Home deaths of older people in the city of Rio de Janeiro during the Coronavirus pandemic, 2020

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Abstract

Objective: to analyze deaths in the city of Rio de Janeiro (RJ, Brazil) according to the place of occurrence, age group, cause, and sociodemographic characteristics in the context of the Covid-19 pandemic. *Method*: the distribution of mortality by place of occurrence, age group, and the cause was calculated. The "excess mortality" was analyzed by comparing the monthly averages of deaths by place of occurrence, causes, and sociodemographic characteristics in April to June of the years 2017, 2018, and 2019 with those that occurred in the same months of 2020. *Results*: home deaths increased when compared to the average in the previous triennium. The main causes of mortality were not altered but had significant increases. The growth of unclassified respiratory failure and deaths due to ill-defined causes is emphasized. Regarding the sociodemographic characteristics, there was a greater increase among men of black race/color, widowers, and with low education. *Conclusion*: the increased home deaths found in the city of Rio de Janeiro may be associated with the effects of the Covid-19 pandemic. Besides, the increase in deaths due to ill-defined causes may be associated with the Covid-19 pandemic due to the lack of tests and difficulty in accessing health services. The greater vulnerability of older people is known, but additional studies are important to understand the gender and marital status differences. Black race/color and a lower level of education are associated with a higher chance of home mortality due to an overlap of risks throughout life, leading people in these groups to greater vulnerability.

Keywords: Pandemics. Coronavirus Infections. Mortality. Health of the Elderly.

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The authors declare there are no conflicts of interest in relation to the present study.
No funding was received in relation to the present study.o.

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Received: November 3, 2020
Approved: March 19, 2021

http://dx.doi.org/10.1590/1981-22562020024.200316

INTRODUCTION

Since March 6, 2020, when the first case of Covid-19 was recorded in the State of Rio de Janeiro, the risk of death from the disease has increased rapidly. In October 2020, the State had the second-highest mortality rate due to Covid-19 (117.5 per 100,000 inhabitants according to data from "Monitora COVID-19" of Osvaldo Cruz Foundation)[1], having accumulated 20,292 deaths from this cause until October 27, 14,797 of which were older people (72.9%). In the city of Rio de Janeiro, there were 11,952 deaths, with 9,179 (76.8%) of people aged 60 years or older[2].

The lethality rate of older people is especially relevant in the State of Rio de Janeiro since the percentage of older people in the population is the second-highest in the country (16.3%), only behind Rio Grande do Sul (17.6%). In the municipality, the ratio of older people is 14%[2].

Along with the increase in deaths caused by Covid-19, it is also possible to observe an increase in home deaths, a problem that is emphasized by the situation of the pandemic observed in the country[3,4]. Although the phenomenon has been pointed out, its causes and meanings for the mortality of older people are still poorly analyzed.

It is important to emphasize that home death does not necessarily point to failures in the healthcare system. When it happens due to chronic-degenerative causes, being followed by palliative care [5] with a good support network and with specialized guidance in a quiet and comfortable environment, without physical pain, and in contact with the beloved ones, home death can be an indicator of a dignified and humanized death, a "good death"[6]. However, this is not the case for deaths from highly communicable diseases, which often demands hospitalization for treatment as is the case of Covid-19. Home deaths show lack of care, gaps in the healthcare system and social assistance, as well as lack of timely and preventive care that should be offered by the Primary Health Care (PHC)[4].

Another important aspect when analyzing home deaths during the Covid-19 pandemic is the impact that the discharge of hospitalizations for this cause can have in the scenario of home mortality, both regarding the set of causes of mortality and its amount.

All these aspects are even more relevant when dealing with the collective residences of older people such as Long Term Care Facilities (LTCF), where illness by Covid-19 can represent a great risk of infection for other institutionalized people and workers,[7,8] and where several older people in a fragile and vulnerable state are concentrated and more likely to be affected by the decrease of beds available for hospitalization due to their reversal for the treatment of coronavirus.

Moreover, inequalities in access to the healthcare system and differences within the municipal territory bring an even more challenging element to the scenario of fighting the pandemic in Rio de Janeiro[9,10]. Therefore, the analysis of the causes of home deaths by place of occurrence and sociodemographic markers is essential to understand the progression of the pandemic in the state and municipality.

Given the above, the present study aims to analyze deaths in the city of Rio de Janeiro according to the place of occurrence, age group, cause, and sociodemographic characteristics in the context of the Covid-19 pandemic.

METHOD

The study sample was all deaths that occurred in the city of Rio de Janeiro between 2010 and 2020 according to the place of occurrence, age group, and cause of death. We used data from the Death Certificates (DO) consolidated in the Mortality Information System (SIM) of Rio de Janeiro and made available online by the Municipal Health Department and the Health Department of the State Government of Rio de Janeiro[11]. Although it is possible to obtain the most recent data, the choice to analyze only the period from April to June is justified by the quality of the data. It is expected that the non-inclusion of the most recent periods avoids potential failures or delays in the death record. These problems may occur given the need for state and municipal health departments to review the cases. The data was updated until October 15, 2020.

The place of occurrence was sorted according to the DO, with the following options: 1. Hospital; 2. Other health facilities; 3. Home; 4. Public areas; 5. Other (if not listed already); and 6. Ignored (option used when it is not possible to identify the place of death). Note that the DO does not allow to identify the type of home (private or collective), making it impossible to identify deaths in LTCF, for example.

The identification of alterations in the place of occurrence and age group of deaths was made by analyzing the number and ratio of general deaths and at home according to age group and year in the city of Rio de Janeiro between 2010 and 2020. Four age groups were considered for the analysis: less than 30 years, 30 to 59 years, 60 to 79 years, and 80 years and older.

The measure of "excess mortality" of older people was used as a way to identify deaths related to Covid-19. To estimate the "excess mortality" of older people during the pandemic period in the city of Rio de Janeiro, deaths of people aged 60 years or older between April and June 2020 were compared with the monthly average of deaths of the same age group in the same months of the occurrence of the previous three years (2017, 2018 and 2019) according to the place of death. Then, the percentage difference between mortality in 2020 and the monthly average of the previous three years was estimated. Said difference indicates the "excess mortality" in 2020.

The excess mortality of the old population in the period was also estimated according to causes, according to the 10th Revision of the International Classification of Diseases (ICD-10) for deaths occurring at home. This analysis was deepened by estimating the ratio of older people deaths due to ill-defined cause (Chapter XVIII of ICD-10) that occurred at home, month by month, comparing the same months of the triennium of 2017-2019 and 2020 in the city of Rio de Janeiro. This indicator is a frequently used measure to assess the quality of the record of the deaths due to ill-defined cause and the quality of care since it also reflects the structure for diagnosis available.

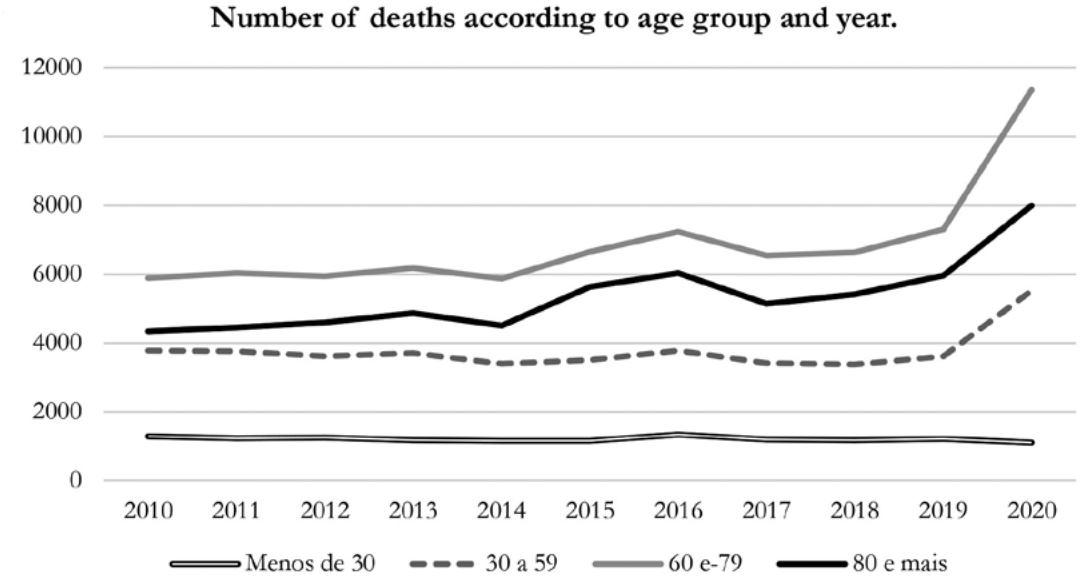
Lastly, the sociodemographic distribution of deaths of older people according to the place of occurrence (home or general deaths) was analyzed in the same period based on the variables available in the system, namely: gender, race/color, marital status, and education.

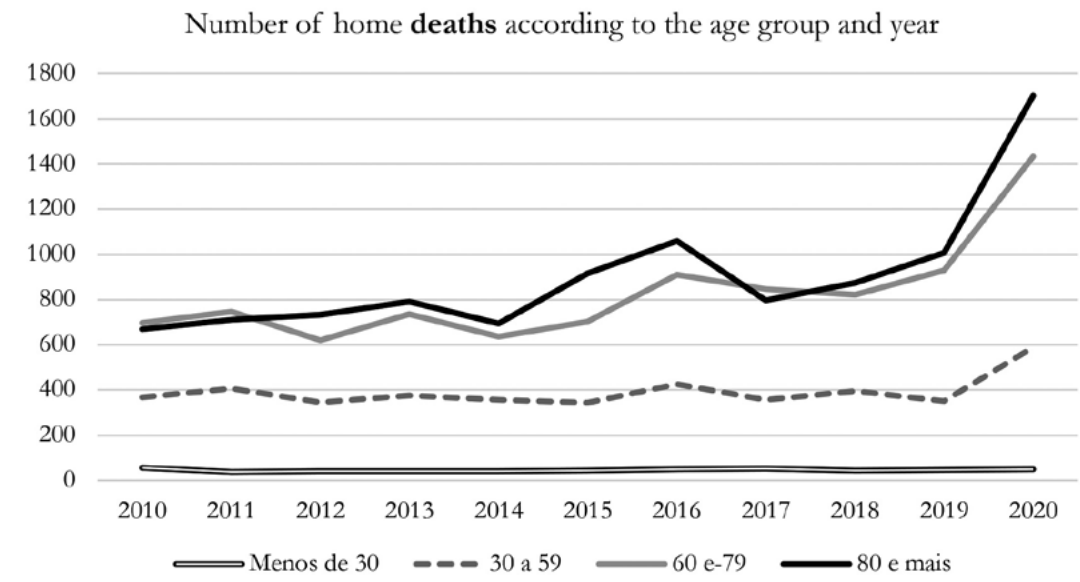
All data used is secondary publicly available data on the SIM, eliminating the need for appreciation by the Research Ethics Committee according to current legislation.

RESULTS

Figure 1 shows the difference in the age distribution of the number of deaths per place of occurrence. For home deaths, the predominant age group is 80 years or older, while for deaths in all places of occurrence the age group between 60 and 79 years of age had a higher number. It is also shown that the ratio of deaths that occurred at home increases significantly for the group aged 80 years or older.

Table 1 deals with deaths of older people in the State and Municipality of Rio de Janeiro according to the place of occurrence. It is possible to identify that the State of Rio de Janeiro had an excess of general mortality of 9,215 older people representing an increase of 36.5% compared to the same period of the previous year. Note that 57% of deaths in the State are concentrated in the city of Rio de Janeiro (n=7.023).





Ratio of home deaths according to the age group and year.											
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Less than 30 years	4.3	3.1	3.3	3.5	3.6	3.9	3.8	4.5	3.7	4.0	4.4
30 to 59	9.8	10.8	9.6	10.1	10.5	9.9	11.2	10.4	11.7	9.7	10.7
60 and -79	11.9	12.4	10.4	11.9	10.8	10.6	12.6	13.0	12.4	12.7	12.6
80 and over	15.4	16.0	16.0	16.3	15.4	16.2	17.6	15.5	16.2	16.9	21.3

Fonte: SMS/SUBPAV/SVS/CAS/GTDV - Sistema de Informações sobre Mortalidade (SIM). Dados sujeitos a revisão. Os dados utilizados referem-se aos meses de abril a junho.

Figure 1. Number of overall deaths and at home, and the ratio of home deaths according to the age group and year in the city of Rio de Janeiro, 2020.

Table 1. Number and percentage distribution of deaths of older people in Rio de Janeiro (state and municipality) in April to June of the triennium (average from 2017 to 2019) and 2020 according to place of death, and absolute and percentage difference in the period.

Place of death		Total deaths		Excess mortality in 2020
		Average (2017-2019)	2020	Difference
		N (%)	N (%)	N (%)
State of Rio de Janeiro				
Total deaths of older people		25,260 (100)	34,475(100)	9,215(36.5)
Place of occurrence	Hospital	17,468(69.2)	22,878(66.4)	5,410(3.0)
	Another health facility	3,603(14.3)	5,280(15.3)	1,677(46.5)
	Home	3.756(14.9)	5,795(16.8)	2,039(54.3)
	Public areas	69(0.3)	71(0.2)	2(3.4)
	Others	359(1.4)	446(1.3)	87(24.3)
	Ignored or not informed	4(0.0)	5(0.0)	1(15.4)
Municipality of Rio de Janeiro				
Total deaths of older people		12,325(100)	19,348(100)	7,023(57)
Place of occurrence	Hospital	8,749(71)	13,070(67.6)	4,321(49.4)
	Another health facility	1,575(12.8)	2,805(14.5)	1,230(78.1)
	Home	1,760(14.3)	3,135(16.2)	1,375(78.2)
	Public areas	13(0.1)	28(0.1)	15(115.4)
	Others	227(1.8)	307(1.6)	80(35.4)
	Ignored or not informed	2(0.0)	3(0.0)	1(80)

Source: SMS/SUBPAV/SVS/CAS/GTDV - Mortality Information System (SIM). Data subject to review. The data used refer to April to June.

When comparing the difference between the state and municipality of Rio de Janeiro, it is observed that the municipality had an increase of 78.2% in home deaths in 2020 compared to the average of the previous triennium. This growth was 54.3% in the State. Regarding deaths in another healthcare facility, the difference in the period was 78.1% in the municipality and 46.5% in the State.

Table 2 shows the home deaths of people aged 60 years and older in the city of Rio de Janeiro according to the cause of death. Mortality in 2020 increased for all groups of causes (percentage difference of 78%). The cause of mortality with the greatest absolute difference in deaths in the period was hypertension, going from 153 to 364 deaths in 2020, excess mortality of 137%. Another cause with a significant increase in the number of home deaths was diabetes, with 91.7% more than the previous period.

The main causes of home death from June to April of the triennium 2017-2019 were diseases of the circulatory system, neoplasms, diabetes, and diseases of the respiratory system. This scenario does not change in 2020. Nevertheless, it is possible to observe a great increase in deaths from infectious and parasitic diseases (725%), besides the record of 76 deaths related to diseases due to unspecified localization viruses (which in the months analyzed between 2017 and 2019 did not present cases). Among the diseases of the circulatory system which increased by 12%, there is a 400% increase in respiratory failure not classified elsewhere.

Table 2. Number, proportional distribution, and percentage and absolute difference of older people home deaths in the city of Rio de Janeiro according to groups of causes of ICD-10 in April to June of the triennium 2017-2019 and 2020.

Cause groups (ICD-10)	Total deaths		Excess mortality in 2020		Ratio	
	Average (2017-2019)	2020	Absolute Difference	Percent Difference	Average (2017-2019)	2020
Total Deaths	1760	3135	1375	78.1	100.0	100.0
I. Some infectious and parasitic diseases	12	99	87	725.0	0.7	3.2
B34 Virus diseases of unspecified location	0	76	76	*	0.0	2.4
II. Neoplasms (tumors)	152	330	178	117.1	8.6	10.5
C18 Colon malignant neoplasm	10	21	11	110.0	0.6	0.7
C34 Malignant neoplasm of bronchi and lungs	23	43	20	87.0	1.3	1.4
C50 Neoplasia maligna da mama	13	30	17	130.8	0.7	1.0
C61 Neoplasia maligna da próstata	16	46	30	187.5	0.9	1.5
III. Diseases of the blood and hematopoietic organs and some immune disorders	4	10	6	150.0	0.2	0.3
D50; D53; D62; D64 Anemias	3	9	6	200.0	0.2	0.3
IV. Endocrine, nutritional, and metabolic diseases	133	252	119	89.5	7.6	8.0
E14 Unspecified diabetes mellitus	96	184	88	91.7	5.5	5.9
V. Mental and behavioral disorders	18	46	28	155.6	1.0	1.5
F03 Unspecified dementia	7	13	6	85.7	0.4	0.4
F10 Mental and behavioral disorders due to alcohol use	3	14	11	366.7	0.2	0.4
VI. Nervous system disorders	87	139	52	59.8	5.0	4.4
G20 Parkinson's Disease	16	26	10	62.5	0.9	0.8
G30 Alzheimer's Disease	59	99	40	67.8	3.4	3.2
IX. Diseases of the circulatory system	956	1274	318	33.3	54.3	40.6
I10; I11 Arterial hypertension	153	364	211	137.9	8.7	11.6
I21 Acute myocardial infarction	469	560	91	19.4	26.6	17.9
I50 Cardiac insufficiency	32	90	58	181.3	1.8	2.9
I64 Cerebrovascular accident not specified as hemorrhagic or ischemic	34	63	29	85.3	1.9	2.0
X. Diseases of the respiratory system	146	164	18	12.3	8.3	5.2
J43 Emphysema	11	17	6	54.5	0.6	0.5
J44 Other chronic obstructive pulmonary diseases	17	24	7	41.2	1.0	0.8
J96 Respiratory failure not elsewhere classified	5	25	20	400.0	0.3	0.8
XI. Diseases of the digestive system	33	38	5	15.2	1.9	1.2
XII. Diseases of the skin and subcutaneous tissue	5	12	7	140.0	0.3	0.4
XIII. Diseases of the musculoskeletal system and connective tissue	5	15	10	200.0	0.3	0.5
XIV. Diseases of the genitourinary system	18	39	21	116.7	1.0	1.2

to be continued

Continuation of Table 2

Cause groups (ICD-10)	Total deaths		Excess mortality in 2020		Ratio	
	Average (2017-2019)	2020	Absolute Difference	Percent Difference	Average (2017-2019)	2020
XVIII. Symptoms, signs, and abnormal clinical and laboratory findings not elsewhere classified	152	662	510	335.5	8.7	21.1
XX. External causes of morbidity and mortality	37	55	18	48.6	2.1	1.8
Y34 Unspecified facts or events and undetermined intent	9	26	17	188.9	0.5	0.8

*Ratio related to Covid-19

Source: SMS/SUBPAV/SVS/CAS/GTDV - Mortality Information System (SIM). Data subject to review. The data used refer to April to June.

Table 3. Number, ratio, and percentage difference of general deaths and home deaths between April and June in the triennium 2017-2019 and 2020 according to the sociodemographic characteristics in the city of Rio de Janeiro.

Variables and categories	Home deaths			All deaths		
	Average (2017-2019)	2020	Difference	Average (2017-2019)	2020	Difference
	N(%)	N(%)	%	N(%)	N(%)	%
Total	**1,760(100)**	**3,138(100)**	**78.3**	**12,324(100)**	**19,501(100)**	**58.2**
Gender						
Male	807(45.9)	1,529(48,7)	89.4	5,607(45.5)	9,748(50)	73.9
Female	952(54.1)	1,609(51,3)	69.0	6,718(54.5)	9,753(50)	45.2
Race/color						
White	1,172(66.6)	2,038(64.9)	73.9	7,569(61.4)	11315(58)	49.5
Preta	170(9.7)	356(11.3)	109.0	1,391(11.3)	2587(13.3)	86.0
Amarela	3(0.2)	5(0.2)	66.7	19(0.2)	40(0.2)	114.3
Brown	406(23.1)	722(23)	77.7	3.251(26.4)	5393(27.7)	65.9
Indigenous	1(0.1)	0(0)	-100.0	4(0)	3(0)	-18.2
Not reported	8(04)	17(0.5)	121.7	91(0.7)	163(08)	79.1
Marital Status						
Single	395(22.4)	629(20)	59.2	2,409(19.5)	3640(18.7)	51.1
Married	4961(28.2)	906(28.9)	82.5	4,061(33)	7050(36.2)	73.6
Widow/er	677(38.5)	1,210(38.6)	78.8	4,529(36.8)	6546(33.6)	44.5
Legally divorced	162(9.2)	281(9)	73.5	1,082(8.8)	1734(8.9)	60.2
Consensual union	10(0.6)	43(1.4)	330.0	85(0.7)	205(1.1)	140.2
Not reported	3(0.2)	6(0.2)	80.0	45(0.4)	83(0.4)	85.8
Ignored	16(0.9)	63(2)	285.7	113(0.9)	243(1.2)	115.7
Education						
None	106(6)	216(6.9)	103.1	811(6.6)	1163(6)	43.4
1-3 years	387(22)	757(24.1)	95.6	3,567(28.9)	4960(25.4)	39.0
4-7 years	375(21.3)	503(16)	34.0	2,582(21)	3825(19.6)	48.1
8-11 years	386(22)	705(22.5)	82.5	2,707(22)	4871(25)	80.0
12 years and older	235(13.4)	453(14.4)	92.5	1,478(12)	2689(13.8)	82.0
Not reported	29(1.6)	43(1.4)	48.3	109(0.9)	315(1.6)	189.0
Ignored	240(13.7)	461(14.7)	91.8	1,070(8.7)	1678(8.6)	56.8

Source: SMS/SUBPAV/SVS/CAS/GTDV - Mortality Information System (SIM). Data subject to review. The data used refer to April to June.

Deaths whose cause was recorded as chapter XVIII (symptoms, signs, and abnormal findings of clinical and laboratory examinations not elsewhere classified) went from 8.7% in the months analyzed of the previous triennium to 20.1% in 2020. In absolute numbers, the average months considered in the previous triennium had recorded a total of 152 deaths, which increased to 662 in 2020; an increase of 335.5%.

Table 3 shows the number, ratio, and percent difference of general deaths and home deaths from April to June of the triennium 2017-2019 and 2020 according to the sociodemographic characteristics. As for home deaths and in other places, a higher percentage increase was observed among men compared to women. Regarding race/color, it was observed that the black old population had higher excess mortality at home than the white population in the period, with 109% and 73.9%, respectively. The excess home deaths of brown older people in 2020 were similar to that of older people identified as white, being slightly higher (77.7%).

It is also noteworthy the significant increase in deaths without race/color reported, especially in home deaths.

Regarding marital status, there was a more significant increase in the number of widow/er home deaths (78.8%) compared to deaths in all places of occurrence (44.5%). The same can be observed, although on a smaller scale, among the divorced ones, with an increase of 73.5% of home deaths and 60.2% of places of occurrence. Again, the sharp growth of deaths with ignored sociodemographic information, especially at home (285.7%), is emphasized.

Regarding education, there was a sharp percentage increase in home deaths among people with lower education, especially in the categories "No education" (percentage increase of 103.1%) and "1 to 3 years of study" (95.6%) compared to deaths in all places of occurrence, which increased 43.4% and 39.0%, respectively. The information of "ignored" or "uninformed" education is high both in home deaths and in other places.

DISCUSSION

The ratio of home deaths of older people increased significantly in April to June 2020 when compared to the average of these months in the previous triennium, especially the group of 80 years and older both in the State and in the Municipality of Rio de Janeiro. Although the main causes of home deaths are not altered, we can notice relevant proportional increases of both hypertension and diabetes. There was also a sharp increase in deaths from infectious and parasitic diseases. Among the diseases of the circulatory system, there is an increase in respiratory failure not classified elsewhere. Deaths due to ill-defined causes had a proportional increase of 335.5%. Regarding the sociodemographic characteristics of home deaths in the municipality, there was a higher percentage increase among men, population with declared black race/color, widow/er, and people with low education.

One hypothesis that may explain the excess of home deaths is the pandemic which increased the demand for public hospital beds. Other studies on home deaths in the general population work with a similar explanatory hypothesis[3,4,9]. Due to the incipient provision of care from the public healthcare system in the state and municipality of Rio de Janeiro, many patients likely returned to their homes without the necessary care. Primary Health Care (PHC) faces the same problem.

The search for beds and public care services may have been hindered by the worsening of coverage indicators in Rio de Janeiro. According to Martins et. al. (2019), the problems of access and quality of the public hospital network have intensified in the State, alerting to a crisis stage in hospital care[13]. Studies show that the situation in the municipality is similar, where there was a reduction in the population covered by the PHC[14,15], in the procedures, as well as human resources and essential materials such as beds and family healthcare teams[15].

In addition to this factor, the increase in home deaths can also be linked to the reduction in

regular care resulting from social distancing. The pandemic involved changes in the functioning of the healthcare system, including the interruption of non-essential or elective activities. Along with the fear of contamination by patients, this would have caused important changes in the dynamics of hospital care services[16]. These changes would have caused a decrease in the flow of patients in hospitals, including those with an indication for emergency care, which could be contributing to the increase in home deaths[9,17]. The finding of excess mortality among the older age groups is corroborated by national and international studies[18–20], and explained by the greater vulnerability of this age group.

The increase in deaths due to hypertension and diabetes is also a cause for concern since both are considered preventable causes of mortality[21] and hospitalization[22]. It is known that high PHC coverage is associated with a decrease in preventable deaths[23]. Also, with adequate PHC the population has greater access to the prevention and treatment of various conditions which would possibly prevent most of the home deaths. Even with the challenges that the pandemic brought to the health system[17], it is expected that in a scenario with articulated action between family healthcare teams with sufficient CHWs and social assistance, it would be possible to have avoided a copious number of older people deaths, regardless of their place of occurrence.

In 2020, the percentage difference of deaths from infectious and parasitic diseases compared to the previous triennium stands out. The number that used to be 12 deaths reaches almost one hundred, an increase of 702%.

Another important issue raised in the results is the increase in mortality due to ill-defined causes. The lack of knowledge of the basic cause of death may be related to the lack of Covid-19 tests and the lack of an adequate care service for severe cases. As in much of the country, the city of Rio de Janeiro suffered from the incipient amount of tests to detect the new coronavirus, and even when the patients were tested, many died before having their results[24]. Thus, it is possible and probable that a great part of the deaths reported as ill-defined causes can be attributed to Covid-19.

Also, it is important to note that Covid-19 is a systemic disease that can affect several organs of the human body, and whose interactions have not yet been fully understood and studied. Thus, the increase in deaths caused by Covid-19 may be mixed with other causes[25].

The results pointing to a higher ratio of death for men go in the same direction as recent studies in several countries[26–28] showing a higher lethality among men even when adjusted by age and comorbidities.

Old widows/ers had a higher ratio of home deaths than those with another marital status. This may be due to the smaller social support network of these people. Therefore, further studies are needed to understand the reasons for the greater risk for this population group.

The higher percentage of increase in home deaths in the old black population compared to other skin colors can be explained by the strong racial inequalities in the country. Structural racism has historically been reflected in worse indicators of access to services and health status, which consequently makes the impact of the pandemic especially strong for this group[29]

A higher ratio of home deaths was found for people with less education. This finding is similar to those of other studies both in Brazil and abroad[20,26,27,30]. Several articles have already pointed out that a lower level of education is a barrier to access to healthcare services, both because this population in general lives in regions with a low infrastructure of basic services[20,31] and because it can reduce the understanding of the system, hinder the recognition of risk situations, and consequently reduce the use of healthcare services[20].

For the old population, the impacts of socioeconomic differences are enhanced. Social inequalities in health and living conditions make vulnerable groups - mainly indigenous, black and low-income people - experience an aging process with overlapping risks, which make them more vulnerable[20,32]. In Brazil, the Covid-19 pandemic has exposed the impact of these differences and the challenges of managing the healthcare system in this context.

An important limitation of the present study is the impossibility of determining whether home death occurred in a private or collective residence. Brazilian health information systems do not have disaggregated data on this type of residence, since they are related to social assistance and not to health. No official data on mortality were found in LTCF, either from Covid-19 or other causes. Another limitation refers to the possible underreporting of deaths. However, this does not compromise the quality of the study, since the SIM has high coverage in the municipality of Rio de Janeiro.

LTCFs are internationally acknowledged as a high-risk space for transmission and mortality by Covid-19. Studies carried out in countries with adequate epidemiological surveillance show that half of the deaths attributed to Covid-19 occur in these institutions[7]. In general, this is because they are crowded with individuals of advanced age who are more vulnerable and already have other morbidities. In Brazil, despite the guidelines and prevention strategies against Covid-19 in the LTCF[33-35], it has not yet been possible to assess its developments.

CONCLUSION

The increased home deaths found in the city of Rio de Janeiro may be associated with the effects of the Covid-19 pandemic, as pointed out in the literature. Besides, the increase in deaths due to ill-defined causes may be associated with the Covid-19 pandemic due to the lack of tests and difficulty in accessing health services.

The analysis showed that home deaths by Covid-19 is related to males, widowers, from an older age group. Although the greatest vulnerability among older people is known, further studies are important to understand the differences in gender and marital status.

The data also showed a link between the black race/color and a lower level of education and a higher chance of home deaths during the Covid-19 pandemic. This is due to an overlap of risks during the life cycle, so people in these social groups age more vulnerably. However, supplementary studies on work and employment and housing conditions for these individuals would be important so that we could better understand the mechanisms behind home deaths during the Covid-19 pandemic.

Despite the relevance of the debate on the LTCF in the context of the pandemic, the invisibility of the topic in information systems prevented its analysis from being further investigated in this study. Although it was not possible to identify the type of household where the death occurred (private or collective), the distribution of deaths by demographic, socioeconomic variables, and causes of death are presented.

Edited by: Maria Helena Rodrigues Galvão

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