

Epidemiological pattern of COVID-19 in a Brazilian northeast small municipality

Perfil epidemiológico dos pacientes infectados por COVID-19 em um município de pequeno porte no nordeste brasileiro

Anselmo Messias Ribeiro Silva Junior¹, Guilherme Bernardo Meira², Leticia Finco Machado³

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ABSTRACT: *Introduction:* The coronavirus 2 pandemic related to severe acute respiratory syndrome (SARS-CoV-2), which causes coronavirus disease 2019 (COVID-19), which emerged in late 2019 in Wuhan, Hubei Province, China is a variation of the coronavirus family that causes respiratory infections. The first human coronaviruses were isolated for the first time in 1937. *Objective:* to characterize the epidemiological profile of confirmed cases and clinical manifestations caused by COVID-19 in a small municipality in northeastern Brazil. *Methodology:* epidemiological, descriptive, quantitative study of 564 patients confirmed with COVID-19 disease in the city of Poções - Bahia. The data were obtained from the notifica-SUS platform and with the analysis of medical records only of patients who died with confirmation of the disease between the period from June 1, 2020 to 08/08/2020. *Results:* The age group most affected by the COVID-19 disease was between 20 and 39 years old, with 40.24% of confirmed cases. In the population aged 3 to 19 years, the number of cases was inversely proportional, with a lower number of infected with the virus, 8.48% of confirmed cases, thus, followed by the low numbers of cases in babies/infants with a low infection rate. of 1.95%. Among the patients diagnosed with the disease, the main symptoms reported were dry cough (276 [48.9%]), fever (225 [39.89%]), headache (163 [28.90%]), sore throat (152 [26.95%]), dyspnea (124 [21.98%]), myalgia (107 [18.97%]) and anosmia (101 [17.90%]). Among the symptoms presented, (76 [12.94%]) of the patients had symptomatic complaints of the gastrointestinal system, of which, the main signs and symptoms reported by them were diarrhea, nausea, vomiting, inappetence, abdominal pain and weight loss. Among the patients who died

in the municipality, the signs / symptoms present were fever and dry cough (10 [100%]), dyspnoea (08 [80%]), (08 [80%]) low saturation, (01 [10%]) diarrhea and (01 [10%]) complained of an important headache. It is noteworthy that the presence of the aforementioned symptoms was associates in patients who died. *Conclusion:* Among symptomatic patients, fever and cough was the most common complaint in the study since among patients with mild illness, those with severe symptoms. The isolated gastrointestinal manifestation was also present in COVID-19 infection in patients. Thus, as a new disease and with a wide range of symptoms, infection with the new coronavirus should always be viewed as a possible differential diagnosis.

Keywords: COVID-19; SARS-CoV-2 viral infection; COVID-19 pandemic.

RESUMO: *Introdução:* A pandemia do coronavírus 2 relacionado à síndrome respiratória aguda grave (SARS-CoV-2), causador da doença do coronavírus 2019 (COVID-19), que emergiu no final de 2019 em Wuhan, Província de Hubei, China é uma variação da família do coronavírus que causa infecções respiratórias. Os primeiros coronavírus humanos foram isolados pela primeira vez em 1937. *Objetivo:* caracterizar perfil epidemiológico de casos confirmados e manifestações clínicas causadas pelo COVID-19 em um município de pequeno porte no nordeste brasileiro. *Metodologia:* estudo epidemiológico, descritivo, quantitativo de 564 pacientes confirmados com a doença COVID-19 no município de Poções – Bahia. Os dados foram obtidos a partir

1. Universidade Estadual de Santa Cruz, médico. E-mail: anselmopocoes@hotmail.com.

2. Universidade Federal do Recôncavo da Bahia, médico. E-mail: gbmeira.med@gmail.com.

3. Faculdade Santo Agostinho, médica. E-mail: lefinco_@hotmail.com.

Endereço para correspondência: Anselmo M. R. Silva Junior. Rua Primavera, 200 – Bairro Primavera. Poções, Bahia. CEP:45.260.000

da plataforma do notifica-SUS e com a análise de prontuários somente dos pacientes que foram a óbito, e presença de sinais/sintomas relacionados a doença causada pelo COVID-19 entre o período de 01 de junho de 2020 a 08 de agosto de 2020. *Resultados:* A faixa etária mais atingida pela doença do COVID-19 esteve compreendida na faixa etária entre 20 a 39 anos com 40,24% de casos confirmados. Na população de 03 a 19 anos, o número de casos foi inversamente proporcional, tendo menor número de contaminados pelo vírus, 8,48% de casos confirmados, assim, seguidos pelos baixos números de casos em bebês/lactantes com taxa de infecção de baixa de 1,95%. Dentre os pacientes diagnosticados com a referida doença, os principais sintomas relatados foram tosse seca (276 [48,9%]), febre (225 [39,89%]), cefaleia (163 [28,90%]), dor de garganta (152 [26,95%]), dispneia (124 [21,98%]), mialgia (107 [18,97%]) e anosmia (101 [17,90%]). Dentre os sintomas apresentados, em (76 [12,94%]) dos pacientes possuíam queixa sintomática do sistema gastrointestinal, dos quais, os principais sinais e sintomas

relatados por estes foram diarreia, náusea, vômitos, inapetência, dor abdominal e perda de peso. Dentre os pacientes que evoluíram para óbito no município, os sinais/sintomas presentes eram febre e tosse seca (10 [100%]), dispneia (08 [80%]), (08 [80%]) baixa saturação, (01 [10%]) diarreia e (01 [10%]) apresentou queixa de cefaleia. Ressalta-se que as presenças dos sinais/sintomas supracitados foram associadas nos pacientes que foram a óbito. *Conclusão:* Dentre os pacientes sintomáticos, a febre e tosse foi a queixa mais presente no estudo desde entre os pacientes com quadro leve da doença, aos com quadro grave. A manifestação gastrointestinal isolada também esteve presente na infecção pelo COVID-19 em pacientes. Deste modo, como uma doença nova e com uma vasta sintomatologia, a infecção pelo novo coronavírus deve ser visualizada sempre como um possível diagnóstico diferencial.

Palavras-chave: COVID-19; Infecção viral pelo SARS-CoV-2; Pandemia COVID-19.

INTRODUCTION

The severe acute respiratory syndrome-related coronavirus 2 (SARS-CoV-2) pandemic, which causes coronavirus disease 2019 (COVID-19), which emerged in late 2019 in Wuhan, Hubei Province, China. This disease is a variation of the coronavirus family that causes respiratory infections. The first human Coronaviruses were isolated for the first time in 1937. However, it was in 1965 that the virus was described as coronavirus, due to its profile under microscopy, resembling a crown^{1 2}.

The World Health Organization (WHO) confirmed the circulation of the new coronavirus on January 9, 2020, and since then, the disease has spread intensively around the world⁴. On January 30 of this year, the World Health Organization (WHO) had already declared that the outbreak of the new coronavirus constitutes a Public Health Emergency of International Concern (PHEIC) – the highest alert level of that Organization³.

According to Health organizations, the transmission of the disease occurs through contact or proximity to the sick person, whether by handshake, hugs, droplets of saliva, sneezing and coughing; and also occurs by touching contaminated surfaces. In case of contamination, the incubation period, the time it takes for the first symptoms to appear since the coronavirus infection, is 2 to 14 days. These factors, which are related to the high speed of dissemination and the ability to cause deaths in vulnerable populations, lead to uncertainty about what would be the best strategies for coping with it in different parts of the world⁴.

Brazil, as in other countries around the world, reveals with more color and clarity the contrasts of inequalities related to socioeconomic status and race or ethnicity. In general, in the country, there are gaps in knowledge about the characteristics of transmission of the virus in a context of great social inequality, with the

population living in precarious conditions of housing and sanitation, without access to treated water and in a situation of crowd.

In the municipality of Poções - Bahia, contingency actions against COVID-19 began in March, consisting of several actions that followed in the 04 phases to face pandemics: containment, mitigation, suppression and recovery^{4,5}.

The first phase, containment, begins before cases are registered in a country or region. It mainly involves the active tracking of passengers coming from abroad and their contacts, in order to avoid or postpone community transmission⁵.

The second phase, mitigation, begins when the sustained transmission of the infection is already installed in the country. The objective of this phase is to reduce the levels of transmission of the disease for the groups with greater risk of presenting severe clinical conditions, in addition, of course, to the isolation of the positive cases identified. These measures, called “vertical isolation”, are usually accompanied by some degree of reduction in social contact. It usually starts with the cancellation of major events, followed gradually by actions such as the suspension of school activities, banning smaller events, closing theaters, cinemas and malls, recommendations for reducing the movement of people. This is what is conventionally called “flattening the curve” of the epidemic⁵.

The timing of suppression may be necessary when the previous measures fail to be effective, either because their implementation cannot be carried out adequately and immediately (e.g., insufficient diagnostic tests necessary to identify infectious individuals at the beginning of the epidemic) or because the reduction achieved in transmission is insufficient to prevent a collapse in health care, so more radical measures can be taken, such as social isolation, curfew, among others. With the objective of delaying the explosion of the number of cases long enough

until the situation stabilizes in the field of health care, testing procedures can be expanded and, eventually, some new effective therapeutic or preventive tool (eg.: vaccine) is available^{3,5}.

Last but not least, the recovery phase, when there is a consistent sign of the epidemic's involution and the number of cases becomes residual. This last phase requires an organization of society for the social and economic restructuring of the country. And, of course, state intervention^{4,5}.

All these measures are and were necessary, the a priori of which is to make the population understand that such measures end with the objective of delaying the rapid spread of the virus through the community, thus, with social isolation, it also allows establishments of health are structured in order to offer necessary and comprehensive support to patients suspected and/or confirmed by this disease. Therefore, using the strategy of the four schematic phases to face COVID-19 in the municipality of Poçôes. The objective of this study is to highlight the characteristics of the epidemiological profile of the population contaminated by the new coronavirus in the municipality of Poçôes.

METHODOLOGY

The study carried out from an epidemiological, descriptive, quantitative analysis of 564 patients confirmed with the disease COVID-19 in the municipality of Poçôes - Bahia between the dates of June 01, 2020 to 08/08/2020.

Poçôes is a Brazilian municipality in the state of Bahia, with a territorial extension of 937,269km². Its estimated population in 2017, according to the Brazilian Institute of Geography and Statistics (IBGE), is 48,861 inhabitants.

All confirmed patients obtained medical evaluation by primary health care and diagnosis defined from rapid tests and/or RT-PCR.

Data were obtained from the *Notifica-SUS* platform and from the analysis of medical records of patients who died with confirmation of the disease in that period.

The variables analyzed were: gender, age group, presence or absence of comorbidities, duration of disease symptoms, clinical profile of symptomatic patients, deaths.

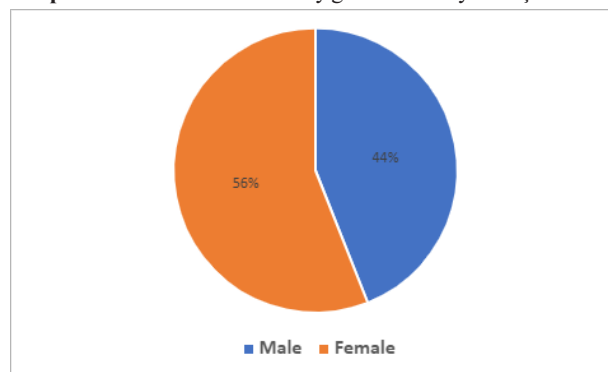
The analysis of data from the notifica-SUS was performed from the tabulation in the Microsoft Excel version 19 program, then exported to the TABWIN program, and the results were extracted through descriptive statistics through tables and comparative graphs.

This work did not require evaluation by the Research Ethics Committee, as it is epidemiological data in the public domain, in accordance with resolutions nº 466/2012 and 510/2016 of the National Health Council, which disciplines research carried out with human beings.

RESULTS

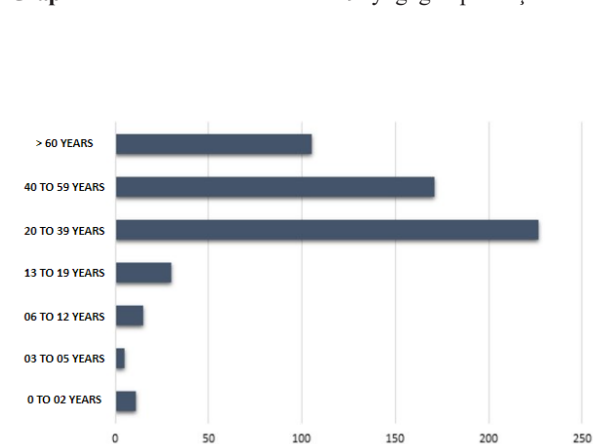
The study included 564 patients with infection with the new coronavirus, confirmed by rapid tests and RT PCR, carried out in the municipality of Poçôes - Bahia. The most affected population lived in the urban area with 87.23% of infection in relation to the rural area. The municipality is located on the BR-116, a highway with an intense flow of cars and trucks, which provide a connection to important centers in the state of Bahia and the north of Minas Gerais - MG.

Graph 1 - COVID-19 infection by gender identity in Poçôes Bahia



Regarding gender, it was observed that more than half of the patients infected by COVID-19 in the municipality were women with 56% (Graph 1). As for the contamination rates by age groups, it was found that the most affected by the disease was between 20 and 39 years old, with 40.24% of confirmed cases (Graph 2). In the age group from 03 to 19 years old, the number of cases was proportionally lower than that of the adult and elderly population with 8.48%, followed by low numbers of cases in babies and lactating women with an infection rate of 1.95%.

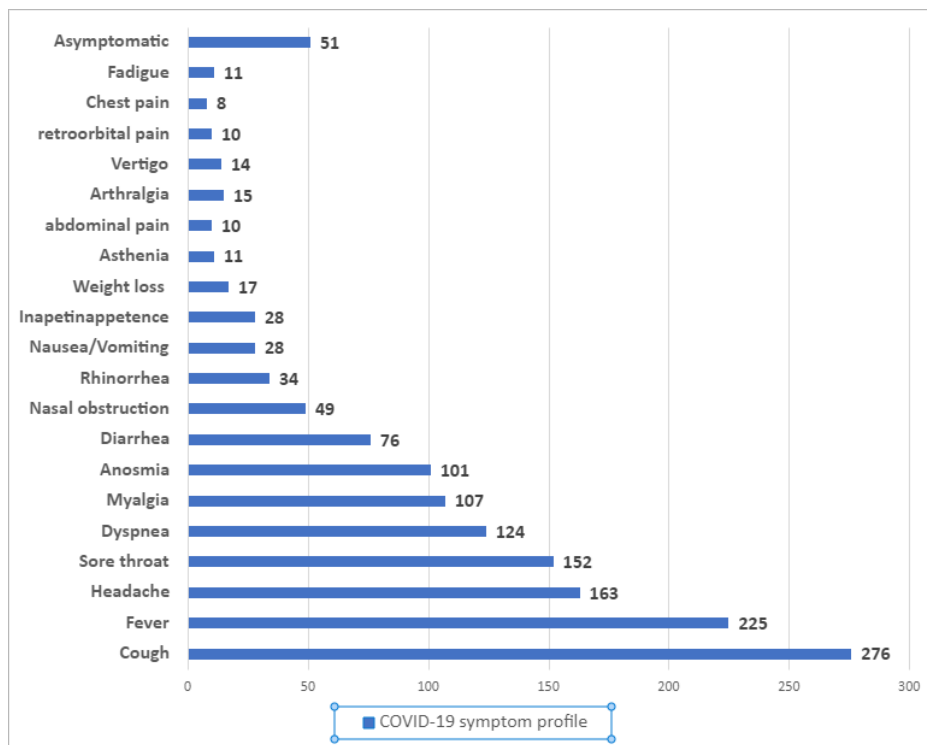
Graph2-Contamination of COVID-19 by age group in Poçôes - Bahia



Of the total of 1,170 cases reported as suspected for the new coronavirus, 564 were confirmed as positive. Of this total number of patients, most presented with a flu-like

syndrome, with complaints such as cough, fever, headache, nasal obstruction and rhinorrhea, as shown in Graph 3.

Graph 3 - Profile of symptoms presented by patients positive for COVID-19 in the municipality of Poçôes- Bahia



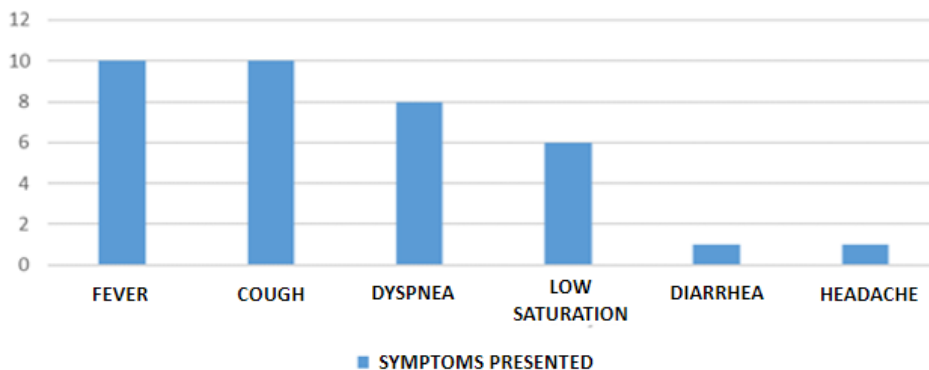
Of the patients confirmed and followed up by the Municipal Health Department, 90 (15.95%) reported not having presented any signs or symptoms of COVID-19 infection, being classified in the asymptomatic group, these patients have the profile of home contact of most confirmed symptomatic cases, reinforcing the importance of testing in this population for epidemiological purposes.

Among symptomatic patients, the main reports were: cough (276 [48.9%]), fever (225 [39.89%]), headache (163 [28.90%]), sore throat (152 [26.95%]), dyspnea (124 [21.98%]), myalgia (107 [18.97%]) and anosmia (101 [17.90%]), the description of signs and symptoms and their percentages are expressed in Graph 3.

Still on the interpretation of Graph 3, it is possible to observe the diversity of the conditions presented in the sample under study, with a total of 20 different signs and symptoms. An important fact to note is that despite the list, all reported, at least, some condition related to the respiratory, gastrointestinal, skeletal muscle and/or central nervous system.

Graph 4 showed that of the total number of patients who died, they had fever and cough, and 08 of these patients had dyspnea, 06 desaturation, 01 diarrhea and 01 headache, it is worth noting again that the aforementioned symptoms were cumulative in the patients who died.

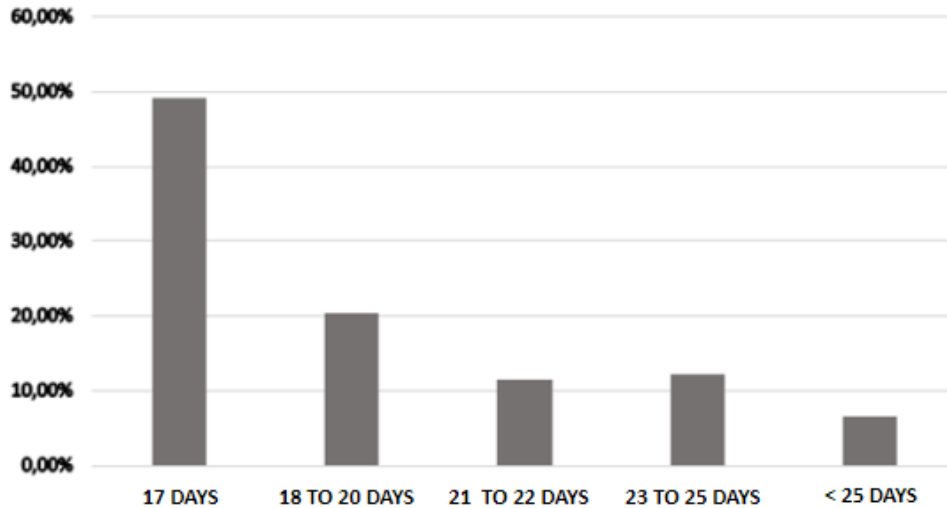
Graph 4 - Signs and symptoms presented by patients evolved to death by COVID-19 in the city of Poçôes - BA



Considering the protocol made available on the Ministry of Health platform, at the time of the study, the cure criterion was given to patients for the new coronavirus

with 14 plus 72 hours (14 days + 03 days or 72 hours), counting the 1st (D1) as the date of onset of symptoms, corroborating the notification form.

Graph 5 - Number of days between onset of clinical manifestations and cure of symptoms caused by Covid-19 infection in Poções - Bahia



Therefore, it is noteworthy that the municipality of Poções carried out patient assessments for cure criteria on weekdays. Thus, in graph 5, it can be seen that 49.19% of the patients were cured on the fourteenth day, according to D1, 20.44% with 15, 16 or 17 days, 11.60% with 18 or 19 days, 12.15% with 20, 21 and 22 and finally 6.62% of patients who had a longer symptomatic phase of the disease and progressed to cure after 25 days of symptoms.

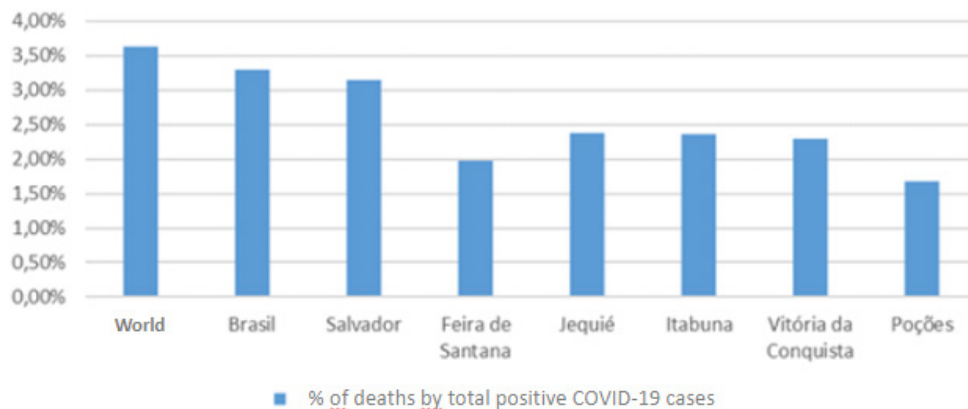
The municipality of Poções has a total of 1,908 cases reported as suspected cases of COVID-19, among which 564 were confirmed as positive for COVID-19, data from 08/08/2020, obtained through an official publication by the Municipality of São Paulo. County. When analyzing the positivity rate of the tests, it appears that 31.86% of

the suspected cases were positive for the new coronavirus.

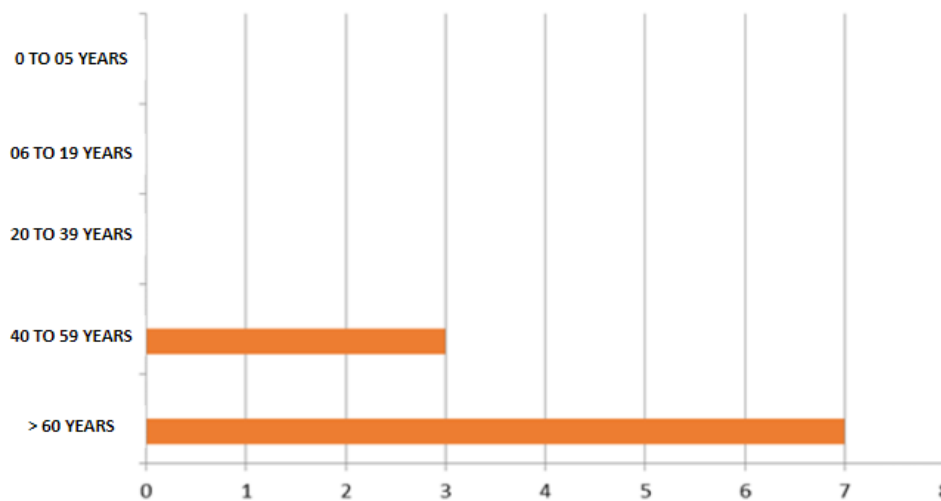
The municipality found 10 deaths with etiological confirmation of COVID-19, when compared to the total number of confirmed cases, it gives a case fatality rate of 1.77%. Still in this context, it is important to highlight that the patients had the diagnosis confirmed by rapid test or RT-PCR, including the post-mortem diagnosis, in which, based on the compatible clinical picture, the sample was collected for further investigation and finalization of the death certificate document.

Graph 6 makes a comparison between the lethality rates of COVID-19 worldwide, nationally and other cities in Bahia, showing that Poções has a lower rate among all the samples compared.

Graph 6 - Comparative analysis between the fatality rate of COVID-19 in Poções - Bahia

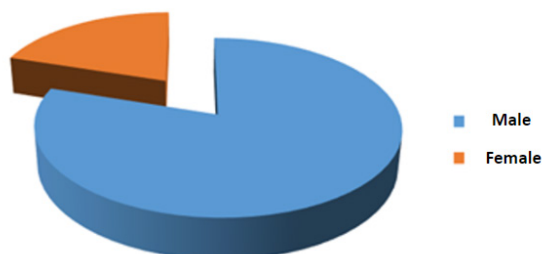


Graph 7: Relation of deaths by age group of patients with suspected death from COVID-19



Of the patients who died, 3 were younger than 60 years old and 7 were over 60 years old, according to the data presented in Graph 7. Graph 8, which refers to the sex of the patients who died, 08 were male and 02 were female.

Graph 8: Number of deaths by COVID-19 between genders in Poçoões - Bahia

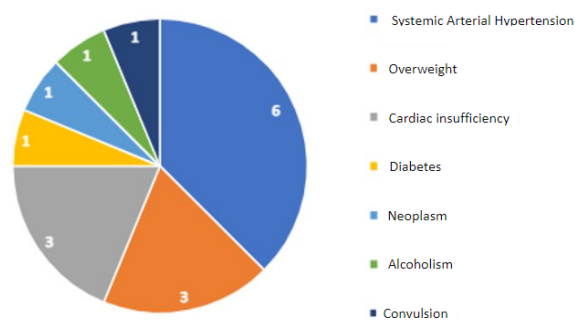


Male 08 X Female 02

According to data obtained through the Health Surveillance Secretariat and the Ministry of Health, the main comorbidities of patients who died as a result of the new Coronavirus were heart diseases, which include Systemic Arterial Hypertension, congestive heart failure and other conditions that may have heart disease, followed by patients with Diabetes Mellitus, it is important to note that these patients, despite the underlying disease, were mostly over 60 years of age, also classified as an aggravating factor, according to data elucidated in Graph 9.

In the sample of cases that died from the new Coronavirus, all had at least some comorbidity, and in some cases, there was an overlap of underlying diseases in the same patient, the distributions of comorbidities are shown in Graph 9.

Graph 9: Number of comorbidities in patients who died in Poçoões - Bahia



DISCUSSION

Regarding gender, the quantitative distribution in females in the present study, in the amount of 56%, differs from the national index, in the percentage where 42.65% of Brazilian women were infected with the coronavirus⁶. However, in another series, when analyzing gender in individuals with a confirmed diagnosis, there is a predominance of females, a finding observed in a study carried out in the state of Mato Grosso⁹, while in Wuhan, China, 56% of the cases were male¹⁰. Although, population estimates for 2020 showed a slight predominance of females in the Brazilian population¹¹.

The involvement according to age group is similar to that of other municipalities in the State of Bahia, such as Santo Antônio de Jesus, which had the highest rates of contamination in the age group from 20 to 39 years, corresponding to 45.21% of confirmed cases, estimates percentages corroborated in other studies, such as in a city in the interior of São Paulo, which obtained the

contamination index in the age group from 20 to 39 years with values of 43.33% of confirmed cases^{6,7,8}. These findings in the population aged 20-39 are similar to those found in a study¹⁵ carried out in Wenzhou, China, which showed 58.9% of confirmed cases in individuals infected with the new Coronavirus¹².

The syndromic diagnosis in the sample shows, according to reports, that 95.03% of patients were classified as Influenza Syndrome (GS) and 4.96% were reported as severe acute respiratory syndrome (SARS). Thus, the vast majority of patients did not require in-hospital care, such as observation in clinical beds or the need for admission to Intensive Care Units (ICU).

In addition to the symptoms mentioned above, up to (76 [12.94%]) of the patients had a symptomatic complaint of the gastrointestinal system, the main signs and symptoms reported by them were diarrhea, nausea/vomiting, inappetence, weight loss and abdominal pain.

It is important to point out, still in relation to the clinical presentation of the patients, that the vast majority did not present with an isolated sign or symptom, but rather, the most common to be reported is their concomitance, and even the overlap of respiratory symptoms and of the gastrointestinal tract.

Another highly relevant data to be demonstrated is that the Coronavirus is a source of infections of the upper respiratory tract, the gastrointestinal tract and the central nervous system. The enzyme that serves as a receptor for SARS-CoV-2 entry at the cellular level is Angiotensin-Converting Enzyme 2, which can be found in the airways and also in ileal enterocytes and in the colon, corroborating the aforementioned distinct symptomatology, in which patients infected with the new coronavirus present conditions similar to respiratory infections and also with other characteristics of gastrointestinal disorders, and they may also present overlapping conditions in more than one tract^{17,18}.

As for the data related to symptoms, compared to studies carried out in the United States, China and Italy, it is possible to observe a lower symptomatology compatible with respiratory disorders, such as fever and cough, which reached values of up to approximately 90% in studies carried out in China^{18,19} up to approximately 72% in a study carried out in Italy and up to 88% in patients observed in a study in the USA¹⁹.

With regard to patients who progressed to Severe Acute Respiratory Syndrome (SARS), as well as deaths, it is possible to observe a prevalence of respiratory symptoms in such patients, with 100% of the 10 patients who died in the city with cough, fever, dyspnea and/or desaturation, these data corroborate studies carried out in several countries, which demonstrate that most patients who require hospitalization have a more severe respiratory form of the

disease, demonstrating that the gastrointestinal disease of patients has milder picture of the new Coronavirus^{18,19,20}.

Comparing to the study carried out at Tongji Hospital in Wuhan, fever and cough were present in 92% of patients who died¹⁴. Other symptoms prevalent early in the disease in deceased patients include fatigue, dyspnea, chest tightness, and mucus production; Less common symptoms include anorexia, diarrhea, and myalgia among patients with acute respiratory syndrome. Dyspnea and chest tightness were much more common in patients who died^{14,15,16}.

When compared with data at national and state level, the city of Poçôes has a lower fatality rate due to the Coronavirus than the national one, currently reported at 3.3%, according to data available on the Covid Panel institutional website, updated daily, according to database.

Still in relation to the number of positive cases and the number of deaths as a result of these, called the lethality rate, the world has a rate of 3.63% of deaths due to COVID-19, Brazil, has a rate of 3.3%. The city of Salvador has a rate of 3.14%, Feira de Santana 1.97%, Jequié 2.37%, Itabuna 2.36%, Vitória da Conquista 2.29% and Poçôes, 1.77%^{26,27,28,29}.

In relation to age group, when comparing the data from the city of Poçôes with the total number of deaths in Brazil, according to data obtained through the information system of the epidemiological surveillance of Influenza, the most affected age group is that of elderly patients, according to the municipality, the occurrence and the numbers of the country, being on the date of 06/22/2020, the representative percentage of deaths of the elderly by the coronavirus of 71.03%, with data practically equivalent to the municipality's rate, which is 70 % of deaths in people over 60 years old, observed in Graph 7.

When comparing the aforementioned data with information obtained from the special epidemiological bulletin, from the health surveillance secretariat in partnership with the Ministry of Health, it is possible to observe a difference in the profile of deaths by sex of patients who are victims of the new coronavirus, the value in males it was 58.6% and in females it was 41.34%. Despite the smaller difference between the sexes, men continue to be the majority of fatal victims of the aforementioned disease (Graph 8).

Following the national statistics, 55% of the cases of death in the present municipality were related to patients with a history of heart disease, with emphasis on uncontrolled Systemic Arterial Hypertension (SAH) or congestive heart failure, 17% overweight, and it is important to emphasize the increased risk of these patients for cardiac decompensation, which, if included in the data referring to heart disease, makes this percentage reach more than 70% of the deaths in the city are related to patients with heart disease, or potential heart disease.

CONCLUSION

Among symptomatic patients, fever and cough were the most frequent complaints in the study. These two symptoms were present in greater numbers from patients with mild disease to those with severe symptoms caused by COVID-19. The isolated gastrointestinal manifestation was also present in the contamination by COVID-19

in almost 13% of the patients reported with a positive result for the COVID-19 infection. In this way, it is not a negligible symptom to assess the diagnosis of COVID-19 even if isolated. Because, among other factors, isolated symptoms can cause the late diagnosis of infection by the new coronavirus. Thus, as a new disease with a wide range of symptoms, infection with the new coronavirus should always be viewed as a possible differential diagnosis.

Author contributions: *Anselmo Messias Ribeiro Silva Junior* - Supported research planning and data collection, as well as data analysis, as well as the writing of the article. *Guilherme Bernardo Meira* - Supported the study planning, research and data collection, as well as supported data analysis, graph construction and article writing. *Leticia Finco Machado* - supported the study planning, research and data collection, construction of graphs, as well as supported data analysis and article writing.

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