Covid-19: Comorbidities, symptoms, and hospitalization - Review

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Short resume of the presenter

Marisa Pires is licensed in Informatic Engineering and is a Master's student in Software Development and Interactive Systems at the organization Polytechnic Institute of Castelo Branco.

Works in the Capgemini Engineering Group as an Advanced Consultant.

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Keywords - Covid-19; Comorbidity; Symptoms; Hospitalization; Age.

Introduction

Covid-19 is a virus that causes respiratory infections and emerged in December 2019 in the Chinese city of Wuhan after exposure to the virus.

The first symptoms start between 2 and 14 days, and the infected people are treated according to the symptoms presented, with existing medications to reduce symptoms.

People with comorbidities are more likely to contract the virus and this fact is reflected in regular hospitalizations and in intensive care units, where the number of deaths in these circumstances has increased.

Figure 1- Wuhan city location (adapted from "The New York Times")

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- The problem

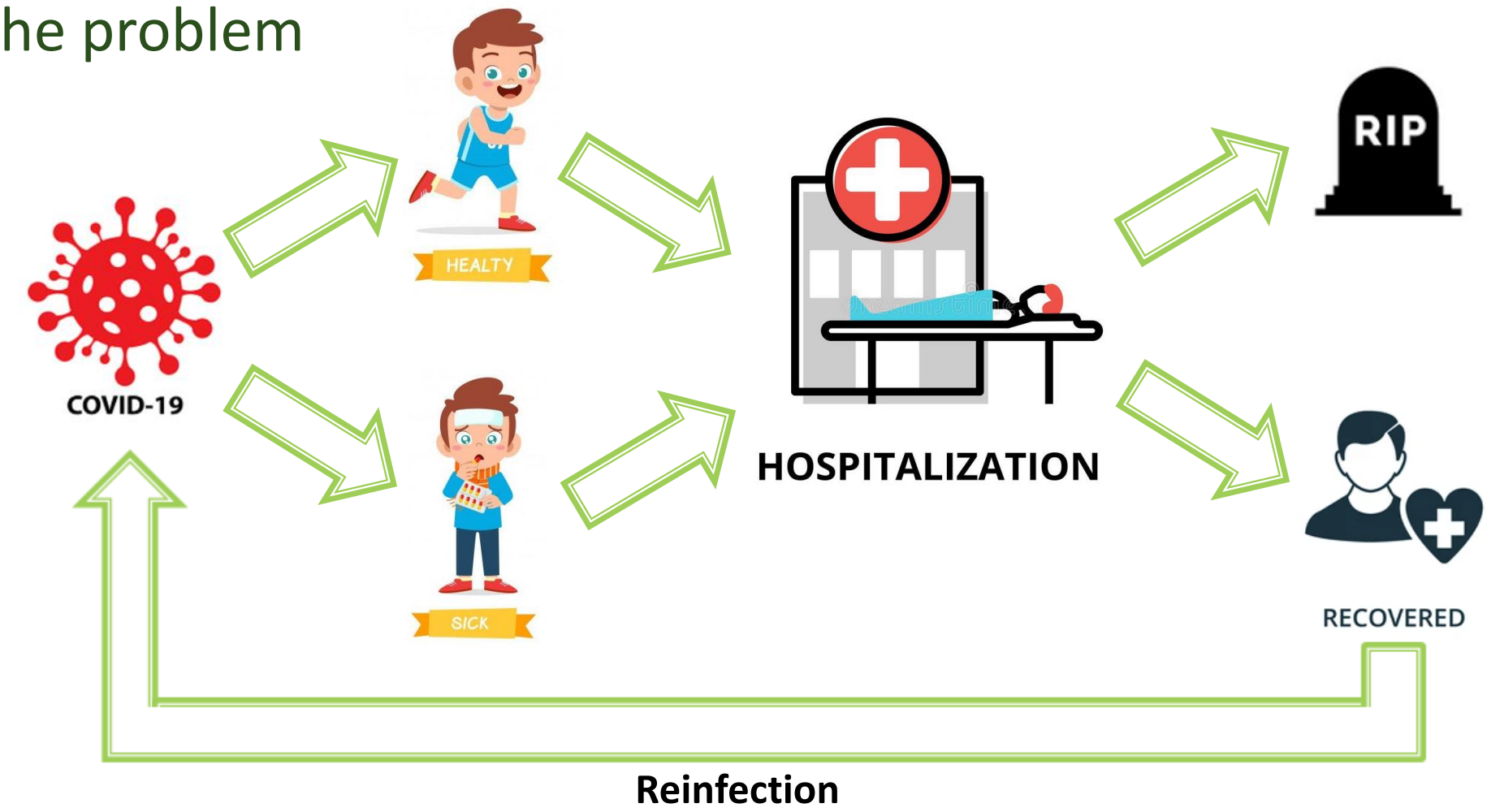

Figure 2 – The problem illustration (images adapted from PNGWing and Pinterest)

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Roadmap

State of art

- Research and survey of scientific articles (*"Medrxiv", "Google Scholar" and "Science Direct" databases*)

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Research and survey of scientific articles

Preparation:

The review includes the following topics:

1. **Research questions**
2. **Inclusion criteria**
3. **Search strategy**
4. **Results**
5. **Data Extraction and Data Analysis**
6. **Discussion**

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Research and survey of scientific articles

***Research questions*:**

- (Q1) Association between Comorbidities and Hospitalizations/Deaths.
- (Q2) Association between Comorbidities and Recoveries.
- (Q3) Association between symptoms and hospitalization.
- (Q4) Association between age, death, and gender.

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Results

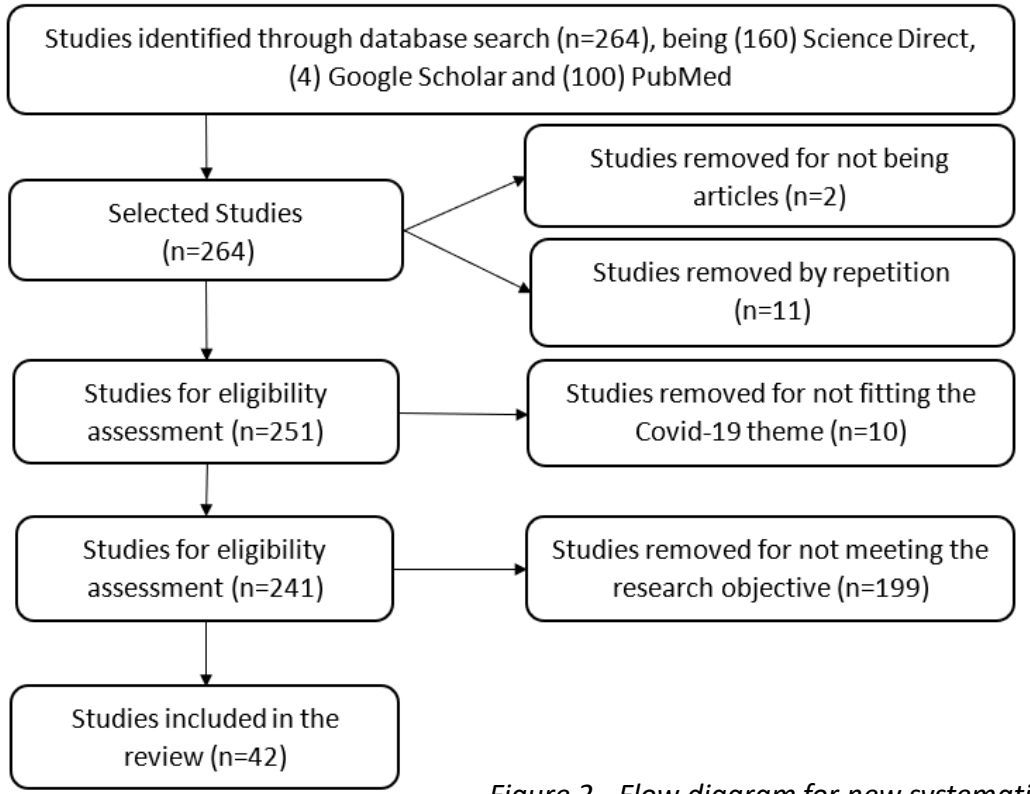

Figure 2 - Flow diagram for new systematic reviews

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Data Extraction and Data Analysis

Table 1 – Extracted data

Study	Data Range Study	Methods	Comorbidity
[10]	February to June 2020	Machine learning and Cox Regression Model	Neoplasm, diabetes, asthma, pulmonary, hepatic, hematological, renal, neurological, neuromuscular and immunodeficiency conditions
[11]	June 2020	Seaborn and SciPy	Asthma, malignancy, chronic hematological disorder, diabetes, HIV/other immunodeficiency, renal disease, liver disease, chronic lung disease, and neuromuscular disorder.
[12]	April 2020	Cohort and Poisson Regression	Comorbidities in general
[13]	February 2021	Developed a simple model	Type II diabetes, hypertension, cardiovascular disease, chronic kidney disease etc
[14]	April 2020	Empirical observation	Obesity in males, lung cancer death rates
[15]	November 2020	Review of literature published	HIV
•••	…	…	…

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Discussion:

(Q1) Association between Comorbidities and Hospitalizations/Deaths

R: Comorbidities in conjunction with Covid-19 infection have been shown to be the leading cause of hospitalization, both in wards and in UCI's.

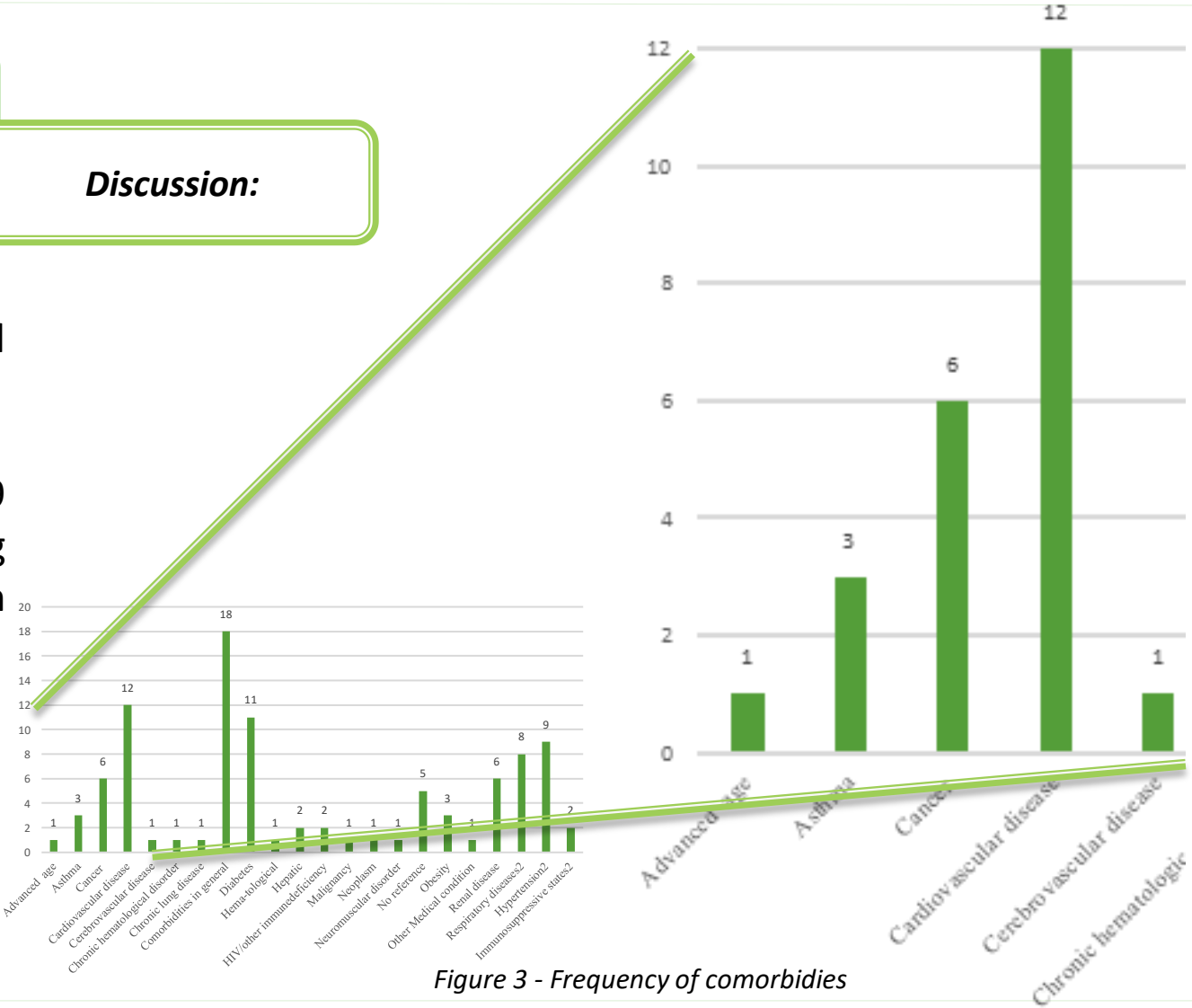

Figure 3 - Frequency of comorbidies

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Discussion:

(Q2) Association between Comorbidities and Recoveries

R: Recovery time was also shown to be influenced by comorbidities, because the more severe the comorbidity, the longer the recovery time. Also, the data analysis showed that the mean follow-up time of a patient infected by Covid-19 was 27 days and that the median the ages was 50 years, with the male gender being the most affected.
However, many studies have not been found, which at this stage addressed those recovered and their post-infection health status.

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Discussion:

(Q3) Association between symptoms and hospitalization

R: Many Covid-19 infected patients were considered asymptomatic due to the absence of symptoms, however, many of the symptomatic patients had to be hospitalized due to their severity. It was found that the diagnosis rate of Covid-19 was directly linked to the presence of symptoms and consequent hospitalization in the most severe cases, thus increasing the risk of mortality. Applications of data analysis and creation of illustrative graphs were also developed to assist in the treatment of Covid-19.

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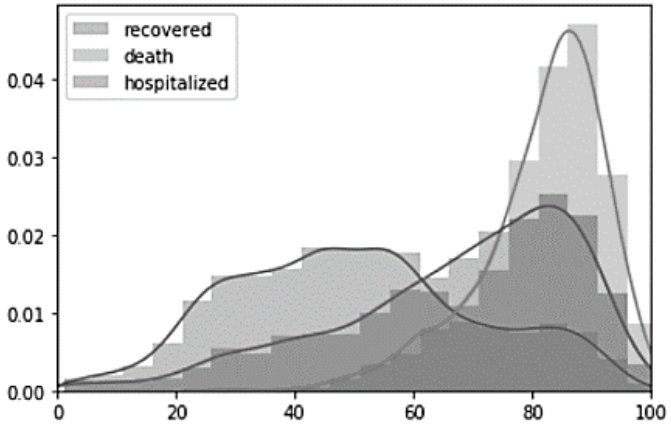
Discussion:

(Q4) Association between age, death, and gender?

R:As mentioned in Q1, the age and gender of the infected may vary considerably, but some authors found that men were more susceptible to death than women.
Also, other authors showed that patients over 60 and 70 years of age had a higher risk of contracting Covid-19, this was even higher than any comorbidity. The genus masculine was the one with the highest rate of infection. It was found that individuals aged 80 years or older were responsible for most deaths in Europe.



(a) age distribution

Figure 4 - Curve of ages most affected in the Covid infection-19 (adapted from [12])

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❁ STRENGTHS AND LIMITATIONS OF THIS REVIEW

Some limitations:

- The search for literature was carried out using three databases ("Medrxiv", "Google Scholar" and "Science Direct")

- Restrict the number of non-relevant articles

- The data from the first wave were the ones that prevailed in most articles

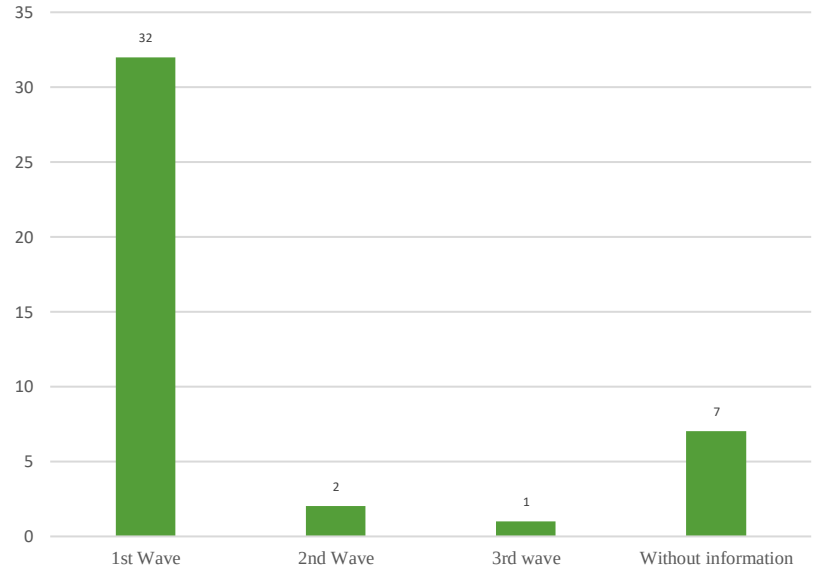

Figure 3 - Distribution of data by vacancy

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- **CONCLUSIONS**

- The symptoms, they varied from patient to patient depending on both the presence and the type of comorbidities.

- The comorbidity that stood out was cardiovascular disease followed by diabetes, hypertension, respiratory diseases, cancer, kidney diseases, asthma, obesity, Immunosuppressive diseases, liver diseases, HIV, neuromuscular and cerebrovascular diseases, advanced age.

- Comorbidities in conjunction with Covid-19 infection have also been found to be the leading cause of hospitalization worldwide prolonging the state of the infection that can lead to death.

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- **CONCLUSIONS**

- Recovery time was also shown to be influenced by comorbidities. Where the more severe the comorbidity, the longer the recovery time, the mean time of infection and recovery of 27 days.

- Age together with comorbidities increased the number of hospitalizations and the risk of death, where the most affected ages were between 70 and 89 years.

- The number of deaths is strongly observed in males and occurs in the older age groups.

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End

Thank you

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