Morbidity and mortality by COVID-19 in olinda: An analysis from epidemiological bulletins

Morbidade e mortalidade por COVID-19 em olinda: Uma análise a partir de boletins epidemiológicos

Morbilidad y mortalidad por COVID-19 en olinda: Un análisis a partir de boletines epidemiológicos

RESUMO

Objetivo: Analisar a distribuição da morbidade e mortalidade por COVID-19 no município de Olinda, Pernambuco, através de informações divulgadas por boletins epidemiológicos. Método: Trata-se de um estudo descritivo, do tipo quantitativo e de corte transversal. Foi realizada uma análise dos números brutos de casos e óbitos por COVID-19, e dos números proporcionais em relação à população de cada microrregional do município. Realizado no período de abril a julho de 2020. Resultados: Os dados encontrados revelaram que os números brutos, de casos e óbitos, foram maiores na microrregional quatro. Os números proporcionais de óbitos tiveram a microrregional um com maior percentual. Conclusão: Conclui-se que casos e óbitos por COVID-19 em Olinda tiveram diferentes impactos em cada microrregional. Proporcionalmente, em relação à população de cada microrregional, o número de óbitos foi maior em microrregionais com menor número de casos confirmados para COVID-19, e as três microrregionais com maior número de óbitos em relação à população adoecida faziam fronteira entre si.

DESCRITORES: Pandemias; Infecções por Coronavírus; Epidemiologia; Vigilância em Saúde Pública.

ABSTRACT

Objective: To analyze the distribution of morbidity and mortality from COVID-19 in the city of Olinda, Pernambuco, through information published in epidemiological bulletins. Method: This is a descriptive, quantitative and cross-sectional study. An analysis of the raw numbers of COVID-19 cases and deaths was performed, and the proportional numbers in relation to the population of each micro-region of the municipality. Held from April to July 2020. Results: The data foun dreve a led that theraw numbers, of cases and deaths, were higher in micro-region four. The proportional number sof deaths had the micro region one with the highest percentage. Conclusion: It is concluded that cases and deaths from COVID-19 in Olinda had different impacts in each micro-region. Proportionally, in relationt othe population of each micro-region, the number of deaths was higher in micro-regions with fewer confirmed cases for COVID-19, and the threemicro-regions with the highest number of deaths in relation to the sick population borderedon each other.

DESCRIPTORS: Pandemics; Coronavirus Infections; Epidemiology; Public Health Surveillance.

RESUMEN

Objetivo: Analizar la distribución de la morbilidad y mortalidad por COVID-19 en el municipio de Olinda, Pernambuco, a través de informaciones publicadas por boletines epidemiológicos. Método: Se trata de un estudio descriptivo, cuantitativo y transversal. Se realizó un análisis de los números brutos de casos y muertes de COVID-19, y de las cifras proporcionales en relación a la población de cada microrregión del municipio. Celebrado de abril a julio de 2020. Resultados: Los datos encontrados revelaron que los números brutos de casos y muertes fueron más altos en la microrregional cuatro. Los números proporcionales de defunciones los tuvo la microrregional con mayor porcentaje. Conclusión: Se concluye que los casos y muertes por COVID-19 en Olinda tuvieron impactos diferentes en cada microrregión. Proporcionalmente, en relación a la población de cada microrregión, el número de defunciones fue mayor en las microrregiones con menos casos confirmados de COVID-19, y las tres microrregiones con mayor número de defunciones en relación a la población enferma lindan entre sí.

DESCRIPTORES: Pandemias; Infecciones por Coronavirus; Epidemiología; Vigilancia en Salud Pública.

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Debora Henrique Bezerra
Professor at the Faculty of Medicine of Olinda (FMO); Specialist in Collective Health in the Residency modality by the Faculty of Medical Sciences (FCM)/University of Pernambuco (UPE). Degree in Psychology from the Federal University of Pernambuco (UFPE). Recife, Pernambuco (PE), Brazil.
ORCID: 0000-0003-2418-8864

Lusanira Maria da Fonseca de Santa Cruz
Coordinator of the Multiprofessional Residency Program in Public Health at the Faculty of Medical Sciences (FCM)/University of Pernambuco (UPE). PhD in Dentistry from the Faculty of Dentistry of Pernambuco (FOP)/UPE. Recife, Pernambuco (PE), Brazil.
ORCID: 0000-0003-2418-8864

Mariana Farias Gomes
Master in Public Health from the Aggeu Magalhães Institute - IAM/Fiocruz. Doctoral student in Public Health at IAM/Fiocruz. Recife, Pernambuco (PE), Brazil.
ORCID: 0000-0003-0895-432X

Liniker Scolfild Rodrigues da Silva
Master's student at the Postgraduate Program in Hebiatry at the University of Pernambuco (UPE). Specialist in Obstetrics Nursing in the Residency modality by Faculdade Nossa Senhora das Graças (FENSG)/UPE. Specialist in Collective Health in the Residency modality by the Faculty of Medical Sciences (FCM)/UPE. Recife, Pernambuco (PE), Brazil.
ORCID: 0000-0003-3710-851X

Rebecca Soares de Andrade
Master in Public Health from the Aggeu Magalhães Institute - IAM/Fiocruz. Doctoral student in Public Health at IAM/Fiocruz. Recife, Pernambuco (PE), Brazil.
ORCID: 0000-0003-4527-2248

Romildo Fellipe do Nascimento Silva
Master's student in Psychology and Mental Health at the University of Pernambuco (UPE). Specialist in Mental Health from the Faculty of Medical Sciences of Santa Casa de São Paulo (FCMSCSP). Specialist in Cognitive-Behavioral Therapy from the Catholic University of Pernambuco (UNICAP). University Professor in the Undergraduate and Postgraduate Programs in Psychology. Recife, Pernambuco (PE), Brazil.
ORCID: 0000-0001-7760-1486

INTRODUCTION

At the end of 2019, a new variation of the already known coronavirus, scientifically called SARS-COV-2 (Severe Acute Respiratory Syndrome Coronavirus 2, in Portuguese: Severe Acute Respiratory Syndrome Coronavirus 2) was identified. [1-4] Widespread among humans through saliva, sneezing, coughing, phlegm, touching objects or places contaminated with the virus, the most acute form of the Coronavirus Disease – 2019 (COVID-19) harms the respiratory tract and can lead to cases of pneumonia that, in greater aggravations, intervention is necessary inside beds in Intensive Care Units (ICU) and tracheal intubation of the patient. [5,6]

The virus can also infect cells in the cardiovascular system and gastrointestinal tract. In this sense, the highest risk groups are people who already have some type of comorbidity, such as: Systemic Arterial Hypertension (SAH), Diabetes Mellitus (DM), Chronic Lung Disease (CLD) and Cancer (CA), as well as the elderly. [7]

The first case of coronavirus in Brazil was dated April 25, 2020 through confirmation by the Minister of Health. The case concerned a man who had recently returned from Italy. This case was not only the first case of COVID-19 in Brazil, it was also the first case in Latin America. [8]

In the state of Pernambuco, the first confirmed cases date back to March 12th, 2020. It was an elderly couple who, like the first case in Brazil, had traveled to Italy. In relation to the northeast region, Pernambuco was the third state to present coronavirus. [8]

In Olinda, the arrival of the coronavirus points to March 23rd, when the first two cases were confirmed in the municipality. They were two men aged 42 and 50. Since March 18th, however, the municipality's prefecture has released information about suspected, discarded cases and those under investigation by the municipality's epidemiological surveillance. Until the state epidemiological bulletin (EB) of April 17th, 2022 [9], there were already 661,938 deaths in Brazil and 21,536 deaths in Pernambuco. The cases recovered in the state totaled 770,999, and those infected by COVID-19 totaled 913,960 cases.

Therefore, the objective of this work is to analyze the distribution of morbidity and mortality by COVID-19 in the municipality of Olinda, Pernambuco, through information published by epidemiological bulletins.

METHODO

This is a descriptive, quantitative and cross-sectional study. This type of study is interesting to be used in this case, as it allows displaying the situation of a given disease in a given period of time. [10]

The study site was the municipality of Olinda, located in the state of Pernambuco. According to data from the Brazilian Institute of Geography and Statistics (IBGE - Instituto Brasileiro de Geogra-

fia e Estatística)[11], the municipality has a population of 377,779 people, being the third largest population in the state. It has about 60% of the residences with adequate sanitary sewage; 41.8% of urban households on public roads with trees; and 17.9% of urban households on public roads with adequate urbanization.

The municipality is divided into two macro-regions and five MRs that encompass 31 neighborhoods plus a rural area. The rural area of the municipality comprises an area of 6.82 km². And the urban area has 36.73km², which makes Olinda a mainly urban municipality. [12] The total population of each MR and the neighborhoods that comprise them[11] can be seen in table 1.

The database used to collect information was the EB provided by the Olinda Health Department, prepared by the municipality's health surveillance team and made available on the city's website, in order to give greater visibility and broad access to information about COVID-19 in the municipality. [13,14]

Within the period of analysis, a total of 94 EB were found. We chose to work with the last EB of each period (April, May, June and July), since each bulletin is cumulative, bringing the accumulated data of cases and deaths up to that EB disclosure date. EB excluded from this research were those who did not provide information on the deaths linked to the neighborhoods of the subjects affected by COVID-19, that is, EB prior to April 13, 2020. From this date onwards, there was an EB where the neighborhood field was marked as "no information". In these cases, the bulletins were not excluded from the study, but the cases and deaths related to the "no information" field were not counted.

To better systematize the data, a spreadsheet was created using Microsoft Excel® 10 software. The worksheet included variables that were already present in the analyzed EB: date of publication of the bulletin, bulletin number, neighborhood of occurrence, sex, confirmed cases, deaths and total. The EB analyzed provided information on cases and deaths by notification date, not by epidemiological week.

Table 1 – Division of the resident population and neighborhoods by microregion in the municipality of Olinda, Pernambuco (PE), Brazil, 2020.

Microregion	Total resident population	Neighborhoods
1	40.066 people	Alto da Conquista, Alto do Sol Nascente, Passarinho, Alto da Bondade, Caixa D'agua, São Benedito.
2	46,106 people *Rural Area of Olinda (no population estimate by IBGE 2010)	Zona Rural de Olinda, Águas Compridas, Sapucaia, Aguazinha.
3	72.625 people	Jardim Brasil, Peixinhos, Vila Popular, Sítio Novo, Salgadinho.
4	130.803 people	Rio Doce, Jardim Atlântico, Jardim Fragoso, Tabajara e Casa Caiada.
5	80.732 people	Ouro Preto, Jatobá, Bultrins, Alto da Nação, Guadalupe, Bairro Novo, Amaro Branco, Bonsucesso, Bairro do Amparo, Varadouro, Bairro do Carmo, Bairro de Santa Teresa e área do Umuarama.

Source: IBGE(11).

After making the spreadsheet, the confirmed cases and deaths related to each health MR were divided into four analysis periods: the first period comprised the EB of April 30th, which provided information on the accumulated number of COVID-19 cases and deaths until April 30th; the second period comprised the EB of May 31st, 2020; the third analyzed period referred to the EB on June 30th and; the fourth period referred to the bulletin of July 31st, 2020. This analyzed last bulletin provided an overview of all cases and deaths that occurred in the municipality up to that date.

To arrive at the numbers related to confirmed cases and deaths for each month between April and July, one month's data was subtracted from its previous month. For example, to find the data for the month of May, the accumulated of May was subtracted from the accumulated of April; when performing the subtraction between the data of the last EB of June and those found for the month of May, it was possible to find the data referring to the month of June; it was performed to find the data for the month of July. This task was performed so that the variation of cases and deaths related to each health MR by COVID-19 distributed month by month, from April to July 2020, could be observed.

Subsequently, the EB data from the last day of July were analyzed, as it concentrated the accumulated number of cases and deaths since the beginning of the pandemic in the municipality until that date. Confirmed cases were related to the total population of each MR, and the number of deaths to the total number of confirmed cases of each MR. Thus, it was possible to proportionally analyze COVID-19 in the municipality of Olinda according to the population of each MR; and, knowing that the number of deaths was linked to the number of confirmed cases, it was possible to reveal a proportional image of COVID-19 in each MR of the

municipality (which may differ from the raw numbers published in the EB of the municipality, in turn).

We also analyzed data on COVID-19 morbidity related to the sex of patients. Mortality by sex, in turn, could not be analyzed, since there is no such reference in the EB in the municipality. It is worth mentioning that as of May 1st, 2020, EB started to differentiate cases into "mild cases" and "severe cases". However, in order to preserve the data by neighborhoods for the month of April in the analysis, it was decided to use the total number of cases and the total number of deaths, not distinguishing between mild cases and severe cases.

Taking into account that this research dealt only with information made available to the public, that is, secondary data, it was not necessary to submit it for approval by the Ethics and Research Committee (CEP), according to Resolution 466 of 2012 of the National Health Council (CNS).

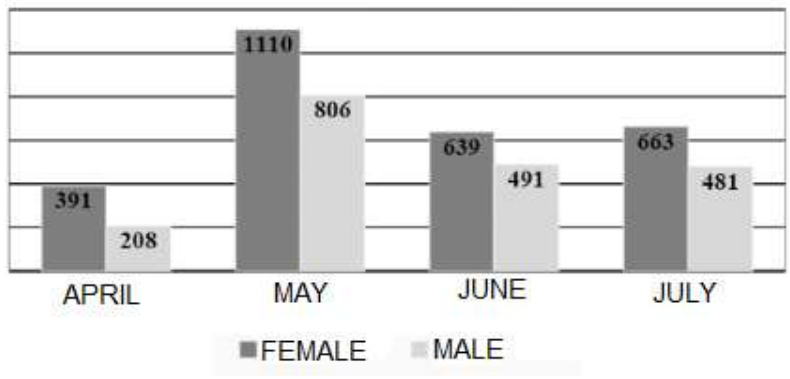
RESULTS

Until the last day of March 2022, there were 39,407 confirmed cases of COVID-19 in the municipality of Olinda, 1,047 confirmed deaths from the same disease, 17,435 cases under investigation and 85,506 discarded cases. [15]

Regarding the cases of COVID-19 according to sex, graph 1 shows the variation in the months studied. The number of cases was subtracted from month to month to obtain data separated by month. It was observed that, from April to July 2020, the sex most infected by COVID-19, in the municipality of Olinda, was female, in contrast to the study by Ribeiro et al. 16, which observed a higher prevalence in males, based on the assumption that women take better care of themselves in relation to health and taking into account the underreporting of cases.

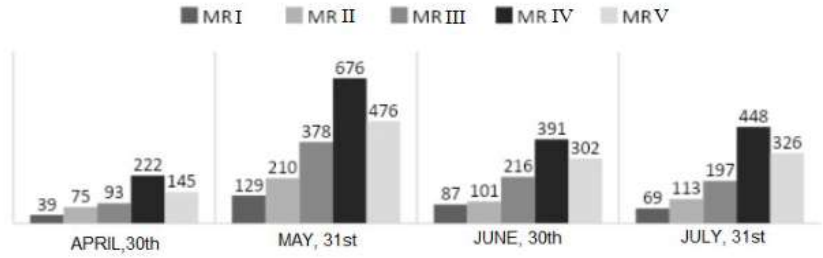
When a graph was drawn from the information on confirmed cases of COVID-19 in the municipality of Olinda, in all the periods analyzed in this study, MR IV obtained a higher raw number of confirmed cases of COVID-19 than the others. MR of the municipality (Graph 2).

Graph 1 – COVID-19 morbidity divided by sex. Olinda, Pernambuco (PE), Brazil.



Source: Prepared by the authors, 2020.

Graph 2 – Confirmed cases of COVID-19 divided by microregion. Olinda, Pernambuco (PE), Brazil.



Source: Prepared by the authors, 2020.

The MR with the lowest gross number of cases was MR I in the entire analyzed period. In June, MR I reached values close to those of MR II. From graph 2, it can also be seen that the peak of confirmed cases of COVID-19 in the municipality of Olinda occurred in the month of May. The month of April, corresponding to the beginning of the pandemic, concentrated the lowest number of cases. Soon after, the values increased in May and began to fall in subsequent months. In July, MRs II, IV and V again suffered an increase in the gross number of confirmed cases of COVID-19 in Olinda.

Regarding the deaths that occurred in the municipality of Olinda, it was found that they began to occur in the month of April, with a higher gross number in the MR IV. In the following month, the number of deaths increased, with MR II and V getting very close to the numbers presented by MR IV, however, the fourth RM remained with the highest gross number of deaths when compared to the other MRs. In this graph (Graph 3) it can be seen that the gross number of deaths recorded by COVID-19 grew from April to May, fell in June in all MRs, and increased again in July.

In the entire period analyzed, MR IV was the one that had the highest gross number of people who did not resist CO-

VID-19 in the municipality, evolving to death. The MR with the lowest gross number of cases and deaths recorded was MR I.

Regarding the percentage of confirmed cases of RM in relation to its total population, and the percentage of deaths in relation to confirmed cases of each MR, it is worth mentioning that the EB released by the municipality provided information on the total data of cases and deaths by neighborhood. Thus, to better systematize and analyze the data, the neighborhoods were grouped by MR and data on cases and deaths were analyzed according to the population of each MR. It should be noted that, although the IBGE 2010 Census is valid, the population data for each MR must have already undergone a natural increase due to the time elapsed (ten years).

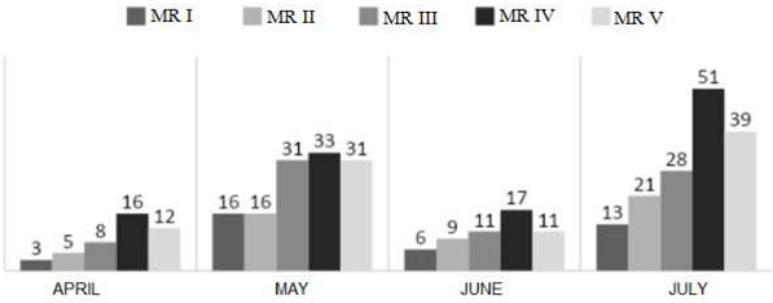
When analyzing the data taking into account the population number of each MR, the following situation is reached: In MR I, 324 people (0.81% of the population) fell ill with COVID-19. Of the sick, 12% (38) died. In MR V, 1.55% (1,249) of the population became ill, and of these 7% (93) died.

The data on confirmed cases proportionally to the population of each MR, and deaths proportionally to the confirmed cases found differ from the raw values provided by the EB. In this analysis, it was noticed that the highest proportional number of confirmed cases of COVID-19 was in MR V, where 1.55% of the total population of the MR became ill with COVID-19, while in the gross figures published in the EB, the highest number of cases is centered on MR IV.

Deaths are directly related to confirmed cases, since a person identified as a death by COVID-19 is also considered a confirmed case. That is, not all confirmed cases are deaths, but all deaths from COVID-19 are confirmed cases.

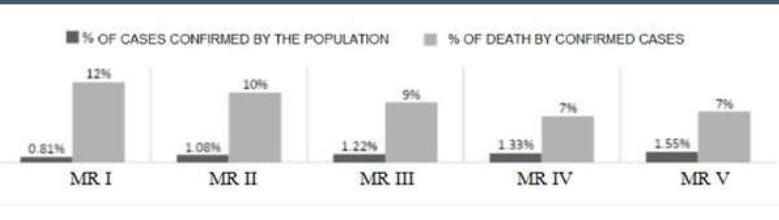
Thus, when comparing the data on deaths obtained in the last EB of July, which concentrated all cases and deaths since the beginning of the pandemic, a different situation is found when looking at the gross numbers of each MR disclosed in the EB. In this sense, the MR with the highest number of deaths from confirmed cases of COVID-19 is MR I, where 12% of confirmed cases (324) of COVID-19 died from the disease. In second place, MR II with 10% of deaths (51) in relation to confirmed cases; third, MR III with 9% of deaths (78); and in fourth and fifth place, respectively, MR IV (117 deaths) and V (93 deaths), with 7% of deaths. In the raw data of the EB, as mentioned above, the largest number of deaths was concentrated in MR IV.

Graph 3 – Mortality from COVID-19, divided by microregions. Olinda, Pernambuco (PE), Brazil.



Source: Prepared by the authors, 2020.

Graph 4 – Confirmed cases of COVID-19 in relation to the population of each MR and deaths recorded by COVID-19 in relation to the confirmed cases in each RM. Olinda, Pernambuco (PE), Brazil.



Source: Prepared by the authors, 2020.

DISCUSSION

The epidemiological bulletin is an important tool for disseminating data on various diseases. Through this document, municipalities give visibility to the numbers of diseases present at certain times [17]

The municipality of Olinda provided data on morbidity from COVID-19 in relation to sex, but did not report on age and race/color, education and profession. Nor did it report mortality related to sex, age, profession or education, for example, within the period studied. In the EB in the state of Pernambuco, this information can be found for the entire state, but specifically for the municipality of Olinda, this data is not available to the public.[18]

Such information is too important to understand the impact of this disease on the lives of citizens. Knowing the neighborhoods with more sick residents and more deaths, the ages of these cases and deaths, the race/color of this population and the most affected professions, can help to think about interventions, aiming to control the spread of the virus in the municipality. Here, we run into a common issue when analyzing data from notification forms: the incompleteness of the data in these forms. This fact is found

in many municipalities, not just in Olinda. [19]

Also, it should be mentioned the absence of data in the EB published on the impact of COVID-19 in the rural area of the municipality of Olinda. Despite being an extensive area and maintaining proximity to more troubled areas, the EB of the analyzed period do not mention either cases or deaths that occurred in the region. It is not known if, until the end of July, there were no cases or deaths in this area, or if these data are underreported, or even if they are part of the data available where the neighborhood field is named as "no information".

Taking into account the state EB [9] for COVID-19 on April 17th, 2022, in the state of Pernambuco, mortality was higher among males (53.3%); the age groups with the highest mortality were people aged between 70 and 79, followed by people aged 80 and over, and in third place the age group between 60 and 69 years. Regarding mortality by race/color, the state bulletin shows that mortality was higher among browns (67.7%), followed by whites (25.7%).

In Olinda, positive cases of COVID-19 were higher in the female audience. Santos[5] relates the issue to the fact that women are seen as "the caregivers of the world", being assigned to them the care of the home and family. In addition to these attributions, the female gender still massively dominates the field of health work, which during pandemics is configured as a front line in the care of the sick. [20]

When deaths are related to the number of confirmed cases of COVID-19, it appears that, proportionally, the deaths were higher in MR with a smaller population and with a lower number of confirmed cases. The most populous RM is IV, as already noted. In it, proportional deaths per confirmed cases were 7%, a lower value than in MR I, where the percentage of deaths in relation to confirmed cases was 12%.

According to the Fundaj's technical note [21] of June 1st, 2020, Olinda is one of the four most troubled municipalities in the Metropolitan Region of Recife (RMR - Região Metropolitana de Recife). The note shows that there was a greater variation in cases and deaths in the most vulnerable neighborhoods of the municipalities. In this sense, Olinda would monitor the situation in Recife. Regarding the variation of deaths, the research reported that the neighborhoods of Olinda: Águas Compridas, Alto da Bondade and Caixa d'Água were the ones that suffered the greatest variation of deaths and had high social vulnerability. This situation was not found when analyzing the neighborhoods of Casa Caiada and Bairro Novo. In them, there was little variation in deaths and a lower social vulnerability index.

The virus can also infect cells in the cardiovascular system and gastrointestinal tract. In this sense, the highest risk groups are people who already have some type of comorbidity, such as: Systemic Arterial Hypertension (SAH), Diabetes Mellitus (DM), Chronic Lung Disease (CLD) and Cancer (CA), as well as the elderly.

The results of the Fundaj study [21] are broadly in line with the findings of this research, and show that even with different situations between Recife and Olinda, this municipality is following the pattern of social inequalities in that municipality. For Fundaj [21], the places that had been showing the greatest variation in morbidity and mortality were the poorest neighborhoods and in situations of greater vulnerability, with lower income and insufficient access to water and quality sanitation.

MRs IV and V have a larger population, but with a larger territorial area. In addition, these MRs have part of their territory located on the seafront of the municipality. It is known that in this coastal strip there are predominantly vertical properties where middle and upper class people live. On the other hand, MRs I , II and III have a smaller territorial area, border each other and are known to be areas of greater social vulnerability in the municipality. This fact may explain the rates of 12%, 10% and 9% of deaths, respectively..

To Harveyet al. [2] the rapid spread of SARS-COV-2 is linked to high population density and the way humans interact with each other. They attribute the rapid transmission of diseases across the planet to the impact of globalization. The authors exemplify the case of measles, which is predominant in large population centers and whose infection rate drops dramatically in less populated regions.

It can be seen that in MRs I, II and III, COVID-19 had a more "aggressive" impact, since even though the MRs were not where there were a greater number of cases, the cases that existed there became severe cases with the outcome of death in 12%, 10% and 9%, respectively. This allows us to infer that a person affected by COVID-19 living in MRs I, II and III is more likely to have the outcome of death than people with COVID-19 residing in MRs IV and V in the municipality.

In this sense, Harvey et al. [2] state that, similarly to influenzas, the coronavirus also acquires variants according to the environment where it is installed, exposing a "division of classes in health", in which those who have access to health insurance and can quarantine in their own homes,

do not have to choose "between income and protection".

CONCLUSION

The study showed that in the same territory the attack of a disease can take different forms. Comparisons between the raw data provided by the EB with the proportional data of the population of each RM and the comparison of the death data in the EB with the morbidity data, since one depends on the other, revealed that the involvement of COVID-19 was greater in MR with a smaller population and a lower rate of confirmed cases. It is worth noting that a limitation of this study was to use population data from the 2010 Census, therefore, data lagged in a time period of ten years.

The importance of completeness of information from the EB is reinforced, since it is official data from the municipality and should be used to support health actions and services. The more data available on COVID-19, the better the understanding of how the disease has impacted the population of the municipality of Olinda, and the more effective the decisions made based on this information will be. Thus, the need to carry out research on the manifestation of COVID-19 in the rural area of the municipality is emphasized, since this information was neglected.

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