Challenges in the nowadays, disabled people, race, income and COVID-19, under the mathematical and probabilistic

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Abstract: The term disability means a physical, intellectual or sensory permanent or temporary nature, which limits the ability to perform one or more activities. According to the WHO, it is estimated that about 15% of the world's population lives with some type of disability (2010 estimates). This number is lower than estimates from IBGE, of the same year, which indicate that approximately 23.9% of Brazil's population. Race is a social construction used to distinguish people in terms of one or more physical marks, among them color. Social inequality is the phenomenon that differentiates among people in the same society. As an aggravation of this whole scenario, in this year of 2020, the COVID-19 pandemic, caused by the SARS-CoV-2, with social, economic and health impacts unprecedented. The estimate of infected and dead competes directly with the impact on health systems, with the populations exposure, vulnerable groups and the economical system support. In mathematical and statistical terms, we intend to describe in this work relations between COVID-19 and different social inequality factors in moments before, during and after this pandemic.

Resumen: El término discapacidad significa una naturaleza física, intelectual o sensorial permanente o temporal, que limita la capacidad para realizar una o más actividades. Según la OMS, se estima que alrededor del 15 % de la población mundial vive con algún tipo de discapacidad (estimaciones de 2010). Esta cifra es inferior a las estimaciones del IBGE, del mismo año, que indican que aproximadamente el 23,9 % de la población brasileña. La raza es una construcción social que se utiliza para distinguir a las personas en términos de una o más marcas físicas, entre ellas el color. La desigualdad social es el fenómeno que diferencia a las personas de una misma sociedad. Como agravante de todo este escenario, en este año de 2020, la pandemia COVID-19, provocada por el SARS-CoV-2, con impactos sociales, económicos y de salud sin precedentes. La estimación de infectados y muertos compite directamente con el impacto en los sistemas de salud, con la exposición de las poblaciones, los grupos vulnerables y el apoyo al sistema económico. En términos matemáticos y estadísticos, pretendemos describir en este trabajo las relaciones entre COVID-19 y diferentes factores de desigualdad social en momentos antes, durante y después de esta pandemia.

Keywords: disability, COVID-19, demographic census, exploratory data, race.

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1. Introduction

Worldwide, disabled people have worse health prospects, lower education level, lower economic participation and higher poverty rates compared to people without disabilities. This is partly due to the fact that disabled people face barriers to access services that many of us have long considered guaranteed, such as health, education, employment, transport and information. Such difficulties are exacerbated in the poorest communities [4].

Race can be understood as a social construct, used to distinguish people in terms of one or more physical marks. In other words, race is a category used to refer to a group of people whose physical marks are considered socially significant. Perceptions and conceptions of race can affect people's social lives, being mainly responsible for creating and maintaining a system of social inequality [2].

People's participation in the workforce is important for reasons such as maximizing human resources by increasing individual well-being, as well as promoting human dignity and social cohesion.

According to experts, the first cases of COVID-19 originated in the seafood market in the city of Wuhan located in China in December 2019 and the incidence increased exponentially in the first weeks.

This virus is believed to host certain species of bats and the pangolin; its incubation period is estimated at around 4 to 14 days; the rate of transmission is 2.75 individuals, and finally, the disease has an overall lethality of 3.4%. Infection with this virus has high rates of contagion with very rapid spread of cases, hospitalization in highly complex hospitals and high mortality rates.

In mathematical and statistical terms, it is intended, with the use of techniques of data analysis, to describe relationships between disabled people, race, income, decent work and COVID-19. In mathematical and statistical terms, probability is the study of the chances of obtaining each result of a random experiment. These chances are assigned real numbers in the range between 0 and 1. Conditional probability refers to the probability of an event A knowing that another B occurred.

To continue this work, in section 2 we will present materials and methods, in section 3 results and discussions, and finally, in section 4 the conclusions of this research.

2. Materials and methods

2.1. Motivation

In order to assess the effects of the epidemiology of COVID-19 in relation to factors such as disabled people, work, income, race and sex, among others, we will use the data from the 2010 IBGE Demographic Census of 20800804 respondents from the sample and aggregates for the 5565 municipalities together with the 2013 UNDP data.

In statistical terms, there are few published works that describe the effects of the COVID-19 epidemic in areas such as education, disability, income, economy, work, sex and social inequality, among others.

2.2. Social inequality

Social inequality, also called economic inequality, is a social problem present in all countries of the world and it is an economic difference that exists between certain groups of people within the same society. It stems mainly from the poor distribution of income and the lack of investment in the social area, such as education and health. In this way, the majority of the population is at the mercy of a minority that owns the resources, which generates inequalities.

The main causes of inequality are lack of investment in social, cultural, health and education areas; mismanagement of resources, poor distribution of income; market logic and, finally, corruption. Among the consequences generated by inequality it is possible to mention an increase in the rate of violence and crime; poverty and misery; delay in economic progress; famine, destruction and child mortality;

marginalization of young people; increase in the unemployment rate and, finally, formation of different socials classes.

The expansion of the COVID-19 epidemic in the slums, peripheries and interiors opened up the social and economic inequality between the naturalized social classes that are accepted by a large part of society and State institutions, which represents a barrier to the recommendations of basic hygiene, social detachment and staying at home.

According to health experts, the main problems pointed out are the need for special protection for groups in situations of vulnerability or at risk, such as people on the street, suffering or mental disorder, with disabilities, living with AIDS/HIV, LGBTI, indigenous, black, riverside, informal market workers; the lack of sanitation and housing conditions in the face of the pandemic; recommendations such as the use of alcohol gels and masks, hand hygiene and not leaving home are measures that come up against realities in the country, or in the absence of basic rights such as employment, health and housing, and, finally, it is not possible to develop the economy in the country without effective control of the pandemic.

3. Results and discussion

Before the COVID-19 pandemic, in regards of adequate housing, it was already possible to notice worrying scenarios with a group of vulnerable people on the rise formed by groups such as disabled people, black, brown and indigenous races, and joining these groups came the groups of people most prone to counter the COVID-19 virus such as the elderly, diabetics, hypertension, heart, cancer and respiratory diseases; greater worsening in economic terms with rising unemployment and greater difficulties in meeting the recommendations of health authorities in terms of prevention due to unavailability of resources such as water, electricity, gas, food, health and adequate housing conditions.

Figure 1 shows the distribution of people without disabilities by age group (I), with disabilities by age group (II), mortality by age group (III), clinical status of COVID-19 (IV), people without disabilities (V), people with disabilities (VI). The graphs in Figure 1 also show that COVID-19 affects more disabled people, older people and people working in worse conditions.
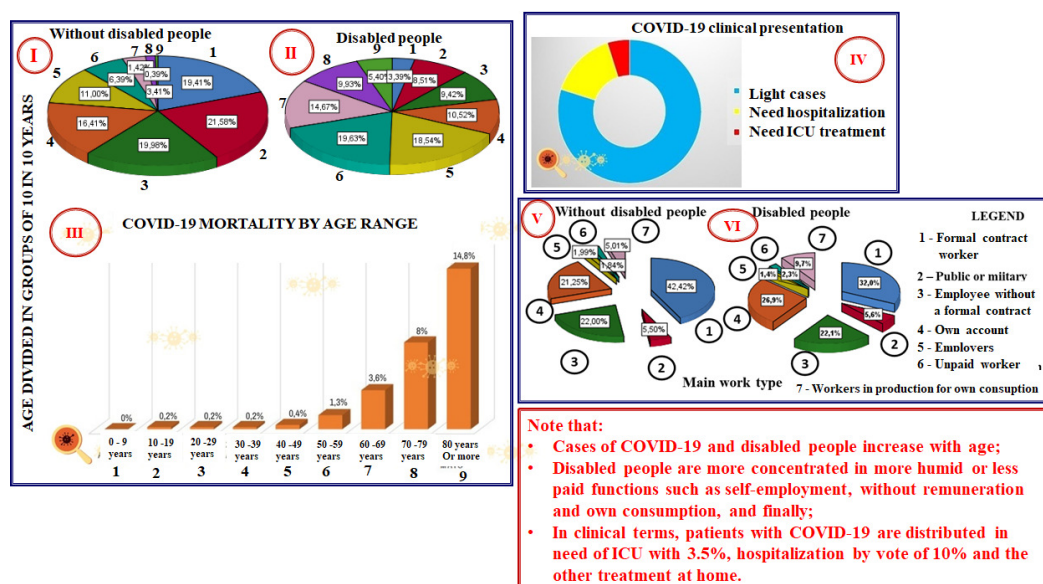

Figure 1: Disabled people distribution, age, work type and COVID-19 clinical internship.

Following, in Figure 2 it shows the distribution of residents by dormitories (1), access to drinking water (2), education level (3) and number of children (4). Analyzing the data in Figure 2, it appears that, proportionally, disabled people are more exposed to COVID-19 than people without disabilities. And first-time mothers have a greater number of children, a lower level of education, less access to drinking water, and a greater number of people per bedroom.
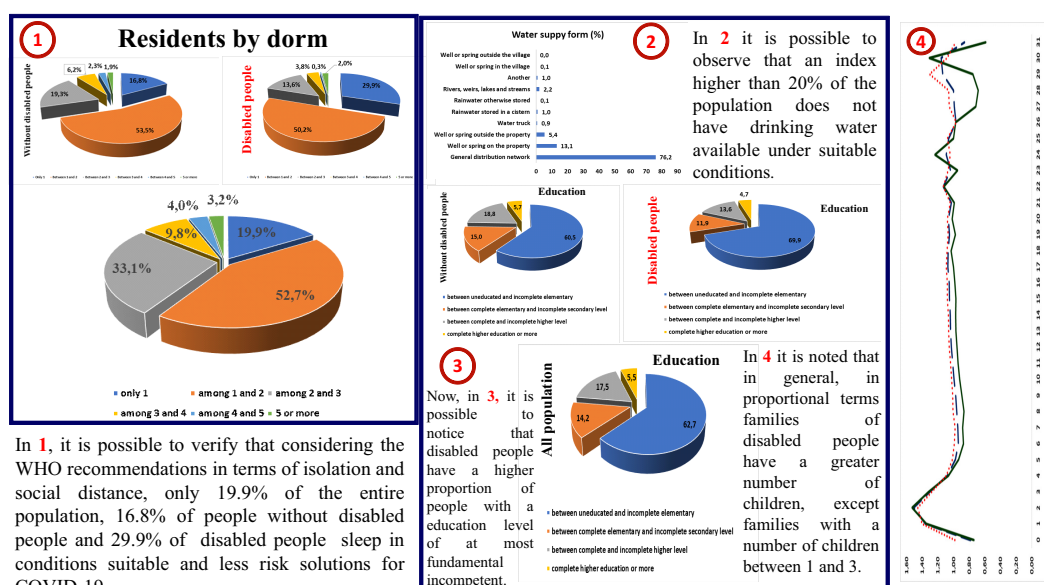
Figure 2: COVID-19, disabled and housing conditions.

4. Conclusions

Data from the 2010 IBGE Census show the disabled people predominance and of black, brown and indigenous races in worse working conditions, income, education and employment. With the emergence of the COVID-19 pandemic and the isolation policies as a solution to combat it, it became even more precarious for a good part of the population, further expanding economic and social inequality due to the increase in unemployment, mainly in informal and closing of many small and medium-sized companies, increasing the mass of vulnerable people in the population according to the results of studies carried out by several specialists in several areas, such as public health, economics, statistics, history, or medicine, among others. These results also show the mismanagement by authorities in establishing a more effective combat plan. These results are confirmed by the results of analyses made with data from the IBGE Demographic Census and with the results of several surveys carried out in Brazil and abroad.

Among the possible results stand out disabled people and other groups of people in more vulnerable situations were already in worse situations on issues such as education, health, housing conditions, income, work, leisure and many other things. These situations were aggravated after the beginning of the COVID-19 pandemic, since, in addition to these factors mentioned above, there is the need for isolation, greater hygiene, and having to satisfy new protocols developed by WHO.

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