleterious effects caused by the virus caused many to evolve into a serious condition of the disease. The study's criterion of targeting the elderly population was evident in the articles that indicated advanced age, physiological aging and the

presence of comorbidities as markers, were factors that contributed to the high rate of hospitalizations and deaths.

It is hoped that this study will contribute to the community and that it will also be an incentive for the production of new research on the subject and especially in the development of actions that allow care for the elderly, especially those with some type of comorbidity. It is noteworthy that this study has limitations due to some databases and the number of productions being non-existent.

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