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Analysis of home and hospital deaths from respiratory and cardiovascular causes during the COVID-19 pandemic in Minas Gerais

Análise de óbitos domiciliares e hospitalares por causas respiratórias e cardiovasculares durante a pandemia da COVID-19 em Minas Gerais

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ABSTRACT

Introduction: The COVID-19 pandemic in Minas Gerais (MG) resulted in a decrease of the demand for healthcare, such as outpatient consultations, exams and elective surgeries, as one of the contingency strategies. **Objective:** To analyze deaths from respiratory and cardiac causes during the first half of 2020 occurring in households and hospitals in MG. **Method:** The causes of deaths were analyzed using data from the Civil Registry Transparency Portal (ARPEN) in epidemiological weeks 1st to 23th. **Results:** It was found that, compared to the same period in 2019, there was an increase in home deaths from pneumonia (17.59%), respiratory failure (20.65%), severe acute respiratory infection (SARI) (20.69%), sepsis (31.91%), acute myocardial infarction (15.56%), stroke (18.29%) and other cardiovascular causes (18.44%) in 2020. In relation to hospital deaths, a reduction in deaths from pneumonia (6.08%), from respiratory failure (3.59%) and from sepsis (2.21%) was observed, despite an increase of 338.30% for SARI. In addition, there was a 3.02% decrease in deaths from strokes, and a 3.41% increase in AMI and 2.93% for other cardiovascular causes. In relation to age and gender, regardless of the place of death, men aged between 75 and 80 years predominated. **Conclusions:** It is believed that part of these deaths are related to the restructuring of the dynamics of hospital care, associated with the fear of seeking assistance and becoming infected by the new coronavirus. In conclusion that there was an increase in home deaths and a reduction in hospital deaths in 2020 due to respiratory and cardiac causes in the context of the pandemic.

KEYWORDS: Pandemic; Coronavirus; Deaths; Lung Diseases; Heart Diseases; Minas Gerais

RESUMO

Introdução: A pandemia pela COVID-19 em Minas Gerais acarretou a diminuição da procura por atendimentos médicos, como consultas ambulatoriais, exames e cirurgias eletivas, como uma das estratégias de contingência. **Objetivo:** Analisar as mortes por causas respiratórias e cardiovasculares durante o primeiro semestre de 2020 ocorridas em domicílios e em hospitais de Minas Gerais. **Método:** As causas de óbitos foram analisadas por meio dos dados do Portal da Transparência do Registro Civil nas semanas epidemiológicas 1 a 23. **Resultados:** Constatou-se que, comparativamente ao mesmo período de 2019, houve acréscimo nas mortes domiciliares por pneumonia (17,59%), insuficiência respiratória (20,65%), infecção respiratória aguda grave (20,69%), sepse (31,91%), infarto agudo do miocárdio (15,56%), acidente vascular cerebral (18,29%) e por outras causas cardiovasculares (18,44%) em 2020. Já em relação aos óbitos hospitalares, constatou-se redução das mortes por pneumonia (6,08%), por insuficiência respiratória (3,59%) e por sepse (2,21%), apesar do incremento de 338,30% por infecção respiratória aguda grave. Além disso, encontrou-se decréscimo de 3,02% dos óbitos por acidente vascular cerebral e crescimento de 3,41% por infarto agudo do miocárdio e de 2,93% para

outras causas cardiovasculares. Em relação à faixa etária e ao sexo, independentemente do local do óbito, predominaram homens com idade entre 75 e 80 anos. **Conclusões:** Acredita-se que parte desses óbitos esteja relacionada com a reestruturação da dinâmica de atendimento hospitalar associado ao medo de procurar assistência e se infectar pelo novo coronavírus. Conclui-se que houve aumento de mortes domiciliares e redução das mortes hospitalares em 2020 por causas respiratórias e cardiovasculares em meio ao contexto da pandemia.

PALAVRAS-CHAVE: Pandemia; Coronavírus; Mortes; Doenças Pulmonares; Doenças Cardíacas; Minas Gerais

INTRODUCTION

The new coronavirus emerged in December 2019 in the city of Wuhan, Hubei province, China. It was initially characterized as pneumonia resulting from acute respiratory syndrome by the SARS-CoV-2 virus. In February 2020, the World Health Organization (WHO), officialized the name as coronavirus 2019 disease (COVID-19)[1].

By the end of the first half of 2020, 8,317,055 affected people have been confirmed worldwide, with 447,581 deaths. The United States of America (USA) occupies the first place in number of cases, with 2,159,446 occurrences of this disease. In the same period, Brazil occupied the second place in this ranking, with 955,377 affected[2].

The Southeast region of Brazil is the one that has the highest number of cases (324,604; 35.16%), behind only the Northeast. The state of Minas Gerais (MG), located in this area, is the 14th in the ranking of the country (22,024; 2.38%). However, the last five projections of this state, carried out on May 11, May 18, May 27, June 4, and June 10 overlap, that is, there is no decrease in the speed of progression of the pandemic[3]. At the end of April, MG had only 1,021 cases, which shows an exponential increase of 21,003 affected in just two months[3].

Another concern regarding the state of MG is due to the increasing manifestations of severe acute respiratory infection (SARI). According to data from InfoGripe[4], the incidence of SARI is high when considering the state's history. This excess of deaths in the state is of almost 650%, which denotes an expressive occurrence of this syndrome, and with a growth concomitant to the manifestation of COVID-19. Due to the similarity between signs and symptoms between COVID-19 and SARI, it is believed that this increase is actually due to the underreporting of deaths by the new coronavirus[5].

The first case with a clinical diagnosis for the new coronavirus in the Unified Health System (SUS) of MG occurred in the second week of March. As of that date, there is an average of almost 120 hospitalizations/day in clinical beds and approximately 27 hospitalizations/day in intensive care unit (ICU) beds. In this scenario, the average length of stay in intensive care beds is 14.2 days and 8.77 days in clinical beds[3]. The Brazilian Ministry of Health (MS) has a policy of managing people with COVID-19 by isolating them at home since the patient does not require hospital accommodations if they present with mild and moderate forms of the disease[6].

In this context, due to the guidelines of keeping social isolation, the MG State Department of Health (SES) stimulated and developed platforms that allow the online service based on telemedicine. Although the focus is on the new coronavirus, people with different signs and symptoms can go through this process[7]. In addition, as a pandemic containment strategy, several non-urgent hospital services have been suspended, such as consultations, examinations, or elective surgeries. This prevents people who are not affected by the COVID-19 from attending health units and taking risk of becoming infected, in addition to freeing beds for patients who are already diagnosed with this disease[8]. Thus, individuals with conditions that require continuous monitoring, such as those with causes similar to those of COVID-19 and those with cardiovascular diseases, may have been affected by this measure, which results in variation in the epidemiological profile of deaths in relation to their locations.

In this sense, this article aimed to analyze the causes of deaths and their home or hospital occurrences in the state of MG in the context of the COVID-19 pandemic.

METHOD

This is a descriptive and quantitative study of the registry records of home and hospital deaths registered in the state of MG in Brazil. This unit of the federation has an estimated population, according to the Brazilian Institute of Geography and Statistics (IBGE), of 21,168,791 people and a territory of 586,521.121 km² in 2019. Its Human Development Index (HDI) is 0.731 and the population aged 0 to 15 years represents 22.25%, the population aged 15 to 64, 69.31%, and the group above 65 years of age, 8.12%[9,10].

Data were collected on the Civil Transparency Portal on July 6, 2020. This is a free access site, which was developed to provide citizens with data and statistical information on births, marriages, and deaths, forming a Civil Registry Information Center (CRC) in the country[11]. The statistics presented in this portal come from Death Certificates (DC), including those related to COVID-19, registered in the registry, which presents only one cause for each death. Due to the COVID-19 pandemic, two specific sections were created in this portal to investigate in more detail the deaths from this disease, called "Special COVID-19" and "COVID Registral Panel"[12,13].

Deaths from respiratory and cardiovascular causes from the period of January 1 to June 6 of the years 2019 and 2020 were selected. The state chosen for analysis was MG, and the different places of death were listed: hospitals and households. To assess the total pattern of these deaths before and after the period of increase in deaths by COVID-19, the analysis was divided into two sections: that of epidemiological weeks (EW) 1 to 11 and another that considered EW 12 to 23. On July 14, 2020, information on the age group and sex due to selected causes of death were also collected. The statistics presented here are based on the DCs related to COVID-19 registered at the registry offices, which present only one cause for each death[12].

In the DC, the cause mentioned in the last line will be considered as the basic reason for death, according to the ICD-10 rules, when the sequence of causes informed by the doctor has been filled in correctly. Other significant reasons or conditions that may have contributed to death are also recorded. In the DC evaluated in this article, we selected those that contained a reason for the suspected or confirmed death by COVID-19, as well as other causes related to this disease, such as SARI, pneumonia, respiratory failure (RF), septicemia (sepsis/septic shock). Cardiovascular causes were also selected, such as stroke, acute myocardial infarction (AMI), and non-specific cardiovascular causes (sudden death or cardiorespiratory arrest, associated with arterial hypertension, atrioventricular block, cardiac arrhythmia, supraventricular tachycardia, among others). As for the "Place of Death", the data related to the place of death constant in the DC were certified by the doctor who filled it out[13,14,15].

For statistical analysis of the collected data, the t-Student test for independent samples was used, with the purpose of comparing the averages of deaths from respiratory causes at home in the years of 2019 and 2020 in the EWs from 1 to 23, and also to compare the mean deaths from cardiovascular causes at home in the years 2019 and 2020, using the GraphPad Prism 7 software (GraphPad Software, Inc. San Diego, CA). P-value < 0.05 was considered statistically significant. All graphs were created using the GraphPad Prism 7 software. The excess of deaths refers to the total number of deaths in the period from EW 1 to 23 in 2020 subtracted from the total number of deaths in the same period in 2019 for each cause analyzed.

The collected data were analyzed in an electronic spreadsheet using descriptive statistics and presented in raw numbers and relative frequency. As these are secondary publicly accessible data, submission to the Research Ethics Committee was waived.

RESULTS

When analyzing deaths from respiratory causes at home, there was a significant increase in the average in 2020 (79.83 ± 4.151) compared to the average of deaths in 2019 (66.57 ± 2.349) ($p < 0.0080$). And, when analyzing deaths from cardiovascular causes at home, there was a significant increase in the average in 2020 (93.96 ± 4.346) compared to the average of deaths in 2019 (80.04 ± 2.792) ($p < 0.0100$).

When assessing respiratory diseases at home from EW 1 to 11 of 2020, in contrast to the year 2019, there was an increase of 81 deaths (17.02%) and, during EW 12 to 23, the increase of 206 deaths (32.54%); when analyzing the hospital scenario from EW 1 to 11, there was an increase of 684 deaths (8.11%) and, during EW 12 to 23, a reduction of 1,295 deaths (-12.42%) (Figure 1A). As for cardiovascular causes at home from EW 1 to 11 in 2020, there was an increase of 22 deaths (2.67%), during EW 12 to 23, there was an increase of 298 deaths (29.27%), and, when it was observed cardiovascular diseases in hospital environments from EW 1 to 11, an increase of 179 deaths (6.43%) was identified), and, during EW 12 to 23, a reduction of 111 deaths (-3.31%) (Figure 1B).

The discrimination of home deaths due to respiratory causes in 2020 in relation to 2019 revealed an increase of 17.59%

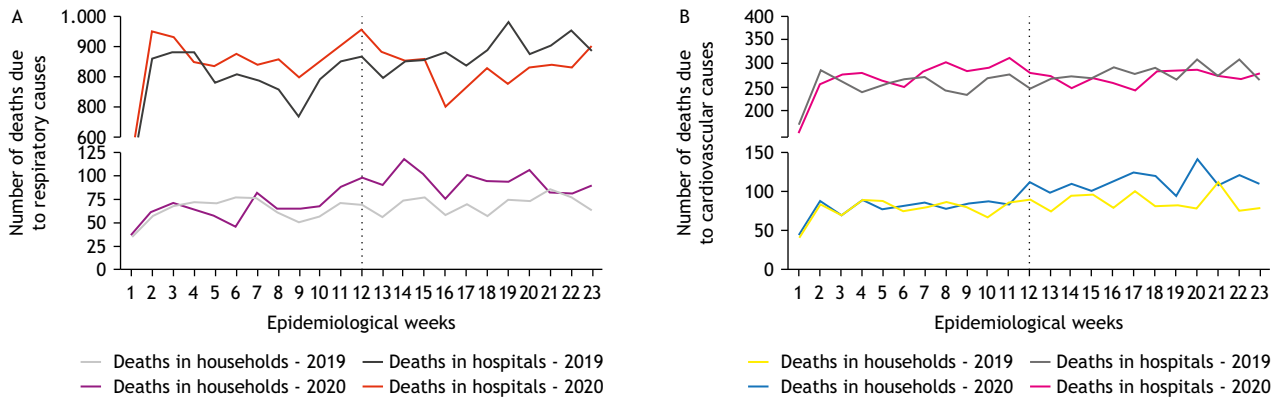


Figure 1. Distribution of deaths from respiratory and cardiovascular causes in hospitals and households according to the Civil Registry Transparency Portal (ARPEN). (A) Deaths from respiratory causes in hospitals and households in the years 2019 and 2020, during epidemiological weeks (EW) from 1 to 23 in the state of Minas Gerais. (B) Deaths from cardiovascular causes in hospitals and households in the years 2019 and 2020, during epidemiological weeks (EW) from 1 to 23 in the state of Minas Gerais. The black dashed line in EW 12 indicates the milestone of the increase in deaths by COVID-19 in the state of Minas Gerais, Brazil.

due to pneumonia (Figure 2A), with a greater predominance (50.42%) among women aged between 90 to 99 years (Fig. 2B). An increase of 20.65% of deaths due to RF (Figure 2C) was also identified, predominantly in men (50.49%) aged between 80 and 89 years (Figure 2D). An increase of 31.91% of deaths from sepsis (Figure 2E) was noted, but these had a higher occurrence in women (55.91%) between 80 and 89 years of age (Figure 2F). Regarding SARI, an addition of 20.69% (Figure 2G) was found, with a greater preponderance in men (65.71%) aged between 90 and 99 years (Figure 2H). The total number of home deaths in 2020 from the causes mentioned above had an increase of 25.88%.

On the other hand, there was a reduction in hospital deaths of 6.08% due to pneumonia, 3.59% due to RF, 2.21% due to sepsis, and an increase of 338.30% for SARI. This comparison of total hospital deaths from the causes mentioned above showed a reduction of 3.24% in 2020.

When analyzing deaths from cardiovascular causes at home, there was an increase of 18.29% due to stroke (Figure 3A), with a higher prevalence in women (50.32%) aged between 80 and 89 years (Figure 3B). There was also an increase of 15.56% due to AMI (Figure 3C), with a greater predominance in men (61.17%) between 60 and 69 years of age (Figure 3D). Lastly, an increase of 18.44% in deaths due to other cardiovascular causes (Figure 3E) was identified, with a greater predominance in men (52.47%) between 80 and 89 years of age (Figure 3F). The total number of home deaths in 2020 from the causes mentioned above compared to 2019 had an increase of 17.38%.

There was a decrease in deaths in hospital units of 3.02% due to stroke and an increase of 3.41% due to AMI and 2.93% due to other cardiovascular causes. The total of these deaths increased by 1.11%. However, when analyzing from EW 12, it is noted that hospital deaths are decreasing in all cardiovascular causes, totaling a reduction of 3.31%.

DISCUSSION

This article fulfills its primary objective of evaluating deaths and their places of occurrence in the state of MG due to respiratory and cardiovascular causes in 2020. As mentioned in the results, there was a representative increase in deaths at home from all *causas mortis* denoted in the objective: pneumonia, RF, SARI, sepsis, AMI, and stroke, and they continue to predominate in terms of gender and age group.

Firstly, it is of great importance to address that the COVID-19 pandemic implied changes in the functioning of the health system with interruption of non-essential or elective activities that, associated with the fear of contamination by patients, caused significant changes in the service's dynamics of care hospitals[14]. Thus, it is understood that these changes led to a decrease in the flow of patients in hospitals, including those with an indication for emergency care, that is, with life risk, and, consequently, may be contributing to the increase in deaths at home.

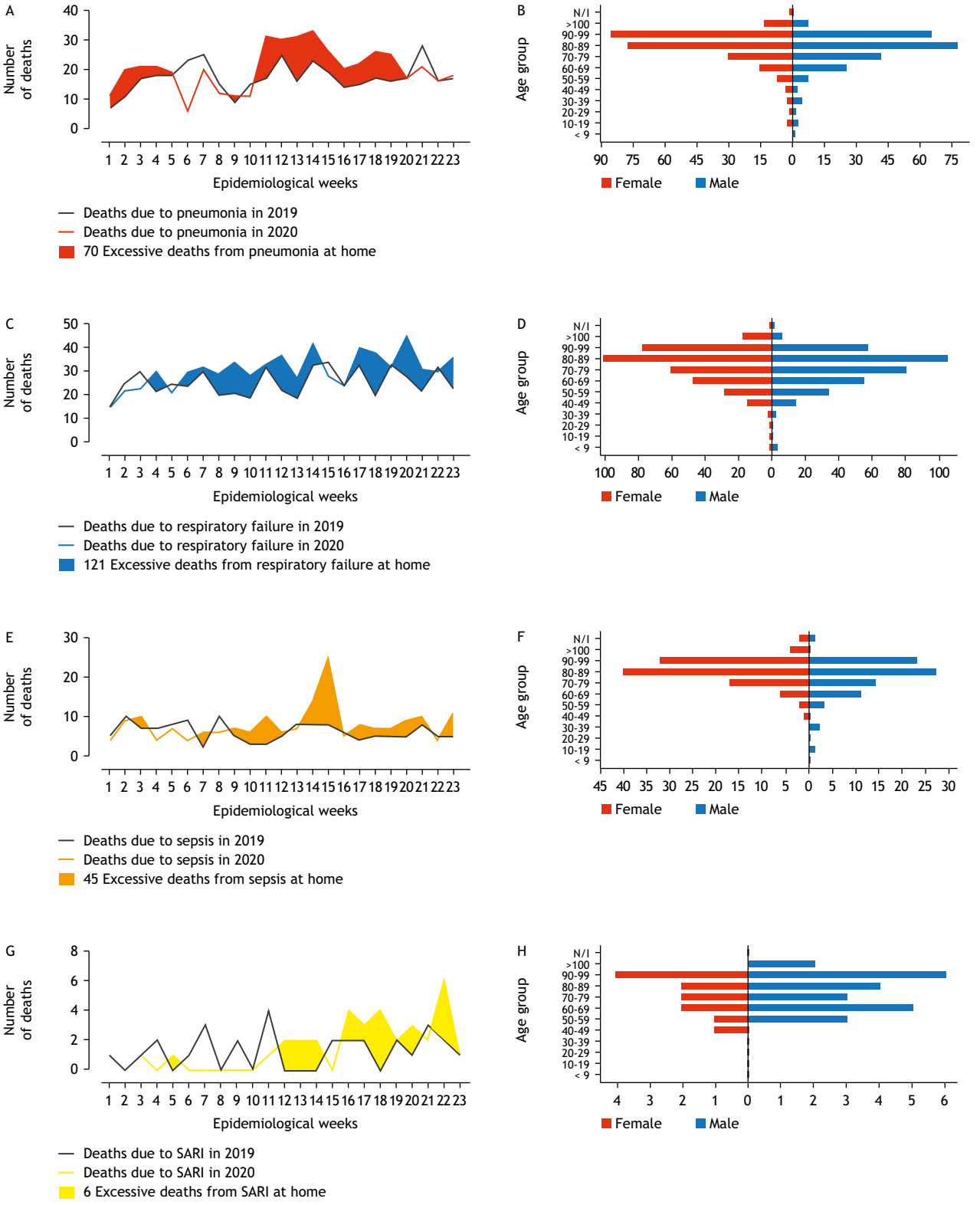
Second, with regard specifically to COVID-19, according to the MS, the clinical management of influenza syndrome, a clinical manifestation related to the disease, in Primary Health Care (PHC) varies according to the severity of cases. Thus, mild cases should include non-pharmacological therapeutic management (rest, hydration, adequate food, analgesics, and antipyretics) and home isolation for 14 days with active surveillance by PHC professionals, via telephone, every 48h[6].

Thus, the management proposal instituted by the MS prioritizes the containment of the dissemination of the new coronavirus (since the patient with mild flu syndrome will be isolated at home) and the minimization of expenses, since the patient, at that moment, does not have to have a hospital bed. However, this measure may be contributing to the increase in deaths at home. This can be explained by the lack of complete information on the natural history of the disease, as well as on measures of the clinical management of human infection by SARS-CoV-2[6], which makes them questionable. Therefore, there is a certain probability that this patient will evolve to the severe form of the disease, developing SARI, and die at home, which would explain the increase in deaths at home due to this cause. This is stated when considering all the factors that influence this condition, such as comorbidities, disease incipience, social determinants, and countless other variables that can drive this evolution and that involve the disease agent, the patient, and their environment.

SARI is a set of acute and severe respiratory signs and symptoms whose main etiological agents are viruses, such as influenza, respiratory syncytial virus (RSV), adenovirus, hantavirus, dengue, and coronavirus, and other agents, such as bacteria[15]. Individuals with a combination of the following symptomatic conditions are considered to be cases of SARI and must be notified compulsorily: high fever (above 37.8ºC) AND cough OR sore throat AND breathing difficulty OR dyspnea OR O_2 saturation < 95% AND required hospitalization OR died having presented the referred symptoms, regardless of hospitalization[16].

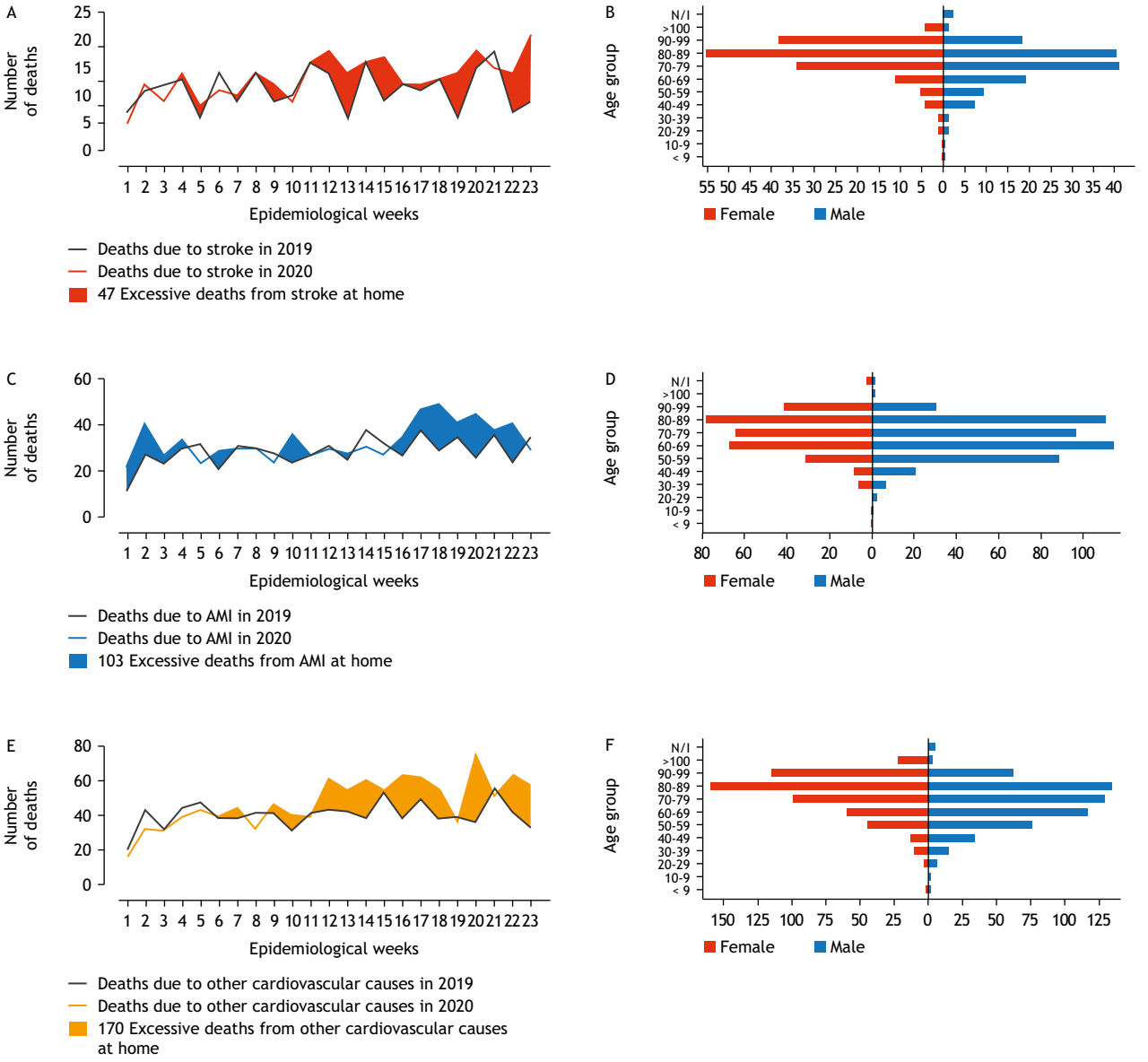
In Brazil, the notification of hospitalized cases due to SARI started to be carried out in the Notifiable Diseases Information System (Sinan) since the influenza A (H1N1) pandemic, in 2009, including RSV from 2012 and, currently, COVID-19, which, in 2020, made SARI one of the main causes of death in Brazil[16]. This scenario directly influences the increase in household deaths due to SARI observed in this study in the amount of 20.69% during the COVID-19 pandemic.

It is not yet possible to carry out a detailed analysis of the epidemiological profile of deaths due to SARI caused by COVID-19 because there are still no robust studies on this topic. However, according to Niquini et al.[17], between the years of 2010 and 2019, the dominant infectious agents were Influenza A and B and RSV. The prevalence of both viruses in children was identified, however, for the influenza virus, there is also a predominance in the elderly aged 60 years or older. On the other hand, hospitalizations for SARI due to COVID-19 concentrated among elderly men or those aged 40 to 59 years. Similar to what was identified



SARI: Severe acute respiratory infection.

Figure 2. Distribution of deaths from respiratory causes and age groups according to the Civil Registry Transparency Portal, during epidemiological weeks from 1 to 23 in the years 2019 and 2020 in the state of Minas Gerais, Brazil. (A) Excessive deaths from pneumonia at home; (B) Age pyramid of deaths from pneumonia in 2020; (C) Excessive deaths from respiratory failure at home; (D) Age pyramid of deaths from respiratory failure at home in 2020; (E) Excessive deaths from sepsis at home; (F) Age pyramid of deaths from sepsis in 2020; (G) Excessive deaths from SARI at home, and (H) Age pyramid of deaths from SARI in 2020.



stroke; AMI: Acute myocardial infarction.

Figure 3. Distribution of deaths from cardiovascular causes and age groups according to the Civil Registry Transparency Portal, during epidemiological weeks from 1 to 23 in the years 2019 and 2020 in the state of Minas Gerais, Brazil. (A) Excessive deaths from stroke at home; (B) Age pyramid of deaths from stroke in 2020; (C) Excessive deaths from AMI at home; (D) Age pyramid of deaths from AMI at home in 2020; (E) Excessive deaths from other cardiovascular causes at home; (F) Age pyramid of deaths from other cardiovascular causes in 2020.

in this study, with a predominance of household deaths due to SARI due to the COVID-19 pandemic in men aged 90 to 99 years and in the second most affected age group from 60 to 69 years. Another issue to consider is that Brazil is experiencing a population aging process, with a decrease in birth and mortality, as well as a significant increase in people over 60 years of age, characterizing a demographic and epidemiological transition in the country[18], which can contribute for this age group to be one of the most affected.

In the elderly with multimorbidity, the severe course of COVID-19 is already expected and, despite hospitalization and intensive care, mortality in this group is high. Facing this reality, and clarifications, many patients choose to stay home and face the disease in a family environment[19]. It is known that the highest mortality rate due to COVID-19 occurs in this group, especially in those with comorbidities[6], and, given the above and the fear of infection by COVID-19 when seeking care, the influence of this situation on the increase in the number of home deaths is possible.

Regarding deaths from pneumonia at home, the findings of the prevalence among women over 80 years old corroborate with a study by Dias et al.[20], which demonstrates that, between 2014 and 2019, in Triângulo Mineiro, elderly people aged over 60 years or older were the main ones to be hospitalized for

this disease. Prina et al.[21] also showed that there is a higher global incidence of community-acquired pneumonia (CAP) in people over 65 years. As already mentioned, the distancing of patients from health centers due to the pandemic scenario caused by the new coronavirus may have caused this increase. This is stated because, according to Corrêa et al.[22], there is a need for constant monitoring of patients with CAP, to allow the assessment of the Pneumonia Severity Index (PSI). The PSI is relevant for the proper management of the individual, which involves the decision about the place of care (ambulatory, hospital, or ICU), the need for an etiological investigation, and the choice of antibiotics and their route of administration. Among the criteria evaluated in the PSI, are the monitoring of blood pressure, urea, albumin, respiratory rate, tachycardia, mental confusion, oxygenation, and ph. In addition, monitoring of oxygen saturation (SpO_2) is recommended. Thus, it is evident that the contribution of the health center is essential for the care of these patients so that maintaining them at home can be fatal.

Invasive mechanical ventilation via an endotracheal tube or tracheal cannula is an essential therapy for patients with acute RI[23]. Other forms of treatment also involve maintenance of the airways and oxygen therapy[24]. Thus, these patients must have monitoring for these services to be provided, which is limited in the context of the current pandemic by the new coronavirus.

In addition, if the development of the RF is lasting (for months or years), chronic respiratory diseases may be developed, with chronic obstructive pulmonary disease (COPD) being the most common[24]. In this case, it is known that physical activity is essential for pulmonary rehabilitation. Training of arm strength or whole-body vibration, and, mainly, the practical walk test are essential and show beneficial results in the recovery of these[25]. However, in the context of the pandemic, in which social distancing is recommended, the performance of these activities is difficult, and this can aggravate the chronic conditions of RF and result in death.

This is stated because, according to Pitanga et al.[26], it is recommended that, at the moment, the exercises be carried out preferably with technological support, through video with sequences of activities, apps, and online guidance from professionals. However, as evidenced by this study, the main victims at home due to RF are the elderly over 70 years of age, that is, it is expected that they will find it more difficult to manage this situation. This may be due to the inability or difficulty in using technology devices, internet, and related, or simply because they do not have access to a computer, cell phone, or tablets. In addition, also due to isolation, these people will be unable to assist family members in the use of these technologies.

Home deaths from sepsis also showed an increase in relation to last year and with a predominance among women in the present study, with a difference of 9% between genders. It was also found that the age group between 80 and 89 years was the most affected. Both data corroborate the findings of the study by Santos et al.[27], which assessed all deaths registered in 2017 in the Mortality Information System and found a predominance of sepsis among women in this age group.

The diagnosis of this pathology is the initial obstacle to be faced by doctors, as its first manifestations can be confused with other non-infectious processes[28]. These findings may help to understand the increase in home deaths in 2020 from this disease in MG, because, if recognition is already difficult in person by the doctor and through laboratory tests, this can be even more neglected in remote visits or by not looking for hospital services.

Carvalho and Trotta[28] also highlighted that sepsis can result in dysfunction, failure of one or more organs, or death. Thus, the Brazilian Federal Council of Medicine recommends that patients with this reaction should be transferred as soon as possible to the intermediate care units or the ICUs in order to continue with the treatment. In this regard, the context of the decrease of outpatient care and going to the hospital due to the scenario caused by COVID-19 can lead to deaths at home due to this cause, since medical intervention is crucial to contain this condition.

AMI is the leading cause of death in Brazil and worldwide[29]. In several regions of the globe, there was a significant decrease in demand for care for AMI due to the COVID-19 pandemic, which can vary from 50% to 90% reduction[30]. It is known that most deaths from AMI occur in the first hours of disease onset: 40% to 65% in the first hour and approximately 80% in the first 24h. Thus, most deaths occur outside the hospital environment and are generally unattended by doctors. Therefore, early care and the rapid institution of adequate treatment are essential for the survival of patients with AMI[31]. In this perspective, quarantine, by prioritizing social isolation and the consequent staying at home, can further increase the likelihood that a patient with AMI will die at home. In this study, an increase of 15.56% was observed in household deaths due to this condition during the COVID-19 pandemic, which corroborates this suspicion.

It is worth considering that, in Brazil, notaries registered an increase of 31% in the number of deaths from cardiovascular diseases[12] which, in part, could be a reflection of this non-attendance to patients with AMI and their consequent death. However, it is possible that this increase is also being influenced by the underreporting of deaths by COVID-19 because, mainly due to difficulties in diagnosis and the risks of contamination, many death certificates may be being issued with the *causa mortis* due to cardiorespiratory arrest, falling under cardiovascular disease, and not due to COVID-19.

Regarding the epidemiological profile, this study found a higher incidence of home deaths from AMI in men aged between 60 and 69 years, as found by Marino et al.[29] for patient profile assisted for AMI in a study carried out in the North of MG, in which 67.6% were male and the average age was 63 years.

Stroke is the second leading cause of death in the world and Brazil. It is one of the most important chronic non-communicable diseases that result in deaths and hospitalizations, in addition to causing some type of partial or complete disability[32]. It can be of the ischemic type, corresponding to 80% of the cases, or of the hemorrhagic type in 20% of the cases[33]. It is a neurological emergency and the loss of time to approach patients means a worse outcome. Therefore, it is necessary to quickly identify the signs and symptoms of stroke, seek specialized hospital care, that is, a stroke unit, perform diagnostic tests and specific treatment in a timely manner, be it medication, clinical, or surgical, to avoid mortality and sequelae[34]. Thus, just like what was exposed for AMI, due to the need for immediate care or fear of contamination by COVID-19, the signs and symptoms of stroke may be being neglected by patients. This may explain the increase of 18.29% in deaths at home due to a stroke observed in this study.

On the epidemiological profile of this disease, Mourão et al.[35] found, in a hospital accredited in the stroke care line in MG, a prevalence in males and the average age of 64.3 years for stroke patients. Regarding the profile of stroke deaths in the state of Paraná, Hata et al.[33] found that more than half were male patients with a higher incidence in the age group of 70 to 79 years. In the findings of this article, the profile of stroke deaths in 2020, in the analyzed period, is prevalent among women aged between 80 and 89 years.

CONCLUSIONS

This article brings as a contribution the emphasis on the increasing number of deaths at home due to respiratory causes similar to those of COVID-19 and cardiovascular causes and their correlations between the most affected age group and gender. These data can contribute to the creation of public policies that address the correct management of these conditions in conjunction with the control of the new coronavirus.

The care conditions imposed by the current pandemic advocate social distancing and a reduction in the health services offered. Both resolutions decrease the demand for care by the population and are essential measures to contain the progress of COVID-19. However, given the data presented here, there is a need for a more focused look at diseases and manifestations that require continuous medical monitoring and technological support present in hospitals, as in the cases of the pathologies presented here. In this sense, studies similar to this must be carried out in different regions, in order to ascertain whether this pattern is repeated to certify the national influence of the new coronavirus on home deaths, both by causes analyzed here, as well as others.

This article has as a limitation the supply of secondary data, which is restricted to the years 2019 and 2020, which makes it impossible to compare with other years. In addition, as they are data from a governmental system, there may be delays in updating them, which impairs the accuracy of the values. Lastly, it was not possible to ascertain whether there was a decrease in the demand for hospital care, when comparing the entry of patients to health services in 2020 with 2019, as these results are not available. Thus, the decrease in deaths in hospitals due to causes analyzed here is in relation to the gross value of these deaths, and not based on the relationship between admission to the hospital and death in this environment.

After carefully analyzing both the available databases and related literature, we were able to explore the related aspects between this new disease and its implication in the home treatment policy, which brings a new look to the current situation.

REFERENCES

1. Shi Y, Wang G, Cai XP, Deng JW, Zheng L, Zhu HH et al. An overview of COVID-19. J Zhejiang Univ Sci B. 2020;21(5):343-60. https://doi.org/10.1631/jzus.B2000083
2. Johns Hopkins University and Medicine - JHU. COVID-19 dashboard by the center for systems science and engineering (CSSE). Baltimore: Johns Hopkins University and Medicine; 2020[acesso 17 jul 2020]. Disponível em: https://coronavirus.jhu.edu/map.html
3. Secretaria de Estado de Saúde de Minas Gerais – SES-MG. Boletim epidemiológico e assistencial COVID-19: edição especial número 8. Belo Horizonte: Secretaria de Estado de Saúde de Minas Gerais; 2020[acesso 17 jul 2020]. Disponível em: https://www.saude.mg.gov.br/images/noticias_e_eventos/000_2020/jun-jul-ago/17-06-Boletim_Edicao-EspecialN8.pdf
4. Fundação Oswaldo Cruz – Fiocruz. Risco de espalhamento da COVID-19 e avaliação da vulnerabilidade socioeconômica por estado: Minas Gerais. Boletim Minas Gerais. 2 abr 2020[acesso 17 jul 2020]. Disponível em: https://gitlab.procc.fiocruz.br/mave/repo/-/blob/master/Relat%C3%B3rios%20t%C3%A9cnicos%20-%20COVID-19/relat%C3%B3rio%20t%C3%A9cnico%203%20-%20boletins%20estaduais-2020-04-01/boletim_estadualMG.pdf
5. Alves THE, Souza TA, Silva SA, Ramos NA, Oliveira SV. Underreporting of death by COVID-19 in Brazil's second most populous state. MedRxiv. 2020:1-15. https://doi.org/10.1101/2020.05.20.20108415
6. Ministério da Saúde (BR). Protocolo de manejo clínico do coronavírus (COVID-19) na atenção primária à saúde. Brasília: Ministério da Saúde; 2020[acesso 17 jul 2020]. Disponível em: https://www.saude.gov.br/images/pdf/2020/marco/20/20200318-ProtocoloManejo-ver002.pdf
7. Secretaria de Estado de Saúde de Minas Gerais – SES-MG. Saúde digital em Minas Gerais. Belo Horizonte: Secretaria de Estado de Saúde de Minas Gerais; 2020[acesso 16 jul 2020]. Disponível em: http://coronavirus.saude.mg.gov.br/saudedigitalmg

8. Agência Nacional de Saúde Suplementar – ANS. ANS orienta: consultas, exames e cirurgias que não sejam urgentes devem ser adiados. Rio de Janeiro: Agência Nacional de Saúde Suplementar; 2020[acesso 17 jul 2020]. Disponível em: http://www.ans.gov.br/aans/noticias-ans/consumidor/5426-ans-orienta-consultas-exames-e-cirurgias-que-nao-sejam-urgentes-devem-ser-adiados
9. Instituto Brasileiro de Geografia e Estatística – IBGE. Panorama: Minas Gerais. Brasília: Instituto Brasileiro de Geografia e Estatística; 2020[acesso 17 abr 2020]. Disponível em: https://cidades.ibge.gov.br/brasil/mg/panorama
10. Atlas Brasil. Atlas do desenvolvimento no Brasil: Minas Gerais. Brasília: Instituto de Pesquisa Econômica Aplicada; 2020[acesso 29 abr 2020]. Disponível em: http://www.atlasbrasil.org.br/2013/pt/perfil_uf/minas-gerais#demografia
11. Associação dos Registradores de Pessoas Naturais – ARPEN Brasil. Registros. Portal de Serviços Registro Civil. 2020[acesso 29 abr 2020]. Disponível em: https://transparencia.registrocivil.org.br/registros
12. Associação dos Registradores de Pessoas Naturais – ARPEN Brasil. Painel registral: óbitos com suspeita ou confirmação de COVID-19. Portal de Serviços Registro Civil: especial COVID. 2020[acesso 29 abr 2020]. Disponível em: https://transparencia.registrocivil.org.br/especial-covid
13. Associação dos Registradores de Pessoas Naturais – ARPEN Brasil. Painel registral: óbitos com suspeita ou confirmação de COVID-19. Portal de Serviços Registro Civil: Registral COVID. 2020[acesso 29 abr 2020]. Disponível em: https://transparencia.registrocivil.org.br/registral-covid
14. Oliveira M, Sousa P, Sousa L, Mendes C, Labucha M, Macedo F. A cardiologia na pandemia COVID-19: que impacto na atividade clínica? Gaz Med. 2020;2(7):101-6. https://doi.org/10.29315/gm.v7i2.348
15. Ribeiro SA, Brasileiro GS, Soleiman LNC, Silva CC, Kavaguti CS. Síndrome respiratória aguda grave causada por influenza A (subtipo H1N1). J Bras Pneumol. 2020;36(3):386-9. https://doi.org/10.1590/S1806-37132010000300017
16. Bastos LS, Niquini RP, Lana RM, Villela DAM, Crus OG, Coelho FC et al. COVID-19 e hospitalizações por SRAG no Brasil: uma comparação até a 12ª semana epidemiológica de 2020. Cad Saude Publica. 2020;36(4):1-8. https://doi.org/10.1590/0102-311x00070120
17. Niquini RP, Lana RM, Pacheco AG, Cruz OG, Coelho FC, Carvalho LM et al. SRAG por COVID-19 no Brasil: descrição e comparação de características demográficas e comorbidades com SRAG por influenza e com a população geral. Cad Saude Publica. 2020;36(7):1-12. https://doi.org/10.1590/0102-311X00149420
18. Oliveira AS. Transição demográfica, transição epidemiológica e envelhecimento populacional no Brasil. Hygeia. 2019;15(31):69-79. https://doi.org/10.14393/Hygeia153248614
19. Kunz R, Minder M. COVID-19 pandemic: palliative care for elderly and frail patients at home and in residential and nursing homes. Swiss Med Wkly. 2020;150:1-2. https://doi.org/10.4414/smw.2020.20235
20. Dias FLT, Mendonça FD, Pinto GM, Borges ISC, Oliveira SV. Doenças respiratórias no triângulo mineiro: análise epidemiológica e projetiva com a pandemia de COVID-19. J Health Biol Sci. 2020;8(1):1-6. https://doi.org/10.12662/2317-3219jhbs.v8i1.3206.p1-6.2020
21. Prina E, Ranzani OT, Torres A. Community-acquired pneumonia. Lancet. 2015;386(9998):1097-108. https://doi.org/10.1016/S0140-6736(15)60733-4
22. Corrêa RA, Costa AN, Lundgren F, Michelin L, Figueiredo MR, Holanda M et al. 2018 recommendations for the management of community acquired pneumonia. J Bras Pneumol. 2018;44(5):405-23. https://doi.org/10.1590/S1806-37562018000000130
23. Fichtner F, Moerer O, Weber-Carstens S, Nothacker M, Kaisers U, Laudi S. Clinical guideline for treating acute respiratory insufficiency with invasive ventilation and extracorporeal membrane oxygenation: evidence-based recommendations for choosing modes and setting parameters of mechanical ventilation. Respiration. 2019;98(4):357-72. https://doi.org/10.1159/000502157
24. Pádua AI, Alvares F, Martinez JAB. Insuficiência respiratória. Medicina. 2003;36(2/4):205-13. https://doi.org/10.11606/issn.2176-7262.v36i2/4p205-213
25. Spruit MA, Rochester CL, Pitta F, Kenn K, Schols AMWJ, Hart N et al. Pulmonary rehabilitation, physical activity, respiratory failure and palliative respiratory care. Thorax. 2018;74(7):693-9. https://doi.org/10.1136/thoraxjnl-2018-212044
26. Pitanga FJG, Beck CC, Pitanga CPS. Atividade física e redução do comportamento sedentário durante a pandemia do coronavírus. Arq Bras Cardiol. 2020:1-3. https://doi.org/10.36660/abc.2020023
27. Santos MR, Cunha CC, Ishitani LH, França EB. Mortes por sepse: causas básicas do óbito após investigação em 60 municípios do Brasil em 2017. Rev Bras Epidemiol. 2020;22(Supl 3):1-13. https://doi.org/10.1590/1980-549720190012.supl.3
28. Carvalho PRA, Trotta EA. Avanços no diagnóstico e tratamento da sepse. J Pediatr. 2003;79(Supl 2):S195-S204. https://doi.org/10.1590/S0021-75572003000800009
29. Marino BCA, Marcolino MS, Reis Júnior RDS, França ALN, Passos PFDO, Lemos TR et al. Perfil epidemiológico e indicadores de qualidade em pacientes com síndrome coronariana aguda na região norte de Minas Gerais: projeto Minas telecardio 2. Arq Bras Cardiol. 2016;107(2):106-15. https://doi.org/10.5935/abc.20160095
30. Wood S. The mystery of the missing STEMIs during the COVID-19 pandemic. Tctmd Feature: Interventional. 2 abr 2020[acesso 17 jul 2020]. Disponível em: https://www.tctmd.com/news/mystery-missing-stemis-during-COVID-19-pandemic
31. Piegas LS, Timerman A, Feitosa GS, Nicolau JC, Mattos LAP, Andrade MD et al. V diretriz da sociedade brasileira de cardiologia sobre tratamento do infarto agudo do miocárdio com supradesnível do segmento ST. Arq Bras Cardiol. 2015;105(2 supl 1):1-105. https://doi.org/10.5935/abc.20150057

32. Almeida SRM. Análise epidemiológica do acidente vascular cerebral no Brasil. Rev Neurocienc. 2012;20(4):481-2. https://doi.org/10.4181/RNC.2012.20.483ed.2p

33. Hata MM, Rodrigues AJS, Quadros AC, Turmina L, Iachinski RE, Osório APS. Análise do perfil epidemiológico de óbitos por doenças cerebrovasculares em residentes do estado do Paraná no período de 2008 a 2017. Fag J Health. 2019;1(3):209-15. https://doi.org/10.35984/fjh.v1i3.126

34. Gagliardi RJ, Raffin CN, Fábio SRC. Tratamento da fase aguda do acidente vascular cerebral. São Paulo: Academia Brasileira de Neurologia; 2001[acesso 18 jul 2020]. Disponível em: https://diretrizes.amb.org.br/_BibliotecaAntiga/tratamento-da-fase-aguda-do-acidente-vascular-cerebral.pdf

35. Mourão AM, Vicente LCC, Chaves TS, Santanna RV, Meira FDC, Xavier RMDB et al. Perfil dos pacientes com diagnóstico de AVC atendidos em um hospital de Minas Gerais credenciado na linha de cuidados. Rev Bras Neuro. 2017;53(4):12-6.

Author's Contributions

Alves THE, Souza TA, Silva SA, Ramos NA, Oliveira SV - Conception, planning (study design), acquisition, analysis, data interpretation, and writing of the work. The authors approved the final version of the work.

Conflict of Interests

The authors inform that there is no potential conflict of interest with peers and institutions, politicians, or financial in this study.