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Risk Factors in Covid-19 Mortality

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Abstract
Background:*COVID-19 is an infectious disease caused by the new coronavirus (SARS-CoV-2) and its main symptoms are fever, tiredness and dry cough. Some risk factors such as comorbidities increase the rate of mortality from the disease, age is the variable that presents the highest risk of mortality from COVID-19, with cardiovascular diseases and chronic lung diseases being the main comorbidities associated with death.*
Methods:*The objective of this study was to list and rank the risk factors and comorbidities that had the greatest influence on mortality rates from COVID-19. This is a documentary, statistical and retrospective review and field research through the collection, analysis and comparison of article data and patient data.*
Results and Conclusion:*It is possible that the data obtained may lead to conclusions about specific contingency and isolation measures that could change the outcome on mortality rates. It is estimated that this research identified the main risk factors and/or comorbidity, specifying chronic renal failure and diabetes mellitus as the main factors related to mortality from COVID-19.*
Keywords: *Risk Factors, Comorbidity, COVID-19, Mortality.*

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I. Introduction

COVID-19 is an infectious disease caused by the new coronavirus (SARS-CoV-2) and its main symptoms are fever, tiredness and dry cough (PAHO, 2020). Some risk factors such as comorbidities increase the rate of mortality from the disease, according to Caramelo (2020) age is the variable that presents the highest risk of mortality from COVID-19, with cardiovascular diseases and chronic lung diseases being the main comorbidities associated with death. According to Sepandi et al. (2020), older age and male gender were the factors most likely to die from COVID-19. Comorbidities such as type 2 diabetes, systemic arterial hypertension, renal disorders, respiratory disorders and chronic heart diseases may increase the risk of mortality from COVID-19.

Most of the studies found report that among the risk factors in relation to COVID19, advanced age and comorbidities are predisposing factors that can increase the risk of mortality. For Wang (2020) common comorbid conditions, including high blood pressure, chronic kidney disease, chronic obstructive pulmonary disease, asthma, obesity, diabetes, HIV and cancer, when adjusted for covariates, chronic kidney disease remained significantly associated with greater chances of mortality in patients with COVID-19. According to Junior (2004), chronic kidney disease consists of kidney damage and progressive and irreversible loss of kidney function (glomerular, tubular and endocrine). In its most advanced stage (called the end stage of chronic renal failure-CRF), the kidneys are no longer able to maintain the normality of the patient's internal environment. According to the 7th Brazilian Guidelines on Hypertension (2016), the disease is a multifactorial clinical condition characterized by a sustained increase in blood pressure levels ≥ 140 and/or 90 mmHg. It is often associated with metabolic disorders, functional and/or structural alterations of target organs, being aggravated by the presence of other risk factors.

For Pinheiro (2004), obesity, defined in a simplified way, is the excessive accumulation of body fat to such an extent that it harms the health of individuals, such as respiratory difficulties, dermatological problems and disorders of the locomotor system, in addition to favoring the emergence of potentially lethal illnesses such as dyslipidemia, cardiovascular disease, Non-Insulin Dependent Diabetes (Type II Diabetes) and certain types of cancer. Cardiovascular diseases are a set of problems that affect the heart and blood vessels, and that arise with age, usually related to unhealthy lifestyle habits, such as a high-fat diet and lack of physical activity, for example. However, cardiovascular diseases can also be diagnosed at birth, as is the case with congenital heart disease. Cardiovascular diseases can happen as a consequence of infections by viruses, fungi or bacteria, which cause inflammation of the heart, as in the case of endocarditis and of myocarditis (LIMA, 2021). In this sense,

according to Yang et al. (2020) extrapulmonary involvement is mainly characterized by refractory heart failure and significant kidney damage, leading about 25% of these critically ill patients to renal replacement therapy.

The evolution of COVID-19 to sepsis and septic shock is also mentioned in the literature and can reach an incidence rate above 50% in critically ill patients, as published by Zhou et al. (2020), demonstrating the intrinsic capacity of SARS-CoV-2 to lead to multiple organ dysfunctions. Therefore, this research aims to statistically correlate and rank which comorbidity has the most influence on the risk of mortality from COVID-19, since comorbidities have been an important factor for the increase in mortality rates from COVID-19, with some of the risk factors already published may have a greater direct statistical relationship with the unfavorable outcome in patients with COVID-19 admitted to intensive care units.

II. Methods

The work consists of exploratory review and retrospective documentary field research through the collection, analysis and comparison of public data and publications on the subject Initially, articles published since the beginning of the pandemic were collected in the main databases with the descriptors "Risk Factors, Comorbidity, COVID-19 and Mortality", through the websites LILACS, ScieLO, MEDLINE and Google Scholar, listing in the articles the age, sex, comorbidity(s), length of stay and outcome (discharge or death) of patients included in the survey for data analysis and treatment.

III. Results

In Brazil, the new coronavirus pandemic has been experienced since March 2020, according to Strabelli (2020) the clinical picture of COVID-19 is similar to that of other respiratory viruses, namely, fever, usually dry cough, tiredness and, in more cases, severe (5%), dyspnoea, pulmonary bleeding, severe lymphopenia and renal failure. According to Martelleto (2021) The systemic inflammation characteristic of both diseases, as well as tissue dysfunction resulting from cell invasion by SARS-CoV-2 caused by its receptor in the cell membrane, are critical for the worse prognosis of COVID-19 in obese patients. People with obesity are more prone to infections, as this condition impairs immunity by causing chronic inflammation of the adipose tissue, influencing the activity of innate and adaptive immunity cells, in addition to disturbing the body's hormonal balance (BEZERRA, et al., 2020). According to Borges (2021) Concomitantly, it became evident that the specific demands in the treatment of patients with obesity, such as adapted devices, make the care of these individuals even more difficult within a pandemic scenario. Previous neurological diseases presented an important percentage among the risk factors for increased morbidity and mortality related to covid and had a predominance among the elderly (MENDES, et al., 2020).

COVID-19 develops in three stages, in the first stage, after the virus infects the body, for most people there is an incubation period associated with mild and non-specific symptoms such as malaise, fever, dry cough that it can last from a few days to two weeks with symptoms disappearing. During this period, the virus multiplies in the respiratory system and can migrate, via hematogenous, to the small intestine. In the second stage, the virus continues to multiply and the inflammation will be located in the lungs, patients develop viral pneumonia with cough and low fever and hypoxia with a feeling of deep tiredness, with bleeding in the lung. In the third phase, in addition to severe inflammatory processes in the lungs, there is a process of generalized inflammation and the lack of control of the immune system, "cytokine storm", where neutrophils and lymphocytes release large amounts of toxic substances that instead of reaching the virus, they will reach cells, type 2 pneumocytes and vessel endothelial cells, which can lead to shock and death. In this scenario, the need for a basic health care system and the availability of quality hospital care during the rise of SARS-CoV-2 in Brazil becomes essentially predictable. of social inequality, has a high discrepancy in health indicators between its regions.

However, the analysis of the quality of health services offered is encouraged, since indicators such as infection rates, length of stay and nosocomial comorbidities may corroborate the disparity in lethality for the same disease in different cities. Given this scenario, other regional indicators of socioeconomic development such as employment, income and education generate a close relationship with health indices. Previous researches prove a direct relationship between years of schooling and improvement in health and quality of life. According to a study by Pimentel & Pellegrini Filho (2013), individuals with less than three years of schooling have a mortality rate ten times higher than individuals with eight years of schooling or more, corroborating the evidence of the relationship between education and health. In addition, several studies have already proven that social determinants - such as improving housing conditions, fighting poverty and improving nutrition - reduce the effect of infectious diseases, such as tuberculosis, even before the advent of effective drugs.

According to Barbosa (2020), the Brazilian epidemiological situation shows that the mortality of elderly people due to COVID-19 in Brazil is related to demographic and income distribution aspects. The age structure may have a protective factor against the risk of death from COVID-19, but by controlling for different age structures, we will more adequately identify the risk differentials (QUEIROZ, et al., 2020). According to

Souza (2020), the presence of cardiovascular comorbidities accelerates mortality from COVID-19. According to Maciel (2020) factors associated with death were revealed to be the oldest age group, being notified by a public institution, the number of comorbidities and the existence of some of the specific diseases/diseases (cardiac, renal, hepatitis, diabetes mellitus, immunological, HIV infection, neoplasms, smoking, chronic neurological). The involvement of the cardiovascular system in COVID-19 can determine the severity of the disease, potentiated in the presence of cardiovascular risk factors, resulting in complications that require intensive treatment and death. In general, all patients with COVID-19 are likely to have cardiac involvement, a fact that may depend on personal morbid history, inflammatory response and biochemical releasers (MARTINS et al., 2020) According to De Medeiros (2020), Diabetes Mellitus (DM) was considered an aggravating agent to the high rates of mortality and progression to acute respiratory distress syndrome in hospitalized patients with infection by coronavirus disease (COVID-19). Bloomgarden (2020) reports that diabetes is a major risk factor for adverse outcomes, death rates among people with diabetes in Hong Kong aged 75 years and over currently exceed mortality rates in this age group from cardiovascular disease and cancer. For Costa (2021) Acute kidney injury (AKI) in Covid-19, although relevant in clinical practice in the ICU, has few data in the literature, especially in Brazil, especially AKI was associated with higher hospital mortality, and individuals with no change in renal function or with stages 1 and 2 of AKI had higher in-hospital survival compared to stage 3.

Therefore, reviews on the subject showed that the most severe cases of the disease were older, male patients with comorbidities, compared to milder cases and specifically the presence of comorbidities increases the risk of death by 9.44 times in comparison to individuals without comorbidity (LAI et al., 2020; LI et al., 2020).

IV. Conclusion

A conclusive review result of this research brings publicity and knowledge about mortality from COVID-19, as well as important epidemiological data about objective public policies for prevention and health promotion.It is possible that the data obtained may lead to conclusions about specific contingency and isolation measures that could change the outcome on mortality rates.It is estimated that this research identified the main risk factors and/or comorbidity, specifying chronic renal failure and diabetes mellitus as the main factors related to mortality from COVID-19.

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