Journal of Health, Medicine and Nursing
ISSN 2422-8419 An International Peer-reviewed Journal
Vol.80, 2020

Testing for Correlation Between Age and Recovery Speed from COVID-19 Infection in Mpumalanga Province, South Africa

Professor Bhekizizwe Mdlovu

Abstract
The major aim of this research study was to test for correlation between age and recovery speed from COVID-19 infection among case-patients in Mpumalanga province. A sample of 5723 case-patients in the province was used. Using the date at which the result confirming positivity for each case was received and the date at which discharge occurred, the suitable date function in Excel was used to calculate the speed of recovery, measured by number of days. The speed of recovery from infection was calculated as the number of days from first positive to first negative SARSCoV-2 PCR test result. Data was processed in Statistical Package for Social Sciences (SPSS) version 21 for windows prior to conducting statistical data analysis. The correlation between age and recovery speed was tested using a Pearson's correlation method. Frequencies show that the largest proportions of cases were 32% (n = 1831) aged 30-39 years, and 21% (n = 1208) aged 40-49 years. Descriptive statistics show that the mean (standard deviation) age and average recovery speed were 38.3 ± 14.6 years and 16.9 ± 7.4 days. The calculated Pearson correlation coefficient ($\rho = 0.008$; $p > 0.05$) show that there is a positive but statistically insignificant correlation between recovery speed and age, confirming that recovery speed does not correlate strongly with age of case-patients.
Keywords: Age, Recovery Speed, COVID-19 Infection
DOI: 10.7176/JHMN/80-12
Publication date: September 30th 2020

1. Introduction

COVID-19 basically affects all ages, and impacts other health conditions. Until the vaccine is found, the pandemic will remain as a serious global health threat. Since COVID-19 is a new disease, there is limited information regarding risk factors for severe disease. In some cases, people who get COVID-19 can become seriously ill and develop difficulty in breathing, while severe complications can lead to death. The older population (> 50 years of age) as well as those with underlying medical conditions such as those who are immune-compromised like serious heart problems and chronic lung disease is more likely to develop serious illness. As more data becomes available, additional risk factors for severe COVID-19 may be identified. Since its outbreak globally, the COVID-19 pandemic has shown a markedly low proportion of cases among young children (National Institute of Communicable Diseases, 2020).

Age disparities in observed cases are believed to be explained by children having lower susceptibility to infection, lower propensity to show clinical symptoms. The Center for Disease Control (CDC, 2020) states that COVID-19 is a new disease and there is limited information regarding risk factors for severe disease. Based on currently available information and clinical expertise, older adults and people with underlying medical conditions have been observed to be at higher risk for severe illness from COVID-19. With regards to recovery rates from COVID-19, scientists and researchers globally are constantly tracking infections and recoveries. The data at disposal is only on confirmed cases and does not include people who do get COVID-19 tests. In addition, available data does not contain information about the outcome of every infection.

1.1. Research Objective

- To determine the nature and magnitude of correlation between age and recovery speed (days) from COVID-19 infection among case-patients in Mpumalanga province.

1.2. Research Question

- What is the nature and magnitude of the correlation between age and recovery speed (years) from COVID-19 infection among case-patients in Mpumalanga province?

1.3. Research Hypothesis

- There is a statistically significant and positive correlation between age and recovery speed (years) from COVID-19 infection among case-patients in Mpumalanga province.

1.4. Significance of the Study

The results from this analysis on the nature and magnitude of correlation between age and recovery speed are expected to provide insights to health practitioners and policy makers on suitable clinical interventions to pursue towards curbing the spread of the disease. From a monitoring stance, findings can provide insights on the ways

in which infection prevention and control can be directed to all case-patients.

2. Materials and Methods

2.1. Design

A descriptive research design was used to test for the linear correlation between two continuous variables.

2.2. Population and Sample

The population for the study was patients who got infected and first tested positive from the first SARS CoV-2 PCR test and later tested negative to SARS-CoV-2 PCR test after a certain period. The sample consists of 5 723 clinically confirmed recovered cases as at 21 July 2020.

2.3. Data

The secondary dataset used in the analysis was obtained from Mpumalanga Department of Health (MDoH). Data cleaning and processing was initially conducted in Excel and Statistical Package for Social Sciences (SPSS) prior to conducting statistical analysis. The variable "recovery speed (days)" was calculated by inserting the date at which the result confirming positivity was received and the date discharge occurred into the DATEDIF() function in Excel. Thus, time from infection to recovery is measured as the number of days from first positive to first negative SARSCoV-2 PCR test result. The corresponding variable used in testing the correlation was age of the case-patients in the province under study.

2.5. Statistical Analysis Technique

The Pearson's correlation coefficient statistical technique was applied to examine the linear correlation between recovery speed (days) from COVID-19 infection and age, based on function.

$$r = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{\sqrt{\left[n\sum x^2 - \left(\sum x\right)^2\right]\left[n\sum y^2 - \left(\sum y\right)^2\right]}} \quad (1)$$

where r is the Pearson's correlation coefficient, n represents the sample size, x denotes the recovery speed (days), and z represents the age of case-patients.

3. Results and Analysis

The frequencies and descriptive statistics are presented in Tables 1 and Table 2; respectively below.

Table 1: Frequencies

Age group	**Frequency**	**Percent**	**Cumulative Percent**
0-9 years	192	3,4	3,4
10-19 years	321	5,6	9,0
20-29 years	925	16,2	25,1
30-39 years	1831	32,0	57,1
40-49 years	1208	21,1	78,2
50-59 years	829	14,5	92,7
60-69 years	306	5,3	98,1
70-79 years	69	1,2	99,3
>= 80 years	42	0,7	100,0
Total	**5723**	**100,0**	

Table 1 presents frequencies of the case-patients per each age group. Results indicate that the age group 30-39 years accounted for the largest proportion of 32% (n = 1831), followed by the age group 40-49 years which accounted for 21% (n = 1208) of the cases. The age group with the third highest proportion is the 20-29 years with 16% (n = 925) cases, while the age group with the fourth highest proportion is 50-59 years which accounted for approximately 15% (n = 829) of the cases.

Table 2: Descriptive Statistics

Variable	Mean	Std. Deviation	N
Age (years)	38.29	14.625	5723
Recovery speed (days)	16.88	7.353	5723

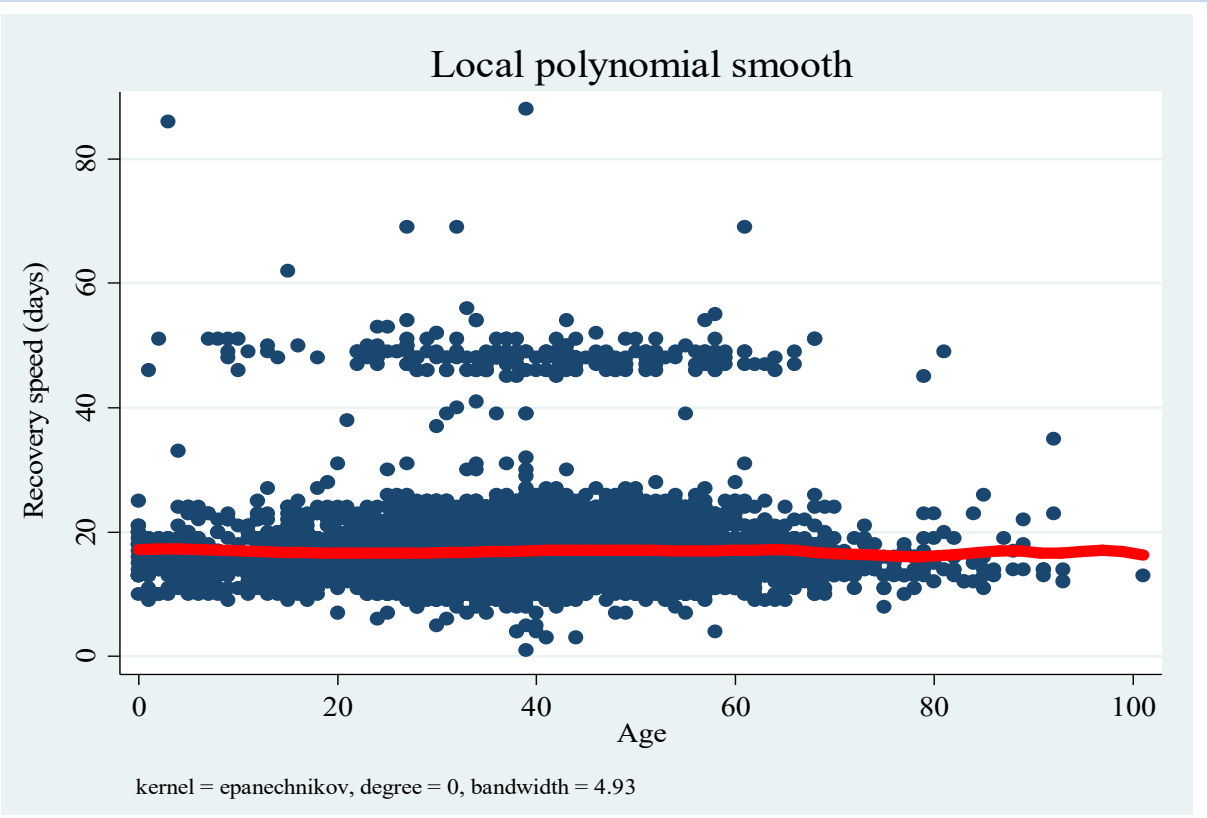
Descriptive statistics (Table 2) show that the mean (standard deviation) age and average recovery speed were 38.3 ± 14.6 years and 16.9 ± 7.4 days.

Table 3: Pearson's Correlation Coefficient

		Recovery speed (days)	Age (years)
Age (years)	Pearson Correlation	.008	1
	Sig. (2-tailed)	.567	
	N	5723	5723
Recovery speed (days)	Pearson Correlation	1	.008
	Sig. (2-tailed)		.567
	N	5723	5723

The Pearson correlation coefficient ($\rho = 0.008$; $p > 0.05$) indicate that there is a positive but statistically insignificant correlation between recovery speed and age, confirming that recovery speed does not correlate strongly with age of case-patients. In other words, there is no significant association between the age and recovery speed of a case-patients from COVID-19 infection. This correlation is confirmed by Figure 1.

Figure 1: Recovery Speed (days) and Age (years) local polynomial smooth



The local polynomial smooth (Figure 1) graph shows that the recovery speed for the majority of the case-patients of all ages remain relatively stable marginally below 20 days, which conforms with the average recovery speed of 16.9 ± 7.4 days (Table 2) and positively and insignificant correlation of 0.008 (Table 3).

4. Conclusion and Recommendations

This study found a positive and statistically insignificant correlation between age and recovery speed (days) from COVID-19 years. The findings imply that clinical and health-related interventions aimed at curbing the spread of the diseases should not be age-dependent in nature since the average recovery speed of about 17 days has been observed among case-patients of all ages. Concomitantly, follow-ups on recovery cases should also be conducted in a standardised manner, particularly with closer monitoring being essential for case-patients who might have comorbidities and associated chronic health conditions.

References

Department of Health. (2020). Corona Virus(COVID-19) Pandemic. Republic of South Africa.

World Health Organisation. (2019). Coronavirus disease (COVID-19) pandemic. https://www.who.int/emergencies/diseases/novel-coronavirus-2019

World Health Organisation. (2020). Clinical management of severe acute respiratory infection when COVID-19 is suspected. 13 March 2020. https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspectedexternal icon

The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. (2020). The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) – China 2020. *CCDCweekly*.10.46234/ccdcw2020.03210.46234/ccdcw2020.032external icon10.46234/ccdcw2020.032external icon 10.46234/ccdcw2020.032external icon

World Health Organisation. (2020). Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected. https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125external icon

World Health Organisation. (2020). Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdfpdf iconexternal icon