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RESEARCH ARTICLE

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CASE STUDY OF SERIOUS ACUTE RESPIRATORY SYNDROME SECONDARY TO COVID-19 IN THE STATE OF MINAS GERAIS: A RETROSPECTIVE STUDY

Simone Souza de Freitas^{1*}, Karla Cordeiro Gonçalves², Ana Cristina Carioca³, Arilma Contarini Soares de Araújo⁴, Aline Borges Penna⁵, Flavia Mariana Mendes Diniz⁶, Gabriela Freitas Pinheiro⁷, Ana Carolina Carvalho Rios⁸, Samantha Vieira Alves Amaral⁹, Lana Silva de Oliveira Teles¹⁰, Simone Aparecida de Souza Freitas¹¹, Lisiane Pinto Gomes¹², Maria Fernanda Silveira Scarcella¹³, Monique Rocha Nogueira¹⁴, Laiana Cristina Santos Felix¹⁵, Simone Rodrigues Campos¹⁶, José Luiz dos Santos¹⁷, Leandra Delfim do Nascimento¹⁸, Carla de Fatima Januario¹⁹ and Natália Borges Pedralho²⁰

¹Specialist Nurse in Public Health (FUTURA), ²Master in Science Applied to Health by UFMG, ³Nurse specialist in Hospital Nursing, Cardiovascular Emphasis by EE/UFMG, ⁴Specialist Nurse in Intensive Care - UNILESTE/MG, ⁵Professional Master Nurse in Intensive Care at IBRATI, ⁶Professional Master Nurse in Intensive Care at IBRATI, ⁷Master Nurse in Nursing from EE/UFMG, ⁸Specialist nurse in cardiology by FCMMG, ⁹Master's Nurse at the Federal University of Minas Gerais - UFMG, ¹⁰Professional Master Nurse in Intensive Care at IBRATI, ¹¹Professional Master Nurse in Intensive Care at IBRATI, ¹²Master's Nurse in Nursing at EE/UFMG, ¹³Master Nurse in Nursing from EE/UFMG, ¹⁴Specialist in Intensive Nursing by UFBA, ¹⁵Specialist Nurse in Intensive Care at PucMinas, ¹⁶Professional Master in Intensive Care by IBRATI, ¹⁷Specialist Nurse in Family Health Strategy Centro Universitário São Camilo, ¹⁸Specialist in Elderly Health from the Federal University of Minas Gerais, ¹⁹Resident of Nursing in Cardiovascular Health HC/UFMG, ²⁰Specialist Nurse in Adult Intensive Care by the Pitágoras College

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*Corresponding author:

Simone Souza de Freitas

ABSTRACT

The State of Minas Gerais presents, unlike most Brazilian States, a transmission level that is still low, because Belo Horizontes, the state capital, as well as the cities of Betim and Araguari have not yet reached the level of transmission of the disease that can place the Public Health System in collapse due to lack of ICU beds, respirators and personal protective equipment for health professionals. At first, the pandemic in the state remained at low levels because social isolation measures were enough to flatten the transmission curve. However, social isolation measures most impacted in reducing the transmission of the virus, with fewer cases and fewer deaths from Covid-19. But, soon came the growth of the curve and the number of cases grew, because social isolation was weakened by municipal decrees that made the quarantine more flexible to save the economy, sending people to the streets. The moment is now one of apprehension, with the number of cases and deaths by Covid-19 growing in the capital and in the cities. This work aims to evaluate the epidemiological situation and Covid-19 in the State of Minas Gerais, considering its intensification of confirmed cases of COVID-19, because they only have basic health care, according to SUS guidelines, and they use the hospital system of secondary and tertiary care in medium-sized cities, which are already reaching the limit of their capacity for ICU beds. This work aims to evaluate the epidemiological situation and Covid-19 in the State of Minas Gerais, considering its intensification of confirmed cases of COVID-19, from January 2020 to June 2021. Finally, there is a need for improvement in primary care, as well as training of the health team as a way to mitigate the impacts on hospital care in the state of Minas Gerais.

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INTRODUCTION

The new coronavirus (SARS-CoV-2) was identified in China, considered the cause of the disease called Corona Virus Disease 2019 (COVID-19)¹. The most common coronaviruses that cause respiratory infections in humans are alpha coronavirus (229E and NL63) and beta coronavirus (OC43, HKU1)^{two}.

In 2002 and 2003, an outbreak of Severe Acute Respiratory Syndrome occurred in China, with more than 900 deaths and 14 countries affected, caused by a specific type of coronavirus, SARS-CoV³. In December 2019, a subtype of this virus, called SARS-CoV-2, was identified as the cause of a new Severe Acute Respiratory Syndrome epidemic, initially located in Wuhan, China.⁴. Since then, there has been rapid dissemination of SARS-CoV-2 worldwide,

leading the World Health Organization (WHO) declares COVID-19 pandemic situation, given the detection of the virus in several continents with sustained transmission⁵. The state of Minas Gerais is a unit of the federation with a large territorial extension, in addition to having the largest number of municipalities among Brazilian states⁶. It should also be noted that it is the second most populous state in the country, with approximately 20 million inhabitants⁷. According to the Minas Gerais State Department of Health (SES/MG), the disease caused by Coronavirus (COVID-19) is a Public Health Emergency of International Importance (ESPII)⁸. Considering the rapid exponential progression in the number of COVID-19 cases in Brazil and Minas Gerais, as well as the potential severity of this disease, therefore, every case is immediately mandatory notification, based on the occurrence of suspected cases⁹. Thus, patients who present signs and symptoms such as fever, cough, respiratory distress, O₂ saturation <95%, dyspnea, fatigue, among others should be notified¹⁰. The transmission of SARS-CoV-2 occurs through respiratory droplets (expelled during speech, coughing or sneezing) from symptomatic people to others who are in close contact (less than 1 meter), by direct contact with the infected person or by contact with contaminated objects and surfaces¹¹. For patients with suspected COVID-19, the gold standard for laboratory confirmation by the Ministry of Health is the RT-PCR with a nasopharyngeal and gold swab sample¹². According to the Coronavirus Epidemiological Bulletin issued on June 17, 2021 by the State Health Department of Minas Gerais, the number of confirmed cases so far is 1,714,057 cases, while the confirmed cases for COVID-19 evolved to deaths were 43,814 cases. According to the World Health Organization, there is still no specific therapy for the treatment of patients with COVID-19¹³. However, as one of the pillars in the strategy to combat the Sars-CoV-2 virus, the Unified Health System (SUS) makes vaccines available to all Brazilian states, where Minas Gerais until June 17th vaccinated 2,570,620 people with the second dose of the vaccine¹⁴. The forecast is to vaccinate with the first dose the entire target audience (miners aged 18 or over) by October 2021¹⁵. Given the context, it is important to emphasize the importance of preventive measures in addition to vaccines, such as avoiding crowds, washing hands frequently, always using masks, among others^{11,12}. The purpose of this study was to evaluate the epidemiological situation and Covid-19 in the State of Minas Gerais, considering its intensification of confirmed cases of COVID-19, in the period from January 2020 to June 2021.

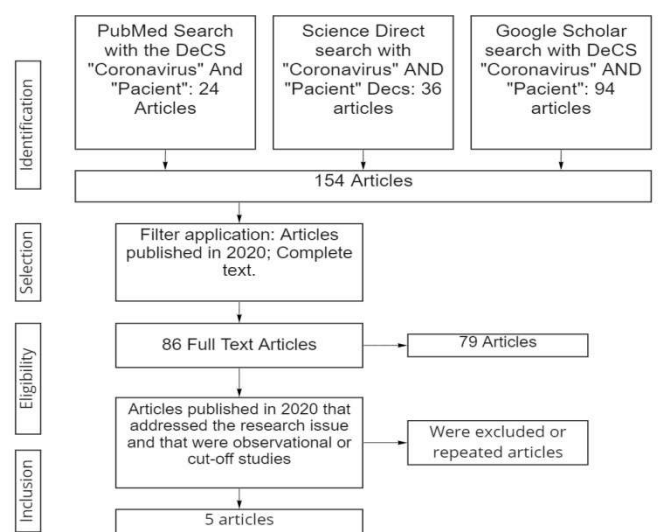
METHODOLOGY

Treats-is an epidemiological, descriptive and secondary study, which used the data obtained through databases, analyzing-if the numbers of cases and deaths made available in relation to the state of MG. Its execution proceeded from the execution of eight phases, which are detailed below.

- Elaboration of the review research question: in this phase, the PEO question was established, P = Population (patients), E = Exposure of interest (COVID 19) and O = Outcome (frequency of COVID-19). Thus, the question raised was "What is the knowledge, in the scientific literature, about the frequency of COVID-19 in the state of Minas Gerais?"
- Literature search: carried out in May and June 2021, using the Virtual Health Library (VHL), Medical Publisher (PubMed), Medical Literature Analysis and Retrieval System Online (MEDLINE) databases, Notes techniques, Mortality Information System (SIM), Information System for Notifiable Diseases (SINAN) and the DATASUS to search for studies and data that addressed the review issue. These platforms were chosen because they are widely accessible, easy to use, intuitive and because of the number of publications with free and open access. In the database search process, no articles were identified that addressed the PEO issue in the VHL and MEDLINE.
- Selection of articles: Medical Subject Headings (MeSH) were used and the search met the following combination, using the Boolean operator AND: coronavirus AND patients. It is

noteworthy that this restrictive association applied to all search channels. Furthermore, observational or cohort studies, available full texts and published in 2020 were included, as the new coronavirus appeared at the end of 2019. Articles repeated in more than one database, remaining at least once, were excluded.

- Data extraction: information related to the frequency of the new coronavirus in the state of Minas Gerais was sought and, from then on, data were summarized in tables. A synthesis was performed by two reviewers (LAS and FJA) and any incongruence between the material selected by both was resolved through discussions and, when the disagreement persisted, a third was consulted to make a final decision.
- Methodological quality assessment: the GRADE System Methodological Guidelines were used to classify the methodological quality of the studies (Charts 3 and 4) that make up this article (Figure 1), in which the filtering path adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses or the PRISMA Recommendation.



Source: Own Authorship, 2021

Figure 1: Steps followed to select the articles that make up this study according to PRISMA recommendation

- Data synthesis: In this phase, the main findings of the investigation are presented, selecting variables such as: year, type of study, database, objectives. The evidence of the extraction of results that answer the review question is reinforced, so that the analysis and synthesis of the studies is possible.
- Assessing the quality of evidence: the GRADE System was used to grade the quality of evidence and strength of recommendations. According to the document, observational studies should start with a low classification and, based on certain criteria, the quality of evidence can be raised. In detail, the measured information is specified in Tables 1.

According to the GRADE system, the factors responsible for the reduction in the level of evidence are: methodological limitations (risk of bias); inconsistency; indirect evidence; imprecision; publication bias. If the level is not lowered by identifying the aforementioned criteria, the quality of evidence from observational studies can be high considering three main factors: large magnitude of effect; dose-response gradient; residual confounding factors, which increase confidence in the estimate. It is necessary to assess the presence of factors that reduce the level of evidence of selected studies, because from the moment there are methodological limitations, there is a reduction in the confidence of the estimate of the effect of these studies. It is essential to classify the level of

evidence of the studies that make up a systematic review, since it represents the quality of available scientific evidence and defines the confidence in the information used, enabling the definition of a particular recommendation. Thus, the selected studies were analyzed in their methodologies in search of the presence or absence of these criteria, in order to establish the level of evidence for each of the studies and classify them, according to the GRADE system, into: high, moderate, low and very low. To perform this classification, the GRADE system analyzes factors that decrease the level of evidence and factors that increase the level of evidence. Finally, in phase 8, the presentation of the results was modeled, which were synthesized, constituting this article.

In this sense, it is noted that COVID-19 in the state of Minas Gerais, despite the relative stabilization of cases, remains a serious and complex problem, and thus the authorities need to remain alert, especially in the epidemiological profile presented (Men, brown, over 60 years old with comorbidities) so that the pandemic is really controlled and that there is no new increase, as already observed in some Brazilian states and European countries. Given this scenario, it is essential to draw strategies such as the creation of protocols for care and therapeutic flows, to reduce the morbidity and mortality of COVID-19, such a fact, added to the expansion of the hospital network, the redirection and reorganization of services, will contribute to alleviating the chaotic situation caused by COVID-19, allowing for an adequate flow of care.

Table 1. Distribution of articles used according to quantitative detailing. Title of the work, objectives, type of study and year

Title of the Work	Goals	Kind of study	Year
Respiratory diseases in the Triângulo Mineiro: Epidemiological and projective analysis with the COVID-19 pandemic.	To investigate hospitalizations for respiratory diseases in the Triângulo Mineiro (Minas Gerais, Brazil), discussing them in the context of health care, and the COVID-19 pandemic.	Descriptive and Quantitative	2020
COVID-19 Geographic Tracking According to Socioeconomic and Demographic Factors in the Municipality of Uberlândia, Minas Gerais	To analyze the spatial distribution of COVID-19 according to socioeconomic and demographic factors in the municipality of Uberlândia, Minas Gerais.	Ecological, transversal	2020
Analysis of COVID-19 transmission dynamics in Minas Gerais: Modeling and Simulation	Analyze the mathematical model of the SEIR type (Susceptible-Exposed - Infected - Recovered) for COVID transmission dynamics -19 in Minas Gerais – Brazil.	Theoretical-computational	2020
Spatiotemporal dynamics and risk estimates of the COVID-19 epidemic in the State of Minas Gerais: analysis of an expanding process	Analyze the spatial and spatiotemporal patterns of occurrence of COVID-19 and identify priority risk areas in the State of Minas Gerais, Southeastern Brazil.	Ecological	2021
Analysis of the spatiotemporal dynamics of incidence, mortality and testing rates (rapid and RT-PCR) of COVID-19 in the state of Minas Gerais, Brazil	Establish spatiotemporal associations of incidence; mortality; and rapid testing fees and RTPCR in Minas Gerais.	quantitative	2021

RESULT AND DISCUSSION

After carrying out the methodology used for the study, it was possible to identify 154 articles, according to the established criteria, 5 articles were included. In the period identified and from the special epidemiological bulletin, week 25, the State of Minas Gerais has 853 municipalities. Among the cities in the state of Minas Gerais, the main city affected by the pandemic is Belo Horizonte, which is the state capital, with 218,202 confirmed cases of Covid-19, followed by Betim, with 27,587 confirmed cases and Araguari, with 14,483 confirmed cases.

The epidemiological profile of cases that progressed to death in Minas Gerais demonstrates that Belo Horizonte is the municipality with the highest number of deaths, followed by Betim, Araguari. Of the Covid-19 fatalities, males were the hardest hit, with 23,957 deaths (55%), while females totaled 19.8 deaths (45%). Regarding age group, most deaths occurred in people aged 60 years or more, corresponding to 73%), with comorbidities: heart disease (18,836), diabetes (13,295), obesity (4,545), lung disease (2,902), kidney disease (2,873), neurological disease (2,729) and immunodeficiency (1,567). In 68% of deaths, patients have one or more of these comorbidities.

The distribution of Covid-19 cases by sex shows a significant difference, with (52%) cases being female and (48%) male and demonstrates a slight predominance of cases in the brown population (36%). The most affected age group was people between 30 and 39 years, with (22.2%) the most costly for the SUS, followed by the age group of 40 to 49 with (19.0%) cases. In the age group between 20 and 29 years (17.8%) infected people. In the current context, confirmed cases of COVID-19 that required hospitalization in the public or private network of Minas Gerais, registered since the beginning of the pandemic, correspond to 149,828 of the cases. The home isolation of confirmed cases of COVID-19 represents 1,564,229 of the cases.

CONCLUSIONS

The State of Minas Gerais appears on the national scene as one of the least affected by the Covid-19 pandemic, according to data released by the Minas Gerais State Department of Health. However, this placement has changed as Covid-19's rate of new cases began to increase. Even so, Belo Horizonte, Betim and Araguari are the cities most affected by the Covid-19 pandemic. THE intensification of transmission in these cities can be catastrophic, because they only have basic health care, according to SUS guidelines and they use the hospital system of secondary and tertiary care in medium-sized cities, which are already reaching the limit of their bed capacity of ICU. Given the above, it is clear that the epidemiological profile of cases of covid-19 secondary to Severe Acute Respiratory Syndrome in municipalities belonging to the state of Minas Gerais is similar to records from other locations in Brazil. From the time of diagnosis, it was observed that the largest number of cases occurred in the capital of the state of Belo Horizonte. Finally, there is a need for improvement in primary care, as well as training of the health team as a way to mitigate the impacts on hospital care in the state of Minas Gerais.

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